

IS ECONOMIC GROWTH DESIRABLE?

A WELFARE ECONOMIC ANALYSIS OF THE THAI EXPERIENCE

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Doctor of Philosophy

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DECLARATION

I hereby declare that the Research Work for this thesis, entitled “Is Economic Growth Desirable? A Welfare Economic Analysis of the Thai Experience”, being submitted to **Victoria University** for the award of the **Degree of Doctor of Philosophy**, was carried out entirely by me at the Centre for Strategic Economic Studies, Melbourne and that it has not, either wholly or in part, been submitted for any other degree.

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1 February, 2003

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ABSTRACT

The desirability of economic growth is an emerging question in contemporary development studies. A dominant view both within the literature and public policy is that economic growth is desirable as it is the best means to increase social welfare and enhancing social welfare is a rational objective of society and governments. Economic growth increases social welfare through improving health outcomes, food intake and access to other basic needs. However, the costs of achieving economic growth are often not fully considered, as welfare analysis of economic growth is limited within the literature.

This thesis focuses on Thailand as a representative developing economy. Over the last twenty-five years, 1975-1999, Thailand has experienced some of the world's highest and most constant rates of economic growth. Thailand is an appropriate case study because its remarkable levels of economic growth have resulted in it becoming a model country for other developing countries to emulate.

Economic growth is defined as the change in Gross Domestic Product (GDP) per capita between specified time periods. In the mainstream literature, GDP per capita is often used as a measure of social welfare. Therefore, it is argued that economic growth (increases in GDP per capita) enhances social welfare.

This relationship between economic growth and social welfare is questioned within this thesis. This relationship fails to consider a number of important economic costs and non-welfaristic impacts of economic growth on social welfare. Costs of economic growth include increased pressure on social relationships and environmental degradation, whilst non-welfaristic issues include distribution, poverty and intergenerational equity. However, these costs and non-welfaristic issues can be included in measures of social welfare through the operationalisation of social choice theory.

Social choice theory allows the incorporation of these costs and issues through social welfare functions. Social welfare functions are the means by which normative social choice theory can be implemented. Social choice theory refers to the normative process of ordering alternative social states on the basis of choices, preferences and value judgments of members of that society.

The use of a social choice approach to determine the desirability of economic growth is appropriate. Welfare economic analysis of economic growth based in social choice theory includes the costs and benefits of achieving economic growth and a systems perspective of society. This social choice approach is justified as it provides an operational framework for quantifying, measuring and interpreting the objective and subjective elements of economic growth on social welfare. Numerical and operational implementation of social choice theory to real life situations are limited within the literature. This thesis will undertake social welfare analysis of the Thai experience of economic growth by operationalising social choice theory through two social welfare functions.

The first social welfare function adjusts national income (a figure similar to GDP per capita) by adopting certain welfare economic criteria, particularly systems analysis and cost-benefit analysis. It extends the work of previous GDP adjusted studies. Within this function national income will be adjusted to consider the costs and benefits arising from achieving economic growth. Comparisons of this measure of social welfare (adjusted national income) and unadjusted national income will assist in determining the desirability of economic growth.

The second social welfare function is based on achieving a sense of well-being. It utilises a concept of hierarchical needs in a new form. Within this approach, social welfare includes non-welfaristic considerations such as liberty, social relationships and self-actualisation. Therefore, the fulfillment of specified hierarchical needs can be used to measure social welfare. The results of this social welfare function will be used to test the veracity of the results of the first social welfare function

A brief welfare analysis of economic growth's desirability in the context of certain contemporary development issues, sustainability and globalisation, is also undertaken.

The results of these welfare analyses are expressed as time series. All the time series trends show that despite constant increases in economic growth, social welfare in Thailand at times fell or remained unchanged. Based on this empirical welfare analysis, this thesis concludes that achieving economic growth often increases social welfare and is therefore desirable, but not at all times. Suggestions that economic growth may decrease a nation's aggregate social welfare are limited within mainstream literature. Within both empirical studies, during periods of high economic growth, social welfare fell at certain times and remained relatively unchanged at others. This experience is described as *stunting economic growth* as this economic growth has "retarded the progress" of social welfare. Stunting economic growth is undesirable.

Finally, a number of illustrative policy frameworks to reduce periods of stunting economic growth and increase social welfare are suggested.

CHAPTER ONE – INTRODUCTION

1.1 INTRODUCTION

The desirability of economic growth is an emerging question in contemporary development studies. Economic growth is desirable if it improves social welfare. A dominant view both within the literature and public policy is that achieving economic growth is the appropriate means to increase social welfare and enhancing social welfare is a rational objective of society and governments (NESDB 1997; Clayton and Radcliffe 1996; Cochrane and Shaw Bell 1956). Economic growth increases social welfare through improving health outcomes, food intake and access to other basic needs. However, the costs of achieving economic growth are often not fully considered as welfare analysis of economic growth is limited within the literature. Whilst some work has been undertaken for transitional economies (UNICEF 1993, 1994, 1995; Cornia et al. 1996), welfare analysis has been generally limited to the suggestion of general frameworks (see Allardt 1973; Lu and Montes 2002).

This thesis focuses on Thailand as a representative developing economy. Over the last twenty-five years, 1975-1999, Thailand has experienced some of the world's highest and most constant rates of economic growth. Thailand is characteristic of many developing countries both within Southeast Asia and the wider developing world. It is an appropriate case study because its remarkable levels of economic growth have resulted in it becoming a model country for other developing countries to emulate.

Economic growth is the long-term rise in the capacity to supply increasingly diverse economic goods and services (Kuznets 1968). It is calculated by comparing the change within Gross Domestic Product (GDP) per capita between specified time periods. Social welfare however is less clearly defined within the literature. There is little consensus on how social welfare should be defined and it is often discussed without explicit explanation (see Hudson 1972; Dodds 1997). Aggregate standard national accounts, such as GDP per capita, were not designed to measure society's well-being (Kuznets 1941,

1968), yet from their inception they have assumed this role both in economic literature and public debate (Beckerman 1972, 1992, 1994; Hjate et al. 1977; Pearce et al. 1989; World Bank 1981, 2001; Gylfasson 1999). Indeed, prior to the current formulation of these standard national accounts, other estimates of nation's productivity were also used as indicators of social well-being (Pigou 1920; Hicks 1920). Such an approach implicitly assumes that social welfare and economic growth are either the same concept or, at the very least, closely related (see Dollar and Kraay 2001; Quay 2001). This relationship between economic growth and social welfare is questioned within this thesis. This relationship fails to consider a number of important economic costs and non-welfaristic impacts of economic growth on social welfare.

Costs of economic growth include increased pressure on social relationships and environmental degradation, whilst non-welfaristic issues include distribution, poverty and intergenerational equity. However, these costs and non-welfaristic issues can be included in measures of social welfare through the operationalisation of social choice theory.

Social choice theory allows the incorporation of these costs and issues through social welfare functions. Social welfare functions are the means by which normative social choice theory can be implemented. Social choice theory refers to the normative process of ordering alternative social states on the basis of choices, preferences and value judgments of members of that society.

The use of a social choice approach to determine the desirability of economic growth is appropriate. Welfare economic analysis of economic growth based in social choice theory includes the costs and benefits of achieving economic growth and a systems perspective of society. This social choice approach is justified as it provides an operational framework for quantifying, measuring and interpreting the objective and subjective elements of economic growth on social welfare. Numerical and operational implementation of social choice theory to real life situations are limited within the literature. This thesis will undertake social welfare analysis of the Thai experience of

economic growth by operationalising social choice theory through two social welfare functions.

This thesis is particularly interested in determining whether Thailand's experience of economic growth actually improved or diminished social welfare over the last twenty-five years, 1975-1999. The net benefits of increased national income, brought about by increased economic growth, may be outweighed by the net costs of environmental and other social decay thus reducing social welfare (Ng 2001).

Welfare analysis of economic growth is therefore an important exercise. Generally welfare economics determines whether people are becoming better or worse off over time (Kakwani 1997b; McKenzie 1983). The view taken in this thesis is not new (see Abramovitz 1961; Sen 1984). Increasing economic growth is desirable if there is a commensurate (full or partial) rise in society's welfare. In the 'context of policy debates in which the need for a high growth rate ...is assigned a truly hallowed position, the basic point about criteria and progress is important to bear in mind' (Sen 1985a, p. 80). If economic growth does not make people better off, it is not necessarily desirable.

This chapter is structured as follows: Section 1.2 discusses the research problem and hypothesis of the thesis before Section 1.3 justifies the research problem. Section 1.4 describes the methodology to be used and Section 1.5 sets out the outline of the entire thesis. Finally, Section 1.6 concludes this chapter.

1.2 RESEARCH PROBLEM AND THE HYPOTHESIS

Achieving economic growth has become the central theme of economic policy in most economies since the end of the Second World War (Nordhaus and Tobin 1973; Landau, Taylor and Wright 1996; Manning 2001). Governments in both developing and developed countries are continuously instigating policies designed to achieve economic growth (see NESDB 1996, 2000). There is little doubt that the major perceived purpose of economic activity is to increase social welfare (Samuelson et al. 1978; Kaosa-ard

2000). The pursuit of economic growth appears intimately tied with pursuing social welfare. The major question underlying this thesis is whether an increase in economic growth ‘really reflects the true changes in social welfare’ (Brekke 1997, p. 158).

The underlying hypothesis of the thesis questions the assumption *that economic growth automatically increases social welfare* and is therefore always desirable (see Beckerman 1995; Gylfasson 1999). Whilst this thesis questions the desirability of economic growth, it is considered extremely unlikely that economic growth is always undesirable with respect to social welfare. It is acknowledged that economic growth has a positive role to play in enhancing social welfare (particularly the *standard of living*, see Chapter Two, Section 2.2.2.1), but whether this will *always* remain the case is of particular interest. The relationship between economic growth and social welfare may include aspects of diminishing returns so that at a particular point in time, economic growth no longer adds to social welfare but actually reduces it (Manning 2001).

This point, in which economic growths ceases to add to social welfare and begins to reduce it, has been labeled the *Threshold Point* (Max-Neef 1991). The consideration of such a point is not new within the literature (Hicks 1959; Pigou 1962; Ng and Ng forthcoming). For the past three decades, a number of authors have argued that this point has been crossed by developed countries (see Daly 1971, 2000; Barkely and Seckler 1972; Heller 1972; Boulding 1972; Zolatas 1981). Indeed, John Stuart Mill suggested that the England of his day no longer needed to increase production as this would not lead to increased social welfare (Arndt 1978). Thus, whilst the developed world has reached an age of mass-consumption (Rostow 1971), social welfare may have decreased during this simultaneous increase in economic growth. Social and environmental pressures, such as pollution, urbanisation, population growth, increased levels of stress and so on, may have resulted in reduced levels of social welfare (Daly 2000).

Consideration within this thesis is given to whether the ‘threshold point be reached only by a so-called wealthy society?’ (Max-Neef 1995, p. 117). This thesis asks by implication, whether the threshold point is exclusive to mass-consumption economies, or

can it be reached by developing economies at much lower national income levels? The answer may influence future development plans and policies. Expectations for improving society's welfare through continuous economic growth would need to be re-examined, as would the economic and social policies for achieving this outcome.

If this (*threshold*) point is reached, countries can review the choices between continued economic growth and preserving such things as social relationships and environmental quality (Hufschmidt et al. 1983; Bello 1995). Public policy can be used to partly determine both the rate of economic growth (Kuznets 1968; Barkely and Seckler 1972) and the type of economic growth achieved by countries (Warr 2001).

1.3 JUSTIFICATION FOR THE RESEARCH

This thesis makes the following contributions to the literature on aggregate social welfare measurement:

Firstly, it applies social choice theory to social welfare measurement with the following emphasis:

- Social preferences and value judgements about economic activities and outcomes are important in determining social welfare levels, quality and composition. Therefore, an explicit social welfare function should be specified in valuing economic outcomes for measuring social welfare.
- Social valuation of economic activities and outcomes and economic growth should be based on the considerations of costs and benefits of economic activities and growth, the explicit form of which should be specified in the social welfare function.
- Social valuation of economic progress also needs to be determined within an explicit cost benefit analysis framework with the following possible implications for the measurement of social welfare:
 - (a) Shadow pricing or social valuation of economic outcomes and activities;
 - (b) Discounting by the social discount rate chosen on the basis of some social choice theory as proposed in Islam (2001).

- Non-welfare aspects of the determinants of human welfare should be incorporated.
- An incorporation of the hierarchical structure of human needs in the estimation of social welfare as proposed in Islam (2001).
- The approach is based on social welfare issues in a developing country (Thailand).

Secondly, to operationalise the above approach to the measurement of social welfare the following methods have been developed:

- The first analytical social welfare function considers the desirability of economic growth in terms of social welfare with regards to the costs and benefits of economic growth.
- The second analytical social welfare function then tests these results by measuring social welfare based on a given set of hierarchical needs.

These new analytical tools are reliant on various traditional welfare economic concepts, such as utility, intergenerational equity, cost-benefit analysis, and non-market goods. Both social welfare functions allow new measures of social welfare to be made that can then be plotted against standard measures of economic growth.

The two new social welfare functions are successful as they apply social choice theory to aggregate welfare measurement. Such a combination highlights that social preference and value judgements about economic activities and outcomes are important in determining society's welfare levels, quality and composition.

Thirdly, this study adopts a systems theory approach to the study of social welfare. In this approach, it is necessary to consider the whole socio-economic environment (SEE) system, with its various sub-components of the economy, social, political, environmental and spiritual to determine the level, quality and composition of social welfare. 'The world around us is a complex adaptive system composed of a multitude of systems that interact in various ways' (Bossel 1999, p. 84). Rather than social welfare being a function of the economy, social welfare will be explained as a function of the economy, environment, social, political and spiritual domains (Clayton and Radcliffe 1996). A consideration of

the whole SEE system is necessary since human welfare is dependent on the conditions of the SEE system and its sub-systems, and its dynamics over time. In this exercise the issues of carrying capacity of the earth, sustainability of development, etc are relevant for social welfare measurement.

Fourthly, a new systems representation of the hierarchical structure of social welfare is developed.

Fifthly, there are a number of issues in welfare economics and contemporary development economics, which need to be considered when measuring society's welfare in an economy such as that of Thailand. These issues include; (1) the need for sustainable human development along with economic development; and (2) the impact of globalisation on developing economies. A welfare analysis of the impact of economic growth on these issues will also be briefly undertaken within this thesis.

1.4 METHODOLOGY

Determining the desirability of economic growth is dependent upon how social welfare is defined and measured. The approach chosen within this thesis is to define and measure social welfare through two social welfare functions.

There are several conceptual and methodological issues related to the measurement of society's welfare and economic performance which are central to all studies of welfare (see Arrow et al. forthcoming; Bos, Rose and Seidl 1988; Boadway and Bruce 1984; Islam 2001). They include:

- a definition of well-being and welfare;
- criteria for evaluation of welfare and performance;
- the specification of an aggregate social welfare function such as possibility and impossibility theorems in social choice;

- the numeraire of welfare and performance such as utility, consumption, GDP, capabilities, entitlement, wealth, capital stock, clean environment, the level of human development or a combination of non-economics factors such as rights, freedom, opportunity, equity, etc.;
- units of measurement, i.e. money or physical units, market prices, shadow prices, contingent valuation or willingness to pay;
- the level of measurement at the aggregative (macro) or disaggregative (micro) levels; and
- models for measurement and analysis such as GDP or other aggregative performance indices, family budget analysis, economy wide macroeconomic models, econometric estimates of demand functions, game theory, constrained optimisation, cost-benefit analysis, micro and macro economic or growth models.

The two social welfare functions development in this thesis specify a set of perspectives on all of the above issues. Social choices can be numerically operationalised using expert opinion (or analyst), government formulated public policy, or specific interviews of individuals on social welfare outcomes. The methodology for each technique is well established (Islam 2001). Expert opinion and government policy will form the basis of numerical operationalisation of the social choices expressed on the basis of the above specified social welfare function in the adjustments made to incorporate the welfare economic issues of sustainability discussed before within this study.

The first social welfare function has national income as its basis. National income is derived from standard national accounts and can be derived from GDP. Within this function, national income will be adjusted to consider the costs and benefits arising from achieving economic growth. This empirical implementation of this social welfare function requires the identification and estimation of a number of costs and benefits of economic growth. A broad range of literature identifying costs and benefits of economic growth already exists (Beckerman 1974, 1994; Brown 1996; Daly 1971, 1991; Eltis 1966; Goodland and Daly 1993; Mishan 1971). Relevant costs and benefits of economic growth for Thailand are formulated in order to construct the social welfare function.

Comparisons of this measure of social welfare (adjusted national income per capita) and unadjusted national income per capita, assist in determining the desirability of economic growth.

The form of the first analytical tool (Islam and Clarke 2001a) is:

$$\text{ANI SWF}_t = \sum_{t=1}^T \frac{\text{NB}_t (\text{Ec}_t, \text{En}_t, \text{So}_t, \text{P}_t, \text{Sp}_t)}{(1+r)^t} \quad [1.1]$$

where:

ANI SWF _t	=	adjusted national income
NB _t	=	net benefits
t	=	time
r	=	discount rate
Ec _t	=	economic factors
En _t	=	environmental factors
So _t	=	social factors
P _t	=	political factors
Sp _t	=	spiritual factors

In order to evaluate the accuracy of the results from this first social welfare function, a second function will be developed that investigates the desirability of economic growth in terms of social welfare from a slightly different approach. The second social welfare function is based on achieving a sense of well-being. It utilises a concept of hierarchical needs in a new form. As social welfare includes non-welfaristic considerations such as liberty, freedom and self-actualisation, the fulfillment of hierarchical needs described by Maslow (1971) can be used to measure social welfare.

The form of this second analytical tool (Islam and Clarke 2001b) is:

$$HNF_t = \sum_{t=1}^T \frac{HNF_t(\alpha_1 \cdot BN_t, \alpha_2 \cdot SN_t, \alpha_3 \cdot BLN_t, \alpha_4 \cdot EN_t, \alpha_5 \cdot SA_t)}{(1+r)^t} \quad [1.2]$$

where:	HNF	=	hierarchical needs fulfillment
	BN	=	basic needs
	SN	=	safety needs
	BLN	=	belonging needs
	EN	=	esteem needs
	SA	=	self actualization
	$\alpha_1, \dots, \alpha_5$	=	the weights assigned to each set of needs
	r	=	discount rate
	t	=	time

In order to operationalise these two social welfare functions, a survey of relevant economic and scientific data is gathered, collated and utilised to allow for a quantification of the costs and benefits of economic growth and non-welfaristic issues in Thailand. These new social welfare functions explicitly define social welfare and the value judgements upon which they rest. The comparison of these measures and economic growth rates will illuminate the impact economic growth policies have on social welfare.

The empirical application of both social welfare functions relies on techniques developed by others (Adelman and Morris 1973; Atkinson 1970; Daly and Cobb 1990; Diefenbacher 1994; Hamilton 1998; Islam 1995, 2000; Jackson and Marks 1994; Lawn and Sanders 1997; Mirringoff 1996; Nordhaus and Tobin 1973; UNDP 1990) that have been adapted to more closely fit the Thai experience. Whilst economic data is collected by the Thai government to assist in the calculations of the national accounts, many of the calculations required are not included in these accounts. Data gathered by tertiary institutions and local and international non-government organisations are therefore used.

Unless otherwise mentioned, it is assumed that the data used in this research are accurate. This is a valid assumption as the information has been collected from a number of reliable primary and secondary sources. These include the Thai Government, the World Bank, Asia Development Bank, International Monetary Fund, various United Nations organisations, non-government organisations as well as tertiary institutions in Thailand and from the rest of the world.

A brief welfare analysis of economic growth's desirability in the context of certain contemporary development issues, sustainability and globalisation, is also undertaken.

All welfare analysis of the desirability of economic growth will be expressed within a time series covering twenty-five years, 1975-1999. Any number of factors influence choosing a period of study. Firstly, the time period cannot be too limited as important trends cannot be determined and short-term fluctuations gain inappropriate importance (Abramovitz 1961). Likewise, lengthy time periods also have limitations. The use of index numbers over a lengthy period of time reduces the authority of such numbers (NSO 1997) as comparing prices, quantities, welfare, income, etc., for more than 40-50 years through index numbers becomes almost nonsensical (Jorgenson 1997; Quiggin 1996; Pigou 1962). Likewise, long-term predictions such as those contained in dynamic models (Meadows et al. 1972; Nordhaus 1994; Islam 1995) are also limited as timeframes beyond the current and immediately succeeding generations are also beyond normal comprehension.

A more practical reason for measuring welfare over shorter time periods is one of data collection. It is difficult to compile a time series with data that is absent, of mixed quality or has been collected using different methodology over time (NSO 1997). Whilst a relatively common set of national accounts is now used throughout most of the world's economies, this is a recent phenomena and so comparisons between countries or intertemporal comparisons have only recently been possible. For example, Thailand is still using the 1953 United Nations' guidelines with some 1968 standard national account methodologies incorporated (NSO 1997).

Taking account of these issues, the target period selected for study in this thesis is a twenty-five year period, 1975 to 1999. Periods beyond twenty-five years face the real possibility of losing their relevancy, while a period of 25 years is sufficiently long enough that fluctuations are not mistaken for long term trends.

During this selected period, Thailand experienced a number of changes in economic and social circumstances such as booms, busts, political stability, military coups, an energy crisis and almost constant economic growth. The period 1975-1999 provides an opportunity to track the aggregate welfare of a country increasingly engaging with the world economy and achieving high levels of economic growth.

Such a period also allows informative comparisons to be made between economic growth and the two new measures of social welfare. These comparisons will show distinct differences in levels of society's welfare depending on the definition chosen. It is expected that the contemporary development economics level of welfare (based on economic growth) will be higher than the new measures of social welfare within this target period, thus raising questions over the concept of welfare used and the desirability of economic growth.

All the time series trends show that despite constant increases in economic growth, social welfare in Thailand at times fell or remained unchanged. Based on this empirical welfare analysis, this thesis concludes that achieving economic growth often increases social welfare and is therefore desirable, but not at all times. Suggestions that economic growth may decrease a nation's aggregate social welfare are limited within mainstream literature. When discussed, such economic growth has been termed impoverishing, or welfare-reducing (see Ng and Ng 2001).

However, these descriptions are limited as they do not adequately describe Thailand's experience in which social welfare levels improve by increasingly diminishing rates due to the increasing costs of achieving economic growth compared to the associated benefits. The concept introduced is stunting economic growth. This phenomena is so-

called because this economic growth has “retarded the progress” of social welfare. During periods of stunting economic growth, social welfare improves at decreasing rates, remains stagnant, and at times (while continuing to trend upwards) falls. Stunting economic growth is undesirable as its effects are sub-optimal. Optimal growth occurs when economic growth increases social welfare at the maximum rate. However, certain adjustments must be made to correct social welfare for the associated costs and benefits of achieving this growth. This has resulted, in Thailand, lower rates of increase in social welfare as compared to economic growth – thus, it is sub-optimal growth. This conclusion is in line with other work, such as Thailand’s performance in the Human Development Index (UNDP 2002). This thesis is not concerned with promoting or criticising certain institutional approaches to economic organisation and development per se (see for example Stiglitz 2000, 2002) but noting that the experience of Thailand in achieving economic growth may have been less damaging to the SEE and had greater success in increasing social welfare.

1.5 OUTLINE OF THE THESIS

This thesis is interested in the theoretical aspects of measuring social welfare using social choice theory, but as welfare is intrinsically an empirical concern, a large section of the thesis is empirical in nature. Throughout the thesis, the theoretical and empirical aspects appear side by side.

This chapter is an introduction to the thesis. It briefly sets out the background to the research, the research problem and justification for undertaking such research. Brief definitions of the concepts involved are given and key assumptions and the scope of the research are reviewed.

Chapter Two – Thailand, Social Choice Theory, Economic Growth and Social Welfare: Analysis and Literature Review

Chapter Two introduces Thailand as the case study for this thesis, by providing a brief economic history of the country. This chapter also introduces the two central concepts of

this thesis; economic growth and social welfare. A review of how these measures have previously been defined and measured is undertaken and this is related to Thailand's previous macroeconomic experience.

Chapter Three – A New Aggregated Measure of Social Welfare

A new social welfare function is presented in this chapter based on the adjustment of aggregated preference satisfaction. GDP is the traditional measure of aggregated preference satisfaction however its use as a measure of social welfare is limited. This chapter discusses these limitations and justifies the new social welfare function.

Chapter Four – Application of Socio-economic Adjustments to a Social Welfare Measure; Issues, Methods and Results

Having developed, defined and justified the first social welfare function in the previous chapter, Chapter Four will empirically apply the socio-economic adjustments required and analyse the results in terms of the desirability of economic growth on social welfare. The adjustments made will include: 1) income inequality; 2) public expenditure on health; 3) public expenditure on education; 4) commuting; 5) urbanisation; 6) private expenditure on health; 7) expenditure on public roads; 8) service flows from consumer durables; 9) corruption and; 10) debt. Each of these adjustments will be justified and the methodology for calculations explained.

Chapter Five – Application of Environmental and Spiritual Adjustments to a Social Welfare Measure; Issues, Methods and Results

Chapter Five will continue describing the issues, methods and results of adjustments considered due to environmental and spiritual considerations. These adjustments include: 1) air pollution; 2) water pollution; 3) noise pollution; 4) long-term environmental damage; 5) deforestation; and 6) the cost of commercial sex work. By the chapter's end, a valuable understanding of social welfare will have been developed and the impacts of economic growth upon it.

Chapter Six – A New Hierarchical Systems Analysis of Social Welfare; Issues, Methods and Results

Having analysed the desirability of economic growth through the application of the first social welfare function, these results will be tested by the application of a second social welfare function. This second analytical tool is an application of Maslow's (1971) well-known hierarchy of human needs. Through the use of various indicators of the five hierarchical levels of human needs, it is possible to determine the success of a country in assisting its population increase its social welfare. Such a measure can then be compared to increases in economic growth and the relationship between the two better understood. This new method also has value in that it can be disaggregated to assist policy makers determine their priorities.

Chapter Seven – Application of Contemporary Development Adjustments to a Social Welfare Measure; Issues, Methods and Results

Chapter Seven discusses two contemporary development issues, sustainability and globalisation, in terms of the relationship between economic growth and social welfare. For example, globalisation has led to increased financial liberalisation. This impact on social welfare will be discussed, particularly in light of the recent financial crisis, including the adjustment required to take this into account. Similarly, the issue of sustainability in terms of securing future social welfare will be discussed.

Chapter Eight – Integrated Systems and Welfare Analysis Approach and Results; Implications for Social Welfare, Development Economics and Policies

Chapter Eight will then further analyse the results of both social welfare functions within a welfare economic framework and compare them in order to determine the desirability of economic growth. Both analytical tools support the position that the net benefits of economic growth are decreasing and in fact, more recently, have begun to reduce social welfare within Thailand. Given these circumstances, economic growth is becoming less desirable and at certain times has been undesirable. The outcome is termed stunting economic growth. Various policy considerations based on these findings will then be discussed.

Chapter Nine – Conclusion and Summary

Chapter Nine summarises the thesis as a whole. It reviews the new approaches taken, their application and findings, highlights the contribution of the thesis, summarises the policy considerations discussed before noting the limitations of the thesis and areas for future work.

1.6 CONCLUSION

This opening chapter set out the research question and justification for undertaking this study. The methodologies were also briefly introduced, as were the contributions this thesis will make to the literature. The following chapters will further develop the justifications for this work and empirically investigate the desirability of economic growth in terms of social welfare for Thailand over a twenty-five year period.

CHAPTER TWO – THAILAND, SOCIAL CHOICE THEORY, ECONOMIC GROWTH AND SOCIAL WELFARE: ANALYSIS AND LITERATURE REVIEW

2.1 INTRODUCTION

Having laid the foundation of the thesis in Chapter One and having introduced its justification of the methodology, this chapter provides a short economic history of Thailand and reviews the concepts of social choice theory, economic growth and social welfare with an emphasis on how these have been experienced in Thailand.

The Thai economy has grown dramatically over a short period of time and it has achieved record levels of economic growth. Whether social welfare has simultaneously increased at similar rates is of interest to this thesis. By this chapter's end, an argument will have been developed that justifies the use of two new social welfare functions, utilising social choice theory and systems analysis to determine the desirability of economic growth on social welfare.

This chapter is structured as follows: Section 2.2 discusses the conceptual framework, and lays the welfare economic foundations for the thesis and defines the concepts of social choice theory, social welfare and economic growth. Section 2.3 reviews the history, economic growth and social welfare of Thailand. Section 2.4 discusses the costs and benefits of economic growth in theory and in practical terms within Thailand, before Section 2.5 discusses social welfare and economic growth in theory and within Thailand. The chapter is concluded in Section 2.6.

2.2 THE CONCEPTUAL FRAMEWORK: THE WELFARE ECONOMIC FOUNDATIONS

This section defines and explains the welfare economic analysis approach taken within this thesis. It briefly reviews the history of welfare economics and defines social choice theory (the approach being undertaken within this thesis) and other main concepts within the thesis.

2.2.1 Welfare Economics

The basic objective of welfare economics is to determine whether economic interventions improve or make worse the welfare of individuals and society as compared to alternative interventions or the status quo. This objective has long been a central theme of economics more generally, dating back to Smith's (1776) *Wealth of Nations*. Debate within welfare economics has continued apace since then as to what welfare is and how it is measured.

Welfare economics is concerned with ordering different social states and determining the social states in which people are better off. Welfare economics is concerned with the principles of maximising social welfare. Welfare economic analysis 1) defines social welfare and its criterion, 2) identifies those factors that prohibit achieving optimal levels of social welfare, and 3) sets out policies to maximise social welfare (Oser and Brue 1988; Islam 1997).

Despite the mathematical precision that is pervasive throughout welfare economics, the determination of social states rests upon the firm foundation of value judgements. Welfare economics deals with the logical implications for society of value judgements. It is normative and emphasises policy recommendations (Altman 1996; Maler 1985; Salvaris 1988; Osberg and Sharpe 1998; Erikson 1993; Samuelson 1947). However, whilst value judgements are an essential part of welfare economics and the subsequent ordering of social states, it is preferable to make as few as possible and only make those that are widely acceptable (Boadway and Bruce 1984).

A Brief History of Modern Welfare Economics

Welfare economics foundations are traced back to Adam Smith's *Wealth of Nations*. Whilst Smith was influenced by William Petty and French physiocrats (see Ackerman 1997a for a succinct history), his work codified modern economics in which welfare economics was integrated. Classical economics did not markedly distinguish between positive and normative economics. Smith's view of welfare was also influenced by the relatively new *utilitarian* approach made popular by Jeremy Bentham. Improving society's welfare was dependent on increasing the utility level of individuals. Further, utility was not considered solely a function of income levels.

It was not until a century later that a formal link between utilitarianism and economics was made with the publication of John Stuart Mill's (1863) *Utilitarianism*. Between the 1870s and 1890s welfare economics was based on the 'assumption that consumers seek to maximize utility, just as firms seek to maximize profits' (Ackerman 1997b, p. 82). By cardinally measuring marginal utility, individual and social welfare could be measured and appropriate economic decisions made.

However, at the turn of the century, the work of Marshall (1890) and later added to by Pigou (1912, 1920), questioned this approach (see Cooter and Rappoport 1984 for a succinct history). This new position held that utility had both material and non-material aspects. Economics was able to determine the material but not the non-material aspects, but as there was an "unverified probability" (Pigou 1920) that this relationship was positive, determining economic welfare was sufficient. Further, this approach rested on the assumption that people had similar needs and the average utility for large groups (i.e. the rich versus the poor) could be meaningfully compared (see van Praag 1993 for a recent approach to cardinal measurement of utility). This assumption was combined with a declining marginal utility of money and led to an argument for redistribution toward the poor so long as it did not interfere with economic growth (Ackerman 1997b).

Based on these assumptions and reasoning, it was not difficult to make welfare judgements. In periods of extreme poverty or when externalities threatened the efficiency

of competition, it was permissible for government action to seek to increase social welfare through the redistribution of income or resources. Thus, a social choice perspective on social welfare was considered possible.

At the same time though, Jevons (1871), Fisher (1906) and Pareto (1906) began questioning the actual measurability of utility. This inability to measure utility was clearly enunciated by Robbins (1938). Cardinal approaches to measuring utility were considered impossible in a practical sense, nor necessary when ordinal measure could be undertaken (see Quirk and Saposnik 1968; Gaspert 1997 – though such an undertaking is still a difficult task, Ng 1979; Sen 1985a, 1987a). This soon became the entrenched position within general economic literature.

Modern Welfare Economic Assumptions

Two important assumptions of modern welfare economics are the *Pareto Criteria* and *rationality*.

Alternative social states (of space, time, or information content) are traditionally compared or ranked according to the *Pareto Criteria*. Using this concept, unambiguous normative judgements can be made. If the social states change from (c^1, \dots, c^n) to (c^1', \dots, c^n') and nobody is made worse off and at least one person is made better off, welfare has increased.

Such clear improvements however are difficult to locate. The *Pareto Compensation* case was developed to overcome this difficulty (Kaldor 1939; Hicks 1940). A *Pareto Compensation* exists if the winners of a policy change can compensate the losers for their loss and still be better off themselves. The problem of *reversal* was noted soon after the *Compensation* theory was published (Scitovsky 1941). 'It is possible to find cases when both the change from (c^1, \dots, c^n) to (c^1', \dots, c^n') and the change back from (c^1', \dots, c^n') to (c^1, \dots, c^n) satisfy the Kaldor criterion' (Quiggin 1996, p. 39). This is the problem of reversal; Scitovsky Reversals.

This compensation is hypothetical, which is often used as a criticism; if it is hypothetical, it should not be of interest (Sen 1979a, 1979b; Page 1988; Hausman and McPherson 1996; see Altman 2000 for an alternative to Pareto Criteria).

Another criticism of the Pareto Criterion is that it is efficiency oriented but equitably neutral. Therefore it can justify policies that few people support, such as providing additional benefits to those already wealthy (Quiggin 1996):

...an economy can be optimal in this sense when some people are rolling in luxury and others are near starvation as long as the starved cannot be made better off without cutting into the pleasures of the rich.
(Sen 1970, p. 22)

A second assumption of modern welfare economic is *rationality* - individuals' decisions result in optimal social outcomes. Despite Smith's (1776) *invisible hand*, individuals operating selfishly do not guarantee optimal social outcomes (Ehrlich et al. 1999). Choices are not made within a framework of stable, pre-existing, limitless cognitive capacity, certainty, and full knowledge of the choices faced by others (Paavola and Bromley 2002; Kiron 1997b; Varoufakis 1998; Basu 1980; Roe 1996 - also see Altman 2000). Choices are made with consideration of others, altruism and non-welfarism (Sen 1995). (Smith's *invisible hand* actually operated within a moral framework which may have incorporated issues of altruism, non-welfarism and consideration of others - see Ormerod 1994 for further discussion). To find an optimal level of social welfare it is not always possible simply to aggregate individual preference. It cannot be assumed that individual preferences revealed within the market place can be aggregated to reflect socially optimal outcomes in terms of social welfare.

Firstly, individual preferences may be made without full knowledge. Preferences between *A* and *B* may be expressed without knowing that *C* is an option or that *B* has hidden consequences. However, even assuming full knowledge, individual preferences may not result in optimal welfare outcomes in the first instance. That is, individual preferences are

not necessarily welfare (or utility) enhancing choices (Ehrlich et al. 1999; Broome 1999 – also see Sen 1977; Stoleru 1975). In terms of the environment, unless individual and social incentives are aligned with one another, then optimal environmental outcomes will not be assured (Ehrlich et al. 1999). This is primarily because the environment is a public good (Smith 1988; Sen 1999a).

Further, it is possible for individuals to make decisions both as individuals within the market place and make decisions as citizens within a society (Sen 1995; O'Neill 2001; Clayton and Radcliffe 1996). As citizens, individuals can prioritise certain value judgements such as equity, freedom or altruism. When social choice decisions are made over individual market decisions, socially optimal outcomes are more likely. Therefore social choices can be made by the individual within a new framework that considers alternatives from a social perspective that includes considerations other than their own well-being (Sen 1995).

Aggregation of individual preferences also requires consideration of various other issues such as weighting of preferences and intergenerational equity. Should all preferences be treated equally or are the preferences of certain groups (i.e. the poor or politically powerful) of greater importance (see Rawls 1971 as an example)? How the preferences of future generations or future preferences of current individuals be treated must also be considered.

A New Approach

To overcome these problems of welfare economics, it is possible to undertake welfare economic analysis developing a normative social choice theory (Sen 1999; Islam 2001). Social choice theory allows the normative significance of economic and non-economic events to be evaluated in a formal framework (Boadway and Bruce 1984). The social choice approach recognises the weakness of the Pareto Criteria and rationality assumptions. By operationalising social choice theory, society's choices, preferences and value judgements on issues of economic equity and efficiency, intergenerational equity, aggregation, value judgements, justice, poverty, measurement and market perspectives

versus social perspectives are considered (see Altman 2000; Bonner 1986; Boadway and Bruce 1984; Sen 1982; Arrow and Scitovsky 1969).

2.2.1.1 Social Choice Theory

Social choice theory has a long history (see Sen 1999a for a survey). The difficulties in making a judgement on the state of social welfare have long been recognised (Borda 1781 – reprinted 1953; de Condorcet 1785). Whilst Bergson (1938, 1948) and Samuelson's (1947) independent work on social welfare functions was important, perhaps the most significant work in social choice theory was that of Arrow (1951). Arrow has been credited for creating the modern field of social choice theory (Heller et al. 1986). Interestingly though, Arrow's work on social choices was very pessimistic. Arrow proved it was *impossible* to construct a social welfare function that does not fail one of four "reasonable" assumptions of 1) transitivity; 2) the Pareto Criteria; 3) independence; and 4) democracy. It's thoroughness in dismissing the possibility of a democratic social welfare function almost undermined the entire idea of measuring welfare (Blundell et al. 1994).

However, easing these restrictions allow a democratic ordering of social states. Sen (1966, 1970, 1973, 1999a) and others (Hammond 1976; Roberts 1980; Conley et al. 1996) argued that these "reasonable restrictions" were not reasonable, but rather, were too restrictive because they ruled out by assumption the ability to weigh the gains of the winners against the losses of the loser. This can be achieved through the study of expenditure patterns, informational inputs or direct surveys. From this perspective, which can be distinguished as *normative* social choice theory, it is not possible to refrain from undertaking intertemporal comparisons. 'All ethical systems require one to make interpersonal comparisons of well-being' (Hausman and McPherson 1996, p. 84). 'By the early 1980s, theoretical results demonstrating the existence of logically consistent, non-dictatorial social welfare functions had been established' (Slesnick 1998, p. 2144). There is an embarrassment of riches in intertemporal comparisons (Sen 1982) not a barren lack.

Further, Arrow's analysis is based on some restrictive assumptions, which are not necessary in operational social choice making in real life environments. The impossibility theorem therefore shows the mathematical impossibility of aggregating non-aggregatable entities (ordinal preferences), not a social choice impossibility since no social institutional mechanism is adopted in the aggregation process. Social choices are made through institutions, not abstract mathematical aggregations. These institutions may include parliamentary democracy or the free market (Islam 2001).

Social choice refers to the normative processes of ordering alternative social states on the basis of the choices, preferences and value judgments of members of that society to determine what is the best state for that society. Social choice theory incorporates the various "social concerns around happiness" that are not adequately captured using individual preference satisfaction techniques within the market place. Social choices can be estimated using expert opinion (or analyst), government formulated public policy, or specific interviews of individuals on social welfare outcomes. The methodology for each technique is well established (Islam 2001). Using one, or a combination of the above, it is possible to determine the social choice perspectives on various social welfare issues.

As the "state" maintains the functions of allocation, regulation and distribution (Musgrave 1959), the "state" has a role to enforce these social choice preferences and 'incarnate the moral and political will of the people' (Stoleru 1975, p. 1). This is done in two stages: 1) *quantification* of individual preferences; and 2) the *weighting* of these individual preferences by weights determined by some form of consensus (i.e majority voting for particular social structures, etc). Perhaps more importantly, with regard to certain concepts, such as sustainability, individual preferences will not achieve these outcomes and the State (or analyst) must interpret and then act upon these social preferences (Pezzey 2001, 2002; Ehrlich et al. 1999). That this emphasis be placed on achieving an optimal social outcome should not be considered unusual. 'Samuelson's (1956) consensus model of the household assumes that all members pool their resources and work in concert to maximise a common utility function' (Slesnick 2001, p. 32). Social choice extends this consensus from the household to the society.

Social choice theory therefore is concerned with the study of issues surrounding social welfare on the basis of individual preferences but also considering the requirement for an optimal social outcome. Social choice theory is concerned with defining and measuring social welfare consistent with individual preferences for improving social welfare conditions but in which society's preferences are paramount.

A social choice framework is normative and value judgements about the valuation of, and preferences for, social welfare maximisation must be considered. Social choice theory provides the normative framework for aggregating individual welfare and should be applied to social welfare measures as it highlights social preferences and value judgements (Bonner 1986). It is concerned with economic and non-economic activities that are important in determining social welfare levels, quality and composition. Social choice theory can highlight changes within society and how these changes impact on social welfare (Clarke and Islam forthcoming). Social choice theory can be used to determine the weights assigned to different components of social welfare (Sen 1999a).

It is reasonable that these social choice perspectives are normative in nature as this thesis is concerned with social welfare, itself a normative concept. When value judgements are central to measuring social welfare, these judgements must be made explicit. Social choice theory does just this through the use of social welfare functions.

The two social welfare functions developed and empirically applied in this thesis will operationalise social choice theory by explicitly stating the social choices, preferences and value judgements of society. The first function focuses on the costs and benefits of achieving economic growth. The second function focuses on how economic growth impacts on fulfilling certain hierarchical needs.

2.2.2 Defining the other Central Concepts

Having set out the welfare economic analysis foundation, and explained the social choice theory approach, there are three other concepts in this thesis that must also be clearly defined: the hierarchical nature of social welfare, economic growth and systems analysis.

2.2.2.1 Hierarchical Nature of Social Welfare

Within the literature, various terms are used to describe welfare (Bonner 1986; Ng 2001). Often terms such as social welfare, quality of life and standard of living are used interchangeably (D. Johnson 1996; Ng 1999; Ayres 1996b), implicitly implying that there is no effective difference between them. The position taken within this thesis is that a hierarchy of understanding welfare exists (also see Sen 1985b, 1987a; Williams 1987). Distinct differences between terms should be made explicit as they can be usefully measured by different indices. Without appreciating these differences, certain indices can ignore relevant information about welfare (Slesnick 2001). Such shortfalls lead to ineffective indicators and misinformed policy decisions (Atkinson et al. 1997).

Standard of living is a narrow economic measure of society's welfare. Standard of living is based on material goods and consumption levels (Latouche 1996; Slesnick 2001). Economic growth is most desirable in improving the standard of living. Economic growth is associated with improving health outcomes, food intake, shelter, clothing and other basic needs. Individual standard of living is a function of personal income and society's standard of living is a function of national income. Difficulties with interpersonal comparability, distribution levels and equity notwithstanding, national income is a suitable index for measuring standard of living (Dowrick 1994; Mazumdar 2000).

$$\text{SoL} = w(\text{NI}) \quad [2.1]$$

Where *SoL* represents standard of living and *NI* represents national income, calculated either through consumption or expenditure. Prior to the 1997 Asian Financial Crisis, the average standard of living rapidly increased in Thailand (Kakwani 1999). However,

following the crisis the standard of living (based on real income levels) of all sectors of Thai society fell by up to 28 percent (Kakwani and Pothong 2000).

A criticism of using standard of living as an estimate of social well-being is that it implicitly assumes current income distribution levels are optimal. The flaw of this assumption is best illustrated by Stoleru's (1975) question: 'when you say that the standard of living will double, does that mean that those who have one car will have two and that those who have none will still have none?' (p. 34).

A higher level of welfare measurement is quality of life. Quality of life differs from standard of living in that it includes a limited set of non-welfaristic issues. In addition to economic measures, considerations such as equity, political liberty, social relationships and the environment (Sen 1999b; Hjalte et al. 1977; Gerdtham and Johannesson 2001). This understanding can be represented by:

$$QoL = w(SoL, NW) \quad [2.2]$$

where *QoL* represents quality of life, *SoL* represents the standard of living and *NW* represents non-welfaristic issues.

The inclusion of these non-welfaristic factors result in a de-linking of well-being from the economic (standard of living) and so this new measure of well-being can actually increase or decrease despite constant positive increases in national income. It becomes possible therefore, to say that whilst standard of living may have increased, quality of life has been reduced. Both individual and social quality of life involve more than just increases in income (Ng 2001; Ng and Ng forthcoming). Indeed, this thesis will later argue that as society is systems based (see this chapter, Section 2.2.2.3), increases in income may negatively impact other quality of life factors causing a reduction in this measure.

Overarching both standard of living and quality of life, is social welfare. The use of this terminology can cause further confusion as social welfare often refers to the aggregation of individual welfare (Sen 1970; Ng 1979; Hufschmidt et al. 1983; Chakravarty 1990). Within this thesis, this aggregation is referred to as either society's welfare, national welfare or aggregate welfare. Social welfare is the peak concept and includes all welfaristic (*W*) and non-welfaristic issues (*NW*) within a systems analysis that impact on an individual or society's *joie de vivre*. It is similar to Pearce et al.'s (1990) *vector of desirable social objectives*, which includes increasing income and improving its distribution, improving health and education outcomes and access to resources and increasing basic freedoms. It can be represented by:

$$SW = w(QoL, W, NW) \quad [2.3]$$

Within this thesis, social welfare will be measured by adjusting national income through cost-benefit analysis and through the attainment of a specified set of hierarchical needs.

Defining well-being in a hierarchical fashion assists in analysing the desirability of economic growth as the desirability will be different at each level within the hierarchy. Economic growth is more likely to be desirable in terms of standard of living than social welfare when standard of living is a simple function of national income compared to social welfare, which is a function of national income but also all other non-welfare and welfare issues.

2.2.2.2 Economic Growth

The theory of economic growth is well developed (important classic texts include amongst others Harrod 1948; Domar 1947; Samuelson 1950; Swan 1956; Solow 1957; Abramovitz 1956; Denison 1962; Romer 1990). Yet, few conclusions within this literature remain uncontested (Mussa 1999). Economic growth is a factor of economic variables, social variables and political variables (Lane and Errson 1990).

Economic growth is a dynamic concept which involves ‘the steady process of increasing productive capacity of the economy’ (Bancock et al. 1981, p. 144). Economic growth is not static in that it cannot be measured in “snapshots” of time, but can only be captured by analysing productive capacity over a period of time. ‘The long-term economic growth of a nation can be attributed to the growth of measured factor inputs, such as physical capital, labour and human capital, and to technical progress (improving improvements in efficiency’ (Lau 1996, p. 63).

The concept of calculating a nation’s product predates the development of the current system of standard national accounts and was explored in Petty’s *Political Arithmetik*, Smith’s *Wealth of Nations* and Marshall’s *Principles of Economics*. The current manner of calculating a nation’s economic output was formulated during the decade after the Depression (see Kuznets 1941), in part, as a response to the new Keynesian approach of macro-management of the economy (Manning 2001). This system of aggregating national economic output continued to evolve and the United Nations presented various codified systems in 1953, 1968 and 1993. Presently, nearly all nations are implementing this system. Thailand has a very sophisticated government ministry responsible for the collection and compilation of these national accounts. The National Statistics Office (NSO) regularly publishes the national accounts, though Thailand is primarily using SNA 58 with some aspects of SNA 68 incorporated (NSO 1997).

Whilst economic growth is a dynamic concept, static concepts compared across time can be used to calculate it. GDP is the total value of final goods and services at market prices produced in an economy during a specific period. It excludes income earned by domestic residents from overseas investments but does include income earned in the domestic economy by non-residents. GDP does not deduct the value of expenditure on capital goods for replacement purposes. GDP is the volume of commodities and services produced but corrected for all duplications in fuel, raw materials, semi-finished and finished products. However deductions for the current consumption of capital equipment are not considered (Kuznets 1941).

GDP is a measure of what is produced within the economy and therefore is a measure of economic activity. GDP includes activities such as food production, textiles and manufacturing and diseconomies such as defense spending, the justice system and advertising. Quite clearly GDP accurately measures economic activity, but is this the same as measuring welfare? Pigou noted that economic welfare is not a barometer ‘or index of total welfare’ (1962, p. 12). But he also noted though that there is an “unverified probability” that this is actually the case. ‘The economic welfare of the country is intimately associated with the size of the national dividend, and changes in economic welfare with changes in the size of the dividend’ (Pigou 1962, p. 50 – also see de Graaft 1957 for another early view that social welfare had both economic and non-economic variables). Comparing GDP per capita, both within nations and across nations, is a frequently undertaken exercise (Sen 1982).

Within the literature, a variation of GDP, Gross National Product (GNP), is also often used to capture economic performance. The difference between GDP and GNP is that GNP includes income earned by nationals overseas (GDP does not) but it excludes the income earned domestically by non-nationals (GDP does). As with GDP, no allowance is made for the depreciation or consumption of capital used in production. For economies with a high reliance on foreign investment, GDP is usually higher than GNP as it includes the income earned by this foreign investment. For economies that are net investors, GNP is usually higher than GDP as overseas income is taken into account.

The differences between GDP and GNP however are generally not important enough for absolute use of either concept to be vital to the discussion of economic growth and welfare. Quite often these terms will be used interchangeably (for example, see Harris and Fraser forthcoming). Close readers of this thesis will note a number of examples where authors discussing GNP are compared and contrasted with authors discussing GDP. Given the closeness of these concepts, this is considered reasonable (unlike that of the inappropriate interchangeable use of various terminology used to describe well-being).

So whilst GDP and GNP are considered almost interchangeable, another measure, whilst appearing similar has some distinct advantages over both of these terms (Dasgupta 1995). National income (or National Product at Factor Cost (NNP)) is the same as GNP except that it is calculated after allowances have been made for the depreciation or consumption of capital used in the production process. By taking into account the use of capital and depreciation, some of the costs of economic growth, previously not taken into account, are removed from the final figure. Thus, if high levels of GDP (or GNP) are achieved through high levels of depreciation or consumption of capital, national income will capture this. Thus, national income can be considered a better measure of society's welfare than either GDP or GNP (Weitzman 1976; Clarke and Islam 2002a).

In addition, per capita versions of each of these static standard national account measures (GDP, GNP, national income) can also be used to measure economic growth. Per capita versions are estimated by dividing the total by the population. As this thesis is concerned with welfare analysis, economic growth will be measured by the percentage change in GDP per capita between two specified time periods (usually annually). As GDP is a “snapshot” of an economy at a single point in time, comparing GDP at different times allows economic growth to be calculated. Economic growth is the percentage change in GDP over a specified time period.

As with comparisons between GDP and GNP, it is understood within this thesis that economic growth estimates based on GDP and GDP per capita are also closely related and often discussion involving one will be compared with discussion involving the other. For consistency though, unless otherwise mentioned, economic growth within this thesis is defined as the annual change in GDP per capita.

Table 2.1 GDP per capita and National Income per capita economic growth rates for Thailand, 1975-1999 (1988 prices)

Year	GDP per Capita (1988 baht)	Annual Growth Rate in GDP per capita (%)	Annual Growth Rate in GDP (%)	National Income Per capita (1988 baht)	Annual Growth Rate in National Income per capita (%)	Annual Growth Rate in National Income (%)
1975	14662	7.4	9.5	12143	6.9	8.7
1976	15754	7.5	10.2	13047	5.9	8.2
1977	16942	7.6	10	13872	7.2	9.1
1978	18237	3.2	5.2	14941	1.6	3.5
1979	18819	3.4	5.3	15184	3.2	5.0
1980	19458	3.8	5.9	15690	3.1	4.9
1981	20206	3.4	5.4	16184	3.8	5.7
1982	20883	4.1	5.5	16829	3.3	4.6
1983	21729	3.6	5.8	17396	1.9	3.9
1984	22504	2.2	4.6	17728	2.1	4.4
1985	22996	3.2	5.5	18109	1.7	3.8
1986	23722	7.8	9.6	18417	7.4	8.9
1987	25561	11	13.2	19886	8.8	10.6
1988	28380	10.3	12.2	21811	10.2	11.7
1989	31316	10.4	11.2	24286	8.3	9.0
1990	34565	7.3	8.5	26481	6.3	7.4
1991	37073	6.6	8.1	28256	5.6	7.0
1992	39506	8.3	9.3	29943	6.5	7.4
1993	42765	5.6	7	32026	7.1	8.3
1994	45174	7.4	8.1	34470	7.4	8.0
1995	48511	6.1	7.3	37232	2.6	3.7
1996	51489	-2.5	-1.4	38227	-4.2	-3.0
1997	50184	-9.6	-8.7	36669	-14.8	-13.6
1998	45348	1	1.3	31952	2.7	3.0
1999	45789			32828		

Source: NSO (various issues)

2.2.2.3 Systems Approach

Society is made up of many sub-systems (or domains) that inter-relate in a dynamic manner (Dopfer 1979; Clayton and Radcliffe 1996; Bossell 1999; Islam and Clarke 2001a; Islam et al. 2001). These domains include, but are not limited to, the social, economic, environmental, political and spiritual. Each of these sub-systems has a direct impact on society's well-being and therefore, measures of social welfare must take into account each of these sub-systems for that measure to be legitimate. However, it is rare for national welfare measurement to include all of these sub-systems (see Islam 2001 for a measure containing the social, environmental and economic).

Aggregated standard national accounts are a measure of the aggregation of the different parts of the economic sub-system. Therefore, changes in unadjusted GDP per capita or national income per capita reflect only changes in that particular sub-system. As society is systems based however, the changes in the economy (as indicated by increasing or decreasing GDP or national income) have an impact on the social, environmental, political and spiritual sub-systems as well. These changed sub-systems then impact on the economic and the dynamic inter-relationships continue. These inter-relationships are not direct and causal and it cannot be assumed that a positive movement in the economic sub-system results in a positive movement within the other sub-systems.

Understanding society as systems-based can impact on policy-makers' planning paths of increased development or welfare. Within a total systems approach, development or increasing society's welfare, can be described as:

any change of the total system in a desired direction in terms of desiderata of all systems, under the condition that none of the desiderata must take on a value which is below a specific minimum value. (Dopfer 1979, p. 27)

Under this criteria, a focus on increasing the aggregate value will only add to society's welfare if it does not come at the expense of other sub-systems such as the environment.

If national income 'is now mainly a measure of how fast resources are squandered and converted into money flows, irrespective of their effect on society' (Bossell 1999, p. 12), then increases in unadjusted national income are likely to impact negatively on at least one of the other sub-systems of the social, environmental, political or spiritual (Arbhabhirma et al. 1988).

Further, a concentration on the importance of unadjusted national income per capita or economic growth as a measure of society's welfare is also fraught with danger as unadjusted national income is simply the aggregation of one sub-system of many that in total make up society. The inter-relatedness of these sub-systems means that achieving increased economic growth may be obtained at the direct expense of one or more other sub-systems which will feedback not only to future economic consequences but will also have immediate welfaristic consequences.

The consequence for social planners in Thailand (for example) is that trying to replicate the development experience of Western Europe or even the NICs more recently, is not possible because the very occurrence of that previous development prohibits Thailand repeating it (Dopfer 1979; Clayton and Radcliffe 1996; Ormerod 1994).

The systems approach can be operationalised through the adjusting of aggregated standard national accounts so that the impacts of the separate costs and benefits on economic growth for the economic, social, political, environmental and spiritual sub-systems are incorporated (Islam and Clarke 2001a, forthcoming; Clarke and Islam forthcoming). Or the systems approach can be operationalised by considering how the fulfillment of various hierarchical needs can add to social welfare (Islam and Clarke 2001b).

2.3 THAILAND – A REVIEW OF ITS HISTORY, ECONOMIC GROWTH AND SOCIAL WELFARE

All countries are unique, with distinct histories shaped by different geographies, political experiences and social interactions. Thailand is unique as it has not been colonised, is a Buddhist country, has low levels of urbanisation and an abundance of land. Yet, at the same time, Thailand can be considered representative of many developing countries as it is characterised by a dualistic economy, has significant rural – urban migration, an increasing gap between the rich and poor, and political instability. So whilst its history is unique, Thailand is a member of a large group of low-middle income countries (World Bank 2001), all of whom are seeking to increase national income.

Thailand has regularly outperformed many other developing (and developed) countries in terms of annual economic growth, recording some of the highest rates of economic growth for any country between 1991 and 1997 (Dixon 1999). There is little doubt that it is a role model for most of the third world (Watkins 1998; World Bank 1999c; Vines and Warr 2000). If countries are presently not like Thailand, they aspire to be.

Reviewing Thailand's history will provide a basis on which later analysis of the relationship between economic growth and social welfare and subsequently the desirability of economic growth can be examined.

This section will briefly trace the economic and political history of Thailand, which must be understood to fully appreciate the current economic situation and perhaps to point to the future.

2.3.1 Pre-Twentieth Century: History, Economic Growth and Social Welfare

The settlement of Thailand can be traced to the thirteenth century. Its inhabitants were rice farmers who undertook limited trading. By the mid eighteenth century Thailand (or Siam) was still sparsely populated but there was sufficient political control over the land by its rulers to extract enough agricultural surplus to establish a capital city, Ayutthaya. Ongoing border disputes resulted in Ayutthaya being sacked by the Burmese in 1767.

The Thai state relocated its capital to the strategically safer Bangkok and by 1782 the city had flourished as an important regional trading centre. Trade in agricultural products (including rice) soon prospered under royal monopolies and Chinese merchants became closely intertwined with the growing economy. Bangkok became a regional centre for ship building and was soon producing the largest ships outside of Europe. The wealth from trade allowed Thailand to expand and Bangkok became the ‘centre of one of the largest and most powerful states in south east Asia’ (Dixon 1999, p. 26). Thailand covered most of modern day Cambodia, Laos, Myanmar and northern Malaysia (Parnwell and Arghiros 1996). Despite this growth and expansion, the majority of Thais were still rice farmers living a subsistence lifestyle.

Trade brought Thailand into contact with Europe and various colonial powers, such as the Dutch, English and French, began to show interest in Thailand. Treaties, beginning with the *Burney Treaty* in 1826 with the British, set out new trading practices and laws.

Britain annexed Lower Burma in the 1850s and Upper Burma soon after due to political instability, whilst France annexed Cambodia in the 1860s. Within this political environment and the accession of Rama IV to the throne in 1851, Thailand was opened to the world. Rama IV sought to increase Thailand’s relationship with the west through trade. He abolished the royal monopolies and reduced the influence of the Chinese merchants through signing the *Bowring Treaty* in 1855. So whilst Thailand remained formally independent, it was almost an economic-colony of the British Empire and the social welfare of its inhabitants could be seen as subservient to the social welfare needs of the Empire (Dixon 1991; Parnwell and Arghiros 1996).

By the mid nineteenth century, Singapore had become the dominant trading port for the region. Thailand and Bangkok increasingly became ‘a “buffer-zone” between (the) British and French’ (Dixon 1999, p. 31).

Outside of Bangkok, the traditional farmers throughout this period experienced little change. Despite the expansion of trade and the agricultural sector, population increases,

primarily through falling mortality rates, meant that real (per capita) economic growth was zero and national income per capita did not rise significantly from 1850 to the end of this period (Warr 1993a, 1993b). As a consequence of the sparse population, the existence of a land frontier, and a relatively high natural soil fertility the Thai peasant had long been able to maintain a relatively high level of social welfare (Falkus 1995).

2.3.2 1900-1970: History, Economic Growth and Social Welfare

Between 1900 and 1920, the Thai economy experienced remarkably rapid change. In 1905, the first standing army was created. Whilst central control over the country was now established, the central plains region, just above Bangkok, were still the most populated and economically important, contributing 98 per cent of all exports (Phongpaichit and Baker 1996).

Whilst Bangkok was closely integrated into the world economy, the rest of Thailand including most of its population was not. It has been estimated that economic growth was 0.4% per annum between 1870 and 1913 (Sompop 1989 – cited in Dixon 1999).

Agricultural activities employed nearly all of the Thai population during this time. Thai trade was disrupted by the world depression of 1929 and whilst this negatively affected the traders in the capital of Bangkok, the majority of traditional subsistence farmers remained unaware of and unaffected by the worldwide depression. However, in response to pressure from wealthy traders whom were affected, the Thai authorities began increasing tariffs and began to pursue deliberate policies of economic nationalism. Such a response was not unusual and tariffs on imports were soon commonplace across the world.

Having only been in existence for one generation, the standing army undertook a *coup d'état* in 1932. The absolute monarchy was replaced by a minimalist monarchy. Among the six points cited for the *coup* was the promise to ‘promote the economic welfare of its citizens by providing remunerative employment for everyone and promulgating a

national economic policy designed to end poverty’ (Phongpaichit and Baker 1995, p. 115). A second *coup* took place a year later.

These new military new leaders began the modern industrialisation of Thailand in the guise of economic nationalism. A number of ‘wholly or partly state-owned industrial enterprises’ (Dixon 1999, p. 63) were set up. Slowly, the industrial and services sectors in Bangkok, and limited other urban centres (such as Chiang Mai), began to expand and diversify. Chinese merchants by and large controlled this new trade in addition to their long held control over agricultural trade (Phongpaichit and Baker 1995, 1996).

Whilst wealthy Chinese merchants controlled the bulk of international trade out of Thailand, there was overt discrimination against ordinary Chinese during World War II (Suehiro 1989 cited in Dixon 1999). During the same period the Japanese occupied Thailand and the economy suffered considerable damage. After the war, Thailand was racked with 100 percent inflation and political instability. Between 1944 and 1947, there were five governments and 10 Cabinets. Again though, the bulk of the Thai population was excluded from these disturbances, as they remained in rural areas, occupied in subsistence farming.

Due to the steady rise in population, there was little real economic growth resulting in national income per capita remaining stable between 1913 and 1950.

In 1947, another *coup d’etat* was staged. Military rule lasted the next twenty-five years. Whilst under military rule, the Thai political scene was still one of ‘political instability, continuing power struggles within the military, rivalry within the military, plots and attempted *coups d’etat*’ (Dixon 1999, p. 69). Indeed, the military rulers between 1948 and 1957 survived unsuccessful *coups* in 1948, 1949 and 1951.

Despite the new government, little economic change in policy took place after World War II. Economic growth finally began to overtake population growth by a substantial amount and national income per capita grew on average 4.5% between 1950 and 1960.

Slowly, Bangkok began to modernise (Phongpaichit and Baker 1995). ‘But even by the late 1940s for the majority of the rural population there had been remarkably little development and change’ (Dixon 1999, p. 74). In fact, the traditional agricultural sector was protected from the modern agricultural sector by the failure to administer property rights thus making the risk of clearing land too great for corporate or large-scale farmers. The agricultural sector was also not attractive because of low yields, low access to capital, limited labour supplies and high uncertainty in world markets. But despite these bleak conditions for large scale agricultural enterprises, for ‘over a century, from the mid-nineteenth to the mid-twentieth, the peasantry was the foundation of Thailand’s society and economy’ (Phongpaichit and Baker 1995, p. 3). But this epoch was quickly ending:

...most studies of Thailand’s development consider the *coup d’etat* of October 1958 and the establishment of the regime of Marshall Sarit Thanait as marking the beginning of the modern economic growth of the Kingdom. (Dixon 1999, p. 77)

Soon after seizing power, Sarit established the National Economic Development Board (NEDB – the word “Social” was later added to reflect this aspect of its work and it became known as the NESDB). The NESDB signaled that there would be a shift away from state-led development to a ‘fostering and guaranteeing of domestic and foreign private enterprise’ (Dixon 1999, p. 80). Rather than being responsible for the investment itself, the Thai government assumed the responsibility of providing a secure environment encouraging private investment instead. Following the preceding decade of political instability, Sarit was able to establish an alliance of sorts between the military, bureaucracy and business.

The first five-year plan, for the period 1961-6, was developed and the priority of achieving economic growth was clearly spelt out. ‘They promoted better exploitation of the country’s primary resources, and industrial growth to service home demand’ (Phongpaichit and Baker 1995, p. 140-1). Government investment did not dry up though,

but rather, it was redirected into infrastructure and large programs such as irrigation, transport and communication (Lal and Myint 1996).

Economic growth in this period averaged 7% per annum. This was a result of both an increasingly stable political environment and the very favourable international trading conditions. Post war reconstruction was well underway and the US economy was growing rapidly. Thailand was growing a surplus of rice and other agricultural products and ready international markets were easily found.

Not only were the international economic trading conditions favourable for Thailand, but so too was the international political environment. Thailand became a strategic centre for the United States in Asia as it pursued Cold War activities. A major investment was made to keep Thailand anti-Communist during the 1950s and 1960s. Three billion US dollars were spent in aid during these two decades (Phongpaichit and Baker 1995). Without the investment in roads (to assist control over communist insurgencies in the rural north), tourism (Bangkok was the major rest and recuperation destination for U.S. troops fighting the Korean and later the Vietnam war), the Dom Muang international airport (to allow U.S. airforce to have a suitable base and allowed Bangkok to become a major airport hub) and employment (the U.S. army employed over 40,000 Thais), the Thai economy would not have grown as it did. Not only was the volume of aid important, but it also targeted bottlenecks, which were keeping the economy artificially underdeveloped (Caldwell 1974 cited in Dixon 1999).

With the development of a suitable road network into previously inaccessible (by vehicle at least) areas, the Thai government was able to expand its rural development activities. In addition to increasing the social welfare of its wider population, the Thai government's focus on rural development had two practical outcomes. Firstly, rural investment strengthened the loyalty to the government of rural populations. Secondly, it was a form of anti-Communist propaganda (Phongpaichit and Baker 1995).

During this time, the industrialisation emphasis continued to be on import substitution and protection of national industries. Whilst tariffs were low by international standards, they were continually raised during this period, both as a form of protection, but also as a form of increasing government revenues. Agriculture continued to be the main export but slowly manufactured goods also began to be exported. By the end of the 1960s economic development became clearly based on the expansion of agricultural production and exports and import substitution industrialisation (ISI).

2.3.3 1970 – Financial Crisis: History, Economic Growth and Social Welfare

At the beginning of the 1970s, the World Bank criticised Thailand's tariff policy and called for its industrial policy to be reversed and an emphasis placed on export oriented industrialisation. This policy advice was not unique and was becoming standard for all developing countries.

The third five-year plan (1971-6) reflected the World Bank's advice but little was actually implemented to reduce tariffs and dismantle the ISI policies of the past. Between 1972 and 1974, the Thai baht was devalued and this, coupled with the continuing agricultural boom (particularly rice) which began in 1950 and continued for twenty-five years, caused export receipts to grow (Phongpaichit and Baker 1995). The final years of this boom assisted in offsetting the repercussion of the oil crisis of 1973-4. Whilst economic growth slowed (though was still comparatively high at 5%), 'the high prices and ready markets for the Thai exports tended to offset the increase in the cost of oil imports' (Dixon 1999, p. 94). The government also manipulated the tax on fuel to reduce the impact of the oil crisis.

The successful, though perhaps accidental, weathering of this economic crisis was soon overtaken by political developments. Tariffs were increased and Thai workers began protesting against their working conditions in 1974. These events began to unsettle both foreign and domestic investors. The US Army withdrew from Vietnam in 1976 and effectively withdrew from Asia for the first time since World War II. Given the global economic uncertainty and this withdraw, extreme political uncertainty returned to

Thailand. Violent changes of government took place in 1973, 1976, and 1977. There was an increase in rural insurgency and subsequently state oppression, particularly in the second half of the decade.

Despite the claims of the third NESDB plan (1971-6) to restructure the economy by emphasising export oriented industrialisation (EOI) and reduction of income disparities, little in this way was achieved. ‘The growth of the Thai economy during the early 1970s was accompanied by very limited structural change in the domestic economy, the composition of exports, or the labour force’ (Dixon 1999, p. 101). Whilst the manufacturing and service sectors increased, the majority of Thais were still employed in the agricultural sector. However, ‘smallholder peasantry had ceased to be the dominant feature of the paddy tracts’ (Phongpaichit and Baker 1995, p. 43). Commercial farms and waged labour soon became more common.

Within exports there was a move away from primary goods to secondary and value added goods. The change in export composition was also accompanied in the change in major trading partners from the U.S.A. to Japan and Europe. Japan also became the major investor in Thailand. This investment usually took the form of joint ventures rather than fully owned Japanese companies.

The Thai economy grew on average 7% during the 1970s. Given the world economy and oil crisis shocks, the withdrawal of the U.S. military, and internal political instability, ‘the growth of the Thai economy during the period 1971 to 1978 was remarkable’ (Dixon 1999, p. 108). It is reasonable to argue that the development of the Thai economy from agricultural to industrial (at least in terms of composition of GDP) occurred in spite of all government policies and interventions. Tariffs and fuel subsidies protected domestic industries and violent political upheaval did nothing to increase investors’ confidence. The Balance of Payments was negative, inflation was high, government expenditure was increasingly resulting in higher deficits and overseas debt (whilst low comparatively) also increased through the decade to alarming levels within Thai economic history (Dixon 1996). Following a slump in primary commodity exports in the early 1980s, the enlarged

foreign debt commitment became a serious problem as the economy went into recession (Warr 1993a, 1993b). In order to limit the impact of the fuel crisis of the mid seventies, the Thai government borrowed heavily to subsidise fuel prices. Increasing interest rates in the early 1980s put great pressure on the Thai government's fiscal position. Whilst the "debt crisis" of Thailand was not as severe as suffered by other countries (Krongkaew and Kakwani 1997), it was quite severe by its own conservative standards (Warr 1993a, 1993b).

Despite all these negative economic conditions, the Thai economy was literally in the right place at the right time. Japan and the other newly industrialising countries (NICs) were shedding their low level manufacturing investments as domestic labour costs increased and Thailand was well positioned to assume these industries. Labour costs were still low, the labour force was well educated and the labour movement, though once strong, was under attack from the government.

Regardless of the high levels of growth of the late 1970s, the Thai economy was, according to the World Bank, structurally unsound and an austerity package was introduced as part of the terms and conditions of World Bank loans at the end of the decade. These recommendations were formally incorporated in the fifth NESDB development plan (1982-86). However, like previous plans, the policy outcomes were not completely reflective of the stated plan (Dixon 1999). Whilst some attempt was made to implement these policies and social justice and welfare was downgraded to accommodate these recommendations, public protest and the mid 1980s world-wide recession resulted in only a partial implementation of the structural adjustment program.

Ironically, when the Thai government in the-mid 1980s formally dropped the World Bank recommendations, the Thai economy began to show signs of recovery. The economy had been realigned from ISI to EOI sufficiently so that rapid growth was occurring and foreign investment was becoming increasingly attractive (Phongpaichit and Baker 1995; Krongkaew and Kakwani 1997). Investment, both foreign and domestic, was attractive for four reasons:

- industrial costs were low and the baht was devalued;
- the economic crisis had ended and political stability was emerging;
- there were fewer restrictions of trade from Thailand to Europe and the U.S. compared to restrictions against Japan and the NICs; and
- previous investment had resulted in the development of relationships which encouraged further investment (Dixon 1999).

In the sixth NESDB plan (1987-91) the structural adjustment program of removing rice taxes, fuel and transport subsidies, tariffs, foreign exchange programs and an increase in privatisation were re-implemented and ‘may be viewed as sustaining the boom rather than initiating it’ (Dixon 1999, p. 122). However during the same period poverty (measured by income per capita levels) increased in rural areas (Watkins 1998).

The Thai economy entered the 1990s with a growing economy and economic structures in place to increase this economic growth. It was one of the largest markets for Mercedes Benz cars (Watkins 1998). The “Golden Age” began in the late 1980s when economic growth in 1987 spurted to 11%. ‘Between 1985 and 1992, the total GDP doubled’ (Phongpaichit and Baker 1995, p. 151). This made Thailand one of the fastest growing economies in the world during this period (Jansen 1997; Vines and Warr 2000). The region and the world economy were moving out of the mid 1980s recessions and growing strongly. Thailand was particularly well positioned to increase its previous role of assuming the industries that the NICs were continuing to shed because of high labour costs (Dixon 1999).

Expanding primary exports, promotion of tourism and export of labour to other countries (with the subsequent repatriation of income) assisted the manufacturing boom. But Thailand’s economic success was not the expected output of carefully developed economic policy:

...there is in all this a clustering of favourable global, regional, and national circumstances that Thailand was able to take advantage of, rather than any particular policies or strategies that could be isolated and applied elsewhere. Certainly it is difficult to accept the World Bank's view that Thailand is one of the success stories of formal structural adjustment. (Dixon 1999, p. 128)

Thailand was successful in terms of achieving very high levels of economic growth almost in spite of itself. The success of Thailand can be considered a historical and geographical accident. Whether this success in achieving economic growth crosses over to success in increasing welfare is the empirical question asked in this thesis.

Economic growth has been the major priority of the Thai government for some time (NESDB 1996, 2000), even being encouraged by the Royal Family (APEC 2000). However, such emphasis was often to the exclusion of other possible goals (Parnwell 1996). 'In sum, it would seem that the Thai state has accorded the highest priority to economic growth but at the expense of welfare and social justice' (Schmidt 1996, p. 69). The Thai government abandoned all policies to plan or control the direction and outcome of economic growth in the early 1990s (Phongpaichit and Baker 1995). Whilst this economic growth allowed increases in government expenditure, this additional government spending was not aimed at alleviating the poverty of the poorest of society (Krongkaew and Kakwani 1997).

In 1996, the Thai economy was characterised by zero growth in export earnings, an increasing balance of payments deficit, increasing private sector debt, increased short-term speculative capital movements and over-heating of property and financial sectors. 'The 1997 crisis brought an abrupt halt to Thailand's decade of rapid growth' (Dixon 1999, p. 239). The crisis wasn't widely predicted though (see Krongkaew and Kakwani 1997 as an example as a positive outlook for the future).

There were also serious deficiencies in the infrastructure of Thailand such as roads, water supply, telecommunications and drainage (Muller 1996). The majority of government

investment was actually centred in and around Bangkok and so infrastructural problems were worse within rural areas. These deficiencies have yet to be resolved.

Wage costs were increasing in low skilled manufacturing areas, but there were also skills shortages in high skilled areas thus ‘limiting the move into high labour cost activities’ (Dixon 1999, p. 249).

Again, almost in spite of these concerns, the Thai economy has recovered well from the financial crisis of the late 1990s and is again recording high economic growth rates. The planned growth for the next five-year plan (2002-2006) is for annual growth of between 5-6 percent (Ministry of Finance 2001). Given nearly three decades of high growth rates (see Table 2.1), which are difficult to explain given the policies implemented, the success of the Thai economy almost beggars belief. So whilst the Thai economy has been successful in achieving high levels of economic growth, has this brought about corresponding high levels of social welfare?

Have briefly reviewed Thailand’s economic history, it is appropriate to review the literature surrounding economic growth and social welfare and in particular relate this literature to the experiences of Thailand.

2.4 THE DESIRABILITY OF ECONOMIC GROWTH : IN THEORY AND IN THAILAND

Economic growth as presently experienced is a relatively new phenomenon (de Jouvenal 1969; Arndt 1978). Between the years 500 and 1500, economic growth within Europe only grew at 0.1% per year or 10% per century. This increased to 0.5% per annum during the eighteenth century (Maddison 1982). In contrast, Thailand has averaged nearly double digit economic growth per capita over the last decade (Warr 2001).

Economic growth, as an issue, first entered the economic sphere at the beginning of the eighteenth century. Classical economists such as Smith and Ricardo argued in its favour whilst a small minority headed most notably by J. S. Mill, argued against continued growth. Mill believed:

...it is only in the backward countries of the world that increased production is still an important object: in those most advanced, what is economically needed is a better distribution. (Arndt 1978, pp. 12-13)

Whether Mill would consider modern developing countries, such as Thailand today, as ‘backward’ and thus in continuing need of economic growth or whether they would only need redistribution of current income levels in favour of the poor, would be of interest.

The current debate over the desirability of economic growth is a reflection of previous debates that have continued for over 150 years; did social welfare decrease or increase during the Industrial Revolution (Hartwell 1972; von Tunzelmann 1985):

...in evaluating the consequences of the industrial revolution the question should be *whether, given some set of exogenous changes, the working classes were better off than they would have been in the absence of industrialisation*. And this question should be distinguished conceptually from the question *whether, given the Industrial Revolution, it would have been possible for there to have been some set of policies which would have permitted the working classes to have been better off than they actually were*. And these questions are different again from the question *whether the working classes improved their standard of living over the period of the Industrial Revolution, say from 1750 to 1850*. (Hartwell and Engerman 1975, pp. 193-194 cited in von Tunzelmann 1985 p. 209, italics added)

Within the literature, the first question of whether the working classes would have been better without the industrialisation appears to have been resolved in favour of industrialisation (Mokyr 1985). At the time though, this view was debated (Sismondi

1813 – cited in Smith 1993). John Hobson argued at the turn of the twentieth century that the industrial economy had a ‘built-in bias towards excessive production and consumption of economic goods’ (Smith 1993, p. 197). This philosophy of materialism, Hobson continued, was a direct result of an industrial economy. He argued that to increase welfare, leisure had to be increased, scientific advances slowed and output restricted.

The two remaining questions, which von Tunzelmann (1985) calls the factual and counterfactual debates, remain controversial.

The factual debate is whether aggregated welfare (referred to as standard of living in von Tunzelmann 1985) increased as much as it could have. The aim of this thesis is to contribute to the *factual* debate by developing empirical analysis as to whether or not economic growth has increased social welfare in Thailand over the past three decades.

The second debate is counterfactual. Could the Industrial Revolution have occurred with other economic policies in place? Within the current economic growth debate, this is the question raised by Daly (1991) in his call for a steady state and a change of economic systems.

2.4.1 The Benefits and Costs of Economic Growth

The desirability of economic growth is largely dependent on the costs and benefits it produces in terms of social welfare. Many of these costs and benefits can be considered externalities. If the benefits are greater, social welfare is enhanced, but if the costs are greater social welfare is reduced. Determining these costs and benefits is central to the current controversy. Within the literature, the present debate concerning these costs and benefits can be traced back to the late 1960s when perceived adverse consequences of economic growth on social welfare through the reduction of environmental quality and resources were raised (see Barkley and Seckler 1972; Mishan 1971, 1977; Meadows et al. 1972).

Within this thesis, a primary emphasis in determining the desirability of economic growth will be on calculating its net benefits in terms of social welfare. The net benefits (NB) can be calculated by subtracting the identified costs (C) from the identified benefits (B).

$$NB = (B - C) \quad [2.4]$$

In the early 1970s an influential study highlighting the costs of economic growth was released (Meadows et al. 1972). This computer modeling re-ignited Malthusian fears of over population and added weight to fears of pollution and the extinction of natural resources. These outcomes were predicted to occur in a relatively short time-frame. Economic growth was blamed for increasing pollution, over consumption of natural resources, and encouraging high population levels through higher incomes and medical breakthroughs increasing life spans and reducing infant mortality.

Alternatively, those in favour of economic growth dismiss such predictions of environmental disaster and claim economic growth solves all the costs it is unfairly being blamed for (see Beckerman 1992, 1995 as a representative of this position). Pollution will be limited, as higher levels of economic growth will increase the wealth of countries and free resources to be used in pollution controls. Populations will stabilize once poorer countries realise that mortality rates are not robbing families of their children and future economic resources. Finally, as resources become scarcer, prices will increase and thus encourage additional technological breakthroughs, mining or harvesting, transfer to alternatives, or reduction in levels of equilibrium usage. The benefits of economic growth focus on increased access to material possessions. This can either be measured in income or consumption. Economic growth increases incomes and hence living standards. It reduces unemployment, manages the business cycle and is linked to reducing poverty and increasing social equity.

Determining “what are the benefits” and “what are the costs” of economic growth is difficult. Economic growth is desirable if it increases society’s welfare. This is achieved if the benefits of economic growth are greater than the costs. The need exists therefore to

identify, quantify and estimate the benefits of economic growth and to identify, quantify and estimate the costs of economic growth. Once this has been done, an analysis of the net benefits (either positive or negative) can be undertaken. More recently, this approach has focussed on developed, mass consumption societies (Daly and Cobb 1990; Jackson and Marks 1994; Hamilton 1998). Few such studies have been undertaken for developing economies (see Castaneda 1999 and Clarke et al. 2002 as exceptions).

Welfare analysis requires the determination of who is experiencing the benefits and costs in both intra- and intergenerational terms (Clayton and Radcliffe 1996; Paavola and Bromley 2002). Often the benefits of economic growth are individual in terms of better employment, higher income, and greater consumption. Whereas the costs are more social in nature; commuting, urbanisation, degraded environment, pollution. ‘This results in a dissociation between those who generate these costs and those who are affected by them, even if they are ultimately the same people’ (TDRI 1990, p. 1). Taking a social choice perspective overcomes this dissociation to a degree by incorporating these social outcomes and priorities into the analysis of the desirability of economic growth in terms of social welfare.

Society is a complex system, of which the economy is only one sub-system (Dopfer 1979; Bossell 1999; Islam and Clarke 2001a; Clayton and Radcliffe 1996). Non-welfaristic issues such as political freedom, liberty, equity and spiritual concerns also affect social welfare (Rowan 1996). As all society’s sub-systems interact, the economic can impact on these other sub-systems and thus impact on social welfare indirectly.

Whilst the first tool of analysis used in this thesis will strongly focus on the costs and benefits economic growth (using systems analysis within a social choice framework), the second tool of analysis will more strongly focus on the consideration of non-welfaristic impacts on social welfare when determining the desirability of economic growth. It is important to include these concepts, as making society economically better off is only one dimension of society’s welfare. This thesis uses social choice theory to provide the normative framework for aggregating all of these dimensions.

2.4.2 The Benefits of Economic Growth in Theory and in Thailand

The position that economic growth is desirable as it increases social welfare (regardless of how it is defined) is well supported within the literature (Beckerman 1974, 1992, 1995; Gylfason 1999; Hufschmidt et al. 1983; Dodds 1997; Drake and Nieuwenhuysen 1988; Jones 1988; Eltis 1966; Hoselitz 1960; Manning and de Jonge 1996; UN 1972; Usher 1980; Moss 1968; Nailon 1992). Accordingly, economic growth is the only way for poor countries to aspire to the wealth of rich countries (Dollar and Kraay 2001). A larger pie rather than more equal slices is the best solution.

Within this paradigm, economic growth has no serious costs and is therefore always desirable. There is no need to fear rising pollution levels, nor is there any fear of exhausting the earth's resources (Beckerman 1992, 1995; Gylfason 1999). Therefore, all apocalyptic predictions (such as Meadows et al. 1972) of such things are in error. For example, pollution is a resource allocation problem that will correct itself through market forces (Beckerman 1992, 1995; Thurow 1980; Nordhaus and Tobin 1973). The price mechanism will ensure natural resources are effectively infinite. As resources become scarcer, prices will increase and this will encourage additional technological breakthroughs, mining or harvesting, transfer to alternatives and finally reduced levels of equilibrium usage. Even if the price mechanism fails to deliver, past predictions of exhaustion of resources have been incorrect and so any current or future predictions will also be incorrect. Further, pollution levels follow a natural pattern similar to Kuznets' inverted U-curve for income distribution. As economic growth increases in its initial stages so too does pollution. However, once a certain level of national income has been reached, additional resources will be available to spend on reducing pollution as people seek to improve their environment. Thus, pollution will peak and then fall as national income continues to increase (see Beckerman 1992, 1995; also see Section 2.5.4 for an opposing view).

At the end of the Second World War, economic growth appeared to be the panacea for all the western world's problems, including balance of payment difficulties, unemployment

and inflation and the moral victory of capitalism over communism (Hueting 1980). The achievement of economic growth became and continues as the priority across the globe (World Bank 2001). The major benefits of economic growth were the increase in material prosperity (even if this was not made explicit (Arndt 1978)) and the freedoms such prosperity bestowed (Lewis 1955).

For most policy makers, the only differences of opinion on the benefits of economic growth have been the prescriptions for its achievement. Accordingly, economic growth has bestowed, amongst other things, the following benefits:

- increases in the standard of living;
- freedom to enjoy greater leisure;
- freedom for women;
- reductions in general poverty levels;
- increased technology for pollution control;
- positive effect on capital investment;
- increases in employment levels;
- increases in life expectancy;
- increases in medical care;
- increases in gifts to charity;
- increases in leisure; and
- reduction in social tensions.

For Thailand, the benefits of economic growth have been significant. Numerous indicators of health, such as infant and maternal mortality, malnutrition and immunization levels have all improved as have social indicators such as school enrollments, average life spans, access to clean water and access to government services (NSO, various publications). From 1960 to the present GDP per capita has increased over twenty times. The benefits this has brought about have been very important in improving the both the standard of living and social welfare of all Thais.

These benefits, though not all equally shared (Clarke 2001a, 2001b), have been experienced at all levels of society. Without such economic growth, Thailand would still be a low income country with the accompanying low government spending on health and education, poor literacy rates, higher levels of absolute poverty and shorter average life spans. Economic growth has brought about important benefits to much of the population.

2.4.3 The Costs of Economic Growth in Theory and in Thailand

Economic growth however is not a Pareto activity. It involves winners and losers, costs and benefits (Barkley and Seckler 1972). Following World War II, the emphasis was on winners and potential winners. This optimism was replaced by pessimism in the late 1960s (Mishan 1971, 1977; Arndt 1978). For some, it was becoming evident that economic growth caused costs and these costs were often being borne by people other than those enjoying the benefits of economic growth (Adelman and Morris 1973).

By the early 1970s a long list of negative consequences of economic growth were being attributed to economic growth including urbanisation, traffic congestion, stress, pollution, pornography, bad manners, inequality and environmental destruction (Mishan 1971). Not only did economic growth directly cause these negative goods, but it also eroded activities and relationships that do increase social welfare including trust, love, self-esteem, social mores and leisure time (see Linder 1970 for a general discussion on leisure and Blundell et al. 1994; Sametz 1968; and Norddaus and Tobin 1973 for a specific discussion of the methodology of calculating the value of leisure in welfare measurements).

Of these major costs of economic growth, pollution is considered one of the most serious. Ayres (1996b, 1998) and others (Grossman 1991; Ekins 1993, 1997; MacGillivray 1993; de Bruyn 2000) empirically dispute the use of Kuznets' inverted 'U' curve regarding the benefits of economic growth and pollution. Not only is the empirically evidence questioned, the theoretical use of the Kuznets' inverted 'U' curve is also considered a poor predictor of future pollution levels. Ayres (1996b, 1998) argues that current world pollution levels are at a low level because the developing world (three quarters of the

world's population) have not fully industrialised and therefore are not polluting at western levels. Also, after a certain point any increases in pollution levels result in very rapid increases in its negative impacts (Osberg 1992).

Empirical evidence on this relationship is mixed. One explanation is that there is a Kuznet's inverted U-curve relationship between economic growth and pollution (or environmental degradation). Pollution increases with initial levels of economic growth, then falls with further growth as additional resources are available to introduce pollution reducing controls and technology (Beckerman 1992). The peak pollution level is estimated at US\$8,000 (1985 prices) per capita GDP (Grossman and Krueger 1995). As Thailand's GDP per capita is still well below this level (World Bank 2001), it would appear that pollution is going to steadily increase in Thailand for the foreseeable future. However, a the method employed to improve the environment at this level of income may be to export polluting industries to less developed nations rather than investing in pollution reducing technology (Clayton and Radcliffe 1996). Pollution therefore has not been reduced, simply transferred. As human survival is reliant on a healthy and functioning socio-economic environment (SEE) system, continued environmental degradation (or the transfer of this pollution to other sites) may not be possible (Clarke, Islam and Sheehan 2002, forthcoming; also see Ayres 1996b, 1998 and Osberg 1992). The environment is a higher good and it is not possible to wait for the economy to 'self-correct' because survival depends on a constantly functioning environment (Ayres 1996b; Clayton and Radcliffe 1996; also see Georgescu-Roegen 1971; 1981). Munasinghe's (1993) *tunnel* approach through the inverted U-curve may be required. Rather than progressing along the curve, it may be possible that certain government policy interventions (abatement programs, emission taxes, etc) will result in a shortcut through or flattening of the inverted U-curve.

A second serious cost blamed on economic growth is that of inequality. Three decades ago, Adelman and Morris (1973) and others (Ahluwalia 1975; Dulong 1975) found that the fruits of economic growth were not fairly distributed. Their extension of this argument is

that ‘the continued pursuit of economic growth by western societies is more likely on balance to reduce rather than increase social welfare’ (Mishan 1971, p. 219).

Within societies of uneven income distribution, such as Thailand (Clarke 2001a, 2001b), improvements in economic growth really only reflect differences felt by the minority of the population and not that of the non-wealth owning majority:

...thus the rate of growth of GNP measures essentially the income growth of the upper 40% and is not much affected by what happens to the income of the remaining 60% of the population. (Alhuwalia and Chenery 1975, p. 40)

Indeed, whilst absolute poverty may have decreased in Thailand over the last few decades (Warr 2001; Kakwani and Krongkaew 2000), relative poverty has increased as income distribution has worsened (Clarke 2001a, 2001b). The benefits of income growth are increasingly being received by the wealthy resulting in social costs such as the widening gap between rich and poor. Thus, it is arguable that economic growth only benefits the rich at the direct expense of ‘nearly everyone else’ (Ayres 1996b, p. 117).

Within this dominant paradigm, the emphasis placed on achieving economic growth is seriously misplaced and the use of economic growth as a measure of welfare is deeply flawed (Gillin 1974; Ayres 1998; Samuelson et al. 1978; Moon 1991; Abramovitz 1961; Denison 1971; Okun 1971). Within Thailand, the priority given to achieving economic growth within the nation’s five year plans (Parnwell 1996; Phongpaichit and Baker 1995) occurred at the expense of social justice and welfare (Schmidt 1996). Public policies designed to achieve higher levels of economic growth are often misplaced because standard national account aggregates, such as GDP or national income, ‘makes no distinction between activities that add to well-being and those that subtract’ (Halstead 1998, p. 56):

...much of what we now consider economic growth, as measured by GDP, is really one of three things; (1) the fixing of blunders and social decay from the past; (2) the borrowing of resources from the future; or (3) the shifting of

functions from the community and household realm to that of the monetarised economy. (Halstead 1998, p. 64)

Economic growth is primarily the result of the monetisation of ‘subsistence agriculture and more recently the monetisation of household (ie. often women’s) work’ (Ayres 1998, p. xi) and the substitution of man-made goods for natural goods and services (Barkley and Seckler 1972). Or alternatively, ‘society (has) exchanged poverty in one sphere for poverty in others which seemed less vital’ (Wilkenson 1973, p. 175) and thus is not desirable in terms of increasing social welfare.

Some disagreement within this paradigm does exist though, particularly over the role of science and technology. One view states that society is being held captive by science and technocrats and this is welfare damaging (Mishan 1977). The second is that scientific breakthroughs actually enhance social welfare (Ayres 1996b; Ng 1999; Kuznets 1968).

Such disagreement though is limited and general agreement within this alternative paradigm holds that the costs of economic growth, as identified by Mishan (1971) and others (Seers 1972; Bello 1995; Islam 1998; Barkley and Seckler 1972; Watkins 1998; Irvine and Miles 1982; Kumer and Yuan 1991; Islam and Choi 2000) include:

- an increasing pace of urban life;
- an increasing gap between rich and poor;
- exploitation of non renewable resources;
- creation of imagined wants;
- pollution;
- exhaustion of natural resources;
- negative impact on economic activity;
- an increase in crime, violence and drug use;
- an increase in environmental degradation;
- decreasing volumes of clean water;
- an increase in suicide, divorce, anxiety and sexual deviancy;

- loss of culture;
- loss of control over science and technology;
- reduction of skills;
- disappearance of biodiversity; and
- increasing soil erosion.

Some of these costs of economic growth have been experienced in Thailand. Whilst Thailand's abundant natural resources have fuelled recent economic growth, sufficient planning to protect and secure the long-term viability of these resources has not taken place.

Where once Thailand was covered with forests, less than one quarter of Thailand is now forested despite government policy stating that forest coverage should not fall below 40 percent (Trebuil 1993). Economic growth has in part occurred through the harvesting of forest products and deforestation to allow additional farming.

Whilst Thailand has a lower than usual level of urbanisation, the fact that Bangkok is one of the world's most primate cities (Dixon 1999) results in significant commuting and urbanisation costs for over nine million Thais (World Bank 1999b). Such urban pressure did not exist four decades ago.

Economic growth has brought about a reduction in water quality as unregulated industries dump water into waterways. Bangkok was known as the "Venice of the East" due to its extensive waterways and canals. In order to accommodate the growth in motor vehicles, the majorities of these canals have been filled and now serve as clogged and polluted roads. The few remaining canals that are left are also polluted and hazardous (Poungsomlee and Ross 1992).

In terms of the social costs of economic growth, Thailand has recorded increases in marriage breakdowns (NSO various publications) and commercial sex work (Phongpaichit et al. 1998). Those involved in such work generally do so against their will

(Paul 1995). The increase in tourism and wealth has led to an increase in this industry with all its associated costs of HIV/AIDS, social dislocation and child abuse.

Having explored the concept of economic growth and the costs and benefits that such growth can produce, it is appropriate to review the concept of welfare and how it might be measured before investigating the relationship between economic growth and society's welfare.

2.5 SOCIAL WELFARE AND ECONOMIC GROWTH: IN THEORY AND IN THAILAND

Fundamental to the debate surrounding welfare is that a universally acceptable definition of welfare has still not been agreed upon (indeed much of the literature discusses welfare without explicitly defining it – see Hudson 1972; Leacomber 1975; Dodds 1997). 'While the term welfare is used repeatedly in economic writings, the precise meaning remains vague' (Brekke 1997, p. 92). Society's welfare is assumed to be the aggregation of individual welfare (Ng 1979; Sen 1970, 1976; Hufschmidt et al. 1983; Chakravarty 1990; Kakwani 1997a, 1997b). As a sum of individual welfare, aggregate welfare allows nations to be treated as individuals (Sen 1976) and therefore an increase in national income is considered similar to a rise in personal income. However, it can be considered greater than the sum of its individual parts (Kiron 1997b).

Welfare has been defined as a function of consumption (McKenzie 1983; Slesnick 1998), particularly in areas of great poverty (Huetting 1980), as a function of consumption and the environment (Islam 1998), as a function of consumer surplus (D. Johnson 1996), as a function of consumption weighted by probability of survival (Nordhaus 1998), and as marginal propensity to consume (Islam 2000). Alternatively, welfare is greater than consumption (Bonner 1986). Others have taken the opposing view that welfare is specifically not linked to consumption (Boulding 1949-50, 1992; Sen 1987b) but is rather a function of capital stocks (Daly 1996), or expenditure (Jorgensen 1997), or income (Pearse et al. 1989; Usher 1980; Kakwani 1997b, 1997d), or even the opportunity to

consume – but not the consumption itself (Bliss 1993). Reconciliation between such dialectic views seems unlikely.

As social welfare can be defined in various ways, it can also be measured in different ways. The following sections focus on how welfare can be measured. The two most dominant approaches are based on preference satisfaction and happiness. They will be reviewed before a number of alternatives are also reviewed. The consequences of these approaches of measuring welfare on Thailand will also be discussed throughout this section.

2.5.1 Measuring Social Welfare by Preference Satisfaction: In Theory and in Thailand

Economists, social scientists and politicians all wish to gauge whether individuals and societies are better or worse off as a result of economic or social interventions. The use of GDP per capita is attractive to economists and non-economists alike. GDP per capita is tangible and well understood by many. The development of a system of standard national accounts has been heralded as the “achievement of the century” for its role in winning World War II, stabilising economies and promoting prosperity (Moullon 2000).

For both politicians and economists, the logic of using GDP per capita as a measure of social welfare is therefore simple and attractive; if the economy is growing so must social welfare, if GDP per capita falls, so to does social welfare. Within Thailand, an increase in GDP per capita of over twenty times within three decades is a very positive message to share.

Total GDP is an aggregation of revealed preferences. The concept of revealed preferences is described as ‘one of the most simplest, but also one of the most powerful, in economics’ (Quiggin 1996, p. 46). By observing how individuals allocate a certain sum of money over a specified period of time, data can be collected on people’s preferences for particular consumption bundles (Hufschmidt et al. 1983). The underlying assumption of this approach is rational behaviour (Hausman and McPherson 1996).

Given limited income, if an individual chooses a specific consumption bundle (q^0) then q^0 is the consumption bundle preferred over all other consumption bundles. If in period two, the individual then chooses q^1 when q^0 (the original consumption bundle) could have been afforded, it can be shown that q^1 is preferred to q^0 (represented by $q^1 > q^0$) and thus welfare has increased. ‘So even when the consumption bundles are not obviously comparable, the revealed preference approach may permit us to determine whether consumers are better off’ (Quiggin 1996, p. 46). Such an approach implicitly assumes optimality (Sen 1984).

The standard welfare economic framework compares policies on the different allocations of consumption bundles that they generate. By supposing that society consists of a number of individuals (1, ..., n) each of whom, it is assumed, have different preferences for different consumption bundles, comparisons between different policy outcomes can be made (Quiggin 1996; Dowrick 1994).

The satisfaction of preferences is conventionally therefore expressed through consumption. Welfare measurement has traditionally been concerned with consumption demand or consumption surplus modeling (Blundell et al. 1994 – for a recent innovative approach using consumption see Islam 2000). Welfare is increased with increased preference satisfaction and thus consumption (McKenzie 1983). Consumption, or expenditure, can be a function of welfare if the ‘expenditure function gives the minimum total expenditure required to attain a base level of individual welfare’ (Jorgenson 1997, p. 40).

An interesting critique of consumption as a measure of social well-being is that consumption is not the end state within the economic growth cycle, but rather, the last stage is waste (Illich 1992). The second law of thermodynamics (Georgescu-Roegen 1971, 1981) supports this view.

Hidden behind Thailand's impressive economic growth figures though is an increasing gap between the rich and the poor within Thailand. Income distribution has worsened in Thailand between 1975 and 1999 (Clarke 2001a, 2001b). Therefore, whilst personal consumption has increased in aggregate, it cannot be assumed that this increase within Thailand has occurred evenly at all income levels. Further, Thailand also has spatial differences of income distribution (Warr 2001). As discussed, whilst absolute poverty has fallen (Kakwani and Krongkaew 2000), relative poverty has increased. Whilst Bangkok is one of the largest markets for Mercedes Benz cars in the world, certain regions within Thailand experience poverty at levels similar to those recorded in sub-Saharan countries in Africa (Watkins 1998).

Despite these reservations, personal consumption in Thailand has increased by some degree for all levels of society. If social welfare is linked to personal consumption through revealed preferences, social welfare has increased over the last twenty-five years and economic growth has indeed been desirable.

2.5.2 Measuring Social Welfare by Happiness: In Theory and in Thailand

Another approach to understanding the desirability of economic growth is to review its impact on social welfare when social welfare is considered, not as preference satisfaction as above, but rather as increased well-being / happiness.

Jevons (1871) noted that happiness and welfare are identical (see Ng 2001 for a more recent statement of this position). In an ideal economic world, happiness would be measured by utils:

...it is conceivable that, perhaps several thousands (or million) years from now, neurology may have advanced to a stage where the level of happiness can be accurately correlated to some cerebel reaction which can be measured by a "eudaimonometer". (Ng 1979, p. 5)

However it is not an ideal economic world and such measurements are not possible (though work has begun – see Williams 2000).

Hirsch (1995), Watchel (1989), and Easterlin (1973) draw on surveys undertaken over a period of years and in a number of different countries (developed and undeveloped) which indicate that happiness is not tied to absolute income levels (also see Ng 1999; Fellowes 1999). Rather, most people judge their positions in society in relation to other people (Hirsch 1995; Kakwani 1997a). These surveys show that in the U.S.A. the year in which people described themselves as very happy peaked in 1957 despite GDP more than trebling since then.

In comparisons between countries, there is a close correlation between happiness and relative wealth, not absolute wealth; wealthier people claim they are happier than the poor (see Saunders 1996; also Gerdtham and Johannesson 2001). However, those in poorer countries do not judge themselves to be any less happy than those in wealthier countries. ‘What matters ... is less one’s own present income than the present and past incomes of other people’ (Hirsch 1995, p. 36 – also see Atkinson 1983a; Kanbur 1987; Thurow 1980; Clayton and Radcliffe 1996). This is an echo of John Stuart Mill’s statement in the 19th century, ‘Men do not desire to be rich, but to be richer than other men’ (Daly 1991, p. 188; also see Frank 1999). In a similar vein, Potter (1954) observed that Americans judge their worth not from where they are but from where they began.

If an increase in wealth leads to happiness it is only a temporary situation, a disequilibrium of sorts. ‘Happiness is not the result of being rich, but a temporary consequence of having recently becoming richer’ (Inglehart 1990 cited in Myers 1999, p. 3). Equilibrium will soon return and peoples’ levels of satisfaction will subsequently fall.

Pusey (1998) notes that happiness is the normal human condition and thus evidence from surveys, which find that people in poor countries are just as happy as those in rich countries, have not debunked a myth regarding wealth and happiness. Such results have simply proven that the state of happiness is by and large the normal state of existence.

‘We would then expect average self rated happiness to be constant over time’ (Brekke 1997, p. 115). This process is described as an adaptive mechanism (Travers and Richardson 1993; Ng 2001). Even amongst the most appalling conditions, happiness will be found in small mercies (Sen 1990).

Accordingly, there are no real benefits from economic growth if social welfare is measured by happiness. Regardless of the increases in personal consumption, the adaptive mechanism will result in people’s well-being remaining at a general equilibrium. This is particularly the case in developed countries whose population have attained a basic level of need.

Hirsch (1995) distinguishes between *material* goods and services and *positional* goods and services. The former are those goods and services that can be mass produced (such as cars and clothes). The latter are limited in a real sense (such as sea-side properties and professorships). Further *material* goods will not increase happiness, only unobtainable *positional* goods will (Hirsch 1995 – also see Durning 1982; Winch 1971; Galtung et al. 1982). Indeed, the resultant disappointment when these material goods fail to increase happiness can actually be detrimental to social welfare. This is the *Paradox of Affluence* (Hirsch 1995). Cochrane and Shaw Bell (1956) also noted the tendency for aspirations to run ahead of fulfillment (also see Abrams 1973). ‘The ancient moralists have all held Man then should limit his desires, that the pursuit of ever more goods and services as folly, bound to make men wicked and miserable’ (De Jouvenal 1969, p. 101).

For countries such as Thailand, the same remains true, additional *material* goods fail to increase happiness. One of the effects of globalisation on countries such as Thailand is that the relative standards and reference points of expectations for all levels of society can become those of the United States (Department of Treasury 1973; Max Neef 1991; Cochrane and Bell 1956). Therefore, an additional cost of economic growth may be the disappointment of unrealised unrealistic expectations (Hutanuwatr 1998; Muzaffar 1998; Schaumacher 1993a, 1993b). Additional income may be necessary simply to maintain static levels of happiness (Ng 2001; Parris 1997). However, if happiness is an adaptive

emotion, then it is difficult to imagine that social welfare has increased as dramatically within Thailand as would be suggested by increases in national income or consumption. For many, the increases in economic growth have lifted them above poverty lines, which must bring increased pleasure. But for those seeking increased social welfare through the attainment of *material* goods, disappointment will occur when comparing their lifestyles to western standards. Using this method it is difficult to gauge whether economic growth has been desirable or not within Thailand.

2.5.3 Measuring Social Welfare by Alternative Measures: In Theory and in Thailand

Whilst preference satisfaction and happiness are two major approaches to welfare measurement, a number of alternative measures do exist.

2.5.3.1 Functioning and Capability

Ruskin, writing in the mid 19th century, defined wealth not simply as the measurement of economic possessions but the capability of utilizing them in an appropriate manner (Smith 1993). Cochrane and Shaw Bell's definition of utility is based on a similar approach. 'The consuming unit buys food, clothing, shelter, and recreation and transforms them into satisfaction, or utility' (Cochrane and Shaw Bell 1956, p. 95).

Sen (1984, 1985a, 1987a, 1987b, 1993) takes this approach further and argues that welfare is not measured by the possession of a commodity, nor the utility of the commodity, but rather by what the person actually does with the commodity. Sen terms this the 'functioning' of a commodity. Sen further argues that the use of the commodity is measured in 'functioning vectors' and some basic agreements can be made as to the ordering of these vectors. Therefore, whilst the comparison of functioning vectors is not a measurement of welfare, it can be a comparable approximation (see Chakraborty 1996). An attempt at evaluating the ordering of these capabilities can be taken and this 'can indeed take us some distance – often quite a distance' (Sen 1992, p. 43) in measuring welfare. Whilst taking a different approach, the work of van Praag (1993) is not too

dissimilar to this. The concept of functioning and capability has become a central tenet of “new welfare economics” (Williams 1987; Islam 2000).

Increasing attempts have been made to operationalise Sen’s functioning and capability concept (Sen 1985a, 1987b; Lovell et al. 1993; Travers and Richardson 1993; Comin 2001; Martinetti 2001). Lovell et al. (1993) found that resources are not related strongly to functionings and therefore the attainment of a high quality of life (functionings) is not dependent on high levels of material standard of living (resources). The key is the efficiency by which people use their resources (Denison 1971). Thus, efficiency or skills or social habit (Travers and Richardson 1993) allow ‘people with relatively low levels of resources to lead a relatively high quality of life, and vice-versa’ (Travers and Richardson 1993, p. 48).

Whilst such an empirical application has not been undertaken for Thailand, it is probable that similar findings would be found. Despite increases in income levels (notwithstanding the accompanying increase in inequality), high income is not sufficient in itself to increase functionings. Therefore, within this analysis, it is likely that economic growth is neither desirable nor undesirable, it is simply a neutral factor.

Other issues such as personal circumstances (including health), the environment, social climate and social state are all contingencies which ‘can lead to variation in the “conversion” of income into the capability to live a minimally acceptable life’ (Sen 1999a, p. 360). The importance of Sen’s analysis of functioning and capability is that it allows quality of life to be separated from material well-being (also see Sen 1985b), but also that it can be used to consider the various levels of hierarchy of welfare concepts (see Comin 2001).

2.5.3.2 Capital Stock

Capital stocks include all capital in a society; both fixed capital such as factories, schools and roads, and natural capital including air, undiscovered fossil fuels and the oceans.

Capital stocks are the resources (both natural and non-natural) which are available to a society to be used or transformed into capital flows, incomes or consumption.

Welfare should be measured by the maintenance of capital stock levels, rather than by the demise in the form of production, income or consumption. Decreasing levels of capital stock is not sustainable and thus welfare is best enhanced when the Hicksian definition of income is applied to capital stocks. Within this regard, Hicksian income of capital stock use means that the amount of capital stock destroyed in any one period cannot be greater than that added to capital stocks during that same period. Hicksian income is closely related to Fisherian income which is the ‘the minimum amount a nation can consume while ensuring that members of all current and future generations can have lifetime consumption or utility that is at least as high as the current consumption or utility’ (Nordhaus 2000, p. 259). This sustainable analysis of capital stock means that society’s welfare will fall should net capital stocks fall. Therefore, society’s aim should be to enjoy capital stock with as little consumption and production as possible in order to increase welfare (Boulding 1949-50). This is the basis of a steady-state economy (Daly 1991).

Within Thailand there has been a decrease in natural resources but an increase in non-natural capital. Depending on how the issue of substitutability (weak or strong sustainability) is treated (see Lawn 2001; Harris and Fraser forthcoming; Gutes 1996 for discussion of this issue), the overall capital in Thailand may have increased or decreased or remained unchanged. It is again difficult therefore to determine the desirability of economic growth on social welfare using this method of measurement.

2.5.3.3 Rawls’ Primary Goods

Primary social goods are those goods desired over all other goods people may want (Rawls 1971). Behind a *veil of ignorance* members of society determine the minimally acceptable level of primary social goods, such as education and income levels that a rational individual would choose to have if their position in society could be at any level. For example, given an equal chance of being very rich or very poor, a rational individual

is asked to choose what minimum level of education and income would be acceptable in that society.

Society should contribute only to these primary goods and allow individuals to pursue (through luck and hard work) anything else which makes them happy. Welfare therefore should not be measured by the success of what individuals achieve in terms of preferences satisfied or the well-being achieved, but only by what society contributes to achieving primary social goals.

Rawls' approach avoids the expensive tastes and anti-social preference problems and, as he argues, provides a more impartial perspective for comparing what society contributes to the well-being of difficult individuals than a preference standard does. (Hausman and McPherson 1996, p. 82)

Primary goods in Thailand may include education and be represented by primary and secondary school enrollments. Primary school enrollments have increased from 81% to 99% between 1975 to 1999 and secondary school enrollments have increased from 25% to nearly 40% during the same time (again, spatial differences exist with respect to these figures) (NSO various publications). Primary goods may also include a minimum level of income. As absolute poverty levels have fallen it can be inferred more Thais have achieved this minimum. Social welfare measured by Rawls' primary goods in Thailand can be said to have increased and much of this increase has been caused by economic growth. The conclusion is that economic growth is considered desirable.

2.5.3.4 Other Measures

In addition, there are a number of other well known welfare measurement methods including the following (Islam 2000; Bonner 1986; Johansson 1991):

- aggregate consumer's surplus;
- producers' surplus
- Pareto efficiency and optimality;
- Debrue's efficiency index;

- Frisch's marginal utility of money; and
- compensated demand curve.

To further complicate the analysis, welfare has also variously been defined as a function of health, education, security, individual freedom, culture, social relationships, revealed consumption choices, levels of contentment, control over resources, satisfying of wants, freedom, the environment, leisure, housing and almost all combinations of the above. Nicholson (1949 - cited in Atkinson 1983a) thought that welfare could be measured by consumption of beer! According to national accounts, consumption of beer has increased in Thailand over the past twenty-five years so according to this approach so too has social welfare (NSO various publications). As if these options were not enough, welfare should also 'include, in addition to economic variables, every other interdependence that directly or indirectly affects men's well being' (Zolotas 1981, p. 32).

2.6 CONCLUSION

Thailand has experienced many changes over recent decades. These changes have occurred within its economic, environmental, political, social and spiritual sub-systems. These changes have all interacted and impacted upon one another and resulted in Thailand's unique history. But at the same time, Thailand remains a suitable representative developing country as it is characterised by the same phenomena that developing countries share; rural – urban migration, a dualistic economy, environmental degradation, etc. More importantly though, Thailand's success in achieving economic growth has resulted in it being presented as an economy worthy of imitation. Thus, if countries are presently not like Thailand they aspire to be.

Within the literature, the costs and benefits of economic growth have been discussed, but within the dominant paradigm the benefits are considered to outweigh any associated costs. Thus, economic growth is desirable. As discussed though, the costs of economic growth are numerous and varied and Thailand has experienced many of them. One method of determining the desirability of economic growth therefore, in terms of social

welfare is to measure the net benefits of economic growth. The first democratic social welfare function, which is developed in the next chapter, undertakes this exercise but does so utilising social choice theory within a systems analysis framework.

Calculating the net benefits of economic growth is not the only way of measuring social welfare. Various methods are possible, but as seen in this chapter, the results are often confusing and contradictory. Within Thailand, measuring social welfare by using preference satisfaction or personal income suggests economic growth has been desirable, but measuring social welfare as well-being / happiness suggests that this desirability is not very strong. Likewise, the use of functioning discounts the desirability of economic growth as does the Rawls' primary goods approach.

Thailand has experienced high levels of economic growth over the last twenty-five years, but no consensus can be found on the desirability of this growth. The following chapters seek to add to the current debate by developing two new analytical tools by which social welfare can be measured. Both social welfare functions are developed using social choice theory and systems analysis and both are variations of the two main methods of measuring social welfare. The first is based on measuring social welfare via preference satisfaction (Chapters Three to Five) and the second is a variation of measuring social welfare as well-being / happiness (Chapter Six). Welfare analysis of the impacts of economic growth on two contemporary development issues occurs in Chapter Seven. Results and illustrative policy guidelines are discussed in Chapter Eight before the thesis is concluded in Chapter Nine.

CHAPTER THREE – A NEW AGGREGATED MEASURE OF SOCIAL WELFARE

3.1 INTRODUCTION

Determining the desirability of economic growth is not a simple exercise. In the previous chapter a number of conventional methods of defining social welfare were reviewed and their application to Thailand briefly discussed. By the chapter's end, it was evident that the apparent desirability of economic growth was dependent on how social welfare was defined and measured. Using alternative conventional methods, it was possible to view economic growth in Thailand as desirable, undesirable or neutral.

A new social welfare function based on certain cost and benefits adjustments to national income will be introduced and justified before being empirically applied in the next two chapters. This new social welfare operationalises social choice theory.

As discussed in the previous chapter, revealed preferences are a conventional method of measuring social welfare. Standard national accounts, particularly GDP or national income, are the common expression of these revealed preferences for the macro economy. Of these, GDP per capita has historically measured society's welfare within development economics (World Bank 2001) despite the growing literature noting the limitations of this approach (Sen 1976, 1982; Morris and McAlpine 1982; Cobb et al. 1995; Samuelson et al. 1978; Gillin 1974; Neumeier 1999; Ayres 1998; Nordhaus and Tobin 1973). Recent work within welfare economics has begun on adjusting these aggregate standard national account statistics so they more closely reflect aggregate welfare (Nordhaus and Tobin 1973; Daly and Cobb 1990). With increasing costs of economic growth and doubts about the long-term sustainability of such growth, it is now an appropriate time to apply new measures of social welfare to a developing economy. By incorporating a more intuitive understanding of social welfare (by adopting systems

analysis), and by including questions of aggregation (by utilizing social choice theory), more effective and social welfare enhancing policy recommendations are possible.

This chapter is structured as follows: Section 3.2 discusses the conventional uses of aggregate standard national account statistics as a measure of social welfare and the limitations of such a measure. Section 3.3 introduces the first new social welfare function before 3.4 reviews a number of previous adjusted GDP measures of social welfare. The concept of social welfare functions is introduced in Section 3.5 and the chapter is reviewed and concluded in Section 3.6.

3.2 AGGREGATE STANDARD NATIONAL ACCOUNTS AS THE STARTING POINT

The concept of calculating a nation's product predates the development of the aggregate standard national accounts and was explored in Petty's *Political Arithmetik*, Smith's *Wealth of Nation* and Marshall's *Principles of Economics*. The modern system of national accounts was initially developed just prior to and during World War Two. The most widely used aggregate standard national accounts is GDP.

From its inception, GDP per capita has been used as a measure of social welfare (McLean 1987). High GDP per capita is considered a measurement of high social welfare. Similarly, a high level of growth in GDP per capita, economic growth, is considered a measure of the increase in social welfare. As such, it is now widely considered that economic growth is the measure of change in social welfare (Beckerman 1974, 1992, 1994; Dodds 1997; Drake and Nieuwenhuysen 1990; Jones 1988; Eltis 1966; Hoselutz 1960; Manning and de Jonge 1996; Moss 1968; Thirlwell 1999).

As discussed previously (see Chapter 2, Section 2.5.1), there are legitimate reasons why GDP and other aggregate standard national account statistics, such as national income, are used as a measure of social welfare (Hicks 1940; Pigou 1920). These aggregate statistics measure what is produced within the economy and therefore are a measure of

economic activity. These aggregates include activities such as food production, textiles and manufacturing and diseconomies such as defense spending, the justice system and certain health expenditures. Clearly these aggregate statistics accurately measure economic activity, but the question remains; is this the same as measuring social welfare? If social welfare is delineated into two parts, economic and non-economic, there is an “unverified probability” that economic welfare is a barometer of the “index of total welfare” (Pigou 1920). ‘The economic welfare of the country is intimately associated with the size of the national dividend, and changes in economic welfare with changes in the size of the dividend’ (Pigou 1962, p. 50). Within this position therefore, aggregated economic activity increases, so to does social welfare.

When policy makers explicitly or implicitly accept the identification of economic welfare with the supply of goods and services, they effectively ignore the differences between economic and non-economic welfare and the fact that activities favourably affecting economic welfare may conceivably affect non-economic welfare unfavourably (Abramovitz 1961). Therefore whilst economic growth might increase economic welfare, it may reduce non-economic welfare. The cumulative effect on social welfare may be positive, negative or neutral (Islam et al. 2001), however this approach assumes it to be positive.

Assuming this positive approach between economic growth (EG) and society’s welfare (W), it is reasonable to express this relationship as

$$W_t = w_t(EG_t) \quad [3.1]$$

If welfare is a function of economic growth the issues of poverty, the environment, inequality, are not explicitly taken into account. As such, society’s welfare is overestimated by ‘including items of negative as well as positive utility, and by including material substitutes as satisfiers for emotional needs’ (Clayton and Radcliffe 1996, p. 177).

Another difficulty with this functional relationship is that it is positive. If economic growth increases so to does social welfare. Likewise, if economic growth decreases, so to does social welfare. This relationship does not allow for social welfare to decrease with increasing economic growth or increasing social welfare when economic growth is falling.

A relationship between economic growth and social welfare can be more sophisticated however. Various relationships between economic growth and social welfare can be described. Rather than social welfare being a direct function of economic growth, social welfare (w) is a function of only part (d) of economic growth (EG).

$$W_t = f(dEG_t) \quad [3.2]$$

Following this, social welfare (W) can then be considered a function of the negative (C) and positive (B) aspects of economic growth (EG).

$$W_t = f(B\{EG\} - C\{EG\}) \quad [3.3]$$

A further step, is that society's welfare is a function of the costs and benefits of economic growth plus a function of other sub-systems. Therefore, this social welfare function makes explicit that all sub-systems impact directly on social welfare and thus social welfare will increase or decrease depending on more than simply movements of economic growth.

Economic growth is the basis of each of these functional relationships. As discussed in Chapter Two, Section 2.2.2.2, economic growth is a dynamic concept usually measured by comparing the levels of two static aggregated standard national account measures. Conventionally this measure has been GDP (or GDP per capita). It is also possible to measure economic growth by comparing the levels of other aggregated standard national account statistics, such as national income (including per capita versions).

Total GDP is based on the calculation of prices and quantities:

$$\text{GDP} = q \cdot p \quad [3.4]$$

where: q is a vector of outputs ($n \times 1$), $[q^1, q^2, \dots, q^n]$
 p is a vector of prices ($1 \times n$), $[p^1, p^2, \dots, p^n]$

As discussed in the previous chapter (Chapter Two, Section 2.5.1), by observing how individuals allocate a certain sum of money over a specified period of time, data can be collected on people's preferences for particular consumption bundles (Hufschmidt et al. 1983).

At an aggregate level, GDP is the summation of all individuals' revealed preferences. Just as revealed preferences can indicate whether the welfare of an individual has increased or decreased, thus, so to can GDP indicate this for the entire economy. GDP as [3.4] is a consumption bundle for a given period. Changes in [3.4] are implicitly assumed to indicate changes in social welfare.

There are two main methods of preparing an index number. The Laspeyres method has a fixed quantity base (p^1q^0/p^0q^0) whilst the Paasch method has a current quantity base (p^1q^1/p^0q^1). This results in the Laspeyres index being biased towards the base quantity purchased and thus can be made redundant if the index cover too lengthy a period. Accepting that movements in GDP per capita (i.e. economic growth) is a proxy of social welfare, positive movements of the index indicate an increase in social welfare, whilst negative movements of the index indicate a fall in social welfare. (Limitations of these indices are discussed in Section 3.2.2.8).

It is important to determine whether people are becoming worse off or better off between periods because of changes in GDP per capita (Kakwani 1997b). To make this determination it is necessary to remove price fluctuations in GDP per capita between periods in [3.4] (Kakwani 1997a). Using a fixed price can deflate changes in GDP per

capita. This real measure of GDP per capita is a better measure of welfare (Usher 1980; Blundell et al. 1994).

$$\text{Real GDP} = q \cdot p^0 \quad [3.5]$$

where: p^0 is a vector of base year prices

It should be noted though that within larger countries, price changes can differ spatially (Kakwani 1997c).

Assuming fixed prices (using p^0 , which is the Laspeyres method), welfare increases if:

$$q^1 > q^0 \quad [3.6]$$

where: q^1 is a vector of current year quantities

When comparing social welfare over two periods using [3.5], two clear outcomes can be observed. In the first, consumption bundle $q^1 \cdot p^0$ is preferred to consumption bundle $q^0 \cdot p^0$:

$$q^1 \cdot p^0 > q^0 \cdot p^0 \quad [3.7]$$

This indicates that the consumer is unambiguously better off because the consumption bundle ($q^1 \cdot p^0$) in the second period was higher than the base period consumption bundle ($q^0 \cdot p^0$).

In the second, consumption bundle $q^0 \cdot p^0$ is preferred to consumption bundle $q^1 \cdot p^0$:

$$q^1 \cdot p^0 < q^0 \cdot p^0 \quad [3.8]$$

the consumer is unambiguously worse off because the consumption bundle in the second period (q^1, p^0) is less than the consumption bundle in the first period (q^0, p^0).

There are also two non-clear outcomes. This is when q^0, p^0 is chosen in the second period when the higher q^1, p^0 could have been chosen. Similarly, when q^0, p^0 is chosen in the base period when q^1, p^0 could have been selected. In these instances ‘it is clear that both of them cannot indicate the direction in which the economic satisfaction... enjoyed by the group has changed’ (Pigou 1962, p. 64). This has also been called the *index number problem* (Quiggin 1996).

In addition to these ambiguous outcomes, a number of other concerns including changing tastes and preferences and intertemporal comparisons still exist when comparing real GDP per capita, [3.5], between two periods to determine welfare changes (see Sections 3.2.1 and 3.2.2).

Total GDP is a reasonable measure of all domestic goods and services produced within the official market economy. GDP (total and per capita) has assumed an importance since its inception as its emergence as the leading economic indicator (Cobb et al. 1995). As GDP per capita is the indicator of social welfare, policies to increase welfare are actually aimed to increase GDP per capita instead. As a result, Cobb et al. (1995) argue that GDP-centric policies, especially in developing countries, can undermine household economies thereby reducing the social welfare of these societies in addition to harming the habitat.

Standard national accounts are also criticised from a feminist perspective in that they totally exclude such activities as breastfeeding and informal sectors that are usually undertaken by women and children (Henderson 1994; also see Waring 1987 as the seminal work in this field). The exclusion from these calculations is an implicit statement of the (lack of) value and importance of women and children’s contribution both to economic activities and social welfare. Various calculations estimate that for Australia for instance, breastfeeding is of greater value than total mining resources (Smith and Ingham undated).

GDP per capita as a measure of social welfare is limited in two major ways. Firstly, it faces the limitations inherent in its own construction. Secondly, it is limited through the inherent faults of price indexes.

3.2.1 Inherent Limitations

Major criticisms leveled against aggregate standard national accounts, as measures of social welfare, have been identified (Islam and Clarke 2000). The inherent limitations of aggregate standard national include:

- registering only monetary changes in the economy and leaves out non-market transactions such as household production.
- attributing equal value to economic goods and economic bads.
- double counting problems and their solutions.
- considering natural resources to be free.
- placing no value on leisure.
- ignoring human freedom.
- ignoring the liabilities of living on foreign assets.
- ignoring income distribution.

3.2.1.1 Household Production

Important components of social welfare are those activities undertaken within households such as child rearing, housekeeping and small-scale food production. These activities are not captured within aggregated standard national accounts and therefore are excluded from social welfare comparisons. Within poorer countries, much of the activities undertaken occur within this sector and therefore aggregate standard national account statistics are underestimated. These activities are only captured when they are moved into the official economy such as when others from outside the household are paid to undertake these duties. If a member of a household once cleaned the home and then stopped and began employing a professional cleaner to do this same work, social welfare for those in that household would not increase (ignoring for the moment the social

welfare benefits increased leisure from being freed from the drudgery of housework provides) but GDP per capita, for example, would (the reverse situation also holds true). As a social welfare indicator this falsely reports movements in welfare.

3.2.1.2 Economic Goods and Bads

Aggregate standard national accounts calculate the impacts of all economic activities, whether they are positive or negative. Should crime within a community increase dramatically and the need for jails subsequently increase, GDP per capita will note this increased economic activity as a positive outcome. Similarly, increasing spending on armaments is recorded as a positive increase in GDP per capita (and therefore a positive increase in welfare).

3.2.1.3 Double Counting

There is a lack of discrimination in the calculation of aggregate standard national accounts between the money spent on causing problems and the money spent on solving them. Thus, if production increases at a polluting factory, GDP per capita rises. If at the same time, the government increases spending on pollution control to combat the increased level of pollution caused by the increased production, this is also included in GDP per capita. Therefore, in order to maintain the original level of pollution (and social welfare), GDP per capita has double counted the activities undertaken. So whilst pollution levels have been maintained, GDP per capita has increased thus giving the false impression that social welfare has increased.

3.2.1.4 Free Natural Resources

Many economic activities treat natural resources to be free. That is, the cost of dumping wastes into rivers, or pollution into the atmosphere are not added to the cost of production and therefore are not considered to be economic costs. Likewise, soil quality is often reduced through over farming, yet the reduction of humus in soil is not included as a cost of production (Repetto et al. 1989; Daly and Cobb 1990; Hamilton 1998). If natural resource costs were internalised into the cost of production, the true cost of production would be increased, as would aggregate standard national account measures, such as

GDP per capita. In this instance, GDP per capita understates the true cost of economic activity.

3.2.1.5 Leisure

Social welfare can be increased through increased levels of leisure (Linder 1970), however, aggregate standard national accounts do not include the cost of leisure. If employees were forced to work 12 hours per day, six days a week, production and GDP per capita may increase but the loss of social welfare due to the loss of leisure would not be reflected in this heroic increase in GDP per capita. Leisure has been included in some adjusted aggregated standard national account measures of social welfare (Sametz 1968; Nordhaus and Tobin 1973), but not all (Daly and Cobb 1990).

3.2.1.6 Human Freedom

Similarly, human freedom is a concept closely linked to social welfare, but it is difficult to value in monetary terms. Again, aggregate standard national accounts could be increased dramatically if human choice was removed and economic activity took precedence over political and social demands. Social welfare is both physical and psychological (Liu 1977). Human and political freedom is a very important psychological factor in calculating social welfare, yet is entirely excluded in the calculation of statistics such as GDP.

3.2.1.7 Foreign Liabilities

Sustainable economic growth cannot be assumed if it is based on the liabilities of foreign assets. Loans for consumption or unproductive assets bolster aggregate standard national accounts in the short term, but reduce social welfare in the long run when increased resources must be diverted to repay these loans.

3.2.1.8 Income Distribution

A serious difficulty in social welfare measurement based on preference satisfaction is the treatment of income distribution (Sen 1976). The law of diminishing returns suggests that social welfare is intrinsically linked to income distribution. Aggregate standard national

account measures are income distribution neutral, in so far as income distribution is not a factor in calculating these statistics. ‘It is evident that any transference of income from a relatively rich man to a relatively poor man of similar temperament, since it enables more intense wants to be satisfied at the expense of less intense wants, must increase the aggregate sum of satisfaction’ (Pigou 1962, p. 89 – also see Dalton 1920). Using GDP per capita as a social welfare indicator is incomplete as it does not reflect changes in social welfare caused by income distribution.

3.2.1.9 International Comparisons

Using aggregated standard national accounts as measures of social welfare when comparing countries has three major difficulties (Nafziger 1997; Latouche 1996). Firstly, the aggregate standard national accounts understate economic activity, particularly for developing countries. Economic activity is only included in these statistics if it occurs within the “official” economy. It does not include goods and services produced within the home for their own use, rather than for sale in the market place. As this occurs more in developing countries, GDP per capita, for example, has a bias towards developed countries. Secondly, aggregated standard national accounts in developed countries is overstated because it includes goods and services that could be considered intermediate goods and services. These goods and services reflect the costs of producing (such as business suits, business lunches, pollution controls) or guarding income (such as national defense or law enforcement). Finally, as aggregate standard national accounts comparisons are usually made in US dollars, most developing countries have an undervalued currency. Exchange rates are determined, partly, through international trade levels, and as many developing countries do not trade their cheap, labour-intensive goods, there is no impact on the exchange rate (L. Johnson 1996). Under these circumstances the purchasing power parity (PPP) is a less biased tool of comparison (Nafziger 1997).

At the micro level, individuals in different countries have different life plans or expectations so that it is even more difficult to compare social welfare across cultures

unless the tastes or preferences of individuals are assumed to be the same as is their ability to enjoy satisfaction.

3.2.2 Limitations of GDP as a Price Index

In addition to these limitations as a measure of social welfare, there are difficulties associated with standard national accounts statistics as a price indices, which further undermines their use as a suitable indicator of social welfare. For a number of reasons price indexes are ‘deeply flawed and give misleading results’ (Jorgenson 1997, p.xxvi).

3.2.2.1 Intertemporal Comparisons

When comparing the social welfare of consumers it must be remembered that people’s social welfare is momentary, in the sense that social welfare of the present is really the only thing that can be considered. ‘People do not actually face the choice of being someone else or living at another age or time’ (Sen 1985a, p. 19). It is of limited use to compare the social welfare of a person today with that of a person living one hundred years ago as neither individuals can transpose themselves to the alternative period to experience the alternative level of welfare. This is a sobering thought in the context of this thesis, which will map social welfare over a twenty-five year period.

Similarly, two contemporaries cannot switch lives to experience the life of the other and therefore social welfare comparisons are again severely limited. In this sense, comparing consumption bundles from different periods (q^1 and q^0 [3.6]) is of limited use. It can provide insights but nothing more than that.

3.2.2.2 Tastes and Preferences

Another difficulty is that tastes and preferences change (Abramovitz 1961) as they are endogenous rather than exogenous (Clayton and Radcliffe 1996). What may have been chosen in period one, may no longer be the preferred choice in period two. Whilst social welfare may appear higher in [3.6], it may be that consumers’ tastes and preferences have changed so that the goods making up q^0 . p^0 provided greater social welfare than q^1 . p^0 . It is difficult therefore to compare social welfare between periods based on fixed tastes and

preferences when that is likely not to be the case. Conversely, it is just as difficult to compare the social welfare of the same group from one period to another when changes in tastes and preferences are taken into account (Clayton and Radcliffe 1996). ‘Hence the utmost we can hope for is a measure which will be independent of what the state of tastes and distribution actually is in other periods to be compared’ (Pigou 1962, p. 58). But this is far from satisfactory.

The difficulty of tastes and preferences is also apparent not just in intertemporal comparisons but in attempting comparisons of two contemporary groups. As GDP per capita comparisons, for example, are now one of the most common exercises in welfare economics, different groups of people with different tastes and preferences are having their levels of social welfare compared. This is rather than the traditional economic welfare approach, which is concerned with ‘comparing *alternative* positions of the *same* group of people’ (Sen 1970, p. 19 – original italics). This change in welfare economics is brought about through the use of GDP as a proxy indicator of social welfare.

...this illustration is only relevant to the present purpose on the unreal assumption that English and German workmen’s tastes are the same and that their purchases differ solely on account of differences in their income and in the price charged to them. (Pigou 1962, p. 63-4)

3.2.2.3 New and Old Commodities

Changes in tastes and preferences may occur for a number of reasons. New commodities are constantly replacing old commodities and as these changes occur, consumers may change their tastes and preferences from the old to the new. This may occur because the new products are better, cheaper or more fashionable, but it may also occur because the old commodities are removed from the market place altogether only leaving the new commodities available for consumption. ‘If, therefore a commodity is available for purchase in one of any two years but not in the other, the satisfaction yielded by this commodity in the year in which it is purchased is wholly ignored by these measures. So far then as “new commodities” are introduced between two periods which are being

compared, the measures are imperfect' (Pigou 1962, p. 68). It may be that $q^1 \cdot p^0$ is higher than $q^0 \cdot p^0$, [3.6], but this may be because of changes in products being made. It may be that $q^1 \cdot p^0$ is higher simply because the new commodities being manufactured are cheaper and easier to produce than the products produced in $q^0 \cdot p^0$. The new products may also be of lesser quality and thus not provide a high level of welfare. Consumers may have also preferred $q^0 \cdot p^0$ products but cannot consume them in the second period and therefore have reduced social welfare.

These imperfect measures are cumulative and thus comparisons of social welfare by GDP per capita over a long time series almost become a fruitless exercise, as 'it would be inconsistent to compare index numbers based on different reference situations' (McKenzies 1983, p. 128). This is especially the case when the enormous changes in commodities that have occurred in the last decade alone are taken into account. How can the social welfare of the current period, which includes laptop computers, DVDs, and mobile phones, be compared to a period 10 years previously when such commodities did not exist or were not widely available?

3.2.2.4 Change in Capacity to Enjoy Satisfaction

As with the other changes that can occur between periods, which results in price indexes being of limited use, people's capacity to enjoy satisfaction will also change. Also, capacities to enjoy satisfaction (and therefore social welfare) differ between people. 'In comparing the utility of different persons, one may wish deliberately to take account of interpersonal variability of capacity for satisfaction' (Sen 1970, p. 98). For example, in the case of a manic depressant, the ability to enjoy would be higher in manic periods compared to low abilities during episodes of depression.

3.2.2.5 Income Distribution

Income distribution is not only a concern with the calculation of the aggregate standard national accounts. It is also a concern with the price index problem. Changes in income distribution between periods can have consequences for welfare that are not clearly reflected in total GDP as a price index. Equity needs to be taken into account (Jorgenson

1997). Not only can changes in income distribution change tastes and preferences (Pigou 1962), it can also worsen peoples' positions. Therefore whilst production may have increased, [3.5], the deterioration in income distribution may result in the poor being worse off. This has occurred in Thailand (Clarke 2001a, 2001b; Warr 2001). 'The redistribution of income which has occurred with the economic growth has benefited the rich more than the poor... the ultra-poor in Thailand may have become worse off in spite of a high economic growth' (Kakwani 1997d).

By redistributing income from the rich to the poor, expensive goods will give way to the purchase of more immediate and necessary goods. Social welfare of the poor will increase at a greater rate than the loss of welfare experienced by the rich (Pigou 1962 – also see Altman 2000). However, it is argued that such a transference or redistribution has only a short-term effect on social welfare. "When a group of people have passed from a state of poverty, to which they were accustomed and adapted, to a state of relative wealth, to which they have become adapted, will they really derive more satisfaction from the last state of their environment than they did from their first?" (Pigou 1962, p. 84). This is a reflection of the argument that happiness is the natural start of human existence (Pusey 1998; Easterlin 1973; Brekke 1997; Travers and Richardson 1993 – also see Chapter Two, Section 2.5.2).

3.2.2.6 Aging and Migration

Changes in tastes and preferences also occur as the target group being compared intertemporally changes through the natural process of aging or through the process of migration (Boyle 1991). The tastes and preferences of a target group whose average age is 20 are vastly different to the tastes and preferences of a target group whose average age is 40. So whilst the target group hasn't changed, the process of aging has changed their tastes and preferences, thus making comparisons flawed. Likewise, migration can change the tastes and preferences of a target group as new influences and cultural backgrounds are emphasised. Thus, comparing the social welfare of a target group, whose ethnicity has changed over a period of time, has flaws.

3.2.2.7 Price Deflator

Price changes must be taken into account before accurate comparisons are made between periods. As the total GDP is the calculation of prices and quantities, a large increase in prices can actually outweigh a decrease in quantities produced but result in an actual increase in the measured total GDP. Unlike the inherent problems with the changes in tastes and preferences in price indexes, this problem can be overcome with the use of a *price deflator*. This mechanism removes the changes in total GDP caused by fluctuating prices and results in a truer picture of any increases in economic activity. The price deflator is generally related to the consumer price index. It should be noted though that within larger countries, price changes can differ spatially (Kakwani 1997c). The Consumer Price Index (CPI) is the usual price deflator used in total GDP calculations. However, ‘one source of error arises from the fact that the CPI is a Laspeyres index that uses fixed weights in averaging the inflation rates of the individual goods, so substitution is not taken into account as relative price changes’ (Slesnick 1998, p. 2150). Therefore, CPI is overstated reducing total GDP more than it should and thus impacting on social welfare measures.

3.2.2.8 Laspeyres, Paasche and Fisher Ideal methodologies

Difficulties also exist with regard to the calculation of total GDP itself. The Laspeyres index model has an upward bias to price movements because it uses a fixed quantity base which therefore doesn’t take into account the substitution effect. Consumers purchase less quantity of products whose prices are increasing faster and purchase higher quantities of substitutes. The result is a general upward bias in the Laspeyres indexes. The Paasche index suffers the opposite effect, a downward bias, as it uses current quantities as a base (See Wu 2000 for an empirical analysis of the upward and downward biases on total GDP for China). A reasonable and practical assumption is that the substitution effect is zero (Kakwani 1997a). If this assumption is not made then these biases will distort the price index and thus measures of social welfare. As the Laspeyres price index overestimates price changes because it does not take into account substitution, then social welfare will be overestimated. Likewise, the downward bias of the Paasche index will underestimate social welfare.

The disadvantages with the Paasche index model are primarily linked to the practical difficulty in collecting the data required by this model. This is the same data the Laspeyres index model is criticised for lacking. It is an expensive and perhaps unfeasible exercise to fully take into account yearly changes in tastes and preferences, replacement of products, real income changes, changes in community ethnicity or aging. Therefore whilst such an index would be based on current information and be more representative of current expenditure patterns, the collection of such data is unrealistic.

The Fisher ideal index is the geometric mean of both the Laspeyres and Paasche indexes. Whilst providing a single number, rather than an upper (Laspeyres) and lower (Paasche) range of income needs to compensate a change in price, the Fisher ideal index doesn't overcome the practical disadvantages of collecting data required by the Paasche index. Therefore the Fisher ideal index is probably not a practical solution. As a result, the Laspeyres method is most commonly used to calculate price total GDP and is recommended within the internationally accepted system of national accounts (SNA93). Thailand, for example, uses the Laspeyres method (NSO 1997).

The Chain Index method, as developed by Marshall in 1887 (Pigou 1962), can overcome some of these deficiencies (but not the practical difficulty of data collection, which it shares with the Paasche methods). Comparisons are made between periods taking into account changing prices and commodities. However, whilst this overcomes the limitations of the Laspeyres and Paasche, small errors that occur are cumulative and result in large errors over long time series (Pigou 1962).

Whilst some of these inherent calculation faults and inherent price index faults increase and decrease total calculations, it is not rigorous enough to say that if corrected the overestimations would probably cancel out the underestimations and therefore the same end result would occur. Whilst this may in fact be the case, it is appropriate for all errors to be overcome so that a true estimation can be made.

3.3 THE NEW ADJUSTED AGGREGATE DEMOCRATIC SOCIAL WELFARE FUNCTION

This chapter proposes a social welfare function that is predicated on the assumption that the sum of revealed preferences of individuals does not equate to the optimal revealed preferences (Bonner 1986; Boadway and Bruce 1984; Pigou 1962; Rawls 1971; Sen 1982; Arrow and Scitovsky 1969). Considerations included in this new approach include the social welfare impact of income distribution and the various costs and benefits of economic growth analysed within a systems analysis framework (Islam and Clarke 2001a, forthcoming). This approach therefore operationalises social choice theory by explicitly considering society’s choices, preferences and value judgements on a range of non-welfaristic issues that are excluded from the revealed preferences approach.

Thailand’s national income will be adjusted to consider the costs and benefits of economic growth on social welfare using social choice theory. National income is an appropriate starting point for calculating an adjusted aggregate measure of social welfare (see Chapter Two, Section 2.2.2.2). Theoretically, national income is the optimal social welfare within optimal growth models (Islam 2001). Within theoretical optimal growth model literature, national income (NNP at factor cost, see Chapter Two, Section 2.2.2.2) is considered the current value of the Hamiltonian function (Weitzman 1976). If utility (u) is a function of consumption (c) and sustainability represented by depletable stock (s), the aim is to maximise the optimal level of utility:

$$\max_{J_0} \int_0^{\infty} u(c_t, s_t) e^{-\delta t} dt \quad \text{s.t. } s_t \geq 0 \text{ and } \dot{s} = -c_t \quad [3.9]$$

where \dot{s} represents a time derivative.

In an optimal growth model with consumption and sustainability constraints, the current value of the Hamiltonian, which is constant along the dynamic time path, is interpreted as the measure of national income and sustainable social welfare (Islam 2001):

$$H = u(c_t, s_t) e^{-\delta t} - \lambda_t c_t e^{-\delta t} \quad [3.10]$$

As the optimal growth problem is autonomous, the Hamiltonian value (and hence national income) is stationary. Therefore, the Hamiltonian provides a measure of national income that can be sustained forever.

However, this approach fails to incorporate all the associated costs and benefits of national income that improve social welfare within a SEE system approach (Clarke and Islam 2002s, forthcoming; Islam and Clarke 2002a, 2002b). Therefore, adjusting national income results in national income no longer being the optimal level of social welfare.

Social choice theory is the normative framework based on certain value judgements on the valuation of, and preferences for, maximising social welfare. Market perspectives and individual preferences do not optimise social welfare. A divergence exists between aggregated individual preferences and social preference in measuring social welfare (Broome 1995; Ng 2001; Kiron 1997a). Social choice theory makes it possible to find this optimal social outcome by imbedding social preferences within a cost-benefit analysis.

The adjustments to national income being undertaken are considered within a systems analysis approach. Five different sub-systems of society are considered: 1) economic; 2) social; 3) political; 4) environment; and 5) spiritual. There are specific reasons why the social choice perspectives (as opposed to individual or market perspectives) are necessary in each of these sub-systems to measure optimal social welfare.

Economic Sub-system Social Choice Perspective

Market based economies – such as Thailand – are focussed on efficient distribution of scarce resources, not equity. The market outcome may be an efficient equilibrium level and thus be optimal in this regard, however, this equilibrium outcome will not be an optimal equity level (or if it is, this is purely co-incidental). Equity is important in optimising social welfare (Sen 1973a, 1973b; Atkinson 1970; Dalton 1920).

Social Sub-system Social Choice Perspective

Many social outcomes of economic growth are not considered by individual or market preferences. Government expenditure on health and education positively impact on social welfare but are ignored by individual or market perspectives. Similarly, the negative consequences of economic growth in terms of commuting, urbanisation and private expenditure on ill-health are not fully considered by individual or market preferences. Each of these situations must be imbedded in a cost-benefit analysis when seeking to optimise social welfare.

Political Sub-system Social Choice Perspective

As with the social sub-system, there is a divergence within the political sub-system between market or individual preferences and social choice perspectives in maximising social welfare. The benefits of public roads and the flow of services from consumer durables are fully considered in terms of social welfare. Nor are the diseconomies of corruption or public debt considered. All of these impact on social welfare though and a social choice perspective allows their effects to be appropriately incorporated.

Environmental Sub-system Social Choice Perspective

There are a number of externalities that are not considered by individual preferences when the environmental realm is touched by Pigou's (1962) "money-rod". However, these externalities are generally not considered or included within market prices (TDRI 1990). As public resources (air, water, forests) are considered free, the negative social prices of pollution or over-harvesting is not fully considered within market prices. This

results in false levels of market equilibrium in which the market price is artificially low, leading to additional demand.

Social choice perspectives consider the social price of environment damage caused by economic growth and therefore explicitly incorporates the environment in finding optimal levels of social welfare. Further, it is also not possible for environment degradation to end through individual preferences and so intervention by the State (or policy maker) is required to ensure that the social choice of ending environmental degradation occurs (Pezzey 2001, 2002).

Spiritual Sub-system Social Choice Perspective

Market or individual preferences appear to fully exclude the importance of the spiritual sub-system on social welfare. Higher spiritual and moral feelings, such as justice, are not explicitly captured by market preferences (Ng 2001). Market prices do not exist for the common bond between humans. Social choice perspective goes some way (though further work is required) in capturing some measure of the value this sub-system has on social welfare.

By developing a social welfare function based social choice perspectives and the application of cost-benefit analysis to aggregated standard national accounts (in this instance the measure is national income), all social states can be ranked and explicit value judgements can be included in recommending which policies should be initiated (Islam and Clarke 2002a, 2002b; Clarke and Islam forthcoming a). Concentrating on achieving economic growth does not have the richness of choice as the social welfare function does. Increasing economic growth may assist in increasing opportunities and capabilities, but it is not enough on its own (Sen 1984).

Furthermore, social valuation of economic progress needs also to be determined within an explicit cost-benefit analysis framework with the following possible implications for the measurement of society's welfare:

1. shadow pricing a social valuation of economic outcomes and activities; and
2. discounting by the social discount rates chosen on the basis of some social choice theory as proposed in Islam (2001).

3.3.1 Cost-Benefit Analysis

Cost-benefit analysis will be incorporated into the first social welfare function in this thesis to consider the desirability of economic growth. This will account for both economic and non-economic, direct and indirect effects and concerns of economic growth on social welfare through identifying and incorporating these effects, then assigning monetary values through the uses of market prices and shadow prices, and using social time preferences for intertemporal welfare comparisons. This will make the cost-benefit analysis of economic growth an appropriate tool to rank different social states.

Cost-benefit analysis was first developed in the 1930s in the United States to determine the feasibility of constructing large waterway projects. However, the major development of methodology occurred in the late 1960s to the mid-1970s (Little & Mirrless 1969; UNIDO 1972- see Hufschmidt et al. 1983 for a succinct history of cost-benefit analysis).

Cost-benefit analysis is a useful framework to rank social states (or projects) when the forces of private profitability are unable to rank according to social orderings (Boadway and Bruce 1984). It has several components or elements. The first component is to consider all the direct economic and non-economic inputs and outputs. Social states (or projects) considered within a cost-benefit analysis framework have economic inputs and outputs that would be considered in a financial analysis, but they also have non-economic inputs and outputs that also need to be fully captured (Islam and Mak 2000). These may include time saved, risk taking or health improvements.

The second component then is to consider all the indirect costs and benefits. These indirect effects are primarily externalities that are not captured elsewhere in the economy.

They include such things as pollution which affect third parties to the production-consumption relationship.

Having identified all the direct and indirect, economic and non-economic costs and benefits, the third component of cost-benefit analysis is to then assign monetary values to these effects. The monetary value of the direct, economic costs and benefits are found within the market. However, a variety of techniques have been developed (i.e. hedonic pricing, border prices, willingness to pay, etc) to calculate the prices of indirect, non-economic costs and benefits. These are known as *shadow prices*. By assigning monetary values to these non-economic goods, they can be considered with the economic costs and benefits to determine the final ranking.

The final component of cost-benefit analysis is to sum all these impacts for each period but to also convert all these current values into a present value. This is achieved through the use of time preferences and social discount rates (Boadway and Bruce 1984).

3.3.2 Integrating Cost-Benefit Analysis and National Account Measures

In the existing literature, national income accounts and cost-benefit analysis measures are separated. It is often argued that cost-benefit analysis provides a more accurate measure of social welfare effects of policies, projects or economic states compared to national income accounts (see for example Pearce and Nash 1981). In the present thesis it will be shown that the limitations of national income accounts can be overcome, to a significant extent, by integrating cost-benefit analysis and national income accounts measures of social welfare.

Until recently, aggregated standard national accounts, such as GDP per capita or national income per capita, as measures of society's welfare has focussed only on the winners of economic growth. In terms of cost-benefit analysis, GDP per capita or national income per capita are the measures of the benefits of economic growth. Indeed, even the costs of economic growth (i.e. defensive spending on pollution controls or re-forestation programs) are considered positive and are included within these aggregated standard

national accounts. However, to fully measure society's welfare, the losers of economic growth must be correctly taken into account and removed from the aggregation before a rational decision can be made as to the desirability of economic growth. Individuals calculate the benefits and costs within their rational approach to decision making. Similarly, 'the cost-benefit approach has the characteristics of individual rationality' (Pearce and Nash 1981, p. 5 – also see Basu 1980). And, as with individual choices, cost-benefit analysis is based on value judgements (Pearce and Nash 1981) but within a social choices framework.

The application of cost-benefit analysis to national income results in an adjusted national income as both the benefits and costs associated with economic growth are fully considered. This thesis argues that adjusted national income is a better measure of society's welfare, than unadjusted GDP per capita or national income per capita (Clarke and Islam forthcoming; Islam and Clarke 2002). For example, 'it has been known for quite a long-time now that it is impossible to separate distributional issues from allocative issues and in carrying out cost-benefit analysis we should always bear in mind the necessary of using specific value judgements on distributional questions' (Maler 1985, p. 45). This is undertaken as the first adjustment within the first social welfare function developed within this thesis.

Cost-benefit analysis is a technique to find preferred or optimal levels of welfare (Page 1988). By incorporating cost-benefit analysis into calculating and adjusting national income, a more accurate understanding of optimal levels of society's welfare can be reached. The use of cost-benefit analysis allows the new measure of welfare to increase and decrease as both costs and benefits of economic growth are now included, rather than just the benefits. Social choice theory makes explicit the value judgements upon which the definition and measure of social welfare rests based on society's preferences.

By applying cost-benefit analysis to the calculation of national income in order to measure society's welfare, national income is made to more closely resemble real social welfare income levels. By taking into account all the costs and benefits of achieving

economic growth, the adjusted national income becomes a measure of society's real income. Therefore, cost-benefit analysis is closely linked to the calculation of real income:

Benefit-cost analysis is nothing more than a comparison of real incomes before and after the introduction of a given project. The difference between total benefit and total cost is the amount by which real income has increased.

Thus one may treat benefit-cost analysis as an application of the theory of income comparison or income comparison as an application of the benefit-cost analysis depending on where one's main interest lies. (Usher 1980, p. 30)

3.3.3 The Adjusted National Income Social Welfare Function

The adjusted national income (ANI) social welfare function introduced in this paper is:

$$\text{ANI SWF}_t = \sum_{t=1}^T \frac{\text{NB}_t(\text{Ec}_t, \text{En}_t, \text{So}_t, \text{P}_t, \text{Sp}_t)}{(1+r)^t} \quad [3.11]$$

where:

ANI SWF _t	=	adjusted national income
NB _t	=	net benefits
t	=	time
r	=	discount rate
Ec _t	=	economic factors
En _t	=	environmental factors
So _t	=	social factors
P _t	=	political factors
Sp _t	=	spiritual factors

This social welfare function is an expression of the costs of and benefits of economic growth. Normally national income is a criterion of a social welfare function, but in this social welfare function, the costs and benefits of economic growth are used. Therefore it

is possible to specify a social welfare function that includes such things as the environmental and social impact of economic growth. This social welfare function is not the sum of individual welfare but rather a function of the costs and benefits of economic growth on various sub-systems. One of the major costs is income distribution as it is reasonable to ‘incorporate distributional considerations in a cost-benefit analysis’ (Varian 1992, p. 409) based on society’s value judgements on inequality.

The following adjustments will be added to national income as benefits to social welfare from achieving economic growth: 1) public expenditure on education; 2) public expenditure on health; 3) public expenditure on roads; and 4) service flows from consumer durables. The following adjustments will be subtracted from national income as costs to social welfare from achieving economic growth: 1) income inequality; 2) commuting; 3) urbanisation; 4) private expenditure on health; 5) corruption; 6) debt; 7) air pollution; 8) water pollution; 9) noise pollution; 10) deforestation; 11) long-term environmental damage; and 12) commercial sex work (Islam and Clarke 2001a).

Social Sub-system

- Public expenditure on education
- Public expenditure on health
- Private expenditure on health
- Urbanisation
- Commuting

Political Sub-system

- Government streets and highways
- Consumer durables
- Corruption
- Debt

Environmental Sub-system

- Air pollution

- Water pollution
- Noise pollution
- Loss of forests
- Non-renewable resources
- Long-term environmental damages

Spiritual Sub-system

- Commercial sex work

Levels of national income derived from the national accounts, adjusted by a measure of income distribution inequality (Atkinson 1970) represent the economic sub-system.

Obviously as all of these sub-systems inter-relate, some adjustments may cross-over various components (i.e. commuting could be considered an adjustment for social, political, environmental and even spiritual sub-systems – sitting in a traffic jam provides a wonderful chance to contemplate the meaning of the universe and its conspiracy against you!). However, for simplicity, it is of interest to categorise the adjustments within only one of the sub-systems.

3.3.4 Consideration of Intergenerational Equity

This social welfare function (and the second, see Chapter Six, Section 6.4) incorporates consideration of intergenerational equity (also see equations 1.1 and 1.2 Chapter One, Section 1.4). Within aggregate standard national accounts, intergenerational equity is not explicitly considered. Aggregated statistics such as GDP and national income, do not consider the rights, needs and welfare of future generations (or even the present generation one year hence). The failure to do so is a major limitation of aggregated standard national accounts as a measure of society's welfare. Intergenerational equity is concerned with the distribution of costs and benefits and the implications of irreversible decisions over time (Johansson 1987; Page 1988; Rabl 1996). Economic and social decisions impact the present as well as the future. Determining the costs and benefits of future generations is just as important as determining the costs and

benefits for the present generation. ‘Current growth must be achieved without reducing the growth potential in the standard of living of future generations’ (Landau, Taylor and Wright 1996, p. 8).

Due to changes in tastes and preferences, the introduction of new commodities, changes in capacity to enjoy satisfaction and movements in income generation, ‘dealing with extended periods of time can complicate and obscure our ideas of equity and efficiency’ (Page 1988 p. 22).

Intergenerational equity is analogous to intra-generational equity issues but with longer time perspectives and a larger reference set (Smith 1988; also see Clayton and Radcliffe 1996). It is also complicated by four other considerations. Firstly, the reference set is endogenous in the sense that the decisions made by the present generations will impact on whom future generations will actually be (i.e. decision *a* will cause generation *A* to be born, whilst decision *b* will cause generation *B* to be born instead). Secondly, as future generations are not present, their preferences and interests must be assumed by the present generation. This results in an unequal distribution of power in favour of the present generation. The third complication is the practical implementation of these concerns and fourth is trying to include time preferences and capital productivity into deciding the social rate of discount (Page 1988). As a result of the complicated nature of these considerations, ‘the basic issue of the choice of principles for intergenerational aggregation remains unresolved’ (Johansson 1987, p. 162). The use of social choice theory can be used in this determination. It is possible to make value judgements on the needs of those here in the present and those whom will be in the future (Sen 1995). Little consensus has been reached on the appropriate discount rate (see Broome 1991 for a survey of the issues), and numerous options are possible (Islam 2001; Winter-Nelson 1996).

One method which can be used to deal with the concept of intergenerational equity is to adopt a social discount rate (Rabl 1996; Winter-Nelson 1996). However, as with many aspects of welfare economics, little agreement exists as to what constitutes the “best”

social discount rate (Islam 2001). For financial valuation, the market rate of interest is considered the appropriate social discount rate (Johansson 1987). However, within social welfare considerations, such a discount rate renders the rights of future generations to almost zero within only a few decades.

A social discount rate based on market interest rates can lead to a dictatorial social welfare function as the preferences of the present generation are given precedence over future generations, whereas a social discount rate of zero may not address time preferences and uncertainty issues. Whilst under the utilitarian doctrine discount rates are not needed, they are required if it is considered that future generations are finite. The choice of which discount rate to employ (if any) can be linked to Rawls' *Theory of Justice* where the discount rate is chosen not knowing if one belongs 'to a relatively rich or poor generation' (Johansson 1987, p.161). Perhaps Page's each-way bet is the answer:

I believe that there is some ethical appeal in the idea that the present generation should pay some current costs for the later permanent benefits, but I am not saying that we should apply this idea all the time. To do so would result in the tyranny of the majority, in the intergenerational context. (Page 1988, p. 87)

In terms of this thesis, Page may have been suggesting that the present Thai economy suffer the costs of income redistribution to allow long-term benefits for future generations.

Within health economics literature and in particular *quality adjusted life years* (QALYs) methodology, the benefits of those not yet borne are not considered at all 'because they seem not to represent a benefit to anyone' (Broome 1999, p. 209). This approach overcomes the problem of intergenerational equity but does seem unacceptable when considering the social welfare of whole societies are not just individual welfare of those who may never be born.

Within this thesis, a pragmatic decision has been made to use a social discount rate equal to zero. This view is supported by Ramsey (1928), Harrod (1948) and others (see Cline 1992; Broome 1992 for the use of a zero discount rate with regard to global warming). Within the two social welfare functions developed in this thesis, the consequence of a zero discount rate is that the needs of the present generation are explicitly made equal to the needs of the future generations. The impacts of economic growth on social welfare is considered as equally important for both the present and future generations.

3.3.5 Consideration of Money-Metric Implications: Ordinal versus Cardinal

Indices that are money-metric are often considered cardinal. However, comparing money-metric outcomes is still based on conventions. ‘The statement that a household with twice the income of another is twice as well off is no less normative than a similar statement based on utility levels’ (Slesnick 1998, p. 2145). The opposing point of view is that ‘utility is cardinalized by linking it to money incomes (Usher 1980, p. 20). Van Praag (1993) has attempted to develop these conventions by establishing relationships between money-metric and social welfare levels. This adds to the work of Theil and Brooks (1970), who tried to measure the marginal utility of income.

Whilst this approach has found some significant support (Sen 1985a; Blundell et al. 1994), a major criticism is that there are too many assumptions and acts of faith to accept this outcome of a "one-to-one correspondence between van Praag’s utility numbers and individual welfare’ (Osmani 1993, p. 389). However, van Praag’s utility numbers may be of value if the concept of partial comparability is accepted rather than demanding that only the two extremes, full comparability or no comparability, exist. Partial comparability ‘does not require us to feel confident that we can put everyone’s utility in an exact one-to-one correspondence with each other’ (Sen 1999a, p. 356).

However, the mainstream view remains that measuring the marginal utility of income is considered impossible (Pearce and Nash 1981). It is not possible to consider money-metric measures of social welfare cardinal in nature. A cautious note must be heeded by those using money-metric methods (including aggregated standard national accounts and

adjusted-aggregated standard national account social welfare functions such as the first social welfare function developed within this thesis) to measure social welfare that comparing money-metric levels is still not the equivalent of a fully cardinal measure of social welfare.

3.4 PREVIOUS ADJUSTED AGGREGATED STANDARD NATIONAL ACCOUNT MEASURES OF WELFARE – EXTENDING PREVIOUS WORK

As discussed, aggregated standard national accounts (particularly GDP per capita) have been used as a measure of welfare almost from its inception (McLean 1987; Johnson 1996). Whilst not designed to be, the measure of GDP per capita figure has become a proxy measure of the level of society's welfare. This assumes that an increase in GDP per capita is an increase in society's welfare and therefore the reverse is also true. However, a number of recent studies suggest alternative indices to measure society's welfare (UNDP 1996; Moon 1991) They can be used, if they are accurate, to compare increasing levels of society's welfare with corresponding periods of economic growth to see if there is correlation or disparity.

In 1968, Sametz called for a new set of national accounts to be developed that took into account the costs and benefits of changes in environment, similar to the Net National Welfare accounts developed by the Economic Council of Japan. This occurred during a period of an increasingly qualitative debate surrounding the desirability of economic growth (Mishan 1971; Barkley and Seckler 1972; Meadows et al. 1973; McLean 1987). Sametz (1968 and others – for example, the Australian Minister for Environment and Conservation – cited in Samuelson et al. 1978) called for leisure time, new products, non-marketed goods, urbanisation, and government expenditure to be also included.

(As various subsequent authors, see Nordhaus and Tobin 1973, Daly and Cobb 1990, Cobb and Cobb 1994, do not cite Sametz (1968), it is assumed they are unaware of this seminal article).

Sametz argued that ‘change in GNP over long periods of time is not a good measure of economic growth or welfare’ (1968, p. 77). This new approach implicitly defined social welfare as the net benefits of economic growth.

The majority of net benefit indices that have been developed have a similar approach to calculating welfare. Barkley and Seckler (1972) summarise this approach as follows:

$$NSW_t = f(GDP_t - CL_t) + (B_t - GC_t) - AL_t \quad [3.12]$$

where

NSW_t	=	net social welfare
GDP_t	=	gross domestic product
CL_t	=	capital equipment destroyed
B_t	=	non-economic benefits
GC_t	=	costs
AL_t	=	loss of natural resources
t	=	time

Whilst this generic breakdown is an accurate reflection of the basic approach to calculating welfare; the “devil is in the detail”. Different approaches calculate and include and exclude different components, which make up the capital equipment, costs, benefits and loss of natural resources and thus have dramatically different results. The difficulty is determining what is included and what is left out (Brekke 1997). This is a value judgement and must be explicitly justified.

There are difficulties with establishing such indices. These include value judgements and using statistical data that is new or questionable. Value judgements are unavoidable (Salvaris 1988; Osberg and Sharpe 1998; Erikson 1993; Samuelson 1947) but can be empirically tested:

...basically I hold that to say that something is valuable or good is to say that *given* all the available relevant information about the things (action, person, place or whatever), *most people* would have a feeling of approval, satisfaction, pro-attitude or favourable interest in it. Hence, judgements of value or evaluation generally are in principle empirically testable claims. (Michalos 1980, p. 10)

Those who support the development of alternative indexes also argue measurements of aggregated standard national accounts are also value-laden through what is included and what is excluded in these accounts. As Ng (1979) points out, what is often labeled a value judgement is rather a subjective value of fact or as Sen (1970) notes, if all agree on a value judgement, it becomes an objective fact. The adherents to these measures of social welfare (Cobb and Cobb 1994; Eckersley 1998; Ekins and Max-Neef 1992; Salvaris 1998) note these concerns, as do its critics (Brekke 1997; Miles 1992). The number of indices also indicates the lack of agreement on the correct construction of a social welfare index. There is also a lack of agreement on whether composite indicators actually work (Trewin 1998; Cox 1998; Seabright 1993).

3.4.1 Measure of Economic Welfare

Following Sametz (1968), Nordhaus and Tobin (1973) formulated an alternative measure to the unadjusted aggregated standard national accounts to calculate society's welfare. The purpose of their study was to answer the criticism leveled at national accounts statistics that they should not be used as indicators of social welfare and offer in their place a specifically developed measure of social welfare. The specific criticism that the Measure of Economic Welfare (MEW) sought to address was the inclusion and exclusion of certain disamenities, which the national accounts did not correctly address. It may be that even with these adjustments, the adjusted aggregated standard national accounts approach is an improved measure of national income, rather than an improved measure of social welfare (Brekke 1997).

An imputed figure for the value of household work was included in the MEW, as were imputed figures for leisure and the services of consumer capital. Figures for disamenities

such as urbanisation were imputed and subtracted from the MEW as they were considered regrettables.

Lebergott's (1993) criticism of the MEW centres on the exclusions of regrettables and whether other goods could be also labeled regrettable, such as food, clothing, transport, driver education and insurance. 'Regret is a word of seismic potency. It can be applied to a thousand facets of the real world' (Lebergott 1993, p. 8). Extending the work of Sen (1993) in which food not does provide utility but the functioning of food does, it may be legitimate to complain that food is a regrettable as it must be purchased to facilitate its functioning, in the same manner that commuting is necessary to acquire income. (Likewise, this can be extended so that the Second Law of Thermodynamics results in all consumption ultimately leading, not to utility or functioning, but to waste). Nordhaus and Tobin argued that whilst certain disamenities such as pollution are blamed on economic growth by critics such as Mishan (1971), pollution and other disamenities are in fact a pricing mechanism problem rather than a direct result of economic growth. As such they would occur in a zero growth economy and thus should not be included within any calculations. Thus, pollution was excluded from the MEW calculations.

Nordhaus and Tobin found that the MEW per capita and GNP per capita figures significantly tracked each other when graphed side by side. Therefore, whilst MEW per capita was certainly lower than GNP per capita, its general progress was similar enough for Nordhaus and Tobin to conclude:

...although GNP and other national income aggregates are imperfect measures of welfare, the broad picture of secular progress, which they convey, remains after correction of their most obvious deficiencies. (Nordhaus and Tobin 1973, p. 532)

Therefore, the MEW indicated that GNP per capita was an effective proxy indicator of welfare despite its inadequacies and should be used as such. A similar result was found for Australia by Gillin (1974). Gillin did note though that a trade off between economic

growth and social welfare was necessary. ‘If we are to increase *the Quality of Life* it will be necessary to trade off some growth in GDP in favour of increased welfare’ (Gillin 1974, p. 80 – original italics). This position falls between Beckerman’s (1995) call for constant economic growth and Daly’s (1991) call for a steady state.

3.4.2 Index of Sustainable Economic Welfare

Daly and Cobb (1990) reexamined the figures of Nordhaus and Tobin and disagreed with the original analysis. Using the same figures, Daly and Cobb (1990) showed that during different time segments the MEW did not always track economic growth. In some cases MEW fell whilst economic growth increased. Daly and Cobb interpreted this as proof that economic growth was not an indicator of society’s welfare as the falling MEW proved that increasing economic growth could result in a down turn of society’s welfare. Such a fall in social welfare despite an increase in economic growth is not possible when social welfare is a function of economic growth

$$W_t = w_t (EG_t) \quad [3.1]$$

In response to the MEW, Daly and Cobb developed the Index for Sustainable Economic Welfare (ISEW). It is based on the calculations of the monetary values of the costs of pollution, traffic, the loss of wetlands and the depletion of non-renewable resources, etc. Whilst the valuation of environmental goods have improved over the last decade, its results are still controversial (Brekke 1997).

Daly and Cobb (1990) argued that the data produced by the ISEW suggested that social welfare in the United States had actually decreased from the late 1970s. Social welfare has fallen since then whilst economic growth has risen. They argued that economic growth therefore is no longer desirable because it does not add to social welfare but in fact detracts from it. This result reflects the finding of the US Bureau of the Census which found that the standard of living in the United States, based on the median real family income, has been stagnant over the last two decades (Jorgenson 1997).

During the early 1990's a number of ISEW-type studies focussed on the costs and benefits of economic growth in the United States (Cobb et al. 1995), United Kingdom (Jackson and Marks 1994), Germany (Diefenbacher et al. 1994), Netherlands (Rosenberg and Oegema 1995), and Austria (Stockhammer 1997), Australia (Lawn and Sanders 1997; Hamilton 1998) all of which supported the Max-Neef's (1991) *Threshold Hypothesis*. In each study, the benefits of economic growth were greater than the costs from the 1950's through to the 1970's and early 1980's. From this period the costs of economic growth began to outweigh the benefits. Therefore, further economic growth actually worsened the national welfare of these countries (Daly 1993a) and was therefore stunting economic growth. Similar findings using "subjective" quality of life studies have also been reported (Mattes and Christies 1997).

Hamilton (1998) argues there are four main reasons for these results;

1. Unsustainable levels of foreign debt;
2. Growing costs of unemployment and overwork;
3. Environmental problems; and
4. Failure to maintain investments in capital stock.

Other measures, based on adjusting revealed preferences, include:

- Kendrick (1979) – Adjusted Gross Product
- Ruggles and Ruggles (1982) – Integrated Economic Accounts
- Eisner (1985) – Total Income System of Accounts
- Jorgenson and Fraumoni (1988) – Full Gross Domestic Product
- Osberg and Sharpe (1998) – Index of Economic Well-Being

Each of these alternatives basically follows Barkley and Seckeler (1972) cost-benefit analysis [3.11] in which various adjustments are made to various aggregate standard national account measures.

Such aggregate standard national account adjustment approaches are not without criticism (Neumayer 1999). Firstly, aggregated standard national accounts were not designed to measure social welfare and therefore adjustments to it are misplaced. Secondly, these approaches mix two concepts, current welfare and sustainability, that cannot be measured simultaneously. Finally, these approaches, assume perfect substitutability within natural capital and between natural capital and non-natural capital. Neumayer (1999) concludes that the use of GDP per capita as a measure of welfare, though not its intended use when developed will continue as it is not possible to stop the general public from using it, in this manner. Therefore it is probably best to keep it but warn people against such use.

For proponents of adjusted aggregate measures of welfare this conclusion is not satisfactory. The main purpose of adjusting aggregate measures is to explore the alternative interpretations of welfare that can shed a different perspective on the desirability of economic growth. Further, measuring social welfare by adopting an approach based on social choice theory, as discussed below, is capable of overcoming the some of the limitations set out above (Islam and Clarke forthcoming; Clarke and Islam forthcoming). The determination of social welfare depends on the underlying social preference and value judgements of society (Islam 2001).

Through the application of social choice theory to social welfare via a social welfare function, the new measure of welfare can no longer be considered a version of aggregated revealed preferences. It is now a measure of a SEE system and not just a reflection of national accounts. Therefore many of the limitations of GDP per capita as a measure for development or welfare are overcome. These limitations include time preference concerns, aggregation concerns and the exclusions of non-welfare concerns (Sen, 1985; Islam, 2001). The new measure of welfare is no longer an aggregation of preferences because it explicitly takes into account value judgements through the use of a social welfare function.

Whilst this new measure of welfare is a normative exercise, the adjustments made to national income are based on objective, scientific information and data. It is particularly important when measuring social welfare that value judgements (hence subjectivity) are made explicit. Social welfare cannot be really judged in isolation of the analyst's or society's value judgements (Max-Neef, 1991).

3.5 CONCLUSION

This chapter has introduced the first of two new social welfare functions that will be empirically applied to Thailand to test the desirability of economic growth. This first social welfare function is characterised by the application of cost-benefit analysis to aggregate revealed preferences within social choice theory in order to determine economic growth's net benefits and hence its desirability. This new measure of social welfare is an extension of previous work through social choice theory, systems analysis and application to a developing country.

By implementing a systems analysis view of society a more developed understanding, and consequently measure, of welfare can be achieved. This measure of social welfare is also achieved through the application of cost-benefit analysis to social choice theory. This is operationalised through adjusting national income to take into account various costs and benefits of economic growth which impact on the sub-systems of the social, environmental, political and spiritual.

Having set out the theoretical aspects of this new measure, the next two chapters will describe the methodology in empirically implementing this approach. In order to test these results, a second social welfare function will also be developed and empirically applied in Chapter Six. Chapter Seven undertakes a welfare analysis of economic growth on two contemporary development issues (sustainability and globalisation). All the results are discussed in Chapter Eight before the thesis is concluded in Chapter Nine.

CHAPTER FOUR – APPLICATION OF SOCIO-ECONOMIC ADJUSTMENTS TO SOCIAL WELFARE MEASUREMENT: ISSUES, METHODS AND RESULTS

4.1 INTRODUCTION

The first of two social welfare functions was formally developed in the previous chapter. This new analytical tool, designed to measure the desirability of economic growth, utilises social choice theory and systems analysis within a cost-benefit analysis framework.

Having developed this democratic social welfare function, this and the following chapter will empirically apply the cost and benefit adjustments. Empirical analysis is a vital aspect when assessing the effects of economic activities (Slesnick 1998). This adjusted national income (ANI) social welfare function is empirically applied to Thailand over a twenty-five year period, 1975-1999.

The ANI index is calculated by undertaking nearly twenty adjustments to national income, categorised into appropriate sub-systems, based on social choice theory. The estimates of these adjustments for the economic, social and political sub-system have been made expressly for Thailand either directly within this study for the first time or have drawn on other studies that identified them as distinct outcomes of achieving economic growth. These social choice perspectives are enunciated either through government public policies or expert opinion (expressed through the analyst) (Islam 2001). For each adjustment the following questions will be discussed:

- What is the issue?;
- What is the social choice perspective compared to individual or market perspectives?;
- What methodology will be used to undertake this adjustment?; and
- What are the results and implications for social welfare of this adjustment?

This chapter will discuss the methods, issues and results and describe eleven adjustments to national income for the economic, political and social sub-systems. The impact on social welfare in Thailand will be reviewed and discussed. In addition, the cumulative impact of these adjustments will also be reviewed. By disaggregating the costs and benefits of economic growth on social welfare in this way, insights into the desirability of economic growth can be gained.

The first sub-system to be reviewed will be the economic sub-system. The ANI index of social welfare has at its base aggregated national income. This base is adjusted for income inequality. Following this, adjustments are made for the social sub-system for 1) public expenditure on education, 2) public expenditure on health, 3) commuting, 4) urbanisation, and 5) private expenditure on health. Then the following adjustments are made for the political sub-system, 1) government provided roads, 2) private consumer durables, 3) corruption and 4) debt.

The time series runs from 1975 to 1999. This time series is considered long enough to track the remarkable changes in economic growth experienced by Thailand over the last three decades and the positive and negative consequences of this growth on social welfare. It is short enough though to remain cognisant of the limitations of price indices over lengthy periods as discussed previously (see Chapter One, Section 1.4). The most recent data available is for 1999 (from the 2000 census), thus the time series will end at this point. This target period was further justified in Chapter One, Section 1.4.

This chapter is structured as follows: Section 4.2 discusses the adjustments being made to national income for the economic sub-system. Section 4.3 discusses the adjustments being made to national income for the social sub-system. While Section 4.4 discusses the adjustments for the political sub-system before the chapter is concluded in Section 4.5.

4.2 ECONOMIC SUB-SYSTEM

Within this social welfare function, the net benefits of economic growth (NB_t) within the economic sub-system is a function of aggregated national income (ANI_t) and income distribution ($Y_{ede t}$):

$$Ec_t = NB_t(ANY_t, Y_{ede t}) \quad [4.1]$$

Within the ANI social welfare function therefore, this appears as:

$$ANI SWF_t = \sum_{t=1}^T \frac{NB_t([ANY_t, Y_{ede t}], En_t, So_t, P_t, Sp_t)}{(1+r)^t} \quad [4.2]$$

where:	$ANI SWF_t$	=	adjusted national income
	NB_t	=	net benefits
	t	=	time
	r	=	discount rate
	ANY_t	=	aggregated national income
	$Y_{ede t}$	=	equally distributed equivalent income
	En_t	=	environmental factors
	So_t	=	social factors
	P_t	=	political factors
	Sp_t	=	spiritual factors

4.2.1 Income

Issues

As aggregated standard national account statistics, such as GDP or national income, were not designed to be measures of society's welfare (Kuznets 1941, 1968), a number of alternative measures using these statistics as a base have been developed (Nordhaus and Tobin 1973; Daly and Cobb 1990; Cobb, Halstead and Rowe 1995). This ANI index extends this work. These indices define the benefits and costs of economic growth and then subtract the costs from the benefits leaving a measure of welfare. The basis of each

of these indices is personal consumption, which is a calculation found in the aggregated standard national accounts.

Whilst personal consumption has been used as the basis for other social welfare measures (Nordaus 1994; Islam 1995, 1998), national income, rather than personal consumption, will be the basis of measuring welfare within the ANI. Income is a suitable starting point for this analysis (Sen 1999a).

Income is an indicator of standard of living (see Chapter Two, Section 2.2.2.1) as it reflects an individual's purchasing power for tradables within the market. For non-tradables (such as a clean environment), shadow prices can be calculated that can then be factored into a individual's well-being given a level of income. Likewise, noise pollution, air pollution, future security and so forth can all be allocated shadow prices. Income indicates the command over resources that can affect well-being (Erikson 1993; Sen 1979b; Kakwani 1997b, 1997d)). An even more accurate measure of income may be post tax equivalent income, rather than pre-tax income (D. Johnson 1996). Income (or post-tax income) not only allows control of resources that affect well-being but also 'provides other socio-economic opportunities and benefits such as power, liberty, wealth, happiness and good social relations' (Islam 2001, p. 52). All these opportunities directly impact on well-being.

If prices can be allocated to the costs of urbanisation, the environment and other intra-generational concerns, then income is a suitable starting point for measuring well-being (Mokyr 1985).

Social Choice Perspective

Higher real incomes mean greater control over the economy's resources to satisfy human needs and thus freedom and choice. Lewis (1955) argues that increased freedom and choice results in increased welfare. Others argue more simply, 'a major contributing factor to advances in welfare is real income per capita' (Pearce et al. 1989, p. 29; also see Nolan and Whelan 1996; Gylfason 1999).

Income also incorporates personal savings which is linked to future consumption levels (Gylfason 1999) and are important as this index is concerned with sustainable levels of economic growth investments in the future, albeit it through savings or accounting for the costs of pollution and environmental degradation.

As the base for this index of social welfare, there is no divergence between the market perspective on national income and the social choice perspective on national income. However, the general market perspective considers this measure as a suitable point to measure of social welfare (Kakwani 1997b, 1997d). Whereas in this thesis national income is considered a suitable measure of standard of living, but not a suitable measure of social welfare (see Chapter Two, Section 2.2.2.1). The social choice perspective is that an optimal level of social welfare is a function of various other impacts. These various impacts are discussed within the remainder of this chapter and the next.

Methodology

Income will be deflated for price changes in order to isolate the real changes in income from any changes due to price changes. A number of cost of living indices have been developed. Kakwani (1997c) has developed a spatial cost of living index, which takes into account regional differences in cost of living. The National Statistical Office also takes into account that Bangkok has a higher cost of living than the rest of Thailand. 'It is quite evident that the disparity of real income between rural and urban areas is extremely high' (Kakwani 1997c, p. 19).

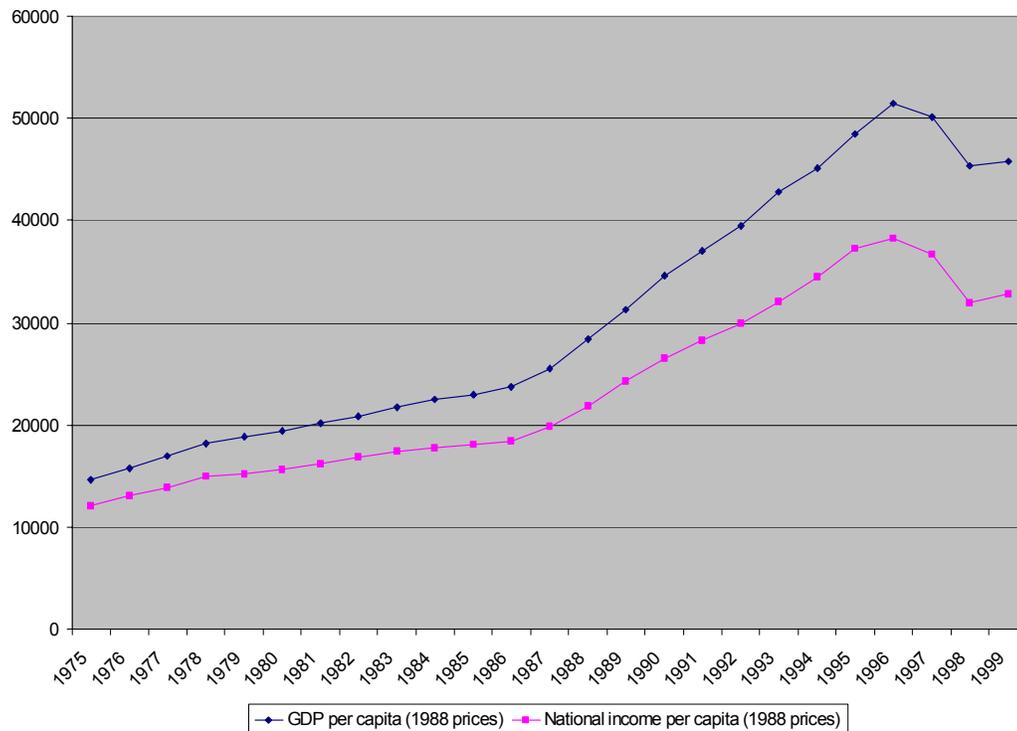
Aggregated national income figures are available in various issues of the *Monthly Bulletin of Statistics*, *Quarterly Bulletin of Statistics*, *National Income of Thailand*, and *Statistical Yearbook for Thailand*.

Table 4.1 National income for Thailand, 1975-1999 (1988 prices)

<u>Year</u>	Aggregate National Income (1988 prices, millions of baht)	Average National Income per capita (1988 prices)
1975	514777	12143
1976	563800	13047
1977	614143	13872
1978	675676	14941
1979	700213	15184
1980	736822	15690
1981	774824	16184
1982	822023	16829
1983	861383	17396
1984	896725	17728
1985	937965	18109
1986	975516	18417
1987	1071338	19886
1988	1198771	21811
1989	1357294	24286
1990	1490961	26481
1991	1609476	28256
1992	1730397	29943
1993	1868278	32026
1994	2037046	34470
1995	2213825	37232
1996	2298050	38227
1997	2230072	36669
1998	1963940	31952
1999	2024239	32828

Source: Compiled from various issues of *Monthly Bulletin of Statistics*, *Quarterly Bulletin of Statistics*, *National Income of Thailand*, and *Statistical Yearbook for Thailand*.

Figure 4.1 Comparison of National Income per capita and GDP per capita for Thailand, 1975-1999 (1988 prices, millions of baht)



Source: Author's own calculation.

Results

National income per capita closely tracks GDP per capita over this period (see *Figure 4.1*). This is expected, as national income is a derivative of GDP (see Chapter Two, Section 2.2.2.2). If social welfare is considered a unique function of national income, then social welfare can be said to have been increasing during the last twenty-five years. Both national income per capita and GDP per capita has three phases of growth. The first phase from 1975 to 1986 is a steady and smooth increase. The second phase is an accelerated increase in growth from 1987 to 1996. The third phase followed the 1997 financial crisis and shows a short-term fall before an upturn in the final year of study, 1999.

4.2.2 Inequality of Income Distribution

Issues

The rise of income inequality is a global phenomena (Cornia and Court 2001; Akita 2002). Certainly income distribution inequality has been on the increase in Thailand since the 1960s (Ahuja et al. 1997; Krongkaew 1985, 1993; Ikemoto 1991; Clarke 2001a, 2001b). Between 1981 and 1997, inequality between the richest 10% and the poorest 10% of the Thai population, increased from a multiple of 17 to a multiple of 38 (Watkins 1998). Therefore, despite the increases in economic growth, the poorest members of the Thai economy have not equally benefited from this economic growth (Kakwani 1997b). This is exacerbated by the spatial divide between rural and urban populations (Cornia and Court 2001). Interestingly though, poverty (measured by poverty line analysis) has fallen during the same period (Dixon 1999; Muller 1996; Warr 2001). However, whilst a fall in poverty levels is important in terms of social welfare, such a fall does not exclude concern over the increasing levels of income distribution. Unequal distribution of income has implications for social welfare (Altman 2000; D. Johnson 1996; Sen 1984; Taylor and Jodice 1983; Ravallion 2001).

In terms of social welfare, income inequality is undesirable for a number of reasons. Inequality hampers: 1) future growth (Ahuja et al. 1997; Rowan 1996; Birdsall et al. 1995; Watkins 1998; Alesina and Perotti 1996; World Bank 1991); 2) poverty reduction (Cornia and Court 2001; Ahuja et al. 1997); and 3) political instability (Cornia and Court 2001). In the long run, inequality threatens the stability of development (Chotikapanich 1994). Such an unevenness of development exacts a high social cost that can lead to economic dislocation, social tension and political unrest (Dixon 1999) as ‘individuals in a society may place intrinsic value on equality and a sense of social cohesion arising from it’ (Ahuja et al. 1997, p. 29). It is also difficult to compare real income differences if income distribution is not taken into account (Sen 1976).

Increasing income inequality has been explained as a natural outcome of economic growth (Mizoguchi 1985; Akita 2002). A Kuznets’ inverted-U curve is used to illustrate the self-correcting nature of income inequality (Kuznets 1955). Income distribution

worsens during the early stages of economic growth as the income rises accrue mainly to the urban industrial classes. At a certain point however, income distribution begins to improve as the economy and agricultural classes modernise and take advantage of modern methods of farming (Mizochui 1985). However, this view is disputed both in theory (Krongkaew 1985; Adelman and Morris 1973; Muller 1996; Ahulwalia 1975) and practice (Muller 1996).

In achieving economic growth, governments have two major policy objectives; increasing income and decreasing inequality. ‘When average income is below the poverty line... then the reduction of poverty and of inequality necessarily become competing objectives’ (D. Johnson 1996, p. 104). When these two objectives conflict the ‘disadvantages of economic growth, due to poorly distributed benefits of growth, outweigh the advantages’ (Mizoguchi 1985, p. 307). ‘Indeed it is often argued that the mechanisms which promote economic growth also promote economic concentration, and a worsening of the relative and perhaps absolute position of the lower income groups’ (Ahluwalia 1975, p. 3). Chotikapanich (1994) argues that whilst average income levels have increased in Thailand, the benefits of this economic growth have not been equally enjoyed by the whole population due to the unequal distribution of this growth.

Social Choice Perspective

Market outcomes on income are not equity based, but rather efficiency based. And yet these two issues should not be separated (Maler 1985; also see Altman 2000 for discussion on an alternative to Pareto Optimality). The divergence between optimal market outcomes and optimal social outcomes begins within the issue of equity. Equity is important in increasing social welfare (Sen 1973). When considering society’s choices, preferences and value judgements on income inequality, the State has an essential prerogative to redistribute income (Musgrave 1959; Stoleru 1975). Within this social welfare function the social choice perspective on equity is imbedded in this analysis. Distributing the benefits of economic growth and national income more equally is a stated goal of the present Thai government (Ministry of Finance 2001; NESDB 1996, 2000).

How income is distributed within a society impacts on social welfare. It must be taken into account in the construction of a welfare index (Adelman and Morris 1973; Sen 1979b). This is particularly the case if intergenerational equity is accepted (see Chapter Three, Section 3.3.3) because ‘if a society is to accept responsibility for intergenerational equity, it must also have some regard to domestic and international equity and distribution of resources (Clayton and Radcliffe 1996, p. 173). Income distribution is therefore one of the most vexing issues when discussing social welfare (Sen 1982).

Methodology

To consider social welfare issues of income distribution an ethical, relative inequality index is required (Chakravarty 1990). Atkinson has developed a method which provides an ‘equally distributed equivalent level of income’ (Atkinson 1970, p. 250). Atkinson’s work is perhaps the answer to a call to calculate ‘the proportion of total income that is absorbed in compensating for the loss of aggregate income due to inequality’ (Champernowne 1952 cited in McKenzies 1983, p. 155). This index therefore has ‘a ready interpretation as the proportion of income wasted from the viewpoint of maximising social welfare, as a result of the inequality’ (Blundell et al. 1994, p. 34). Similar work has been undertaken by others (Sen 1973a; Ebert 1987; Jorgenson 1997 – where one-third of income was considered lost due to inequality).

Atkinson (1970) assumes a view of welfare, whereby welfare increases with higher levels of income as long as the income increases are equally distributed (Kakwani 1997b). This is in line with Dalton (1920) and Lerner (1944).

Thus, given the diminishing marginal utility of income (and assuming the equal capacity for enjoyment), welfare is maximised when income is equally distributed. Therefore an equally distributed equivalent income (Y_{ede}) which calculates the equivalent welfare level based on an equally distributed income is the first adjustment to national income. It is not a utilitarian approach to welfare as it measures the amount of wasted income, with regards to maximising social welfare, as a result of unequal income distribution (Blundell et al. 1994).

The formula for this equally distributed equivalent income is:

$$I = 1 - \sum_{i=1}^n (y^i / \mu)^{1/\epsilon} \quad \text{if } \epsilon \neq 1 \quad [4.3]$$

- where:
- i = level of inequality
 - y^i = income of individuals in the i^{th} income range
 - $f(y^i)$ = proportion of the population with incomes in the i^{th} range
 - μ = mean income
 - ϵ = society's perspective on equality

Table 4.2 Selected Income Distribution and Atkinson's Measure of Inequality for Thailand

	1975	1981	1986	1990	1992	1994	1996	1998	1999
Quintile 1	6	5.4	4.6	4.2	3.9	4.0	4.2	4.2	3.8
Quintile 2	9.3	9.1	7.39	7.4	7.0	7.3	7.5	7.6	7.1
Quintile 3	13.3	13.4	12.1	11.5	11.1	11.6	11.8	11.9	11.3
Quintile 4	21.4	20.6	19.9	19.2	19.0	19.6	19.9	19.8	19.3
Quintile 5	50.1	51.5	55.6	57.7	59.0	57.5	56.7	56.5	58.5
μ	12143	16184	18417	26481	29943	34470	38227	31952	32828
	.3319	.3574	.4198	.4521	.4757	.4600	.4453	.4428	.4757

Source: Clarke (2001b).

If I falls, then the distribution has become more equal. If I equals 0 there is complete equality. If I equals 1 there is completely inequality. Society's perspective on the importance of equality ranges from zero to infinity. If $\epsilon = 0$ then society is indifferent to inequality. If $\epsilon = \infty$ then society is concerned with the position of the lowest individual or income group. Based on previous empirical studies (Kakwani 1997a, 1997b), the

decision to estimate $\epsilon = 1.5$ is considered an appropriate reflection of the level of inequality acceptable within Thailand (Ministry of Thailand 2001; NESDB 1996, 2000).

The Atkinson Index has previously been applied to Thailand (Krongkaew 1993) and to a number of developed and developing countries (see Chakravarty 1990).

It must be noted though, that such a redistribution which Atkinson's Y_{ede} proposes would not be cost-free (Johannesson 1996) and so conceptually involves practical difficulties experienced by the Kaldor-Hicks compensation test.

Table 4.3 National Income per capita adjusted for Income Inequality for Thailand, 1975 – 1999 (1988 prices – millions of baht)

Year	Aggregate National Income	Atkinson's Measure of Inequality (<i>I</i>)	Net Benefits of Economic Growth on Economic Sub-system for Thailand	Net Benefits of Economic Growth on Economic Sub-system for Thailand per capita (in baht)
1975	514777	0.3319	343934	8113
1976	563800	0.33615	374279	8661
1977	614143	0.3404	405089	9150
1978	675676	0.34465	442804	9792
1979	700213	0.3489	455909	9887
1980	736822	0.35315	476613	10149
1981	774824	0.3574	497902	10400
1982	822023	0.36988	517973	10604
1983	861383	0.38236	532025	10745
1984	896725	0.39484	542662	10728
1985	937965	0.40732	555913	10733
1986	975516	0.4198	565994	10685
1987	1071338	0.4151	626626	11631
1988	1198771	0.4104	706795	12860
1989	1357294	0.43125	771961	13813
1990	1490961	0.4521	816898	14509
1991	1609476	0.4639	862840	15148

1992	1730397	0.4757	907247	15699
1993	1868278	0.46785	994204	17043
1994	2037046	0.46	1100005	18614
1995	2213825	0.45265	1211737	20379
1996	2298050	0.4453	1274728	21204
1997	2230072	0.44405	1239809	20386
1998	1963940	0.4428	1094307	17803
1999	2024239	0.4757	1061309	17212

Source: Author's own calculations.

Results

The first adjustment within the ANI social welfare function dramatically reduces the money-metric level of social welfare in Thailand due to the increasing inequality of income distribution within Thailand. This reduction reflects social choices on inequality expressed within stated government policies (Ministry of Finance 2001; NESDB 1996, 2000). The increase in social welfare that does occur is markedly flatter. Not only is the overall level of social welfare reduced, but the difference between unadjusted aggregate national income and income inequality adjusted aggregate national income has increased over the period under review. This suggests that income inequality has a dampening affect on social welfare increases. Flowing from this is the conclusion that policy makers can increase social welfare through reducing income inequality.

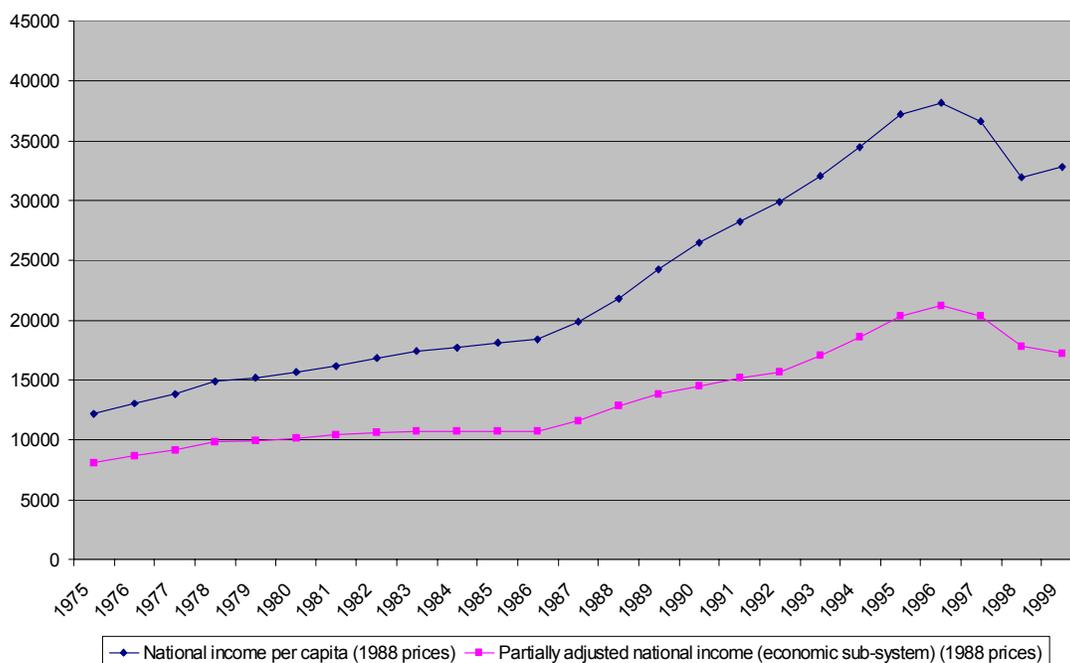
The inequality index (I) has increased from 0.3319 in 1975 to 0.4757 in 1999. It rose steadily to 1992 and fell until 1998 before rising sharply again in 1999.

By disaggregating the various sub-systems of the ANI SWF it is possible to gain useful insights into the impacts each sub-system has played in affecting the overall measure of social welfare.

As would be expected, the economic sub-system closely resembles the increases in national per capita with three distinct phases; 1) steady impressive growth from 1975 to

1987; 2) accelerated growth from 1988 to 1996; and 3) a period of fluctuation in line with the financial crisis after 1996. During the period under study, the economic growth performance was quite impressive and by reviewing this sub-system alone, the impression could be gained that economic well-being has increased considerably and therefore so will have social welfare. However, the economic sub-system does not exist in isolation and there are a number of other sub-systems that significantly impact on the overall measure of social welfare.

Figure 4.2 Comparison National Income per capita and National Income per capita Adjusted for Income Inequality in Thailand, 1975-1999 (1988 prices)



Source: Author's own calculations.

The divergence between market perspective social welfare and social choice perspective social welfare measures is already evident by considering the effects of market inequality in this measure of social welfare.

Welfare Economic Analysis

The estimate of the net benefits of economic growth on the economic sub-system is based upon national income being adjusted for inequality using Atkinson (1970). Within the market place, current levels of national income are an accurate reflection of the correct aggregation of economic activity of a society. However, income distribution is considered within a social choice perspective and national income is therefore adjusted to take this into account.

The concept of *economic efficiency* is a central tenant of welfare economics. Economic efficiency is based on two value judgements (see Chapter Two, Section 2.2.1). The first, known as *rationality*, is that social orderings should be based on individual preferences in which it is implicitly assumed the individual is the best judge of his/her own preferences. The second underlying assumption of economic efficiency is the *Pareto principle*. Under this assumption, if state *A* is ranked higher than state *B* by one individual and all other individuals are indifferent between state *A* and state *B*, then state *A* should be ranked higher than state *B* within the social ordering (Boadway and Bruce 1984).

It should not be surprising that each of these assumptions have their own associated problems. Within *rationality* there are a number of instances in which individual preference may not be utility enhancing either through informational asymmetry or through folly. Secondly, *rationality* fails to incorporate the treatment of preferences for those not yet born, thus failing intergenerational tests. The major fault with the Pareto optimal assumption is the actual difficulty in finding such examples in reality. In most social states it is possible to find individuals who prefer state *A* to *B* and other individuals who prefer state *B* to *A*. Such examples are consider *Pareto non-comparable*. The *Pareto compensation* principle was developed (Kaldor 1939) to overcome this but is hypothetical basis has been criticised (Sen 1979a, 1979b; Page 1988; Hausman and McPherson 1996; Boadway and Bruce 1984).

The market, under perfect conditions, efficiently allocates scarce resources. There are three main causes for market failure that result is less than efficient resource allocation:

1) monopoly; 2) existence of externalities and public goods; and 3) informational asymmetry. It should also be noted that whilst a perfect market efficiently allocates scarce resource it does so with no consideration of equity – or more correctly does so assuming current distribution levels are Pareto optimal. (It has been argued that even perfect markets fail to efficiency allocate scarce resources (Sen 1982, 1999)).

As a result, economic efficiency is a difficult concept by which to order social states. More information and value judgements allow other considerations, such as equity, to be considered within social welfare functions. ‘The social welfare function is an important conceptual tool in welfare economics since it is the means by which a complete social ordering is obtained’ (Boadway and Bruce 1984, p. 4). Therefore there is a need for a social welfare function, as is being undertaken within this work, to rank these social states.

National income levels do not consider intergeneration issues. It is a reflection of current economic activities only. As mentioned above, a central assumption upon which national income lies is that current income distribution is Pareto optimal – that is, income is being efficiently distributed and no other state of distribution could make one person better off without making someone else worse off. Within a Rawlsian view of justice, this assumption can be challenged. Within the case of Thailand, with an increasingly unequal distribution of income (Clarke 2001, 2001b; Warr 2001), that behind a veil of ignorance, more equal outcomes would be preferred. By using the equally distributed equivalent income (Atkinson 1970), a new level of national income is estimated that may, under this assumption, be considered more just.

In a similar way, the adjustment made within this economic sub-system also reflects the view that poverty levels though falling in absolute terms (Kakwani and Krongkaew 2000), it can be considered to have risen in relative and subjective terms due to the rise in inequality (Clarke 2001a, 2001b). By adjusting national income for inequality, relative and subjective poverty concerns are also considered.

4.3 SOCIAL SUB-SYSTEM

Having considered the net benefits of economic growth within the economic sub-system, adjustments within the social sub-system are now considered.

Within the ANI democratic social welfare function the net benefits of economic growth (NB_t) within the social sub-system is a function of public expenditure on education (PE_t), public expenditure on health (P_bH_t), commuting (C_t), urbanisation (U_t), and private expenditure on health (P_vH_t):

$$So_t = NB_t(PE_t, P_bH_t, H_t, C_t, U_t, P_vH_t) \quad [4.4]$$

Within the ANI democratic social welfare function then would appear as:

$$ANI\ SWF_t = \sum_{t=1}^T \frac{NB_t([ANY_t, Y_{ede\ t}], En_t, [PE_t, P_bH_t, C_t, U_t, P_vH_t], P_t, Sp_t)}{(1+r)^t} \quad [4.5]$$

where:

ANI SWF _t	=	adjusted national income
NB _t	=	net benefits
t	=	time
r	=	discount rate
ANY _t	=	aggregated national income
Y _{ede t}	=	equally distributed equivalent income
En _t	=	environmental factors
PE _t	=	public expenditure on education
P _b H _t	=	public expenditure on health
C _t	=	commuting
U _t	=	urbanisation
P _v H _t	=	private expenditure on health
P _t	=	political factors

Sp_t = spiritual factors

4.3.1 Public Expenditure on Education

Issues

Most government expenditure is excluded from this ANI as they ‘measure inputs or costs rather than outputs or benefits’ (Daly and Cobb 1990, p. 422). According to Daly and Cobb (1990), the correlation between government spending and welfare is tenuous at best because of the nature of the services that the government supplies. This includes defence, law and order, etc. These government services are defensive in nature.

The ANI includes government transfers and social security payments to individuals as part of the calculations of national income. It also includes government expenditure on education and health. Human capital is very important in developing countries, perhaps more so than in developed countries (Hamilton and Clemens 1999). It is a valuable non-depleting asset. ‘Educated people make more productive workers.’ (Samuelson et al. 1978, p. 871). Whereas a reservoir of human capital and an educated workforce may exist in developed countries this reservoir does not exist in developing countries such as Thailand. Education is a form of capital investment (Gylfason 1999; Warr 1993a, 1993b; Chichilinsky 1997). According to Muller it ‘seems necessary to more specifically invest into long-term human resource development as it is the only way to sustain income’ (Muller 1996, p. 168). Education in developing countries is just as important investment for an economy as is investment in capital (Gylfason 1999). Though others dispute this view (Daly and Cobb 1990, Cobb and Cobb 1994).

Social Choice Perspective

Public expenditures on education are not considered within market perspectives on social welfare, however they are important in optimising social welfare (NESDB 1996, 2000). This social choice perspective is reflected in the increase in government fiscal expenditure on education during and shortly after the 1997 Financial Crisis (NESDB 1998). Social choice perspectives include this expenditure as a benefit of economic growth within this index of social welfare.

Within Thailand, the highest social returns on education are for the lower primary level of grades one to four. Social returns on education diminish (whilst private returns increase) through successively higher levels of education (Khoman 1993). Within the traditional agricultural sector, ‘there is no clear evidence of any returns from education above the primary level’ (Khoman 1993, p. 329). Studies by Gylfason (1999) suggest that primary school education has a growth elasticity of 3%. Likewise, economic growth also increases non-economic proxy indicators of welfare such as life expectancy (which has increased in Thailand over recent years) and school enrollments. Between 1975 and 1999 primary school enrollments increased from 81% to 99% and secondary school enrollments has increased from 28% to 40% - which is still quite low for comparable countries (Ahuja et al. 1997; Khoman 1993). Within Thailand, improvements in secondary school enrollments are vital to both social and economic development (APEC 2000).

Methodology

Within developing countries, the need to secure human capital is more urgent than within developed countries. Despite the skewing of government funding towards tertiary education, perhaps at the expense of the more important (at this stage of development) secondary education, the addition of education to welfare in developing countries is greater than that of developed countries. Daly and Cobb (1990) argued that only fifty percent of public expenditure on education should be added as a benefit of economic growth. This is increased to 75% within the ANI. This recognises the higher importance of education in developing social capital in developing countries (OECD 2001b), but also recognises that some additional spending on education is for defensive purposes in that it is ‘expenditure judged necessary to preserve the relative positions of individuals (Clayton and Radcliffe 1996, p. 177), not to enhance an individual’s position.

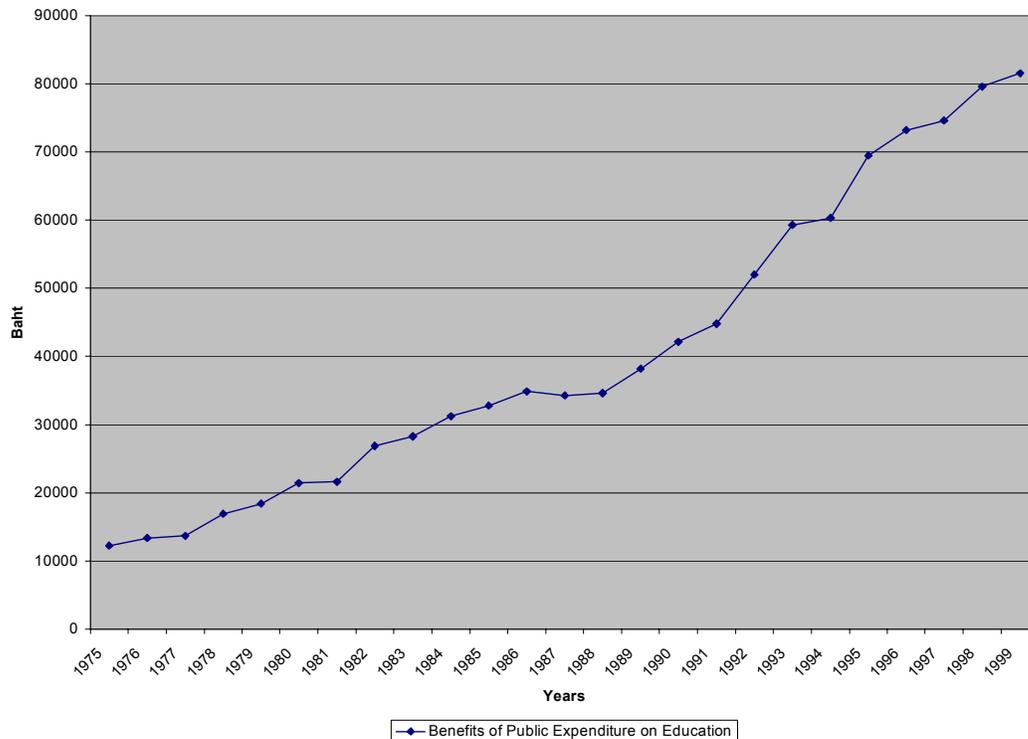
$$\text{BPE} = \text{PE}(0.75) \quad [4.6]$$

where BPE = benefits of public education expenditure

PE = public education expenditure

See Appendix A for calculation.

Table 4.3 Benefits of Public Expenditure on Education in Thailand, 1975-1999 (1988 prices – millions of baht)



Source: Author's own calculations.

Results

The benefits of public expenditure on education rise steadily and increasingly over the twenty-five year period. This steady rise reflects the constant rise in government expenditure on education. This has been possible, in part, due to the rise in economic growth, which has allowed increased fiscal expenditure.

By considering the social choice benefit of public expenditure on education social welfare, has increased over the period of study. However, the benefit of public

expenditure on education does not have a dramatic impact on the overall movements in social welfare. Yet, it is still important to include this adjustment to gain a fuller picture of social welfare within Thailand.

4.3.2 Public Expenditure on Health

Issues

Nordhaus (1998) has shown that in the United States over the last century, the value of improving life expectancy added to social welfare in an equal amount to that of consumption improvements. 'Health status is a major contributor to economic welfare' (Nordhaus 1998, p. 17 – also see Jack 1999). However, not all public health expenditure can be considered to add to social welfare as much of this expenditure is defensive in terms of solving problems of ill-health caused by additional pollution and stress resulting from economic growth (Daly and Cobb 1990):

...traffic congestion, and the air pollution it causes, are seen as having impacts on both physical and mental health. On the physical side, the people mentioned that they get headaches, eye irritation, infected lungs and hearts and feel weak. (Poungsomlee and Ross 1992, p. 39)

Therefore, it is assumed this expenditure simply maintains a static level of health, it does not improve health levels.

Social Choice Perspective

As with the social choice adjustment for public expenditure on education, there is a positive impact on social welfare caused by public expenditure on health that is also not captured within the market perspective. Improving health well-being is a priority within Thai national development plans (NESDB 1996, 2000), however its low expenditure makes it difficult to achieve this priority (NESDB 1998). The social choice perspective permits the impact of government spending on health care to be rightly incorporated into this measure of social welfare.

The market perspective on public health does not consider that part of the expenditure on public health is a response to both economies and diseconomies of economic growth. The market perspective is simply the market value of these expenditures and assumes all public expenditure on public health is positive. By selecting a social choice perspective it is possible to imbed in this calculation the assumption of health economies and diseconomies. The social choice perspective results in a numerical estimate of the net benefits of public expenditure on health.

Methodology

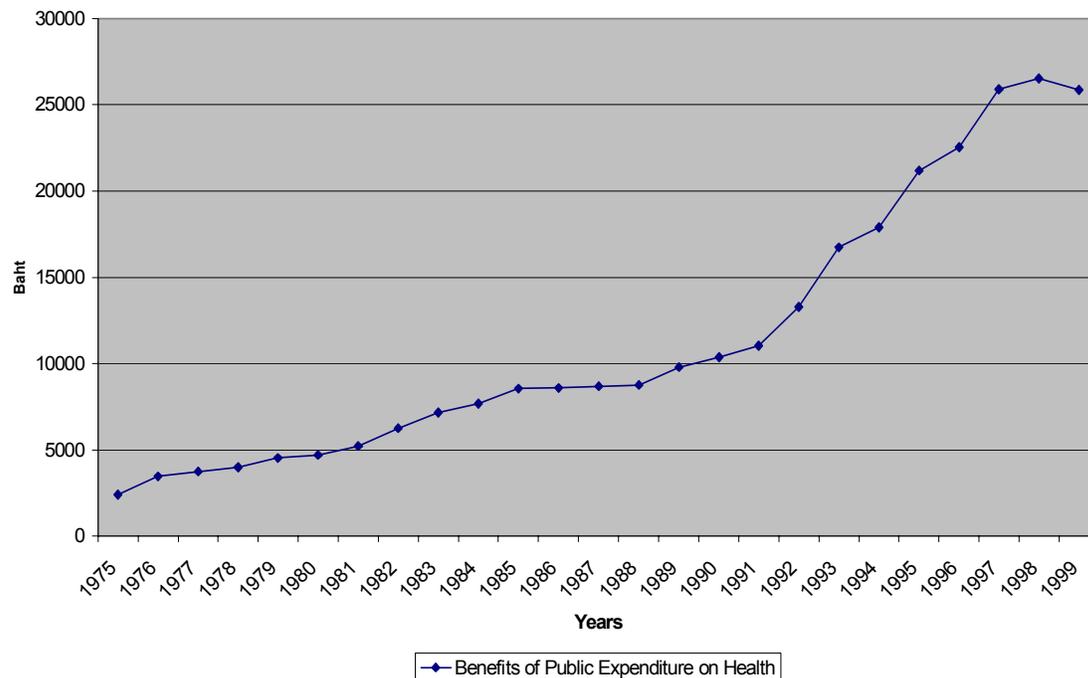
In calculating the social welfare impact of public expenditure on health, it is acknowledged that because of the low base of this expenditure, any addition must increase welfare. One measure of the benefit of this increased expenditure on health is the increase in life expectancy within Thailand, which has increased ten years from 60 to 70 between 1975 and 1999. Developed countries have much higher levels of medical expenditure than developing countries. The increase in medical expenditure is from a much lower bases in countries such as Thailand. For this reason, seventy-five percent of medical expenditure will be added as a benefit of economic growth:

$$\text{BPH} = \text{PH}(0.75) \quad [4.7]$$

where BPH = benefits of public health expenditure
 PH = public health expenditure

See Appendix B for full calculations.

Table 4.4 Benefits of Public Education on Health in Thailand, 1975-1999 (1988 prices – millions of baht)



Source: Author's own calculation

Results

Whilst the benefits of public expenditure on public health are not significant, they have increased slightly over the twenty-five year period. These benefits do increase this cumulative measure of social welfare but not by very much. As with the benefits of public expenditure on education, economic growth has allowed the Thai government to increase its fiscal spending on education. Social welfare continues to increase steadily between 1975 and 1986 before accelerating to 1996. After the financial crisis in 1997, this aspect of social welfare began to fall.

4.3.3 Commuting

Issues

Commuting is a cost of economic growth. As cities become increasingly over populated, roads become clogged with increased numbers of private and public vehicles attempting to move large numbers of people. The end result is increased levels of wasted time spent commuting to and from work. Commuting is a separate problem to urbanisation though,

because an efficient mass transport systems could reduce such time delays considerably if they replaced the over reliance on the private vehicle that economic growth encourages.

In tandem with urbanisation, the problem of commuting has increased with the growth of cities. This is particularly the case in Thailand where Bangkok is perhaps the world's greatest primate city (Dixon 1999).

Social Choice Perspective

Previous studies (Sametz 1968; Nordhaus and Tobin 1973; Daly and Cobb 1990) recognised that one of the costs of economic growth was commuting and included it in each of their calculations of social welfare. The ANI index for Thailand will also include commuting as a cost of economic growth.

The individual decision to commute to work in a private vehicle, rather than use public transport, is taken on grounds of convenience, comfort and access. 'Despite their expense, cars are no longer perceived as a luxury' (Poungsomlee and Ross 1992, p. 42). In fact, Bangkok is one of the largest markets for Mercedes Benz cars in the world (Watkins 1998). An additional car on the road will not make much difference to the experience of other drivers. However, as an additional 800 are registered every day in Bangkok (Bello 1995), the social consequences of these individual choices can be quite significant for society. This equates to over an extra two kilometres of bumper to bumper traffic being added to the crowded streets of Bangkok every day.

Individual preferences do not consider the impact of all other individuals making similar decisions. A social choice perspective allows the negative impact on social welfare of these aggregated individual choices to be included in the calculations. The decision to drive can be understood within a *prisoner's dilemma* framework. If everyone co-operates and chooses public transport over private transport, everyone benefits. However, within this scenario, the individual is assured of receiving greater benefits if they choose to defect rather than co-operate and drive their own vehicle (even if everyone else also

defects) (Clayton and Radcliffe 1996). Under these conditions the welfare implications of social choice theory versus market preferences can be observed.

If the road system had capacity to carry this extra load, then the problem may not be as serious. However, it appears that the current transport system (including the opening of new toll-roads and the *Skytrain*) is unable to cope with any increases (Dixon 1999) and current road works and additional roads being built are also inadequate in keeping up with the increase in cars (Ross 1993):

Road surfaces are not expanding quickly enough to cope with the great increase in the number of vehicles. The total length of roads – major, minor and access roads – is 2,800 kilometres which provides a traffic surface area of about 38.44 square kilometres. This represents only 2.8 per cent of the total Bangkok area, a proportion which is far too low when compared with the recognised standard used in other cities of about 20 – 25 percent. (Poungsomlee and Ross 1992, p. 19)

As a result, it is always “rush-hour” on Bangkok roads and the average speed is between 5 to 8 kilometres per hour (Dixon 1999). The major casualty of this is time (Poungsomlee and Ross 1992):

Even for short distances people will leave home one or two hours early in order to reduce the time spent in traffic, travel on a less crowded bus, or secure a parking space, even if this means arriving at work or school unnecessarily early. (Dixon 1999, p. 205)

The overwhelming impact of the transportation system is on people’s time, which in turn has impacts on family life and health. People have little time at home to rest, spend with their families and friends, or carry out their household responsibilities or recreational activities. (Ross 1993, p. 13)

The demand for transportation within urban areas of developing countries, such as Bangkok, rise faster than the increase in income as ‘the income elasticity of demand is

usually well in excess of unity, per capita incomes are rising more rapidly than in the advanced economies, and urbanisation rates are rising more swiftly (Jolley 2002, p. 2).

Methodology

The cost of Bangkok's jammed roads has been estimated to be 60% of the capital's regional product by the Japan International Co-operation Agency (McGee and Greenberg 1992 – cited in Parnwell and Arghiros 1996). In 1991, the World Bank calculated the cost of commuting on people's time to be 1.4% of GDP (Dixon 1999). Another study, on which the ANI will be based, was undertaken by Tanaborrboon (1990) which estimated the cost of commuting in Bangkok to be about US \$400 million per year in 1988.

This figure can serve as a basis for extrapolation forwards and backwards based on the number of cars on city roads. Two other considerations, which could affect the legitimacy of these extrapolations, can be assumed to counteract each other. The accumulation effect of increasing cars which could see an increasing effect on congestion once a certain level of congestion has been achieved can be assumed to be offset by the increase in road surface increases – inadequate as it is (Dixon 1999).

The cost of commuting per registered car in 1988 in Bangkok was US \$219 based on Tanaborrboon's (1990) calculation. This figure can then be multiplied by the number of registered cars each year to calculate the cost of commuting. For example it was US \$400 million in 1990, US \$613 million in 1994 and US \$79.5 million in 1975. As a percentage of national income (which is the basis of the ANI) this figure intuitively appears correct. It increased from 2.4% of national income in 1980 to 5.8% in 1994. This is the range of other estimates (McGee and Greenberg 1992- cited in Parnwell and Arghiros 1996; Dixon 1991; Martin and Schuumann 1997; Khomnamol 1999). It also appears to correlate with an increasing number of cars each year in Bangkok having an increasingly larger negative impact on people's welfare.

The costs of commuting is only calculated for municipal populations in Bangkok as Thailand's urbanisation problems are concentrated primarily in Bangkok (Dixon 1999).

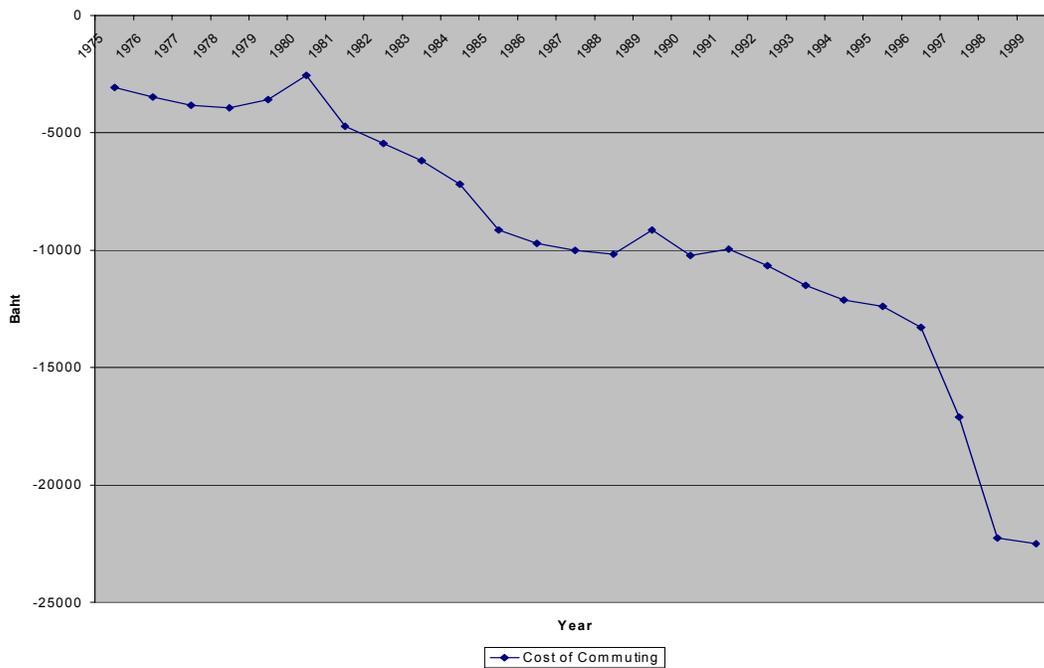
Other “cities” in Thailand have relatively low levels of urbanisation and are thus excluded from these calculations as it is expected that such costs would be quite minor and have a limited impact on the ANI.

$$CC = NRC(219.XR) \quad [4.8]$$

where CC = cost of commuting
 NRC = number of registered cars in Bangkok
 XR = exchange rate

See Appendix C for calculation.

Figure 4.5 Cost of Commuting in Thailand, 1975-1999 (1988 prices – millions of baht)



Source: Author’s own calculation

Results

As with the previous benefits of public expenditure on health and education, the adjustment for the effect of commuting on social welfare in Thailand is not significant in itself. What is significant though is that unlike the previous two adjustments, the adjustment for commuting actually reduces the measure of social welfare. Commuting is a cost of economic growth and subsequently when its affect is considered, social welfare falls. The decision of individuals to commute has negative impacts on social welfare that are not captured by individual preferences.

The cost of commuting is quite static between 1975 to 1981. The cost then increases steadily for the next fifteen years before an accelerated growth in the cost in 1997 and 1998. This negative adjustment signifies that economic growth causes certain social welfare disamenities that need to be considered when measuring social welfare. Such disamenities are usually counted as positive additions in standard national accounts, raising GDP, which incorrectly reflects increases in social welfare.

4.3.4 Urbanisation

Issues

Mishan (1977) argues that one of the major costs of economic growth is urbanisation. Urbanisation as ‘an increase in the proportion of a country’s population in communities above a specific size, the term community implying a concentration of people with a small area’ (Kuznets 1968, p. 97). Urbanisation is a direct result of the process of economic growth (Dhirataykiant 1993). Indeed, attempts to industrialise without urbanising failed in the USSR (Kuznets 1968). The alternative view is that such concerns are really a problem of pricing and urban planning rather than an inevitable consequence of economic growth (Beckerman 1995; Edgmand 1987). Indeed, urbanisation has some substantial benefits. ‘Above all it creates the conditions for the intense intellectual activity associated with modern civilization and thereby created more favourable conditions for the increase in useful knowledge’ (Kuznets 1968, p. 98).

Within developed countries, where cities and urban centres have long existed, both Mishan (1977) and Beckerman (1995) can easily find justification for their particular views. However, in developing countries where the rise of the city has been swift, spectacular and in tandem with economic growth, there is a strong case in linking rising urbanisation with national income. The process of industrialisation relies on a centralised workforce and thus the migration from the rural and agricultural sector to the concentrated urban centres (Nordhaus and Tobin 1973). The majority of the new supercities in the world are located in the developing world.

Sametz (1968), Nordhaus and Tobin (1973) and Daly and Cobb (1990) all recognised urbanisation as a legitimate cost of economic growth and included it within their welfare indices. Methodology differed between each, resulting in the cost of urbanisation ranging from 1% to 40% of GDP.

Social Choice Perspectives

In a similar vein to commuting, an individual preference to live within an urban environment (such as Bangkok) does not consider the negative consequences to others living in this environment of aggregated individual preferences to do likewise. An additional individual or family should not reduce social welfare for others. However, aggregating this preference for a large number of individuals does result in a negative impact on social welfare.

The cost of urbanisation is of major concern for residents of Bangkok. Thailand is in a unique position in that whilst there is ‘a remarkably low level of urbanisation for the Kingdom’s level of economic growth’ (Dixon 1999, p. 20) the concentration of urbanisation is high in Bangkok (Dhiratayakinant 1993). Ten percent of Thailand’s population reside in only 0.3 % of Thailand’s total surface area (Arbhabhirma et al. 1988). This is expected to increase in the future (Atkinson 2000).

A major reason for the increase in Bangkok’s population is rural-urban migration. Whilst the Thai government has been trying to reduce the flows of migrants to Bangkok for the

past two decades, it has not proved successful (Guest 1998). A significant result of this migration is that up to 15 percent of those living in Bangkok are squatting, without any legal access to social services, including health and education (Atkinson 2000).

Rural-urban migration is not peculiar to Thailand. It is a phenomenon of the developing world more generally (Han 1998; Todaro 1989).

Methodology

The ANI will calculate the cost of urbanisation based on a World Bank (1999b) study which estimated that due to pollution levels associated with urbanisation, the average Bangkok citizen will spend 8% of their income on overcoming air pollution and 10% of their income on accessing drinkable and safe water.

$$CU = BY(0.08) + BY(0.1) \quad [4.9]$$

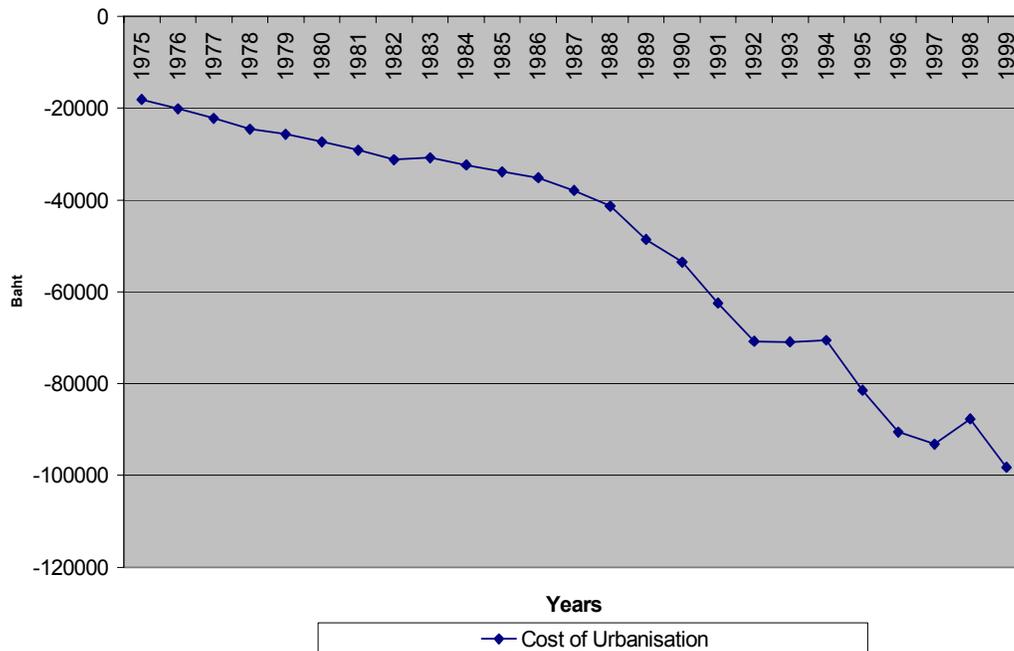
where CU = cost of urbanisation
 BY = average income for Bangkok residents

See Appendix D for calculation.

Results

As with the previous adjustment, this social sub-system adjustment for urbanisation is also considered a cost of economic growth and therefore reduces social welfare. As might be expected, the costs of urbanisation have accelerated over the past decade. As Bangkok has grown and as the dynamic of economic growth has encouraged urbanisation, the associated costs have also increased. The result for social welfare is an increasingly large reduction each year. Within *Figure 4.6*, it is possible to see a increasing divergence between the previous measure of social welfare and the new measure which incorporates the costs of urbanisation.

Figure 4.6 Cost of Urbanisation in Thailand, 1975-1999 (1988 prices – millions of baht)



Source: Author's own calculations.

If this were to be projected forward, the cost of urbanisation on social welfare would become more important. Policy makers will need to consider how the negative effects of urbanisation can be either reduced or overcome. Social choice assists in doing this.

4.3.5 Private Expenditure on Health

Issues

Daly and Cobb 'assumed that half of the real growth in private health expenditure is purely defensive in nature, i.e., compensating for growing health risks due to urbanization and industrialization' (1990, p. 423-4; also see Clayton and Radcliffe 1996). As with public health expenditure, Daly and Cobb subtracted one-half of the difference between the 1950 level of private health expenditure and the given year. Cobb and Cobb (1994) revised this method in light of criticism that agreed that using 1950 as base year was not justifiable. Thus, in the revised ISEW, they 'simply subtracted one half of all medical expenditures in each year on the assumption that they are defensive expenditures.

Social Choice Perspective

In this adjustment, the market perspective and social choice perspective diverge (see for example Freeman and Shipman 2000). Within the market perspective, private expenditure on health is considered to increase social welfare. Whilst within the social choice perspective, it is considered a reduction in social welfare as this additional expenditure is caused by the negative health consequences of economic growth. It may be considered that the expenditure on private health care is the contingency value of the “willingness to pay” for an unchanged health status.

Methodology

Whilst seventy-five percent of public expenditure on health has been added to the ANI for Thailand as a benefit of economic growth because of the low base of government spending, it is assumed in this thesis that private expenditures on health is actually a response to the negative health costs of economic growth. Thus, one half of the private expenditure on health will be subtracted as a cost of economic growth.

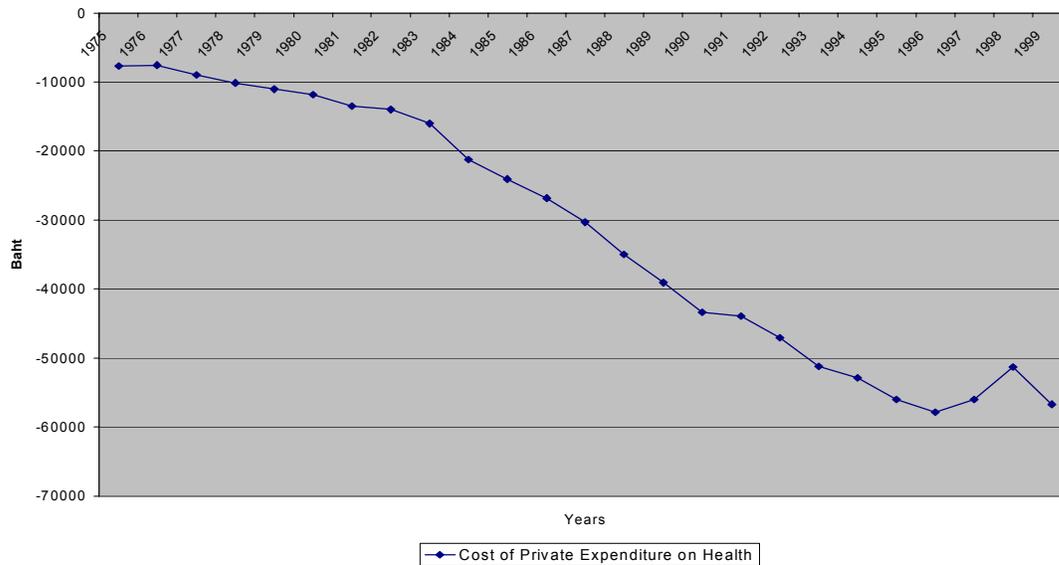
Standard national accounts divide private expenditures on health into *Personal Care and Health Expenses*. On average, *Health Expenses* account for around 80% of total health expenditures. Fifty percent of *Health Expenses* is then subtracted as a defensive cost of economic growth in the ANI in Thailand:

$$\text{CPrHE} = \text{PrHE}(0.5) \quad [4.10]$$

where: CPrHE = cost of private health expenditure
 PrHE = private health expenditure

See Appendix E for calculations.

Figure 4.7 Cost of Private Expenditure on Health in Thailand, 1975-1999 (1988 prices – millions of baht)



Source: Author's own calculations.

Results

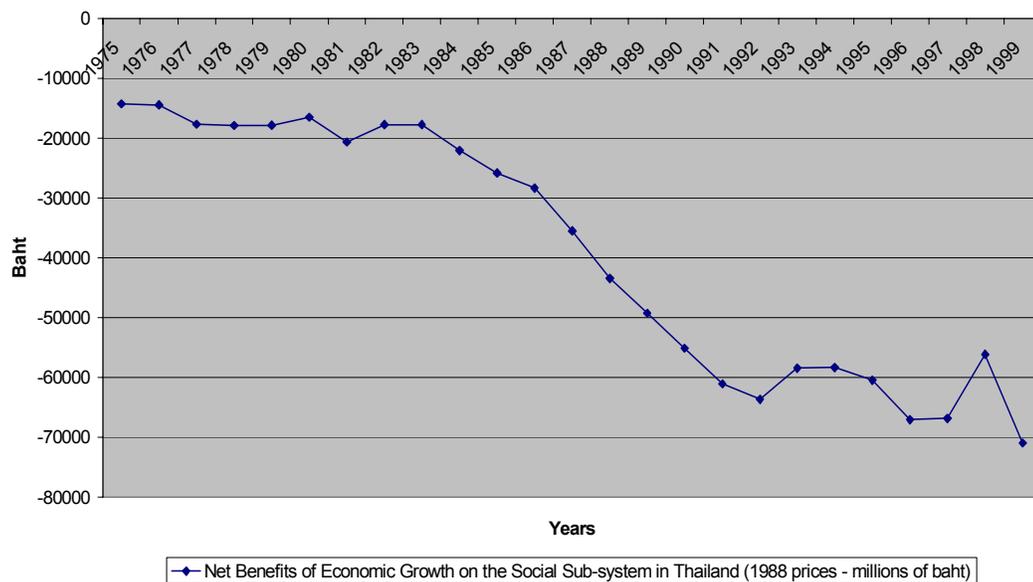
As discussed above, private expenditure on health in Thailand has increased over the last twenty-five years. This is considered a defensive expenditure resulting from increased levels of pollution causing ill-health and stress. This expenditure reflects a reduction in social welfare as people are spending money to rectify the negative effects of pollution and stress brought about, in part, by economic growth. It is a zero-sum result as the additional funds are spent to maintain previous levels of health, not gain improved levels.

This adjustment continues to reduce social welfare and reduce it increasingly near the later stages of the period under review. An inference that can be drawn from this is that the recent experience of economic growth is having an increasingly stunting affect on social welfare experienced in Thailand.

4.3.6 Summary of the Impact of Economic Growth on the Social Sub-system

The net benefits of economic growth on the social sub-system are calculated by adding the benefits of public expenditure on health and education then subtracting the costs of commuting, urbanisation, and private expenditure on health. For the entire period, the net benefits of this sub-system have been negative. Further, they have increased nearly five times since 1975. This increase indicates that the costs of economic growth are steadily increasing and reducing social welfare each year.

Figure 4.8 Net Benefits of Economic Growth on the Social Sub-system of Thailand, 1975-1999, (1988 prices – millions of baht)



Source: Author’s own calculations.

The continuous increase in the negative net benefits of economic growth over the period of study is highlighted in *Table 4.8*. As with the pattern of change within aggregate national income, this trend line also roughly follows the first two phases of growth (albeit negative growth in this instance). Between 1975 and 1986, the pattern of (negative) growth was slow and steady, but this accelerated dramatically from then until 1997. There is also a very sharp fall in the net benefits in the last year, the sharpest for the entire

period. Future studies will determine if this is the start of a new phase of accelerated (negative) growth, or a once off aberration.

Table 4.4 Net Benefits of Economic Growth on the Social Sub-system in Thailand, 1975-1999, (1988 prices – millions of baht)

Year	Benefits of Public Expenditure on Education	Benefits of Public Expenditure on Health	Costs of Commuting	Costs of Urbanisation	Costs of Private Expenditure on Health	Net Benefits of Economic Growth on the Social Sub-system	Net Benefits of Economic Growth on the Social Sub-system per capita (in baht)
1975	12240	2407	-3066	-18084	-7723	-14226	-336
1976	13372	3457	-3466	-20164	-7579	-14380	-333
1977	13683	3753	-3829	-22255	-8981	-17629	-399
1978	16883	4003	-3939	-24634	-10141	-17828	-395
1979	18427	4530	-3787	-25712	-11071	-17613	-386
1980	21455	4708	-3560	-27382	-11828	-16607	-350
1981	21614	5217	-4704	-29172	-13504	-20549	-431
1982	26855	6252	-5441	-31258	-14005	-17597	-361
1983	28274	7153	-6171	-30869	-16045	-17658	-357
1984	31239	7673	-7192	-32420	-21285	-21985	-436
1985	32788	8555	-9141	-33843	-24078	-25719	-498
1986	34871	8584	-9710	-35177	-26847	-28279	-535
1987	34274	8686	-10012	-37963	-30327	-35342	-659
1988	34634	8765	-10164	-41374	-34978	-43117	-791
1989	38198	9788	-9133	-48611	-39108	-48866	-882
1990	42148	10372	-10218	-53538	-43427	-54663	-978
1991	44793	11045	-9947	-62459	-43955	-60523	-1072
1992	52041	13297	-10647	-70775	-47075	-63159	-1101
1993	59305	16749	-11497	-70927	-51248	-57618	-1001
1994	60327	17914	-12107	-70560	-52869	-57295	-987
1995	69457	21208	-12406	-81507	-56051	-59299	-1017
1996	73176	22562	-13289	-90561	-57893	-66005	-1115
1997	74579	25904	-17099	-93200	-56019	-65835	-1099

1998	79595	26532	-22264	-87740	-51308	-55185	-913
1999	81549	25868	-22495	-98231	-56710	-70019	-1151

Source: Author's own calculations

Having adjusted national income to take into consideration the net benefits of economic growth on both the economic and social sub-systems, it is evident that social welfare measured by the (partial) ANI per capita is quite different to social welfare as (conventionally) measured by national income. Not only is the absolute level measured by the money metric lower, the changes are also less. As has been commented on previously, national income per capita rises steadily for the first decade before accelerating until 1997, before falling and then rising again. The partial ANI per capita index of social welfare is far flatter, and whilst the growth does increase after 1986 it is certainly not at levels experienced by national income per capita. There is also no sign of recovery near the end of the period under study. Also of interest is the increasing divergence between the two measures over the course of the twenty-five year period. The two measures of social welfare start at similar levels, but the cumulative increases are far greater in national income per capita. This would suggest that the net benefits of economic growth (with respect to these two sub-systems) are constantly decreasing. Indeed, from 1996, the net benefits are negative and actually reducing or stunting social welfare. The level of social welfare in 1999 is less than it was in 1994. Therefore, in the final five years of the period under review, economic growth has not had a net positive impact on social welfare and indeed has not been desirable in this sense.

Welfare Economic Analysis

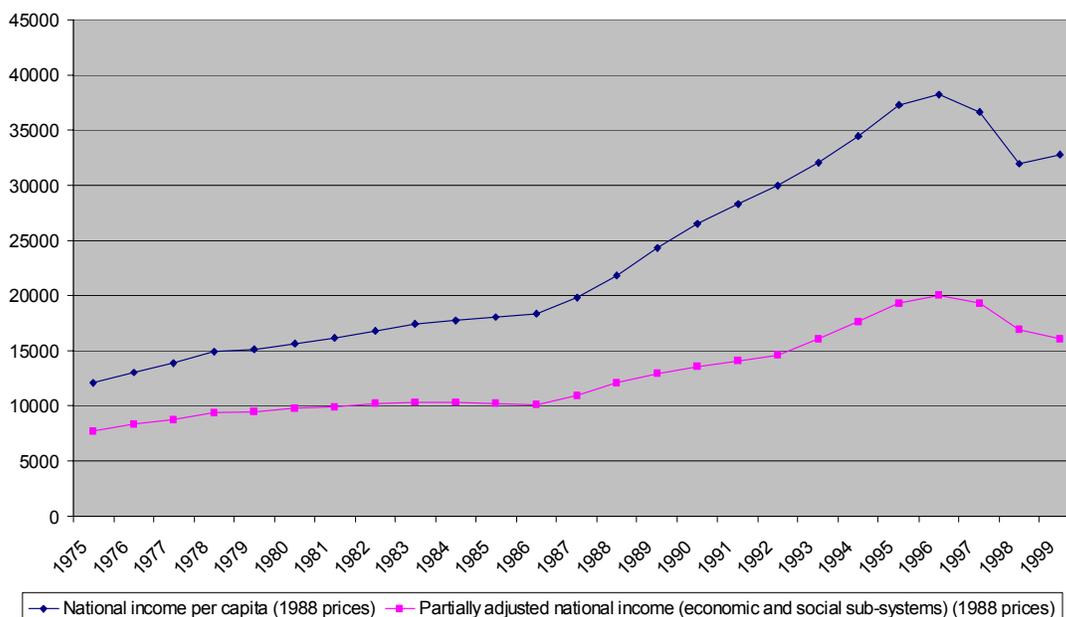
As has been discussed, the net benefits of the social sub-system include adjustments made for public expenditure on education, public expenditure on health, commuting, urbanisation, and private expenditure on health.

The term *welfaristic* refers to the utility achieved by individuals in only the economy. Therefore *non-welfaristic* issues refer to the utility achieved through all other activities such as political or social conditions, physical characteristics such as the environment or

even spiritual considerations. It is perfectly reasonable to include both welfaristic and non-welfaristic considerations within a social welfare function to determine social state orderings and what adds to social welfare and reduces it (Boadway and Bruce 1984).

One important non-welfaristic issue considered within this social sub-system is health. Health is an important consideration for social welfare (Nordhaus 1998) and yet its distribution is not always equitable (Wagstaff 1994). A market perspective on health reflects all the money spent by individuals on health is welfare enhancing. The adjustments made in this sub-system reflect that a certain part of the health expenditure (both public and private) does not add to welfare. Rather, it is a defensive expenditure as it is not increasing health outcomes but rather maintaining health outcomes at a static to counter the effects of pollution, etc caused by economic growth.

Figure 4.9 Comparison of National Income per capita and partial ANI per capita based on the Net Benefits of Economic Growth on the Economic and Social sub-systems for Thailand, 1975 – 1999 (1988 prices)



Source: Author's own calculations.

Measuring the costs of commuting and urbanisation is difficult, as there is no direct market place for these outcomes. Yet, it is possible using cost-benefit analysis techniques to estimate various measures. As with all of these adjustments, these estimations rest squarely on various assumptions.

However, this discussion has focussed on only a partial ANI index. The next section within this chapter will further adjust this measure by considering the political sub-system.

4.4 POLITICAL SUB-SYSTEM

Adjustments have now been made for the costs and benefits of economic growth that impact on the economic and social sub-systems. Adjustments that fall within the political sub-system will now be considered.

Within the ANI social welfare function, the net benefits of economic growth (NB_t) within the political sub-system is a function of public roads (PR_t), flow of services from consumer durables (CD_t), corruption (C_t), and public debt (PD_t):

$$Po_t = NB_t(PR_t, CD_t, C_t, PD_t) \quad [4.12]$$

Within the ANI social welfare function then this would appear as:

$$ANI\ SWF_t = \sum_{t=1}^T \frac{NB_t([ANY_t, Y_{ede\ t}], En_t, [PE_t, P_bH_t, C_t, U_t, P_vH_t], [PR_t, CD_t, C_t, PD_t], Sp_t)}{(1+r)^t} \quad [4.13]$$

where:

$$\begin{aligned} ANI\ SWF_t &= \text{adjusted national income} \\ NB_t &= \text{net benefits} \\ t &= \text{time} \end{aligned}$$

r	=	discount rate
ANY_t	=	aggregated national income
$Y_{ede t}$	=	equally distributed equivalent income
En_t	=	environmental factors
PE_t	=	public expenditure on education
P_bH_t	=	public expenditure on health
C_t	=	commuting
U_t	=	urbanisation
P_vH_t	=	private expenditure on health
PR_t	=	public roads
CD_t	=	flow of services from consumer durables
C_t	=	corruption
D_t	=	debt
Sp_t	=	spiritual factors

4.4.1 Public Roads

Issues

As economic growth increases, governments normally receive greater revenues through higher tax receipts, which can be spent on providing greater services. Most third world countries have a low base of road infrastructure, which quickly become bottlenecks as traffic flows increase in line with economic growth. Often demand (pushed by economic growth) outgrows the extra supply of roads and, despite the new construction of roads, these bottlenecks may remain (see Section 4.3.3). However, increased access to markets, health care, education and other services (including employment opportunities) means that building roads is an important aspect of increasing social welfare for developing countries. It should also be noted though, that not all roads add to social welfare; some are defensive (such as the maze of roads in urban centres trying to overcome the consequences of urbanisation) whilst some such as logging roads are necessary for the destruction of the environment. Roads can also have political purposes. In the 1950s and 1960s, road building also served to increase the loyalty felt by rural populations to the

ruling urban elite and to serve as anti-communist propaganda (Phongpaichit and Baker 1995).

Social Choice Perspective

Excluding the small number of tollways within Bangkok, the vast majority of roads within Thailand are public roads and therefore are without fee. These roads have been built with public finance raised through various tax initiatives or through international borrowing. The use of these roads for individuals is free and no market prices exist. However, these roads are valuable to both individuals and society. This social choice value to social welfare can be estimated. As with the adjustments for public expenditure on health and education, the benefits of the provision of public roads add to social welfare. Within the social choice perspective, the provision of these public roads adds to social welfare as they allow access to markets, education, health services, communities and freedom of movements. Within the rural areas of Thailand, all weather roads are particularly important in removing traditional periods of isolation during the wet seasons.

Methodology

Diefenbacher (1994) based his estimation of the value of public roads to social welfare on the government expenditure on building and maintaining roads. He assumed, 'only 50% of these expenditures are taken to increase the welfare of the population (Diefenbacher 1994, p. 221). The result of this method of calculation is not a smooth increase in the value of service that was found in both Daly and Cobb's method or Hamilton's (1998) method. As a percentage of personal consumption the value in Germany was 0.6% in 1950, 1.9% in 1979 and 1.3% in 1987. From around 1960 onward, these ratios are quite comparable with Daly and Cobb's (1990) estimations for the United States.

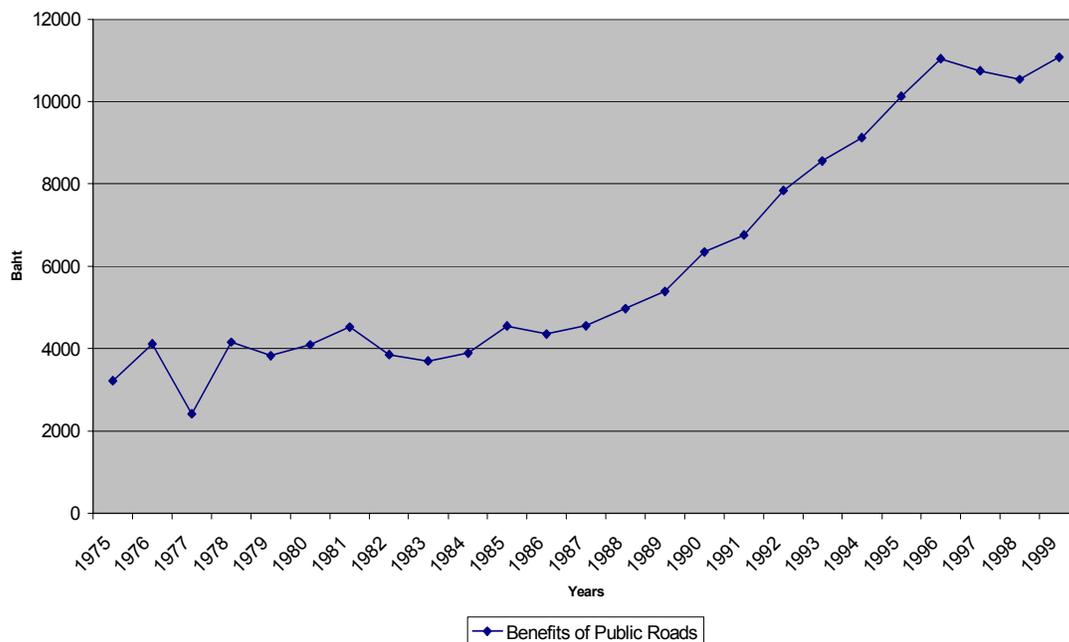
A similar lack of data also exists for Thailand (and presumably most the third world). Therefore the same method of calculation will be used. Given the low base level of roads in Thailand, it is assumed that the additions of new roads will continue for the foreseeable future. Therefore, one half of the expenditure on new roads (including the maintenance costs) will be added as a benefit of economic growth to the ANI for Thailand.

$$\text{BPR} = \text{PR}(0.5) \quad [4.14]$$

where BPR = benefits of public roads expenditure
 PR = public roads expenditure

See Appendix F for full calculations.

Figure 4.11 Benefits of Public Road Expenditure in Thailand, 1975 – 1999 (1988 prices – millions of baht)



Source: Author's own calculations.

Results

The benefits of public expenditure add to social welfare, though not significantly. For the first decade, the benefits of government expenditures on public roads remained quite static, but increased steadily thereafter. Government spending on public roads tripled over the period of review, but the influence on this social welfare measure is not great in

absolute terms. However, it is important to include this adjustment, as the flow of service from the provision of these public roads is important in increasing the optimal level of social welfare. Such an increase in social welfare is excluded from individual or market based perspectives of social welfare.

4.4.2 Private Consumer Durables

Issues

The purchase of consumer durables provides long term benefits (Islam 2000). It is proper therefore to ‘add the value of the services that flow from consumer durables ...by using the estimated value of the service from such equipment rather than its purchase price, we have attempted to overcome the distortion in current measurements (Daly and Cobb 1990, p. 421).

Social Choice Perspective

The divergence between market and social choice perspectives is also evident when calculating the impact of the flow of services from the purchase of consumer durables. The addition to social welfare in consumption-based measures of social welfare (McKenzie 1983; Slesnick 1998), is the actual expenditure on consumer durables. However, the real “social welfare value” is not the purchase prices but the flow of services provided by these purchases over the length of service. This flow of service value may be greater than the initial purchase prices and hence add more to social welfare over time. Whilst this value may be understood by individuals within the market when revealing their preferences, it is not accurately recorded in consumption-based social welfare indices. The use of social choice perspectives allows this flow of services value to be explicitly recorded when measuring social welfare.

Methodology

There is a lack of data available regarding the net stock of consumer durables in Thailand. Due to Cobb and Cobb’s (1994) finding that in a growing economy, expenditure on consumer durables would slightly exceed the services gained, it is assumed in this ANI that due to the low base of consumer durables that the benefits derived from them will be greater than this expenditure.

Daly and Cobb (1990), the average difference between what was expended on consumer durables and what was received as a benefit through the service gained from consumer durables was on average 60%. Thus between 1950 and 1986, consumers on average received only 40% of benefits from the amount of expenditure they made on consumer durables.

In the German study (Diefenbacher 1994) using the ISEW calculations the situation is reversed. The difference between what was expended on consumer durables and what was received as a benefit through the service gained from consumer durables was actually less than 40%. In Germany, between 1950 and 1987, consumers on averaged received 63% of benefits from the amount of expenditure they made on consumer durables.

The revised methodology (22.5% of net stock not 10%) used by GPI (Cobb and Cobb 1994) continued this trend. The difference between what was expended on consumer durables and what was received as a benefit through the service gained from consumer durables was less than 10%. Therefore, in the United States, between 1950 to 1990, consumers on averaged received 90% of benefits from the amount of expenditure they made on consumer durables. The net result of ‘add(ing) the value of the services that flow from consumer durables here and subtract(ing) the actual expenditures on consumer durables elsewhere’ (Daly and Cobb 1990, p. 421), therefore was almost nil.

It is perhaps for this reason that Hamilton excluded these calculations from his interpretation of the GPI for Australia (Hamilton 1998).

As mentioned, despite growing, the Thai economy starts from a low base of the net stock of consumer durables and therefore, the benefits from consumer durables can be assumed to be greater than the expenditures made on them. The difficulty is trying to determine by what amount. Returning to Daly and Cobb’s initial formula, based on the average return

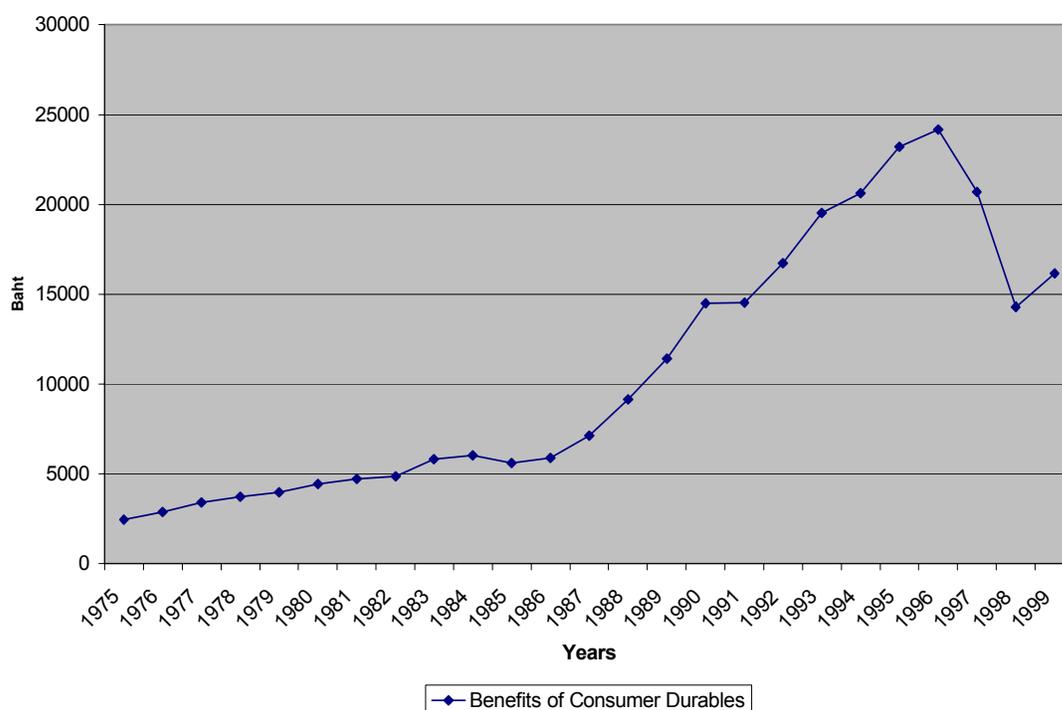
of net housing stock to housing expenditure, 10% of consumer expenditure will be added to the ANI index as a net benefit of economic growth:

$$BCD = CD/0.1 \quad [4.15]$$

where BCD = benefits of consumer durables
 CD = consumer durables

See Appendix G for calculations.

Figure 4.12 Benefits of Consumer Durable Purchases in Thailand, 1975-1999 (1988 prices – millions of baht)



Source: Author's own calculations.

Results

As with the benefits of public expenditure on roads, the relative increase in the flow of services from private expenditure on consumer durables in Thailand has increased six and half times over the twenty-five year period. However, the absolute increases in social

welfare are still quite small. The pattern of the benefits of the flow of services from the purchase of consumer durables closely resembles the movements in GDP. There are steady improvements in this benefit for the first decade before a period of accelerated growth lasting until 1997. Following the Asian Financial Crisis of 1997 the flow of benefits fell dramatically before a recovery is indicated in 1999.

4.4.3 Corruption

Issues

Corruption exists at most levels of public office in nearly all countries (Elliott 1997). ‘It was estimated that in 1991 alone up to 15 per cent of (Italy’s)... US \$100 billion budget deficit was accounted for in kickback money’ (Phongpaichit and Piriyarangsan 1994, p. iix). However, corruption is perhaps most prevalent in the third world where modern political systems such as democracy have been introduced over traditional systems such as paternalism and patronism. The result is that corruption is seen as a way of life or as a cultural phenomenon (Linter 1998).

As economies rapidly grow, the benefits available to a few leading businesses and political offices become enormous resulting in great competition for these rewards. Such ‘competition to secure the corruption revenue that accrues from command of high office is a key theme in Thai politics’ (Phongpaichit and Piriyarangsan 1994, p. 5).

Huntington (1968) argues that corruption is a natural outcome within the early phases of democracy. Countries such as the United Kingdom and United States experienced quite high levels of corruption early in their political histories. Others further argue that corruption is a necessary step to fuel economic growth (Chang 1994; Khan and Jomo 2000), but this view is disputed (Mauro 1995, 1997).

Corruption (in the third world) is closely linked to the political system of the patron-client relationship. This relationship is considered a fair and beneficial system as it promotes stability and provides benefits to its participants. ‘Little people must find a patron and offer respect, gifts and services in order to ensure favour and security. Big people try to

build up their clients in order to maximise the flow of gifts and favours' (Phongpaichit and Piriyarangsan 1994, p. 4-5). Previously, the relationship was important in connecting government officials and the local people. It also ensured that social gains and benefits were allocated to all levels of society. As one moves up the hierarchy, big people become little people to bigger people and so on until the power is concentrated into one person. Within Thailand this was previously the King and is now the Prime Minister.

A strong case can be put forward for linking the increase of corruption with the increase in economic growth. In the early 1960s, Thailand began to experience high levels of economic growth based in the export of agricultural products. Agricultural expansion was achieved through the building of new communications and irrigation systems and new road networks opened up the north and northeast. 'It is believed that the economic development policies after 1960 opened up opportunities for Sarit (the Thai Prime Minister) and his men to mass wealth on a spectacular scale' (Phongpaichit and Piriyarangsan 1994, p. 43).

Whilst corruption may benefit a few individuals it further worsens income distribution by placing even more wealth into the control of a limited number. It allows the destruction of social resources such as forests and water, it allows building and construction at sub-level standards, it increases the costs of government expenditure and reduces the services made available, it allows unfair advantages within the market place and it reduces peoples faith in public offices. Corruption does not occur in a vacuum. Someone must pay for it and this cost is usually paid for by those least able to afford it (Parnwell 1996).

Social Choice Perspective

An individual may choose (or be coerced) to participate in corrupt practices to facilitate favourable business outcomes, overcome bureaucratic regulations, achieve high academic scores, supplement low civil service salaries or receive large financial gains. At the individual level, the decision to participate in corrupt practices usually has positive consequences for both parties. However this distortion of the market-based equilibrium distribution of resources results in further inequities (Parnwell 1996). At a social level,

corruption distorts the market distribution of goods and services away from the poor in favour of the powerful (Elliot 1997).

The cost to social welfare must be considered, but is not at the individual or market level. Social choice perspectives incorporate the costs of corruption into this new measure of social welfare.

Corruption is entrenched in Thai society (Bello 1995; Bell 1996; Djalal 2001) and is complicated by its history:

...in the traditional *sakdina* system of government, officials received their appointment from a higher authority but were not remunerated by any flow of income from the same source. They were expected to remunerate themselves by retaining a reasonable portion of the taxes they collected, and by exacting fees for services rendered. (Phongpaichit and Piriyaangsan 1994, p. 6)

So whilst these modern bureaucrats and politicians are remunerated, the collection of fees and retention of taxes is thoroughly entrenched as a practice and widely accepted within Thailand. It is for this reason that Thailand is perhaps considered one of the most corrupt countries in the region (Linter 1998).

It is also entrenched because whilst salaries are now paid, they are quite low thus “forcing” officials to accept bribes and fees. Also, the legal provisions and procedures for policy corruption are quite limited, as is the strength of political opposition (Phongpaichit and Piriyaangsan 1994).

It is further complicated by the apparent public acceptance of mid-level corruption. Various surveys have indicated that acts of corruption as defined by Western standards are considered acceptable under the traditional patron-client relationship. The acceptance of fees or bribes is only considered corruption if they exceed conventional limits. ‘In short, for many Thais acts of “cheating the people” and “cheating from the royal coffer” will be called corruption only if they involves large sums of money, stem from

aggressively greedy people, and have consequences which are clearly damaging for society as a whole' (Phongpaichit and Piriyarangsan 1994, p. 163). An acceptable limit is considered to be around ten percent.

Corruption therefore, defined in this way, is not an acceptable practice within Thailand and must be considered a cost of economic growth and harmful to the welfare of society. The major reason put forward by the military for the 1991 coup was the level of corruption by the elected government.

Methodology

The difficulty of estimating the cost of corruption is caused by the lack of data that can be compared over time. Phongpaichit and Piriyarangsan (1994) have reviewed the cases of corruption brought into the public arena and made various assumptions based on these cases. Within Thailand, two mechanisms exist for investigating corruption; the office of the Auditor General (OAG) and the Counter Corruption Commission (CCC).

Corruption was broken down into two components; that undertaken by bureaucrats (including the military and police) and that undertaken by politicians.

By adding the two types of corruption together, an estimate can be made of the amount of corruption as a percentage of GDP. Corruption was broken down into two components; that undertaken by bureaucrats (including the military and police) and that undertaken by politicians.

Based on known and prosecuted cases of corruption, it was assumed that 20% of all ministry budgets allocated for the purchase of materials, or for construction work contracted out disappear through corruption. This is considered a conservative figure. It has been suggested it could be as high as 50% (Morell 1975 – quoted in Phongpaichit and Piriyarangsan 1994, p. 3). For the Sanya-Kriangsak administration (1974-1981) the total of this estimate is 3996 million of baht, compared to 7120 million of baht per annum for the Prem administration (1981-1988), compared to the Chatchai administration (1989-1999)

where the total cost of corruption based on construction, etc was 11676 million baht per annum.

The second form of corruption is based on assets seized from politicians after they have left office as they were judged to be “unusually wealthy” and could not be explained. It is likely therefore that this figure is also conservative as it does not take into account other wealth which was not seized by the authorities but was also achieved through corrupt means. For the three periods, this form of corruption is estimated at 0.04 percent of GDP.

By adding the two types of corruption together, a estimate can be made of the amount of corruption as a percentage of GDP. It will be assumed that the corruption of politicians during the Sanya-Kriangsak and Prem administrations will be the same as that of the Chatchai administration at 0.04% of GDP per year.

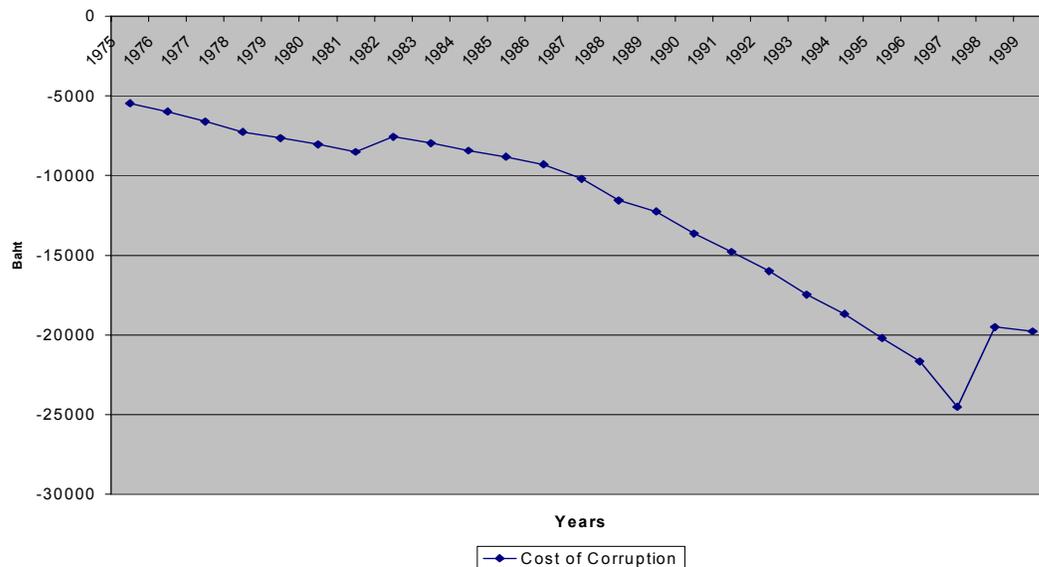
‘Corruption is obviously impossible to quantify with my degree of accuracy. The data which exist are partial, almost random in some cases and politically biased in others’ (Phongpaichit and Piriyarangsak 1994, p. 51). It is however indicative of the cost of corruption to social welfare in Thailand and will be included in the ANI being developed in this thesis:

$$\text{CPC} = \text{GDP}_{1975-81}(0.0088) + \text{GDP}_{1982-88}(0.0074) + \text{GDP}_{1989-99}(0.007) \quad [4.16]$$

where CPC = cost of political corruption
 GDP = gross domestic product

See Appendix H for full calculations.

Figure 4.13 Cost of Corruption in Thailand, 1975-1999 (1988 prices – millions of baht)



Source: Author's own calculation.

Results

The costs of corruption have a negative impact on social welfare. As they are calculated as a function of GDP (albeit a reducing function over time), increases in economic growth have brought about an increase in the costs of corruption. Whilst these amounts may appear small, they do represent the United Nation's recommend aid target for developed countries. In essence then, the cost of corruption in Thailand as a percentage of GDP is equal to that which wealthier countries would be lauded for if they spent the same percentage on official overseas aid.

4.4.4 Debt

Issues

Debt has long been recognised as a major impediment to the development of countries (George 1999; Watkins 1998). In order to service large levels of public debt substantial outward flows of income are required. Generally public debt has been accumulated for non-productive investments. For example, a significant amount of debt accumulated by the Thai government in the 1970s was to finance petroleum imports that were then sold at

subsidised prices (Warr 1993a). This policy was aimed at encouraging economic growth. The Thai government was then faced with increasing interest rates through the early eighties, which increased debt-servicing repayments. As this debt was primarily in US currency, foreign exchange devaluations also worsened the problem.

Whilst Thailand's debt has not reached levels experienced by other countries (Warr 1993a; Kakwani and Krongkaew 1997), it has still resulted in many hundreds of millions of dollars being repaid overseas rather than being spent on the essential services such as health, education and social security.

The accumulation of debt cannot be entirely blamed on Third World governments (Bell 1993). For example, many non-productive loans in the mid seventies (such as those in Thailand to subsidise high international petrol prices) were made with petro-dollars. The high petrol prices caused a glut in the international capital market and poor governments were offered great encouragement to take on loans in order for these new petro-dollars to be invested (George 1999). Interest rates were low and servicing did not seem unduly difficult. However, primary commodity price slumps in the eighties negatively affected foreign exchange rates, interest rates and the abilities of governments to repay loans (Warr 1993a).

Social Choice Perspective

The cost of public debt on social welfare is not considered within market or individual preferences. Maintaining reasonable levels of debt servicing (not greater than 16 percent of the government budget) is the present fiscal and public debt management policy (Ministry of Finance 2001). This policy recognises the negative consequences of high debt repayments on social welfare. A social choice perspective considers the cost of public debt though as it reveals that expenditure servicing public debt reduces the amount of funds available to governments to increase expenditure on other social welfare enhancing social welfare action (such as education, health and roads) (Sen 1999a).

However, not all debt is non-productive and capital is required for economic growth. Debt that is for consumption, such as subsidised fuel, is non productive and a significant cost when considering sustainable social welfare. ‘Sustainable consumption requires that a nation does not accumulate debts over a long period’ (Hamilton 1998, p. 88).

Whilst not a crippling problem in Thailand, debt is a crippling problem in much of the third world. Debt has been repaid many times over, yet large parts of government revenues are being directed away from essential services such as health and education to continuously service these loans.

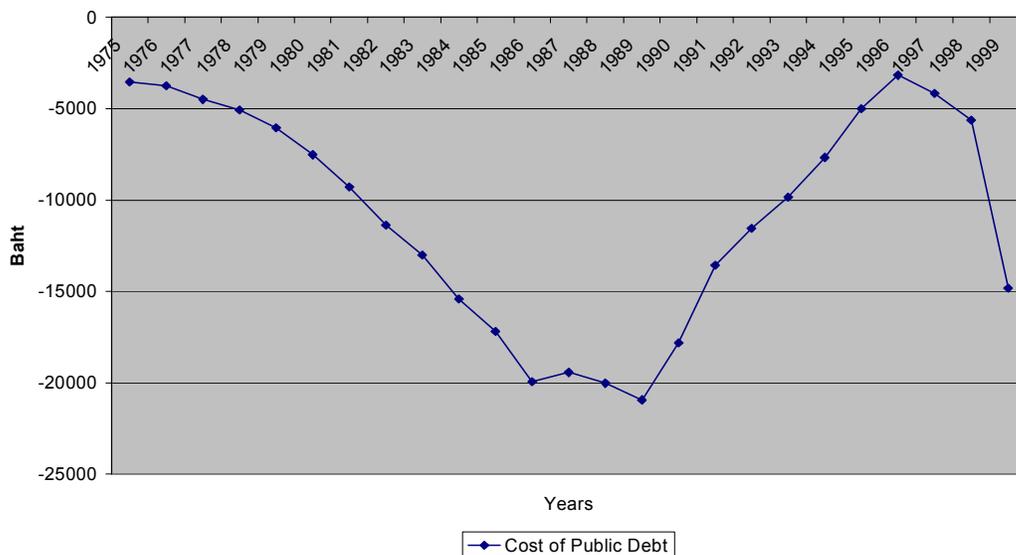
Methodology

$$CPD = IPD(0.5) \quad [4.17]$$

where CPD = cost of public debt
 IPD = interest on public debt

See Appendix I for calculations.

Figure 4.14 Cost of Public Debt in Thailand, 1975-1999 (1988 prices – millions of baht)



Sources: Author’s own calculations.

Results

The costs of public debt have risen and fallen quite unevenly over the period of study. The cost of public debt increased from 1975 to 1986 before remaining static for four years. The cost of public debt reduced from 1990 to 1997 then began to increase again with a large increase in the final year of the study, 1999. It is not known if this large increase will continue into the future. The costs of public debt reached their highest level in 1989 and the lowest in 1996. However, throughout all of this period, the servicing of debt has removed funds that may have been available for the government to use on welfare enhancing activities such as education, health or roads.

4.4.5 Summary of the Impact of Economic Growth on the Political Sub-system

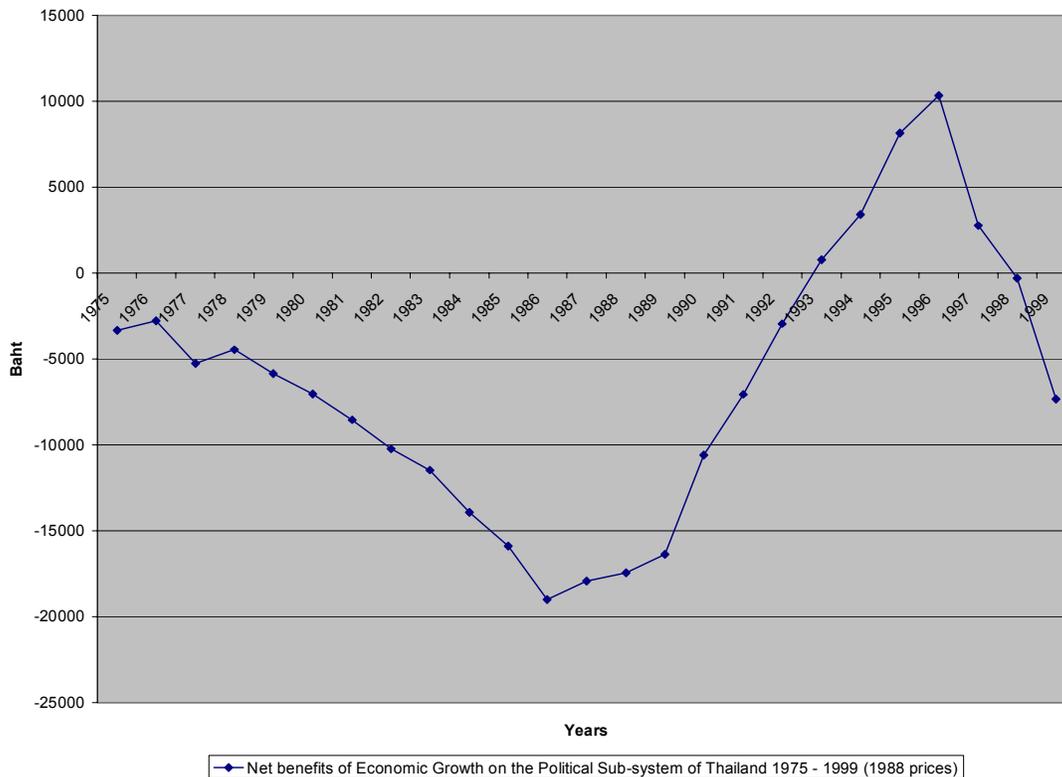
Unlike the net benefits of economic growth on either the economic or social sub-systems, the net benefits of economic growth upon the political sub-system are quite varied. The political sub-system is calculated by adding the benefits of government built roads and highways and consumer durables and subtracting the costs of corruption and debt. The results of this sub-system are striking. In only five years of the twenty-five years (1994 - 1998) are the net benefits positive within this subsystem. During the remainder of the time the net benefits are negative and therefore reduce social welfare. The net *negatives* worsened in the first part of the time series reaching a low in 1986 before increasing slowly to a high in 1996 before beginning falling again. The period until 1987 was dominated by the negative consequences of corruption under the Sanya-Kriangsak and Prem administrations (Phongpaichit and Piriya-rangsarn 1994) and high levels of debt resulting from the fuel crisis in the mid 1970s. They range from positive to negative, with 30,000 million baht being the difference between the two extremes. The net benefits become increasingly negative from 1975 to 1986. From this year they began to reduce, but remained negative until 1993. In 1996, the net benefits reached their highest level before falling again until the end of the study. The major factor influencing this reduction in the negative net benefits was the reducing costs of debt for the decade beginning 1989. As the debt burden fell the net benefits of economic growth rose.

Table 4.15 Net Benefits of Economic Growth on the Political Sub-system in Thailand, 1975-1999 (1988 prices – millions of baht)

Year	Benefits of Public Expenditure on Roads	Benefits from Consumer Durables	Costs of Corruption	Costs of Public Debt	Net Benefits of Economic Growth on the Political Sub-system	Net Benefits of Economic Growth on the Political Sub-system per capita (in baht)
1975	3216	2458	-5470	-3540	-3336	-79
1976	4114	2855	-5991	-3749	-2771	-64
1977	2412	3419	-6600	-4494	-5263	-119
1978	4157	3717	-7257	-5077	-4460	-99
1979	3824	3998	-7637	-6050	-5865	-127
1980	4091	4437	-8041	-7521	-7034	-150
1981	4523	4738	-8513	-9288	-8540	-178
1982	3845	4854	-7549	-11381	-10231	-209
1983	3692	5808	-7962	-13011	-11473	-232
1984	3884	6042	-8424	-15416	-13914	-275
1985	4546	5590	-8814	-17203	-15881	-307
1986	4354	5888	-9298	-19933	-18989	-358
1987	4554	7150	-10190	-19436	-17922	-333
1988	4970	9159	-11543	-20031	-17445	-317
1989	5387	11417	-12252	-20934	-16382	-293
1990	6351	14491	-13623	-17812	-10593	-188
1991	6757	14527	-14782	-13552	-7050	-124
1992	7841	16736	-15981	-11533	-2937	-51
1993	8560	19518	-17463	-9834	781	13
1994	9123	20637	-18687	-7664	3409	58
1995	10126	23218	-20191	-4994	8159	137
1996	11041	24150	-21667	-3181	10343	172
1997	10752	20686	-24514	-4159	2765	45
1998	10544	14297	-19512	-5621	-292	-5
1999	11082	16180	-19764	-14833	-7335	-119

Source: Author's own calculations.

Table 4.15 Net Benefits of Economic Growth on the Political Sub-stem of Thailand, 1975 – 1999, (1988 prices – millions of baht)



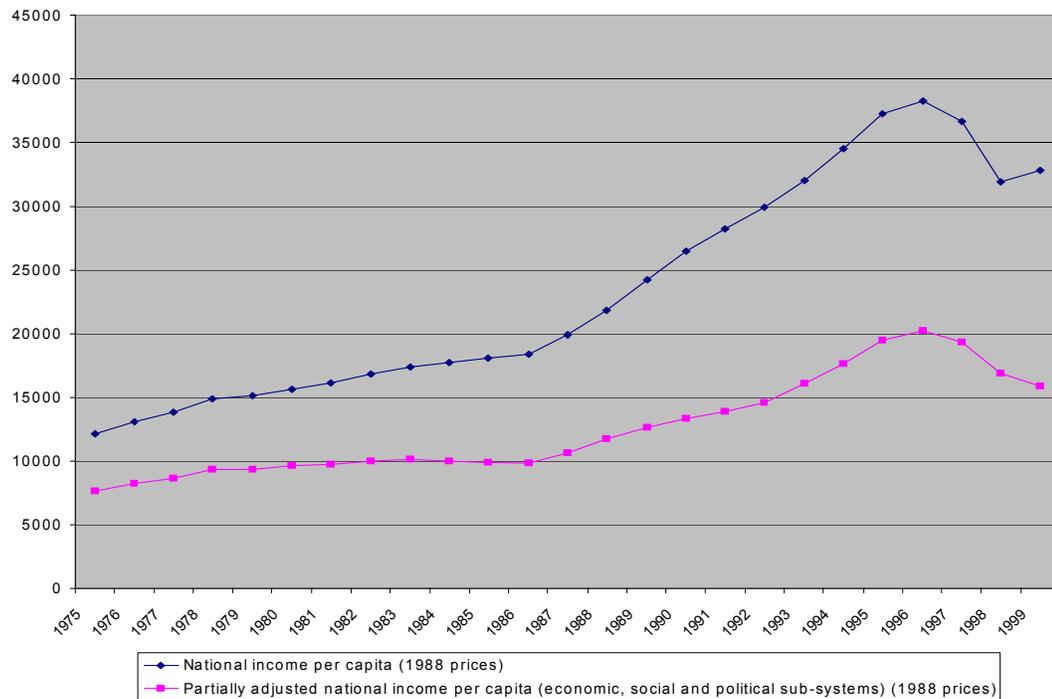
Source: Author’s own calculations.

Welfare Economic Analysis

As has been discussed, the net benefits of the political sub-system include adjustments made for public roads, private consumer durables, corruption and debt.

Corruption can be analysed from an equity-efficiency viewpoint. Corruption results in an inequitable distribution of scarce resources. This distortion of the market-based equilibrium distribution of resources results in further inequities (Parnwell 1996). At a social level, corruption distorts the market distribution of goods and services away from the poor in favour of the powerful.

Figure 4.16 Comparison of National Income per capita and partial ANI index based on the Net Benefits of Economic Growth on the Economic, Social and Political sub-systems for Thailand, 1975-1999 (1988 prices)



Source: Author's own calculations

The most obvious intergenerational issue within the political sub-system is that of debt. Debt can promote future growth if it is used to invest in productive assets, but if debt is brought about by over-consuming today, then that results in poverty in the future (Hicks 1946; Hammond 1994). Whilst Thailand's debt has not reached the levels experienced by some developing countries, it did substantially increase its debt burden during the late 1970s and early 1980s, partly to subsidise fuel consumption (Warr 1993a). Such debt negatively affects future generations as they become responsible for repaying the debt without having enjoyed in any sense the consumption or productive benefits brought about by that debt. Such disregard for future generations thus becomes an issue of justice and fairness as the future are become responsible for the actions of the present. The accumulation of debt does not consider the rights of future generations to be debt free.

As with partial ANI per capita, based on adjustments made for the net benefits of economic growth for the economic and social sub-systems, there is a substantial difference between national income per capita and this partial ANI per capita index based on the extra inclusion of the net benefits of economic growth for the political sub-system. There is not any great difference between the first partial ANI per capita measure and this second one as the net benefits of economic growth in the political system were not large in absolute numbers (independent of being either positive or negative). Comparing these two measures of social welfare the obvious differences include the difference in how each index rises (and falls). The national income per capita rise is quite strong (and as discussed), accelerated after 1986, whereas the new partial ANI per capita is flatter and smoother. Over the period of the study, the two measures become increasingly divergent suggesting the desirability of economic growth is becoming less over time. Also, the partial ANI per capita index does not show signs of recovery after the 1997 financial crisis, whereas national income per capita does. Finally, taken as a whole, it may be that economic growth is losing its desirability in terms of increasing social welfare and becoming stunting. As with the previous review of a partial ANI per capita, the social welfare experienced in 1999 is actually less than that experienced in 1994.

4.5 CONCLUSION

The task to measure social welfare by adjusting standard national accounts for certain costs and benefits of economic growth is not complete. This chapter focussed on reviewing the issues, methods and results for just over half the requisite adjustments required for this task. As social choice theory and systems analysis form the basis for this approach, these adjustments have been categorised into various sub-systems of society. This chapter has focussed on the economic, social and political sub-systems.

National income serves as the base for this new ANI index. Adjustments have been made for the following costs and benefits; income inequality, public expenditure on health,

education and roads, commuting, urbanisation, private expenditure on health, consumer durables, corruption and public debt.

The results of making these adjustments are a considerable change in the measure of social welfare. Compared to the conventional approach of measuring social welfare by national income per capita, this new partial measure of social welfare is significantly lower, does not increase as much and has begun to fall without any signs of recovery.

The following chapter continues applying the required adjustments and does so for the environmental and spiritual sub-systems. Again this chapter will review the issues, methods and results of these adjustments.

The remainder of the thesis continues to discuss the desirability of economic growth in terms of social welfare but does so from different perspectives. Various contemporary development issues, such as sustainability and globalisation are considered and a second analytical tool is developed and applied based on the attainment of certain hierarchical needs.

CHAPTER FIVE – APPLICATION OF ENVIRONMENTAL AND SPIRITUAL ADJUSTMENTS TO SOCIAL WELFARE MEASUREMENT: ISSUES, METHODS AND RESULTS

5.1 INTRODUCTION

This chapter continues the adjustments to national income to measure social welfare that began in the previous chapter. A new measure of social welfare was developed in Chapter Three and its partial application estimated in Chapter Four. Adjustments for the economic, social and political sub-systems were made. This chapter continues this empirical application and adjustments for the environmental and spiritual sub-systems are undertaken.

This new adjusted national income (ANI) social welfare function is calculated by making almost twenty adjustments to aggregated national income within five sub-systems. The first adjustment fell within the economic sub-system and was the adjustment to aggregate national income for inequality. The second set of adjustments were within the social sub-system and included: 1) public expenditure on education; 2) public expenditures on health; 3) commuting; 4) urbanisation; and 5) private expenditure on health. The third set of adjustments fell within the political sub-system and included: 1) government provided roads; 2) private consumer durables; 3) corruption; and 4) debt.

Based on these adjustments, the partial result of this new measure of social welfare indicate that social welfare within Thailand over the last twenty-five years is substantially different than suggested when conventionally measured. This new (partial measure) has had lower overall increases and has actually fallen over the last few years of study.

It is expected that that the remaining adjustments to revealed preferences will result in a further divergence between the ANI per capita measure of social welfare and the national income per capita measure of social welfare. As within the previous chapter, the

estimates of these adjustments for the environmental and spiritual sub-system have been made expressly for Thailand either directly within this study for the first time or have drawn on other studies that identified them as distinct outcomes of achieving economic growth.

Within this chapter the following adjustments for the environmental sub-system will be made: 1) cost of air pollution, 2) cost of water pollution, 3) cost of noise of pollution, 4) cost of deforestation and, 5) long-term environmental damage. Finally, one adjustment will be made to represent the spiritual sub-system of Thai society. This adjustment will be for the cost of commercial sex work. Again all these adjustments will be made for the twenty-five year period, 1975-1999.

Having completed the empirical application of this new measure of social welfare, it will be possible to determine the desirability of economic growth in terms of social welfare for Thailand. A second measure of social welfare, based on well-being and on achieving a favourable mental state, will then be empirically applied to Thailand for the same period to test the results of this new first measure.

This chapter is structured as follows: Section 5.2 discusses the adjustments being made to GDP for the environment sub-system. While Section 5.3 discusses the adjustments for the spiritual sub-system before the results of all adjustments are reviewed and analysed in Section 5.4. The chapter is concluded in Section 5.5.

5.2 ENVIRONMENTAL SUB-SYSTEM

One of the major criticisms of economic growth has been the negative impact on the environment (Mishan 1971; Ayres 1996b, 1998; Grossman 199; Grossman and Krueger 1995; Commoner 1972a, 1972b; Daly 1991, 1993b; Osberg 1992; Meadows et al. 1972; Georgescu-Roegen 1971, 1981; Throsby 2001; Zamagni 1994). This position is strongly disputed though with arguments being put forward that economic growth is a process by which the problems of pollution can be solved (Beckerman 1974, 1992;

Gylfason 1999). Whilst further economic growth may eliminate pollution and environmental damage in the present, it is clear that presently the levels of pollution and environmental degradation are increasing and this can be linked to economic growth (Commoner 1972a; Ehrlich et al. 1999).

Hufschmidt et al. (1983) lists a number of reasons why environmental quality is at risk in developing countries, including: 1) extensive poverty puts a premium on current income over long-term protection of ecological sub-systems; 2) inadequacies of technical, economic and administrative skills in planning and implementing environment management programs; 3) widespread market failures resulting in under pricing (or zero pricing) on natural resource inputs and pollution outputs; 4) inadequacies in environmental data collection; and 5) a wide diversity of cultural values on environmental quality.

At the theoretical level, interest in the relationship between economic growth and the environment is also strong. Neoclassical models that incorporate pollution have been developed since the 1970s (Forster 1973; Brock 1977). Within these models, the production function can be written as $y = f(k, e)$, where y is income, k is capital stock and e is pollution emissions. Within such a model, capital and pollution emissions are substitutes. The capital stock accumulates according to:

$$\dot{k} = f(k, e) - c - \delta k, k(0) = k_0 > 0 \quad [5.1]$$

pollution emission accumulate as

$$\dot{S} = e - S, S(0) = S_0 \geq 0 \quad [5.2]$$

The optimal solution is to:

$$\max_{\{(c(t), e(t)) \geq 0\}} \int_0^{\infty} e^{-\rho t} U(c, S) dt \quad [5.3]$$

Subject to the two formulas above.

When solved, ‘results of this type underlie most of the discussion about the link between pollution control and growth, the idea being that stricter pollution control will reduce consumption and standards of living determined solely by consumption levels’ (Xepapadeas 1997, p. 127, also see Pezzey 2001).

Within endogenous models, the optimal social welfare level is found by maximising the following:

$$\max_{\{K_Y, K_H, Z_H, Z_Y\}} \int_0^{\infty} e^{-\rho t} U(c(t), N(t)) dt \quad [5.4]$$

where:

- N = stock of environment capital
- K_Y = man-made capital used in environment sector
- Z_Y = pollution in environment sector
- K_H = man-made capital used in technology sector
- Z_H = pollution in technology sector

Optimal sustainable growth occurs when consumption knowledge and man-made capital increases while at the same time pollution and the environment capital remains constant (Xepapadeas 1997).

Pollution was not included in either Sametz (1968) nor Nordhaus and Tobin (1973). Sametz though did note the depletion of natural resources was an external diseconomy of economic growth. Nordhaus and Tobin also discussed the issue of pollution and environmental degradation but argued along similar lines to Beckerman (1992, 1994). ‘The mistake of the antigrowth men is to blame economic growth per se for the misdirection of economic growth. This misdirection is due to a defect of the pricing system’ (Nordhaus & Tobin 1973, p. 525). Thus, if the pricing system was corrected, all externalities such as pollution and environmental degradation would be internalised and would either be rectified or the appropriate individuals rather than the general community

would pay for these externalities. Likewise, Nordhaus and Tobin also argued that natural resources will never disappear because of substitution to non-natural materials (i.e weak sustainability) and the pricing mechanism based on scarcity, which will slow down their consumption or result in new resources being found. ‘If the past is any guide for the future, there seems to be little reason to worry about the exhaustion of resources which the market already treats as economic goods’ (Nordhaus & Tobin 1973, p. 523).

Within this social welfare function, the net benefits of economic growth (NB_t) within the environmental sub-system is a function of: 1) cost of air pollution (AP_t); 2) water pollution (WP_t); 3) cost of noise of pollution (NP_t); 4) cost of deforestation (D_t); and 5) long-term environmental damage (ED_t):

$$En_t = NB_t(AP_t, WP_t, NP_t, D_t, ED_t) \quad [5.5]$$

Within the ANI democratic social welfare function then would appear as:

$$ANI\ SWF_t = \sum_{t=1}^T \frac{NB_t([ANY_t, Y_{edet}], [AP_t, WP_t, NP_t, D_t, ED_t], [PE_t, P_b, H_t, C_t, U_t, P_v, H_{-t}], [PR_t, CD_t, C_t, PD_t], Sp_t)}{(1+r)^t} \quad [5.6]$$

where:

- ANI SWF_t = adjusted national income
- NB_t = net benefits
- t = time
- r = discount rate
- ANY_t = aggregated national income
- Yede_t = equally distributed equivalent income
- AP_t = air pollution
- WP_t = water pollution
- NP_t = noise pollution

D_t	=	deforestation
ED_t	=	long term environmental damage
PE_t	=	public expenditure on education
P_bH_t	=	public expenditure on health
C_t	=	commuting
U_t	=	urbanisation
P_vH_t	=	private expenditure on health
PR_t	=	public expenditure on roads
CD_t	=	services from consumer durables
Co_t	=	corruption
PD_t	=	public debt
SP_t	=	spiritual factors

5.2.1 Air Pollution

Issues

Air pollution occurs due to emission of pollutants into the atmosphere. Prior to industrialisation, the major pollutant was suspended particulate matters (i.e. smoke) caused by fire. However, the atmosphere quickly absorbed this pollution with little loss of amenity or health to humans. However, since industrialisation and urbanisation, the level, mix and concentration of pollutants has substantially risen and changed and is no longer quickly and completely absorbed by the atmosphere (IPCC 2001a, 2001b). The result is poor air quality and subsequent ill-health and loss of amenity. These poor health and social outcomes are particularly true within Bangkok (Atkinson 2000). Within Bangkok, the simple increase in cars for example, has decreased air quality (Dhiraykaniant 1993).

Social Choice Perspective

There are no market prices for air pollution as air is considered a free public good, even though air pollution negatively affects social welfare levels. Air pollution is an externality excluded from market prices. A social choice perspective must include the value of air pollution as a negative impact when calculating a social welfare index. Clean air adds to social welfare (NESDB 1996, 2000). The responsibility of maintaining clean

air levels falls to the Thai Ministry of Technology and Science (see ONEB 1989). Various WHO standards on air pollution are reported against within Bangkok (Tiwari 1997).

Methodology

The cost of air pollution can be calculated in a number of ways. Two common methods are to calculate the health costs associated with air pollution (restricted health days and morbidity – see Tiwari 1997; USAID 1990; Trakannuwatkul 1996) or to calculate the abatement costs of pollution (what it would cost to overcome pollution – see Agotini and Col 1992 cited in Guenno and Tiezzo 1998). For the purposes of this study, the second method (pollution abatement) has been selected.

There are five major air pollutants within Bangkok (and most industrialised cities throughout the world): carbon dioxide (CO₂), carbon monoxide (CO), nitrogen monoxide (NOX), Sulfur monoxide (SOX) and suspended particulate matters (SPM). These pollutants are by-products of production processes, human activities and increased consumption levels.

Previous work (Agotini and Col 1992 cited in Guenno and Tiezzo 1998) has estimated the costs of pollution abatement for each of these pollutants. Converted to Thai currency (1988 prices) these abatement costs are .03335 baht per kilogram of carbon dioxide and carbon monoxide, 2.84 baht per kilogram of nitrogen monoxide, 7.4 baht per kilogram of sulfur monoxide and 4.15 baht per kilogram of suspended particulate matters.

Within Bangkok it is possible to calculate the emission of each of these pollutants by analysing the data of the five main polluting sectors: transportation; electricity; industry; household; and commercial sectors and others. The data for the various pollution emissions is found in Department of Energy Development and Promotion (1990).

The amount of emission for each of these pollutants in each sector can be calculated and the cost of each pollutant subsequently calculated:

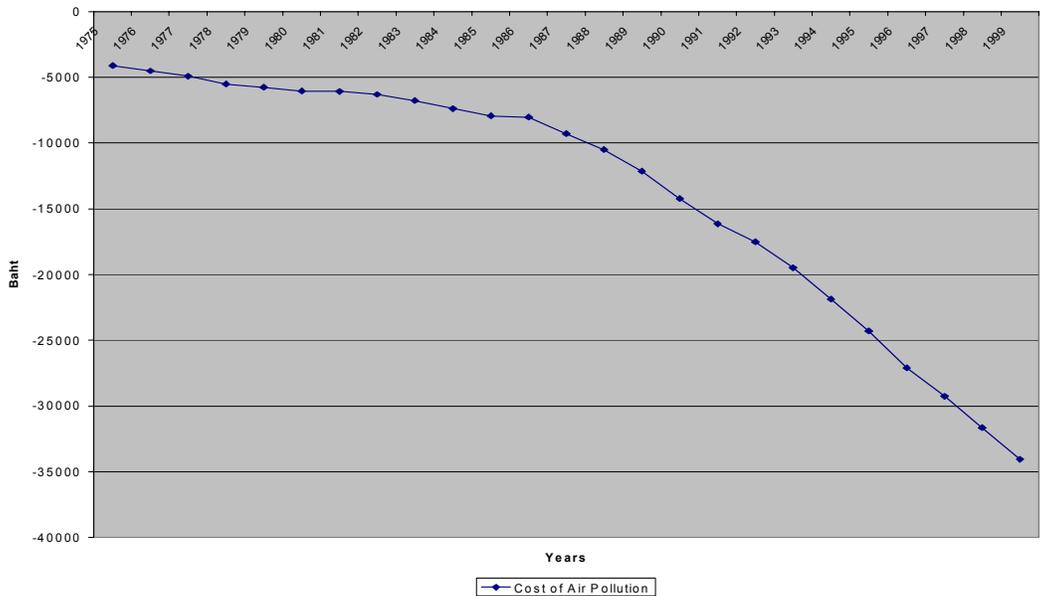
$$AP = cCO_2 + cCO + cNOX + cSOX + cSPM \quad [5.7]$$

where:

AP	=	air pollution
cCO ₂	=	cost of carbon dioxide (.03335 baht per kilogram)
cCO	=	cost of carbon monoxide (.03335 baht per kilogram)
cNOX	=	cost of nitrogen monoxide (2.84 baht per kilogram)
cSOX	=	cost of sulfur monoxide (7.4 baht per kilogram)
cSPM	=	cost of suspended particulate matters (4.15 baht per kilogram)

See Appendix J for full calculation.

Figure 5.1 Cost of Air Pollution in Thailand, 1975-1999 (1988 prices – millions of baht)



Source: Author's own calculation.

Results

The cost of air pollution for Thailand increased over eight times during the period of study. This is quite a dramatic increase and as this impact of economic growth is considered a cost to social welfare, the net result is a decrease in social welfare. Furthermore, this decrease in social welfare has increased in real terms over the twenty-five year period. The calculation of this adjustment is based on recorded levels of pollutants in various sectors. As economic growth increased, pollution levels also increased. Economic growth has negatively impacted on social welfare levels within Thailand and on this basis alone can be considered undesirable and stunting.

5.2.2 Water Pollution

Issues

Economic growth can place pressure on water resources through the dumping of wastes in rivers, decreasing water levels through inappropriate development (such as golf courses in developing countries) or the increase in salinity through over use of land. Water is necessary for the survival of all, therefore water pollution of whatever kind can negatively impact well-being.

According to surveys undertaken, the perception of people in Bangkok is their water quality is decreasing with the growth of urbanisation (Ross 1993; Dhiratayakinant 1993; Pongsomlee & Ross 1992). As with many other pollution problems in third world countries, government regulations are in place to protect the environment against water pollution, however these are not being implemented. 'The solution depends on the willingness of the government to take effective action to solve the problem' (Pongsomlee & Ross 1992, p. 22).

Social Choice Perspective

As with air pollution, water pollution is not generally considered in the market prices of those goods and services that cause this pollution. This results in over supply and over demand at artificially low prices. A social choice perspective is able to provide an

indicative value of these externalities and include the negative impact when calculating a social welfare index.

Pollution is a major cost of economic progress within Bangkok. Once known as the “Venice of the East” because of its extensive waterways, Bangkok is now one of the world’s most polluted cities (Hutanuwatr 1998). The damage is not restricted to Bangkok though.

The landscape of Siam has been stripped of its tress, and the coral reefs destroyed through pollution and plundering. The water of the numerous klongs and rivers of this water-based culture are now so polluted they are unsafe for swimming. (Hutanuwatr 1998, p. 97)

Whilst water supply is often of good standard, wastewater disposal is very poor, leading to the pollution of local waterways and unsanitary conditions (Atkinson 2000).

Methodology

It is possible to measure the cost of water pollution within urban areas by estimating the cost of restoring the quality of water. This method calculates the expenses to clean up or restore previous water quality caused by water pollution. Using previous estimates, each person approximately adds 12.6 grams of biochemical oxygen demand (BOD) per day to canals and river systems, or 4.6 kgs of BOD per person per day (Phansawas et al. 1987).

Water pollution is also caused by industry, a study on 1986 found that 5 industries caused 99.6% of water pollution. These were the food industry, drink industry, paper industry, chemical industry and textile industry. By calculating the growth of each industry in terms of GDP, it is possible to extrapolate the 1986 figure of 514,381 tonnes of BOD both forward and backward to estimate the amount of water pollution caused by each industry each year (TESCO 1993).

The final calculation of the cost of water pollution is made by estimating the cost of cleaning this pollution to be 7.5 baht (in 1988 prices) per kilogram of BOD (Department of Industrial Works 1986). This is then doubled to account for non-point of survey sources of pollution:

$$WP = [(7.5 \times IP) + (7.5 \times 4.6 \times MP)] \times 2 \quad [5.8]$$

where:

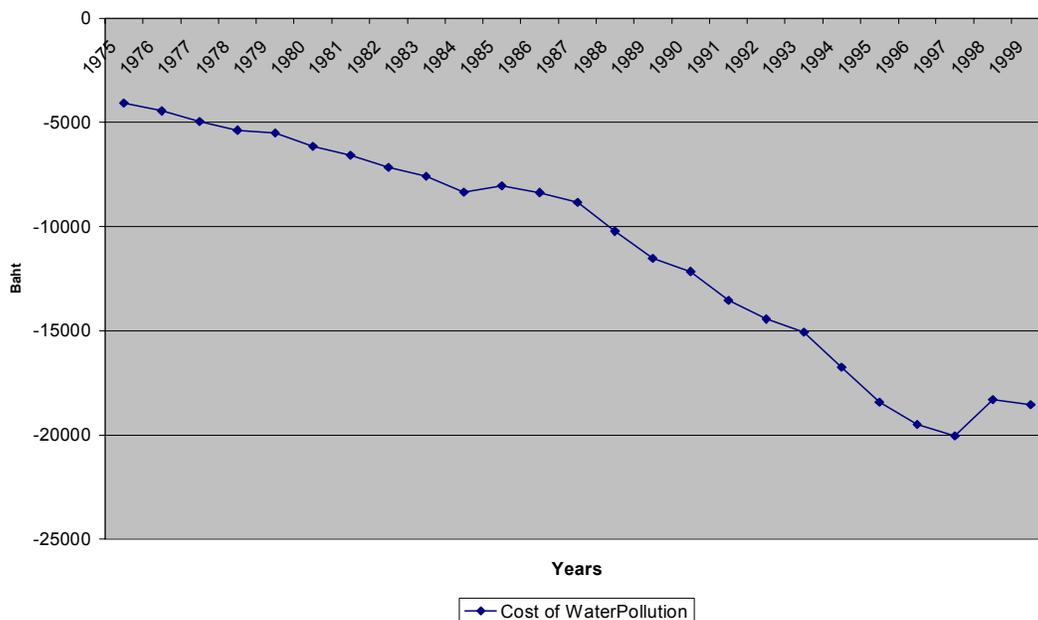
WP	=	cost of water pollution
IP	=	industrial pollution
	=	FI + DI + PI + CI + TI
FI	=	food industry BOD
DI	=	drink industry BOD
PI	=	paper industry BOD
CI	=	chemical industry BOD
TI	=	textile industry BOD
MP	=	municipal population BOD
	=	municipal population x 4.6 kgs per years

See Appendix K for full calculations

Results

In contrast with the previous adjustment for air pollution, the overall increase in the cost of water pollution (whilst still significant) was 4.5 times. The general pattern of the costs is quite steady. As with air pollution, this increase has occurred in line with increases in economic growth. The impact of water pollution on social welfare has been negative and therefore, social welfare has fallen in spite of corresponding economic growth.

Figure 5.2 Cost of Water Pollution in Thailand, 1975-1999 (1988 prices – millions of baht)



Source: Author's own calculations.

5.2.3 Noise Pollution

Issues

It is difficult to estimate the cost of noise pollution, but it is equally difficult to dismiss the loss of amenity to social welfare that noise causes. 'Noise is an uncompensated cost imposed on people mostly as a result of increasing traffic volumes, especially heavy vehicles' (Hamilton 1998, p. 83). Though in Bangkok, the greatest contributor to noise pollution is not heavy vehicles but rather the many thousands of small motor scooters and motorcycles. Unlike air pollution, noise pollution is not suitably measured by associated health costs. Certainly exposure to noise can lead to hearing loss and jangled nerves, but generally the diseconomy of noise is immediate and not long lasting. Therefore, estimates of noise pollution must focus on loss of amenity rather than loss of health.

Social Choice Perspective

The utilisation of social choice perspective allows the incorporation of important impacts such as noise pollution that are normally excluded from individual or market perspectives

when determining levels of social welfare. There is no direct market for peace and quiet though it would be possible to use *hedonic* pricing techniques to estimate the value of this, when comparing housing prices (Dasgupta and Pearce 1972; Irvine 1979; Mishan 1976; Perkins 1994). Certainly this technique (usually used in studies of new airports, roads, etc) indicates noise pollution is a disamenity for social welfare.

Methodology

The estimate in this study is that the cost of noise pollution is equal to one percent of GDP each year. This estimate is based on a report of the World Health Organisation for the United States three decades ago (see Daly and Cobb 1990). Whilst this study is obviously dated, it is assumed that it remains a relevant estimate of noise pollution for Bangkok today. Certainly the increased traffic and industrial activities that have accompanied this growth in GDP would suggest that it is reasonable to assume that noise pollution has also increased proportionately (Dhiratayakinant 1993; Hamilton 1998):

$$NP = GDP(0.01) \quad [5.9]$$

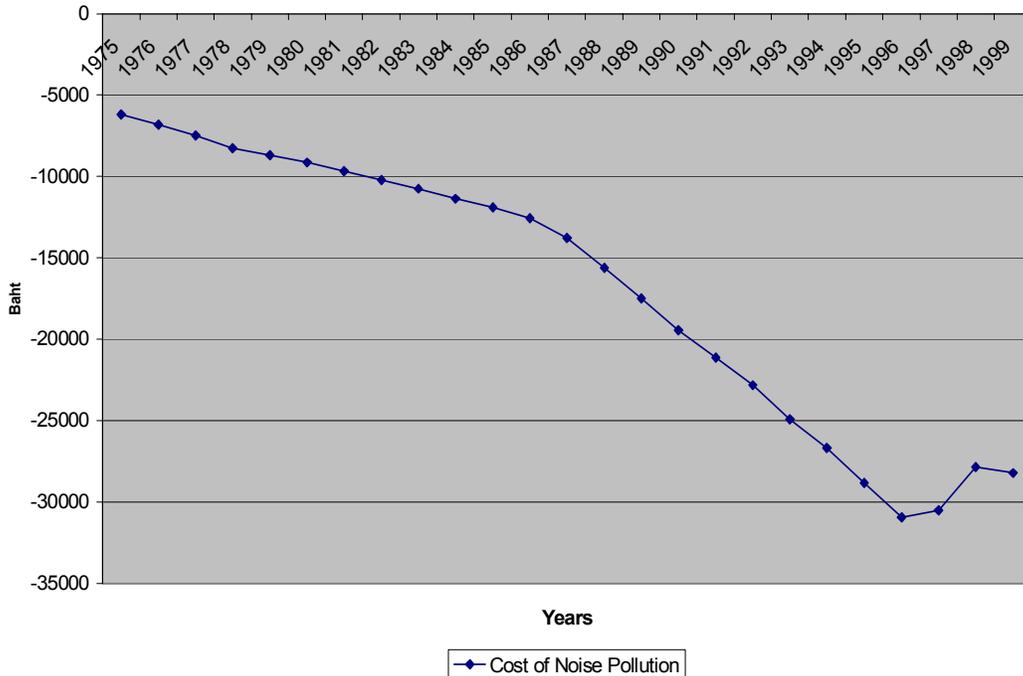
where NP = cost of noise pollution
GDP = gross domestic product

See Appendix L for full calculations.

Results

The costs of noise pollution are in line with the costs of air and water pollution calculated previously. As this present calculation is a direct function of GDP, the rise and fall of the costs of noise pollution have the same characteristics of GDP (the initial rise, the accelerated rise and the final fall then recovery). The cumulative impact of economic growth on the environmental sub-system has been quite negative. Divergence between market and social choice perspectives for social welfare exists because of the incorporation of these measures.

Figure 5.3 Cost of Noise Pollution in Thailand, 1975-1999 (1988 prices – millions of baht)



Source: Author’s own calculations.

5.2.4 Deforestation

Issues

As economic growth increases, so too does pressure on land use. Land is required for factories and housing, and farming is pushed to increasingly unproductive land. All these activities reduce well-being as people lose their traditional land tenure and are forced to farm unproductive land, which results in increased work for less result. Within many developing countries (such as Thailand) the majority of the population are reliant on agriculture and subsistence farming for their livelihood (Dixon 1996). Forests in Thailand do not add to social welfare only through aesthetic reasons. Forests are still important for many people to earn their livelihood. Due to the increasing demand for land through the forces of economic growth, wetlands and forests are facing increasing pressure and more is disappearing each year. Deforestation is an important environment issue as it directly affects a very large number of Thais (Tingsabadh 1989).

Within Thailand, the official target for forest coverage is 40 percent (Trebuil 1993). This was last achieved in 1973. In 1999, forests coverage fell progressively to under 17 percent in 1999. It is unlikely that the target of 40% will be reached (Bello 1995).

Social Choice Perspective

Market perspectives reflect private ownership values. When natural resources are not owned, they are considered free. As a result, over-harvesting, destruction, or lack of maintenance causes a “tragedy of the commons”. The individual preference costs for cutting down a hectare of forest to increase land available for farming are close to zero as there are many millions more hectares of forest remaining. But when this preference is aggregated, deforestation has a social cost not reflected by these individual choices. Social choice perspective captures these costs to social welfare.

The major problems of deforestation include the loss of wildlife, soil, watersheds, biodiversity and access to livelihoods by traditional farmers (Dearden 1993; Turner et al. 1994). Forests have provided rural Thai people their livelihood for centuries. As this food source decreases so to does the ability to live independently or to remain outside of the money economy.

To achieve the record levels of economic growth in Thailand, the environment, and particularly the forests, have been exploited (Warr 1993a; Kakwani and Krongkaew 1997; Dixon 1999). This exploitation has included the denuding of large forest tracts to allow extra cultivation, the over-harvesting of forest and timber products and the destruction of forests for mining purposes (Dixon 1999).

At a national policy, the recognition that forests add both to economic growth and quality of life, at the village and national levels, is now explicitly recognised (Ministry of Finance 2001; NESDB 1996, 2000). The policy aim is to maintain a balance in the use of natural resources, such as forests, between the economic benefit and the continuing functioning of a healthy eco-system.

Methodology

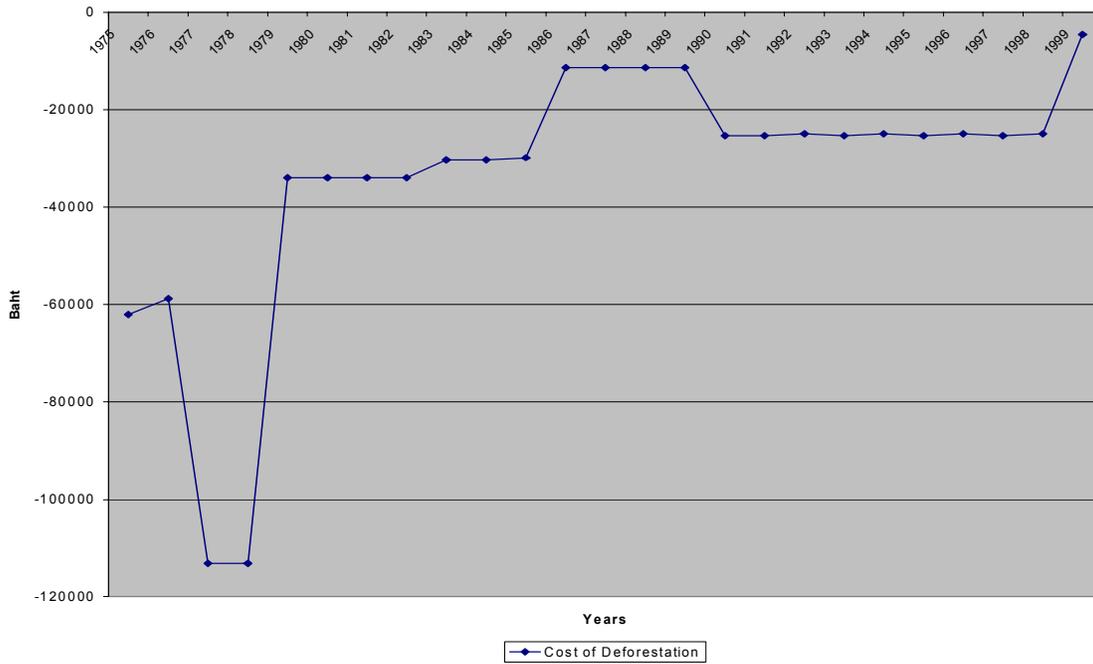
Based on a study undertaken by Panayotou and Parasuk (1990), the cost of deforestation is estimated at 886 baht per hectare of forest lost. Deforestation causes local soil erosion, regional flooding and continental and global unseasonable climates. Soil erosion is very serious for farmers. For example, a loss of 5 centimetres of topsoil results in a twenty-two percent reduction in maize yields and a 15 centimetre reduction in topsoil reduces maize yields by half. The calculation of the cost of deforestation ‘is specified in double-log linear function form, and is estimated with data from 1961 – 1987’ (Panayotou and Parasuk 1990, p. 56). This estimate is probably conservative as it only considers the cost of soil erosion. The real cost of deforestation would be higher if other factors, such as loss of wildlife, wildlife sanctuaries, flooding and global climate change were incorporated:

$$D = DF(886) \quad [5.10]$$

where D = cost of deforestation
DF = hectares of deforestation

See Appendix M for full calculations.

Figure 5.4 Cost of Deforestation in Thailand, 1975-1999 (1988 prices – millions of baht)



Source: Author’s own calculations

Results

The cost of deforestation is dependent on the levels of forest destruction each year. At its height the negative impact of deforestation as calculated at over 100,000 million baht (1977 and 1978). This compares with the cost of deforestation in the final year of study, 1999, in which the cost was only 4526 million baht. This dramatic change can be attributed to both tighter controls on deforestation, but also on the fact that as a resource is reduced, it becomes more difficult to maintain previous levels of destruction. As Thailand’s forest resources have dwindled over the twenty-five years of this study, their protection has increased. However, the damage has already occurred and can be evidenced by the absolute cost over the period of study. The reduction of social welfare due to deforestation between 1975 – 1999 has been 850,000 million baht. This is a significant reduction and signals that economic growth is not always desirable.

5.2.5 Long Term Environmental Damage

Issues

Whilst Beckerman (1995) argues that pollution will decline at a certain point when sufficient growth will enable the citizens of that economy to buy a cleaner environment (US\$8,000 at 1985 prices according to Grossman and Kruger 1995), the alternative view is that the environment is the basis of all life and any damage is detrimental to well-being (Ayres 1996b). Without a sustainable environment life on earth cannot exist in the long run. As mentioned, lax enforcement of laws and regulations in developing countries results in the indiscriminate destruction of the environment (TDRI 1990; Pongsomlee & Ross 1992).

One view is that clean environments and economic growth are mutually exclusive. 'Deterioration in environmental quality is viewed as a necessary cost of rapid economic growth' (Hufschmidt et al. 1983, p. 1). Within the ISEW, long term damage caused by dumping waste products into the environment was the greatest cost of economic growth. In real terms it increased three fold between 1950 and 1986, from US \$84 billion to US \$258.7 billion. As a percentage of personal consumption, it remained fairly constant, ranging from 24% to 22%. The importance of the cost of long term environmental damage to the ISEW is quite significant.

Social Choice Perspective

Externalities of environmental damage are not captured by market or individual preferences. However, expert opinion (Nordhaus 1991; Islam 2001, IPCC 2001a, 2001b) indicates that there are important costs to current and future social welfare caused by greenhouse emissions.

Given the increase in carbon dioxide, nitrogen dioxide, chlorofluorocarbons (CFCs) and methane in the atmosphere through industrial activities brought about by increases in economic growth, the irreversible damage is great. Increased instances of skin cancer, high incidences of flooding and unpredictable weather will result. However:

...the greatest threat is ecological. The almost instantaneous change (on a geological scale) of the global climate and of ultraviolet radiation could have harmful effects on all but the most resilient species of plants and animals in those regions of the planet most drastically affected by the climate change. (Daly & Cobb 1990, p. 441)

Methodology

There are three factors within Thailand that contribute to increases in the greenhouse affect (Chongpeerapien et al. 1990). The first is deforestation, the second is wet rice farming and the third is through fuel consumption. The damage caused each year to the environment is cumulative. The cost of long-term environmental damage is therefore also cumulative and so each year's damage is added to the previous running total.

Each tonne of carbon emission has a cost of 21.59 baht. This figure is estimated based on Nordhaus (1991) which values the damages from temperature increase or greenhouse effect in the United States in 1981. This value is transferred to Thailand by adjusting for GDP, shadow exchange rate in 1981 and inflation. Deforestation causes the loss of 246 tonnes of carbon dioxide absorption per hectare of forest destroyed each year. Wet rice farming releases 9.216 kilograms of methane per year for each 400 square metres of paddy, which can be converted to carbon equivalent by multiplying it by 68.6 and dividing the total by 3.664. (This second figure is the ratio weight of a molecule of carbon dioxide and an atom of carbon). Likewise, this figure of 3.664 is used to convert carbon dioxide emissions to carbon equivalents (Israngakurn 2001). The data on forest areas comes from Royal Forestry Department (various issues), Ministry of Agriculture (1992) and the Department of Energy Development and Promotion (1990):

$$ED_t = cCD_t + cCWR_t + cCF_t \quad [5.11]$$

where:

ED_t	=	long-term environmental damage
cCD_t	=	cost of carbon emissions of deforestation
	=	21.59 x tonne of carbon emission
$cCWR_t$	=	cost of carbon emissions of wet rice farming

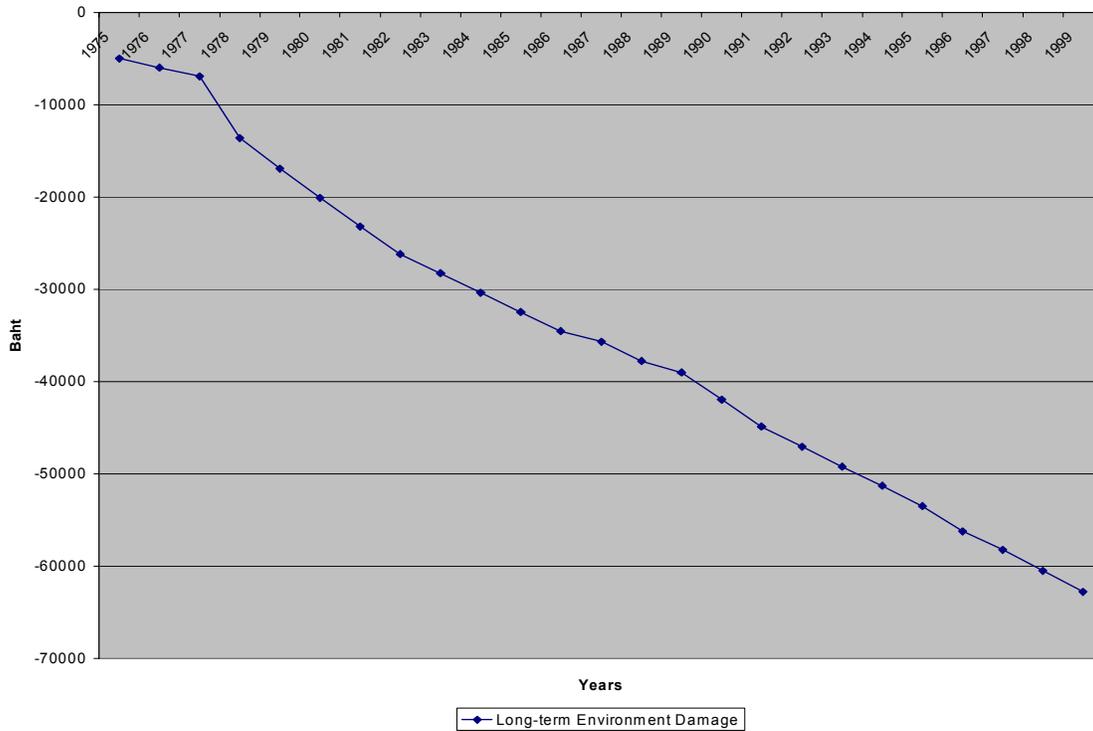
$$\begin{aligned}
 &= 21.59 \times \text{tonne of carbon emission} \\
 cCF_t &= \text{cost of carbon emissions of fuel} \\
 &\quad \text{consumption} \\
 &= 21.59 \times \text{tonne of carbon emission}
 \end{aligned}$$

See Appendix N for calculations.

Results

The costs of long term environmental damage are cumulative. In terms of social welfare in Thailand, the costs of long term damage have reduced social welfare. If projected forward these costs would become a considerable burden on activities to increase social welfare.

Figure 5.5 Cost of Long-term Environmental Damage in Thailand (1988 prices – millions of baht)



Source: Author's own calculation.

5.2.6 Summary of the Impact of Economic Growth on the Environmental Sub-system

The net benefit of economic growth on the environmental system is a slight misnomer as there are no benefits within the calculation. All the adjustments are considered costs to the environment. Over the twenty-five year period, the total (negative) net benefits increased almost 2.5 times. This increase indicates that the costs of economic growth on the environment have steadily increased and thus reduced social welfare each year.

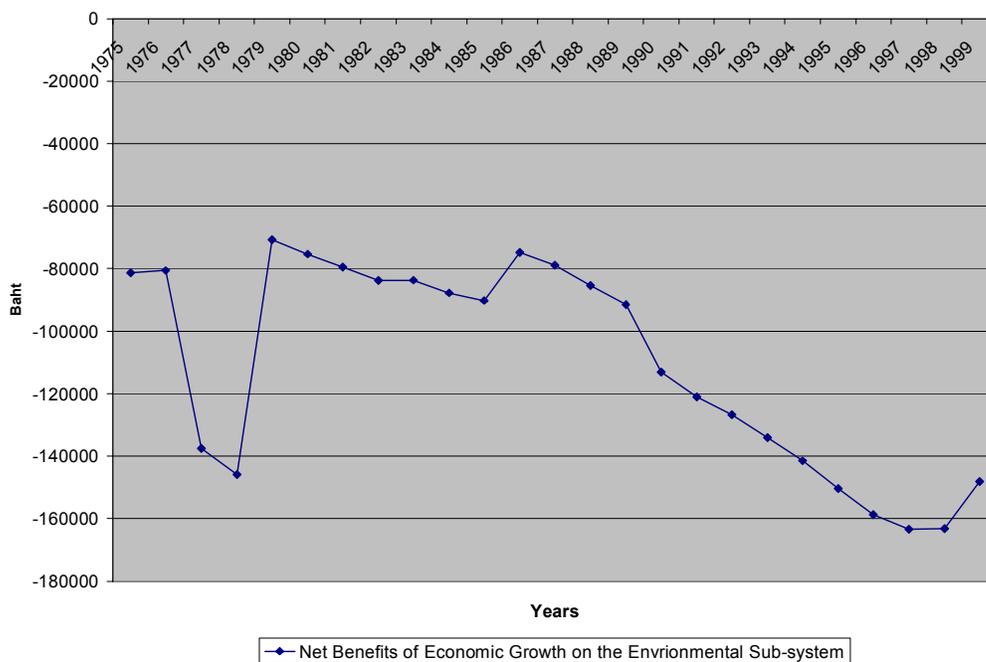
Table 5.1 Net Benefits of Economic Growth on the Environmental Sub-system in Thailand, 1975 – 1999 (1988 prices – millions of baht)

Year	Costs of Air Pollution	Costs of Water Pollution	Costs of Noise Pollution	Cost of Deforestation	Long term Environmental Damage	Net Benefits of Economic Growth on the Environmental Sub-system	Net Benefits of Economic Growth on the Environmental Sub-system per capita (in baht)
1975	4117	4067	6216	62013	4960	-81373	-1920
1976	4509	4454	6808	58844	5965	-80580	-1865
1977	4913	4956	7501	113162	6932	-137464	-3105
1978	5516	5362	8247	113162	13575	-145862	-3225
1979	5759	5503	8678	33949	16893	-70782	-1535
1980	6046	6143	9138	33949	20087	-75363	-1605
1981	6069	6584	9674	33949	23175	-79451	-1660
1982	6302	7151	10201	33949	26170	-83773	-1715
1983	6774	7583	10759	30327	28255	-83698	-1690
1984	7382	8336	11383	30327	30344	-87772	-1735
1985	7930	8033	11911	29875	32428	-90177	-1741
1986	8030	8365	12565	11316	34498	-74774	-1412
1987	9299	8833	13770	11316	35653	-78871	-1464
1988	10508	10213	15598	11316	37762	-85397	-1554
1989	12146	11533	17502	11316	38981	-91478	-1637

1990	14244	12145	19461	25348	41914	-113112	-2009
1991	16144	13528	21117	25348	44848	-120985	-2124
1992	17521	14443	22830	24896	47047	-126737	-2193
1993	19479	15060	24947	25348	49194	-134028	-2298
1994	21880	16733	26696	24896	51269	-141474	-2394
1995	24307	18422	28845	25348	53460	-150382	-2529
1996	27105	19493	30953	24896	56206	-158653	-2639
1997	29257	20033	30520	25348	58210	-163368	-2686
1998	31657	18296	27874	24896	60469	-163192	-2655
1999	34056	18533	28234	4526	62727	-148076	-2401

Source: Author’s own calculation.

Figure 5.6 Net Benefits of Economic Growth on the Environmental Sub-system of Thailand, 1975 – 1999 (1988 prices – millions of baht)

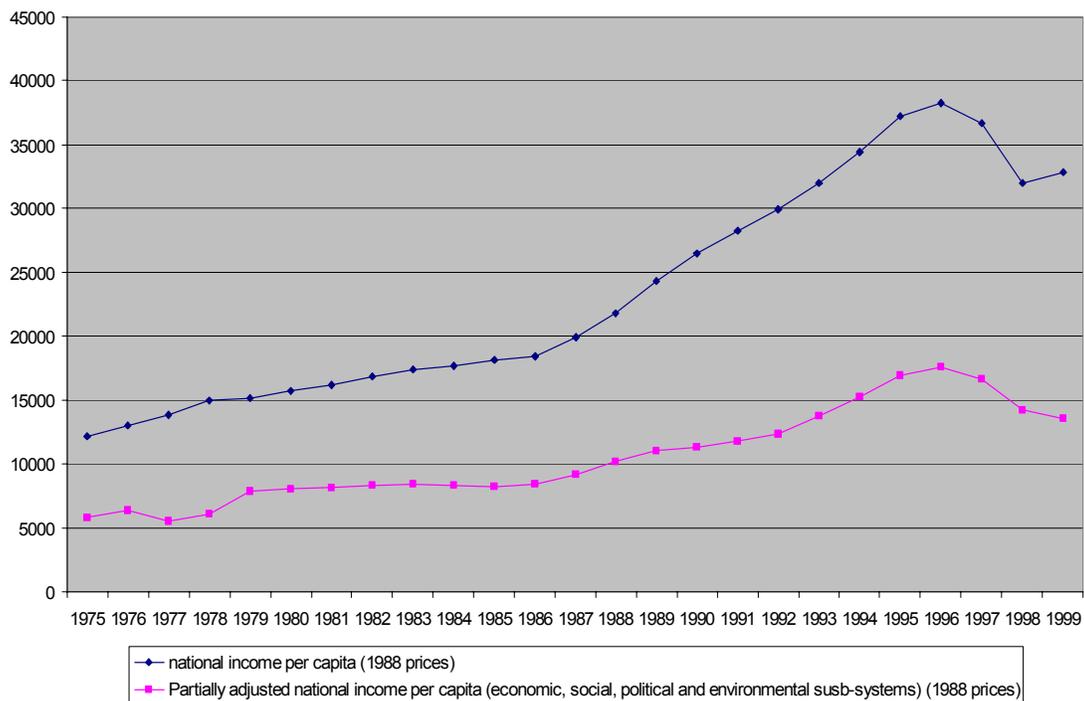


Source: Author’s own calculations.

The costs of economic growth have increased steadily from 1975 with only two exceptions. The first in 1977 and 1978, which can be traced back to a large cost of deforestation for that short period, and the second 1999 in which the costs actually fell.

Otherwise, the rise in environmental costs was smooth and steady. Increased economic growth over the past twenty-five years has led directly to environmental damage in Thailand (Warr 1993a; Kakwani and Krongkaew 1997; Dixon 1999; Bello 1995). Therefore, environmental costs have increased in line with economic growth. Such an outcome is not inevitable as difference types of economic growth can have different impacts on issues such as poverty (Warr 2001) and presumably the environment and social welfare.

Figure 5.7 Comparison of National Income per capita and partial ANI per capita based on the Net Benefits of Economic Growth on the Economic, Social, Political and Environmental Sub-systems for Thailand, 1975 – 1999 (1988 prices)



Source: Author’s own calculations

Policies that encourage economic growth that is not dependent on the consumption of natural resources can be encourage through various public policy initiatives (Warr 2001 – also see Chapter Eight, Section 8.4.1).

The most noticeable impact of adjusting national income for the net benefits of economic growth on the environmental sub-system has been the increasing divergence between the conventional measure of social welfare and this new analytical tool. As with the previous analysis in Chapter Four in which adjustments had been made in the economic, social and political sub-systems, this new partial measure shows a dramatic difference between the two measures of social welfare. Not only is the absolute difference between them great, but the shape of the two indices are also quite different. As has been discussed previously, the change in national income per capita has three main sections (increasing, accelerated growth, fall and apparent correction) whereas the movement in this new partial measure of social welfare is much flatter with no overall rise in the final five years of the period under study. In nearly one quarter of the period under review, the measure of social welfare fell (1977, 1984, 1985, 1997, 1998, and 1999) despite increases in economic growth. This would suggest that economic growth is not always desirable.

Welfare Economic Analysis

As has been discussed, the net benefits of the environmental sub-system include adjustments made for air pollution, water pollution, noise pollution, deforestation, depletion of non-renewable resources and long-term environmental damage.

Adjustments made within this sub-system can be analysed by a number of different welfare economic considerations. The most obvious is that of intergenerational equity (Zamagni 1994; Lesser et al. 1997; Xepapadeas 1997). For society to survive a healthy, robust and functioning SEE is required. Environmental degradation caused, in part, by economic growth, seriously threatens this. The protection of the environment is central to ensuring the survivability of future generations.

One of the major reasons that intergenerational concerns are not considered in the drive for economic growth, is that the environment is treated as a free good within the market. This market failure again results in the classic “tragedy of the common”. As property rights over these environmental resources do not exist, they lack a money-metric value within the production process. Therefore, environmental costs of production (both in

inputs and outputs, such as pollution) are externalities and not factored into prices. This market failure artificially lowers the price and thus increases demand over the correct equilibrium levels. Thus, the market neither efficiently nor equitably allocates these scarce (and vital) resources.

As discussed, these resources are not within the market place, and as such do not have a market value. However, there are a number of established methods, such as compensating variation and consumer's equivalent variation (Lesser et al. 1997) to estimate the value of these resources.

However, one final sub-system must be considered before this new measure of social welfare is complete, the spiritual sub-system.

5.3 SPIRITUAL SUB-SYSTEM

The final adjustment to be made represents the spiritual sub-system of society (SP). The spiritual sub-system is not concerned with religious belief or faith in some sort of deity, but rather is concerned with the interactions between humans. (It could be labelled the moral sub-system or humanity sub-system). There are connections between humans that this sub-system is concerned with. A healthy spiritual sub-system is characterised by mutual respect and a common bond of humanity. A failing spiritual sub-system is characterised by the dehumanising of others and exploitation.

The breakdown of society (as evidenced by recent events in the Balkans and Rwanda) is characterised by a dehumanisation of others. Spiritual sustainability requires this shared humanity to withstand external pressures such as ecological destruction, political insecurity and economic meltdown.

In this social welfare function, it is represented by the cost of commercial sex work (CSW_t).

$$Sp_t = f(CSW_t) \quad [5.12]$$

Within the ANI democratic social welfare function this would then appear as;

$$ANI\ SWF_t = \sum_{t=1}^T \frac{NB_t ([ANY_t, Y_{ede\ t}], [AP_t, WP_t, NP_t, D_t, ED_t], [PE_t, P_bH_t, C_t, U_t, P_vH_t], [PR_t, CD_t, C_t, PD_t], CSW_t)}{(1+r)^t} \quad [5.13]$$

where:

ANI SWF _t	=	adjusted national income
NB _t	=	net benefits
t	=	time
r	=	discount rate
ANY _t	=	aggregated national income
Y _{ede t}	=	equally distributed equivalent income
AP _t	=	air pollution
WP _t	=	water pollution
NP _t	=	noise pollution
D _t	=	deforestation
ED _t	=	long term environmental damage
PE _t	=	public expenditure on education
P _b H _t	=	public expenditure on health
C _t	=	Commuting
U _t	=	urbanisation
P _v H _t	=	private expenditure on health
PR _t	=	public expenditure on roads
CD _t	=	services from consumer durables
Co _t	=	corruption
PD _t	=	public debt
CSW _t	=	commercial sex work

5.3.1 Commercial Sex Work

Issues

Commercial sex work exists in all countries. Whilst in some countries it is legal, the majority of those involved in this industry are exploited and lead unenviable lives (Paul 1995). Commercial Sex Workers (CSW) are often young, abused and drug dependent.

When the sex services industry became an issue in Thailand during the 1960s many technocrats and policy makers brushed it aside. They took the view that when the Thai economy grew, prostitution would become less of a problem, just as in Japan and other developed countries. Yet there is no sign that prostitution in Thailand is in decline. Indeed with economic development, increased wealth has *raised* the demand for sex services. (Phongpaichit et al. 1998, p. 196)

A similar relationship between economic growth and commercial sex work exists in other developing countries, especially in south and south-east Asian countries. For other countries where the link is not as defensible, the case for this inclusion is weaker and it may be justifiably left out of an ANI index.

Commercial sex work is now considered a part of the Thai culture (Packard-Winkler 2000; Lyttleton 2000). ‘A survey of popular *luk Thung* (songs) titles in the late 1980s found as many as one-fifth dealing with prostitution’ (Phongpaichit & Baker 1995, p. 78). With Thailand, sex tourism has almost become part of the official government tourism industry. ‘The blatant existence of a large-scale sex trade would have been impossible without the tacit blessing of the Ministry of the Interior’ (Phongpaichit & Chiasakul 1993, p. 164). Not only are most CSW involved against their wishes, but their average age is becoming progressively younger (Paul 1995). Also, the negative consequences of commercial sex work is far wider than those experienced by simply clients and workers. In addition to the societal consequences of the infidelity of married partners, etc, there are very real health costs through the spread of STDs, including HIV/AIDS.

Phongpaichit et al. (1998) note that illegal activities such as commercial sex work are labour intensive and thereby create employment and generate subsequent wages. Indeed,

a number of economists advocate the legitimisation of illegal activities as they add to economic growth and by extension to social well-being (Chang 1994; Khan and Jomo 2000). Whilst such a case can be made, commercial sex work is not victimless. Indeed, in Thailand most commercial sex work is based on bonded labour, slave like conditions and the exploitation of children and ethnic minorities (Phongpaichit et al. 1998; Clarke 2001c).

The illegal economy is detrimental to the nation's human resources. Drug abuse, AIDS and STDs, and the element of child abuse in the sex services trade, inflict direct damage on people and very often on young people who represent the future stock of human resources. (Phongpaichit et al. 1998, p. 200)

These negative effects are extremely large, long lasting and, in the case of HIV/AIDS, fatal. Children are increasingly being sought for commercial sex work as clients are seeking younger workers in the mistaken belief this will give them greater potency, protect them from contracting HIV/AIDS and even cure them of HIV/AIDS (Clarke 2001c). It is estimated that there are more than 20,000 children working as CSWs in Thailand (Paul 1995; Phongpaichit et al. 1998).

Perhaps the most vulnerable of the adult CSWs are the women from hill-tribes or other ethnic minorities. Normally tricked, sold into this work or forced into it through economic desperation, they have no skills or social support networks to improve their situation. Often confined to the brothels, they are regularly sold from one brothel to another with increasing debts that always must be cleared before they ever begin to earn any money. Stories are common about being threatened or beaten if they tried to leave the brothels. These "payments" disguise virtual slavery, not waged work (Paul 1995).

Due to the close and corrupt relationship between brothel owners and police many CSWs are regularly raped and sexually harassed by police with the consent of the brothel owners (Phongpaichit et al. 1998; Paul 1995).

Social Choice Perspective

The supra-natural relationship between humans is not considered within market or individual preference. Smith (1776) held that individual acting selfishly and in their own interest will benefit society but only within a moral framework (see Ormerod 1994). But as has been discussed throughout this and the previous chapter, this is not always true. An important aspect that is not captured within individual preferences is the spiritual subsystem in enhancing social welfare. Within this measure of social welfare, the cost of commercial sex work is considered a cost to social welfare. For reasons of exploitation, near slave conditions, violence and the involvement of children and other vulnerable people, some part of the economic value of commercial sex work will be subtracted from the ANI in this thesis.

Methodology

There is no clear survey of the number of CSWs in Thailand and estimates range from 68,000 to nearly three million. From the limited surveys undertaken, it is known that the majority of CSWs are in urban centres and are aged between 15 and 29 years of age. Phongpaichit et al. (1998), based on the work of Boonchalaksi and Guest (1994), have reviewed the different estimates (see for example Godley 1993; Sittirai and Brown 1991) and have concluded that there are approximately 200,000 CSW at any one time throughout Thailand.

Phongpaichit et al. (1998) then calculate the income earned by these CSW through obtaining estimates of prices from various sources including government officials, field observations and by talking to key informants in the commercial sex industry. Prices for CSW range from 100 to 6000 baht depending on the session and the type of establishment visited. CSW worked on average 25 days per month and were estimated to service between 0.75 and 3 clients per day. This estimate appears extremely low, particularly for the low end CSW (such as brothel workers) who report being forced to see more than 10 clients per day (Paul 1995).

To calculate the “value-added” aspect or “profit” by commercial sex work, Phongpaichit et al. divided the commercial sex establishments into three categories depending on the method of payment. Their first type are those establishments which split the fee paid between the CSW and the establishment. The second type are those establishments which paid the CSW a salary, commission or fee. The final is where the CSW are quite independent of any establishment and keep the full fee paid for themselves.

Using these calculations Phongpaichit et al. estimate that the value-added of commercial sex work in Thailand is approximately 100 million baht per annum for the 1993-1995 period. This is around 3% of GNP. It is reasonable to argue that this figure has remained steady over the course of the time series studied. This figure is an estimate of the dollar value of commercial sex work. Within this thesis, the dollar value is used to represent the cost of commercial sex workers whom are predominately young women, and increasing numbers of children. Considering that commercial sex work is the predominant mode of HIV/AIDS transmission in Thailand (Clarke 2002), and it has been estimated that the direct cost of HIV/AIDS will be as much as 9% of GDP (Baker 1997), this estimation of the cost of commercial sex work is quite conservative. Therefore 3% of GNP will be subtracted each year to take into account the cost of commercial sex work in Thailand for the reasons outlined above.

$$\text{CSW} = \text{GNP}(0.03) \quad [5.14]$$

where: CSW = cost of commercial sex work
GNP = gross national product

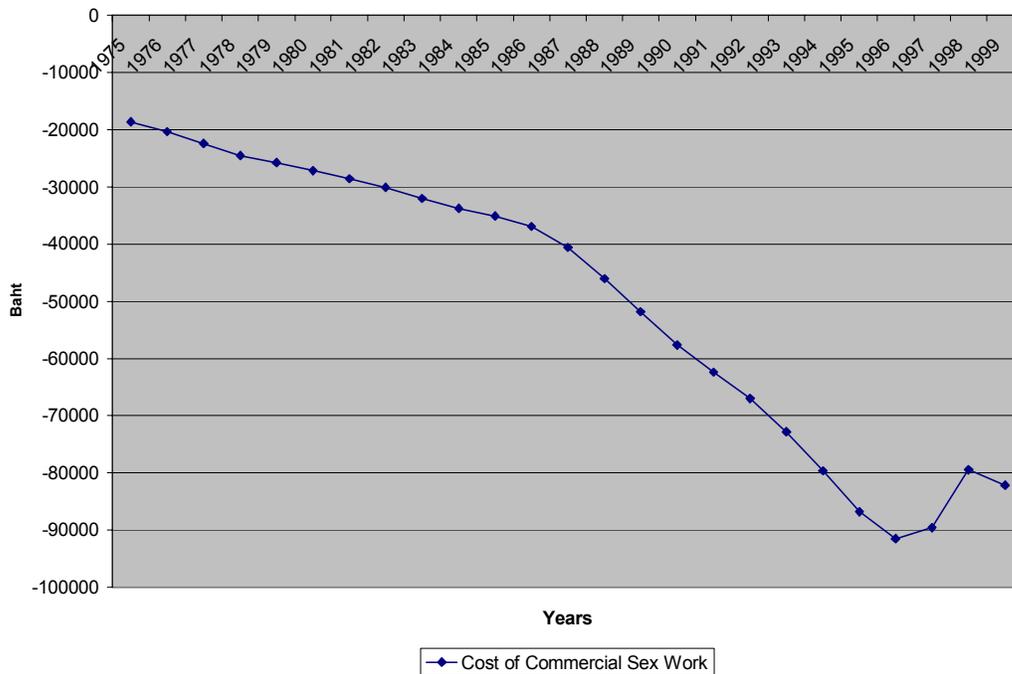
See Appendix O for calculations.

Results

As a function of GNP, the costs of commercial sex follow the now familiar pattern initial growth, followed by accelerated growth followed by the downturn and apparent recovery. Commercial sex work is a considerable cost to social welfare of Thailand and is greater

than most of the other adjustments made to social welfare in Thailand in this chapter. This should not be considered unreasonable as the social welfare for those involved in this work (who are generally involved against their will) live unenviable lives and with the widespread transmission of HIV/AIDS are at a very high risk of dying young. In a Rawlsian sense, it is important that the well-being of the most vulnerable in society has a significant impact on the welfare levels of the entire society.

Figure 5.8 Cost of Commercial Sex Work in Thailand, 1975-1999 (1988 prices – millions of baht)



Source: Author's own calculations.

Welfare Economic Analysis

As has been discussed, the adjustment made within the spiritual sub-system to estimate the net benefits of economic growth on social welfare is simply the cost of commercial sex work.

The most significant welfare considerations within this sub-system centre on justice and poverty. The vast majority of women working as commercial sex workers are poor and come from vulnerable groups. Many are trafficked from neighbouring countries and the average age is becoming increasingly younger (Paul 1995). For many commercial sex workers, increased levels of poverty are experienced, as they become virtual bonded labourers. As they are sold between brothels their debt increases. For a society, such a lifestyle would not be considered enviable behind a *veil of ignorance* (Rawls 1971). They are taken advantaged off and often sexually, physically and mentally abused (Phongpaichit et al. 1998).

In terms of intergenerational equity, the spectre of HIV/AIDS must be considered. Not only are the commercial sex workers themselves at great risk of contracting the virus (Clarke 2001c), but they can pass the virus to their unborn children either across the placenta or through breast feeding (Clarke forthcoming). This is also true for either female clients of commercial workers or female partners of male clients. The cost of HIV/AIDS is enormous both in personal terms and economic terms. It is estimated that up to 9% of Thailand's GDP will be lost as a direct result of the epidemic (Baker 1997).

The social cost of commercial sex work is not directly captured within market preferences. This is evident by the simple fact that a market exists in the first instance. However, the social costs of commercial sex work are real in terms of justice, poverty, and intergenerational equity

5.4 RESULTS – A SUMMARY

Consideration of the impact of economic growth on the economic, social, political, environmental and spiritual sub-systems have now been calculated and the net benefits (which may be negative) of these adjustments added to national income.

By disaggregating this social welfare function, it allows increased analysis of the changes in the net benefits of economic growth to be identified, which in turn allows an

increased understanding of what impacts economic growth has had on social welfare for policy makers. It is evident that income inequality, the environment, corruption and commercial sex work have been the major negative consequences of economic growth and so special consideration of these outcomes is required. Likewise, the increased spending on health and education by the government has been important in improving social welfare.

The impact on social welfare measured by this new method is considerably different to social welfare measured in a conventional way (GDP per capita). However, this new result reflects findings elsewhere for Thailand (UNDP 2002), that social welfare outcomes have been less than expected considering the high rates of economic growth leading to improvements in national income. Such inefficiency is also considered in Sen's (1985a) functioning approach.

An ANI social welfare function provides a more realistic description of welfare. Not only does ANI per capita increase at a slower rate, but is also decreases at times when national income per capita is actually increasing. The ANI per capita rose and fell throughout the 1980s, effectively being unchanged in 1985 from the 1979 figure. In comparison, national income per capita rose 30 per cent over this same period. The ANI per capita rose steadily during the next decade though at significantly different rates than national income per capita. Within this period, the divergence between the two indices becomes quite apparent.

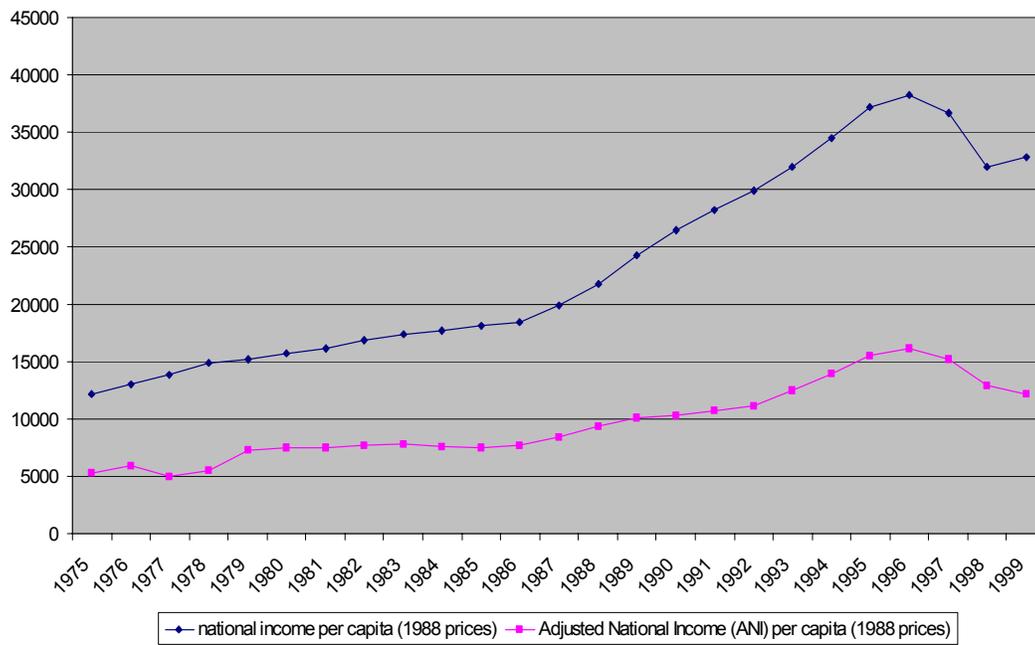
Both indices peak in 1996. This is just prior to the financial crisis of 1997. After 1996 both indices begin to fall. Whilst national income per capita has shown the propensity to increase in 1999, ANI per capita has not increased but fallen by another 10 per cent. It is too early to confirm whether this is a trend or a fluctuation. However, by drawing on the results of other studies (Daly and Cobb 1990; Jackson et al. 1997), predictions may be made that this new divergence could be expected.

Table 5.2 Adjusted National Income for Thailand, 1975 – 1999 (1988 prices – millions of baht)

Year	Economic	Social	Political	Environmental	Spiritual	Adjusted National Income	Adjusted National Income per capita (in baht)
1975	343934	-14242	-3336	-81373	-18646	226337	5339
1976	374279	-14392	-2771	-80580	-20371	256165	5928
1977	405089	-17645	-5263	-137464	-22430	222287	5021
1978	442804	-17843	-4460	-145862	-24558	250081	5530
1979	455909	-17816	-5865	-70782	-25744	335702	7280
1980	476613	-16440	-7034	-75363	-27190	350586	7465
1981	497902	-20631	-8540	-79451	-28562	360718	7535
1982	517973	-17631	-10231	-83773	-30133	376205	7702
1983	532025	-17687	-11473	-83698	-32043	387124	7818
1984	542662	-22050	-13914	-87772	-33754	385172	7615
1985	555913	-25787	-15881	-90177	-35137	388931	7509
1986	565994	-28330	-18989	-74774	-36950	406951	7683
1987	626626	-35479	-17922	-78871	-40599	453755	8423
1988	706795	-43454	-17445	-85397	-46051	514448	9360
1989	771961	-49280	-16382	-91478	-51838	562983	10073
1990	816898	-55089	-10593	-113112	-57650	580454	10309
1991	862840	-61062	-7050	-120985	-62420	611323	10732
1992	907247	-63649	-2937	-126737	-66967	646957	11195
1993	994204	-58415	781	-134028	-72808	729734	12509
1994	1100005	-58340	3409	-141474	-79645	823955	13943
1995	1211737	-60443	8159	-150382	-86771	922300	15511
1996	1274728	-67059	10343	-158653	-91513	967846	16100
1997	1239809	-66852	2765	-163368	-89590	922764	15173
1998	1094307	-56116	-292	-163192	-79414	795293	12939
1999	1061309	-70978	-7335	-148076	-82165	752755	12208

Sources: Author's own calculations.

Figure 5.8 Comparison of National Income per capita and Adjusted National Income per capita measures of social welfare for Thailand, 1975 – 1999 (1988 prices)



Source: Author's own calculations.

As discussed previously, (see Chapter Three, Section 2.2.1), whilst social welfare functions can rank various social states (Chakravarty 1990; Brekke 1997), this ranking is not cardinal simply because these social states are money-metric. Just as it is incorrect to say that as national income per capita has increased ten percent from one social state to another, so too has social welfare (or more precisely in this thesis, standard of living) increased ten percent. It is not possible to assign a cardinal relationship to the various social states estimated by adjusting national income using social choice theory and systems analysis. Further, it is also not accurate, when comparing the levels of national income per capita and adjusted national income per capita, to infer that the money-metric difference between these two indices. What can be inferred from these two time series though is the variations and divergence in the two trend lines. The analysis of the social

welfare experienced by the Thai population between 1975-1999 is, in this instance, dependent on the shape of these two trend lines.

As has been well discussed, the trend line for national income per capita has three main phases; the initial steady rise to 1986, the accelerated growth to 1997 and the final dip and apparent recovery to 1999. Social welfare (or standard of living) can then be said to have followed a similar pattern. This steady then accelerated growth then fall in well-being has been reported elsewhere (Kakwani and Krongkaew 2000; Kakwani and Pothong 2000). However the pattern for adjusted national income is significantly different. The rise is slower, there is not an accelerated period, nor is there a indication of a recovery in the final year after the index begins falling in 1997. Comparing the two indices further, an increasing divergence is also apparent. This indicates that the relationship between national income per capita and adjusted national income per capita is becoming increasingly weaker throughout the time series, casting doubts over the long-term desirability of economic growth in Thailand in terms of social welfare.

Further analysis of these results and welfare analysis of the desirability of economic growth occurs in Chapter Eight.

5.5 CONCLUSION

This new measure of social welfare was developed in Chapter Three and empirically applied in this and the previous chapter. The resulting analysis supports the hypothesis that economic growth is not at all times desirable and can be undesirable, even within developing countries.

It is appropriate that this argument be tested by another analytical tool and the following chapter will develop and empirically apply this new measure of social welfare based on the second conventional approach to welfare measurement: welfare as a favourable mental state. Maslow's (1971) hierarchy of human needs will be used in a new and

original way to measure social welfare for Thailand (Islam and Clarke 2001b). This second measure will test the veracity of the results reported in this chapter.

The thesis will then investigate the impact these new measures of social welfare have on various contemporary development issues, such as sustainability and globalisation. Various policy implications of this will then be discussed.

CHAPTER SIX – A NEW HIERARCHICAL SYSTEMS ANALYSIS MEASURE OF SOCIAL WELFARE: ISSUES, METHODS AND RESULTS

6.1 INTRODUCTION

Various calculations for nearly twenty adjustments to national income within a systems analysis, in order to determine the net benefits and desirability of economic growth were set out in Chapters Four and Five. This chapter develops a second social welfare function in order to test the results of this first analytical tool. Whilst the first social welfare function was an extension of previous work (Sametz 1968; Nordhaus and Tobin 1973; Daly and Cobb 1990), this second social welfare is an original approach to measuring social welfare operationalising social choice theory through Maslow's (1971) hierarchical framework.

As discussed in Chapter Two, there are several existing approaches to measuring social welfare. A limitation of existing literature is that whilst some reporting in terms of social welfare in the form of hierarchical needs has been undertaken (Day 1996; Islam and Craven forthcoming; Craven and Islam 2001), the empirical implication of this approach where social choice is used to determine and measure social welfare in terms of Maslow's (1971) hierarchical needs has not yet been undertaken.

Within this chapter, the second social welfare function will be developed and empirically applied to Thailand for a twenty-five year period, 1975-1999. However, the length of this exercise will be substantially shorter than that required for the first social welfare function. This is due to that fact that whilst the first social welfare function was reliant on nearly twenty adjustments to national income, this second social welfare is not as data dependent. The main purpose of this social welfare factor is to test the results on the desirability of economic growth on social welfare found in Chapters Four and Five.

This chapter is set out as follows: Section 6.2 reviews how this new approach is based on achieving favourable well-being. Section 6.3 discusses the social choice approach to measuring social welfare in this new approach. Section 6.4 discusses the methodology used in this approach before brief review occurs in Section 6.5. Finally, section 6.6 concludes this chapter.

6.2 FULFILLING HIERARCHICAL NEEDS: ACHIEVING FAVOURABLE WELL-BEING / HAPPINESS

Having spent the previous three chapters focussing on defining and measuring social welfare for Thailand adjusting a revealed preference base (i.e. national income), this chapter develops an approach based on achieving favourable well-being / happiness. This “happiness” approach is also a common form of welfare measurement (see Chapter Two, Section 2.5.2).

In developing this new approach, traditionally non-welfaristic issues such as justice, liberty, poverty and inequality are considered. This approach is a distinct alternative to the theories of social welfare based on revealed preferences (Hicks 1940; Pigou 1962), on capabilities (Sen 1985a) and primary social goods (Rawls 1971). It is operational and provides intuitively correct results validated by historical experiences.

This chapter empirically applies a second new measure of social welfare to Thailand. Social welfare (SW) is defined as a function of hierarchical needs fulfillment (HN_F).

$$SW = f(HN_F) \quad [6.1]$$

According to Maslow’s (1971) *hierarchy of human needs*, human well-being is bounded by the fulfillment of a given set of ascending needs. Human effort is exerted to achieve each level. The primary need that must be fulfilled are those basic needs such as food, shelter and water. Until these needs are fulfilled it is not possible to consider higher needs. However, once these needs are achieved, consideration moves to the second tier of

needs – feeling safe. As each level of needs is reached (belongingness, esteem, self actualisation), it can be said that well-being has increased. Therefore, a society can increase its aggregate social welfare by creating an environment which assists people fulfill all five levels of hierarchical needs. In this regard, social welfare is not measured through revealed preferences but rather, social welfare is considered the achievement of a favourable well-being. As people move up through this hierarchy of needs, their well-being (or happiness) improves.

The development of a social welfare function addressing the issues of efficient welfare, poverty or inequality measures, theory of justice, liberty and equality is an important contribution in aggregate welfare theory (Islam and Clarke 2001b). Such work has been undertaken by Islam (2001) and is extended and applied empirically in this chapter. Malsow (1971) developed his theory of needs in the late 1960s. He argued human needs are hierarchical in nature and humans strive to reach the highest levels of their needs. Whilst not initially intended for use outside of management psychology, recent studies (Hagerty 1999; Sirgy 1986) have widened its use to consider development and social welfare issues.

6.2.1 Summary of the Hierarchical Framework

The first group of needs is basic needs and encapsulates some of the traditional *Basic Needs* discussed in development literature (see Streeten 1995 for a summary of these issues). Basic (or physiological) needs include air, water, food, sleep and sex. Unsatisfied basic needs cause feelings of pain, illness and discomfort. Until these needs are satisfied, attention to higher needs is not possible. The attainment of basic needs occurs at a low level of income. Their satisfaction is an absolute outcome and not dependent on increasing income (also see Hirsch 1995, for a description of the *Paradox of Affluence* where higher income and consumption does not increase social welfare).

The second group is safety needs. These needs are psychological rather than physiological and take the form of home and family. The attainment of this level of needs is not a function of income. Indeed, from the first level of needs, income levels are

specifically not important in increasing social welfare with regards to the hierarchical needs fulfillment.

The third level of needs are belonging needs. Human desire to belong to groups such as clubs, work groups, families or gangs. This level of needs incorporates the need to feel (non-sexual) love and acceptance by others.

Closely related to this is the fourth level, esteem needs. Once people belong to groups, they seek to be admired by those around them. Esteem can be brought about through the mastery of skills or attention and recognition from others.

Finally, once these four levels of needs have been satisfied, a person can become self-actualized. Self-actualization is an ongoing process. It is the need to be what one was born to be. It is self-fulfillment of one's own potential. Self-actualisation can be considered as the ultimate *public good* (Rawls 1971) or the highest level of capability (Sen 1985a).

Hindrances *constructed* by *society* stop people reaching the highest level of self-actualization. That is why hierarchical needs fulfillment can be applied to national welfare measures. This approach can demonstrate whether a society is assisting or hindering its citizens from becoming self-actualized. Societies that enable their members to achieve each level of this hierarchy will have higher levels of social welfare.

This new approach also has the hierarchical nature of social welfare (see Chapter Two, Section 2.2.2.1) imbedded in it. Within this hierarchical needs approach, standard of living (SoL) is a function of basic needs (BN).

$$\text{SoL} = w(\text{BN}) \quad [6.2]$$

Quality of life (QoL) is a higher concept and is a function of the standard of living, but also safety needs (SN) and belonging (BLN).

$$\text{QoL} = w(\text{SoL}, \text{SN}, \text{BLN}) \quad [6.3]$$

Social welfare (SW) is the full expression of human potential and thus is a function of quality of life, esteem needs (EN) and self-actualisation (SA).

$$\text{SW} = w(\text{QoL}, \text{EN}, \text{SA}) \quad [6.4]$$

This achieving high levels of social welfare is dependent upon increasing the number of society achieving these higher levels of Maslow's hierarchical needs.

This hierarchical framework is thus complementary to that discussed earlier in Chapter Two, Section 2.2.2.1.

The dominant need is always shifting so that a self-actualised person does become hungry and tired and thus basic needs become the priority again (albeit temporarily). The implication of this shifting dominated need (Maslow 1971) is that policies aimed at maximising social welfare must be more sophisticated than simply seeking to achieve a stages of growth outcome. Developing a social welfare function on Maslow's approach to hierarchical need fulfillment encourages this outcome.

Islam (2001) has provided the introductory theory of social welfare measurement based on the *hierarchical need fulfillment approach*. This chapter extends the theory and empirically applies the hierarchical need fulfillment approach to social welfare to Thailand for a twenty-five year period, 1975-1999 (see Islam and Clarke 2001b). It is an extension of Hagerty (1999) and a natural progression of Sen (1985a) and Rawls (1971).

This approach considers the utility and needs as in utilitarianism, as well as non-welfaristic elements such as freedom, liberty, equity, justice, etc. to provide opportunities for capabilities, as proposed by Sen (1999a). Progressive satiation of the needs according to some hierarchy requires the fulfillment of basic needs (that emphasizes rationality and

utilitarianism) following the satisfaction of higher level needs such as self-actualization (that emphasises functionings, capabilities and freedom, morality, equity, etc.).

This approach is different to a traditional basic needs approach (Streeten 1995) as it moves significantly beyond simple consumption levels to take into account feelings of safety, belonging and self-actualisation. Fulfillment of these *supra*-basic needs are not necessarily found within the market, but can be secured through public policy and within strong social relationships.

Within this approach, social welfare is ideally determined by the satisfaction of all the hierarchical levels based on human needs. In measuring social welfare, appropriate weights are given to the different level needs from a hierarchy of needs. In this approach, the fulfillment of needs at a higher level could receive greater weight than compared to the fulfillment of lower level needs. Other things remaining equal, if one society has a higher satisfied population in terms of the maximum number of their higher level needs fulfilled compared to other societies, that society is better off in terms of social welfare. However, different societies may determine that priority should be given to different levels of needs depending the circumstances of the country, thus placing higher weight on fulfilling basic needs and less weight on fulfilling esteem needs. Two different sets of weights will be applied to the data in this chapter (see Section 6.3.3).

6.3 APPLYING THE SOCIAL CHOICE APPROACH

As discussed social choice theory should be applied to social welfare measures as it highlights social preferences and value judgements. It is concerned with economic and non-economic activities that are important in determining social welfare levels, quality and composition. Social choice theory highlights society's choices, preference and value judgements and how these impact on social welfare.

A hierarchical vector of needs can represent social preferences within a society. Such a vector can be aggregated in a hierarchical form. Social choices aim at satisfying the

greatest number of wants, starting with the most important and urgent and moving to those less urgent (Georgescu-Roegen 1954). Therefore, social choice theory requires preferences not be aggregated in a scalar fashion, but rather as a vector of hierarchical needs.

Applying social choice theory to measuring social welfare within a hierarchical framework is dependent upon four operations: determining 1) whose welfare is being measured; 2) whether the welfare of the group is different or equal to the sum of welfare of the group's individual members; 3) how distribution of the individual welfare affects the group's welfare; and 4) how to aggregate individual welfare to determine the level of group welfare (Bonner 1986).

6.3.1 Determining the Group

A new data set for Thailand is presented in this chapter that fully encapsulates in an index form the five levels of human needs that make up a sophisticated measure of social welfare: basic needs, safety needs, belonging needs, esteem needs and self-actualization needs. As discussed previously (see Chapter Two, Section 2.3), this thesis focuses on Thailand as a representative developing economy. Thailand has been chosen as it has achieved remarkable growth over the last three decades.

Whilst certain characteristics of Thailand are not shared by all developing economies, it is considered reasonable that Thailand is seen as a suitable representative economy. It is expected that the social welfare function developed in this chapter will be suitable for other developing economies without needing serious adaptation. Whilst Thailand is a unique country, with distinct economic characteristics, it displays enough common traits for it to be a reasonable example of a typical developing country (see Chapter Two for further arguments as to why Thailand has been chosen).

6.3.2 Relationship between the Individual and the Group

The objective of social choice is the determination of an intertemporal efficient allocation of resources which maximises a social welfare function that embeds GDP (showing

efficiency and rationality), other economic objectives such as full employment, balance of payments etc. (for good macroeconomic and development management) and indices for equity, justice, rights, liberty and morality (for social welfare) – subject to the given set of resources, information, social structure, legal and institutional or organisational constraints. Within this maximising economy, the aim will be the largest number of the population achieving the highest level of need described by Maslow. This approach is defined in Islam (2001) as the social welfaristic approach to social choice and is in the line of arguments developed by Sen (1999), Romer (1987, 1990) and Hausman and McPherson (1996).

6.3.3 Welfare Distribution

If social welfare is defined as a social welfare function, reflecting various hierarchical components, a decision must be made as to the importance of the different components with respect to their impact on social welfare. Having noted that the hierarchical concept of social welfare is imbedded in this hierarchical fulfillment needs approach, it is still necessary to determine the relative importance of each hierarchical level to the various concepts of social welfare. For example, if social welfare is a function of the first four levels of needs and self-actualisation, a decision must be made as to their relative importance to that functional relationship. Is self-actualisation twice as important as the other needs, or are the other needs twice as important as self-actualisation needs, or are all components equally as important in determining social welfare?

As an aggregation of different components or as a function of separate forms, weighting is an important issue when measuring different levels of social welfare. The use of weights allows the policy-maker to rank social states on social choice objectives (Islam and Mak 2000).

The determination of weights is dependent on various value judgements made explicit within the social welfare function. Even when explicit weights are not defined, a value judgement has been made in that all components are equally weighted. This decision is just as much a value judgement as setting separate weights for each component.

No agreement exists as to how these weights should be determined and they can take any form, depending on the value judgements upon which they are based (Pearce and Nash 1981). A number of various methods have been suggested. These value judgements can be revealed through social choice theory by expert opinion (or analyst), government policies or specific questionnaires.

Unilateral Decisions

The decision-makers unilaterally set the weights according to their own value judgements (Dasgupta and Pearce 1972, see Bjork and Norinder 1999; Montgomery, Burk and Paredes 1997 as examples). Social welfare can then be defined as:

$$SW = SW (\alpha_1 \cdot S, \alpha_2 \cdot E, \dots \alpha_n \cdot En) \quad [6.5]$$

where $\alpha_1, \alpha_2, \dots, \alpha_n$ are the set of weights applied to the social (S), economic (E) and the environment (En) respectively.

Marginal Tax Rates

Alternatively, the weights may be set to reflect the marginal rates of taxation. The underlining justification for this approach is that society, represented through successive governments, has determined that through progressive tax rates the benefits of those on higher incomes should be weighted less than the benefits of those on lower incomes. As such, the calculation of social welfare should be biased in favour of those on lower incomes rather than those on higher incomes as this is society's preference (Dasgupta and Pearce 1972).

Income Ratios

A similar approach, first suggested by Foster (1960), has that the aggregation of social welfare based on individual welfare be weighted by the ratio of the average national income to the individual's income:

$$\alpha_1 = \frac{Y^a}{Y_1} \quad \alpha_2 = \frac{Y^a}{Y_2} \quad \alpha_3 = \frac{Y^a}{Y_3} \quad [6.6]$$

where Y^a is the average national income and Y_1, Y_2, Y_3 is the income of society's individuals (also see Little and Mirrless 1969; Squires and van Tak 1975).

Marginal Utility of Income

Or, rather than use the ratio of national average income to individual income, the shape and elasticity of the marginal utility of income could determine the weights. The major difficulty of this approach however rests on the assumption that such a calculation of utility can be determined. Whilst some estimates have been made (see Theil and Brooks 1970 for an example of an early attempt) 'most economists remain unshaken in their belief in the impossibility of measuring differences in the marginal utility of income across individuals' (Pearce and Nash 1981, p. 27).

Factor Analysis

A more sophisticated approach is to use factor analysis (Sahn and Stifel 2000) or principal component analysis (Hammer 1998; Filmer and Pritchett 1998) that allows the data itself to determine the weights directly.

Equity

A simpler final option may be to determine the set of weights purely on a notion of equity as defined by society (Sen 1999a; also see Atkinson 1970; 1983a). But equity in this sense is not relative only to income, but may be equity in terms of access to social services, ascetic environments, or satisfactory mental health. This approach takes us back to the first option where the decision-maker unilaterally sets the weights based on certain value judgements. Such an approach certainly relies on value judgements, but if these judgements are made explicit and supported with appropriate data reflecting society's choices, preferences and value judgements, a set of weights based on this approach is equally as valid to any other suggested previously.

Clearly then, weights can take any form, being only dependent on the value judgements upon which they are based. Nor must weights be precisely specified. They can be ‘confined to certain ranges or can cover merely the scope of the decision or the judgement to be expressed in a particular case’ (Comin 2001, p. 12).

Within this chapter a value judgement has been made that the appropriate weights should be a linear progression. Two sets of data have been produced. In the first, the value of the highest level of hierarchical needs (self-actualization) will be considered five times as important as basic needs, the second highest level (esteem) will be four times as important, the third level (belongingness) will be three times as important, and the second level of needs (safety) will be twice as important as the first level.

The second set of weights has been applied to take into account different levels of development that may impact on weighting decisions. Countries at different levels of development may wish to emphasize the importance of different levels of needs fulfillment or levels of social welfare (standard of living, quality of life, social welfare). Whilst the basic nature of the hierarchy of needs will remain unchanged, countries at low levels of development may wish to emphasize the importance of achieving the first two levels of needs (basic needs and safety) rather than that of self-actualisation (the highest level of need). This is a value judgement. Should countries calculate social welfare movements using the first set of weights, certain policy recommendations can be drawn from the results. If countries are weighting the lower levels of needs highly (or the converse of the above), public policy should be developed to support this achievement. A war-torn country (such as Sudan) would be misguided to focus its public policy of achieving self-actualisation without first focussing on assisting its citizens to feel safe through the cessation of civil war. Likewise, developed countries (such as Australia) would be misguided to emphasize the attainment of basic needs when nearly all citizens can be guaranteed this achievement. Within developed countries, sensible public policies would aim to increase the number of citizens attaining self-actualisation and when measuring

social welfare this success should be highly weighted to reflect an accurate picture of a country's achievements.

To illustrate this, a second set of calculations will be made whereby weighting the hierarchical needs in reverse order (i.e. Basic Needs will be weighted by 5, safety needs at 4, etc.). Such weighting is a value judgement and recognises the importance of and prioritises that all members of society reach the most important level of needs (food, shelter, and water) before concentrating on higher needs such as self-actualisation. A concentration on basic needs is well supported in the literature (Streeten 1995; Moon 1991).

Intergenerational equity

An alternative set of weights may be based on issues of intergenerational equity. If a high level of intergenerational equity is preferred by society, greater weight will be given to the achievement of those indicators that do not reduce exhaustible resources. Generally within this new approach, social welfare is not dependent on the consumption of resources (other than the achievement of the most basic of needs, which can occur with low levels of consumption), but rather on the development of the "human spirit". The attainment of higher level needs can occur at very low levels of resource use, thus maintaining levels of natural resources. (For further discussion on intergenerational equity, see Chapter Three, Section 3.3.3).

6.3.4 Aggregation

It would be possible to calculate a welfare index from the various individual indicators of hierarchy selected based on a dimensional distribution of these indicators (see Figure 8.10 for an illustration of this disaggregation). However, as the purposes of this second social welfare function is to test the results of the first, an aggregate approach has been undertaken. Having decided weighting (primarily through value judgements expressed in the analyst's opinion), how should the many different indicators measuring attainment of Maslow's hierarchy of needs be aggregated? How does one add calories per year and personal income per capita? A common denominator must be found.

A *normalised* index for each component can be calculated in order to find a common demoninator. A *normalised* index is calculated by dividing each year's figure by the highest figure occurring throughout the time series. Such an index therefore compares movements within a span of numbers rather than the numbers themselves. By using this approach, different indicators can be compared (and aggregated).

Whilst the indicators across all levels of needs may be substantially higher in “rich” developed countries, the measurement of social welfare will not necessarily be higher in these countries than in countries with lower indicators. This is because social welfare is based on movements within these indicators, not on their absolute numbers. Thus, a country with a poor record of infant mortality (of say, 100 in every 1000) will improve in terms of social welfare if the infant mortality is reduced over the specified time period, compared to a country with a low level of infant mortality (of say, 10 in every 1000) that remains static.

This outcome may be considered a significant flaw in the calculation of the index of social welfare based on the fulfillment of hierarchical needs. It appears to reward countries with low starting points and penalises countries that are already developed (such a developed country may wish to alter the selection of weights being used as previously discussed). However, this outcome can also be seen as a major advantage as well.

Human beings are adaptive by nature. Small mercies can be found in the most miserable of circumstances and tedium found in lavish surrounds (Sen 1990; Hirsch 1995). If an increase in wealth leads to happiness it is only a temporary situation, a disequilibrium of sorts. ‘Happiness is not the result of being rich, but a temporary consequence of having recently become richer’ (Inglehart 1990 cited in Myers 1999, p. 3; also see Pusey 1998; Brekke 1997; Travers and Richardson 1993; Ng 2001 provides an extensive review of this literature – for further discussion see Chapter Two, Section 2.5.2). Equilibrium will soon return and peoples’ levels of satisfaction will subsequently fall.

As humans adapt to their current situations, welfare can only increase if there are constant improvements in their circumstances. This new index measures changes in welfare based, not on achieving high levels of success, but by increasingly satisfying certain human needs. This is sustainable development or the movement from one social state to a higher social state.

It may be that social welfare within “rich” countries does plateau at a certain point when all hierarchical needs have been reached. (This may be linked to Max-Neef’s (1991) *threshold point*). It is not difficult to accept that there may be a cap on levels of human happiness or welfare. As discussed, using different weights to emphasize the importance of the different levels of needs and different levels within social welfare may partially overcome such a cap. Though it is reasonable to believe that at some point all of Maslow’s needs will be satiated. This will result in social welfare no longer being able to increase and perhaps the establishment of a steady or stationary state (see Daly 1991).

The *normalised* approach has been adopted for this study.

6.3.5 Systems Approach to Hierarchical Needs

The hierarchical needs approach is also a reflection of a systems approach to measuring welfare (Islam and Clarke 2001; Islam et al. 2001). Society is a complex and dynamic state resulting from a number of interconnected and evolving, dynamic systems or domains (Dopfer 1979; Bossel 1999; Colfer and Byron 2001; Slesnick 2001). These systems may include the social, economic, political, environmental and spiritual, which can be represented by an integrated social-economic system (see Islam and Clarke 2000; Islam 2000, 2001) or a hierarchical needs social welfare function. The concentration on only one system to assess, measure and plan social welfare improvements is inadequate.

Various approaches concerned with measuring the concept of social systems have long existed within the literature (see Sengupta and Fox 1969; Islam 200, 2001). These approaches combine various components to build aggregate systems and in terms of

development, each of these components affects it in various ways and development is the sum influence of these components.

This new understanding of society as a system is important for those attempting to plan paths to increase social welfare or development. It is evident that a concentration on economic growth as a measure of welfare is fraught with danger as economic simply considers one sub-system of many that in total make up society. The inter-relatedness of these sub-systems means that achieving increased economic growth may be obtained at the direct expense of one or more other sub-systems which will feedback not only to future economic consequences but will also have immediate welfaristic consequences for the entire system. By disaggregating the system into hierarchical needs, the relationship between different systems can be better understood in terms of achieving increased levels of social welfare.

6.3.6 Welfare Measurement – Subjective versus Objective

As discussed, the measurement of social welfare has long been a controversial subject (see Chapter Two, Section 2.5). Measures of social welfare are dependent on social value judgements. The use of a social welfare function allows value judgements to be explicitly defined and open to scrutiny. Without a social welfare function, social value judgements can be implicit and hidden.

As a social welfare function, value judgements underlie this new measure of welfare based on the fulfillment of a given set of hierarchical needs. The determination of these needs is a subjective, normative exercise. Yet, the data collected on these value judgements is objective, positive data. If a value judgement is made that a certain level of nutrition be consumed daily to attain a specified level of welfare, that is a subjective value judgement. However, scientific data can be drawn upon to objectively determine the daily calorie intake required and objective tools can be used to measure this intake.

Therefore, whilst this new measure of welfare begins as a normative exercise, the calculations made are based on objective, scientific information and data. It is particularly

important when measuring social welfare that value judgements (hence subjectivity) are made explicit. Social welfare cannot be judged in isolation of the analyst or society's value judgements (Max-Neef 1991).

6.4 METHODOLOGY OF FULFILLMENT OF HIERARCHICAL NEEDS SOCIAL WELFARE FUNCTION

Using Maslow's theory of hierarchical needs, Hagerty (1999) has shown that the development path of nations or general economic development follows a S-shape pattern. Lower level basic needs are achieved during the early stages of economic development, whilst higher level needs are achieved only when the economy has progressed sufficiently in terms of real income per capita. In terms of development strategies, an emphasis may be given to the fulfillment of lower level basic needs at the initial stages of economic development, while the emphasis may shift towards the provision of the satisfaction of higher level needs as the economy progresses over time and reaches a higher level of income.

Hagerty's (1999) work describes the experience of 88 countries over a 35-year period, 1960-1994. The results are in line with Rostow's (1971) stages of growth theory. Hagerty finds that in general, most countries have developed in a S-shape closely following Maslow's predictions that human needs are hierarchical. The implication for nations is that basic needs must be achieved before higher needs such as self-actualisation can be realised.

The present approach in this chapter does not seek to use Maslow (1971) to predict patterns of economic development but rather seeks to draw on Maslow's description of needs to measure social welfare in a manner (Islam and Clarke 2001b). It is an extension of Hagerty's (1999) work and a natural progression of Sen (1985a) and Rawls (1971).

Maslow's hierarchy of needs can be operationalised if the five categories of needs can be numerically measured. Hagerty (1999) has proposed a number of indicators that form the

basis for this new measure. Whilst these suggested indicators are based on value judgements and alternatives could be clearly argued for, they are a suitable starting point. Future work may expand these indicators and introduce alternative indicators. Such indicators may be based on subjective quality of life indicators that cover such focal topics as: personal security; health and access to health services; sense of community; social relationships including marriage and family relations; and morality (Cummins et al. 2001; Eckersley 1999, 2000). However, the present work is sufficient for this chapter. The indicators selected are (Hagerty 1999):

Physiological

- Daily calories available per person
- National income per capita adjusted for inequality

Safety

- Safety from murder
- High life expectancy

Belongingness

- Low divorce rate
- Low child death rate

Esteem

- Political and civil freedom
- Women's participation in work for pay

Self actualisation

- Secondary education enrollment rate
- Primary education enrollment rate

The social welfare function being proposed in this thesis is:

$$\text{HNF SWF}_t = \frac{\sum_{t=1}^T \text{HNF}_t(\alpha_1 \cdot \text{BN}_t, \alpha_2 \cdot \text{SN}_t, \alpha_3 \cdot \text{BLN}_t, \alpha_4 \cdot \text{EN}_t, \alpha_5 \cdot \text{SA}_t)}{(1+r)^t} \quad [6.7]$$

where:

- HNF SWF is hierarchical needs fulfillment
- BN are basic needs
- SN are safety needs
- BLN are belonging needs
- EN are esteem needs
- SA is self actualization
- $\alpha_1, \dots, \alpha_5$ are the weights assigned to each set of needs
- r is the discount rate
- t is time

6.4.1 Basic Needs

Significant literature exists regarding the identification of basic needs (see Streeten 1995 for a summary of the issues surrounding this area), however, as with much of welfare economics, little agreement exists as to the best way of measuring this concept. One widespread method though is the Physical Quality of Life Index (PQLI – Morris 1979; Morris and McAlpine 1982).

Two measures have been chosen as indicators for this first level of need; calories per person and national income per capita adjusted for inequality. Other measures that would have been suitable include indicators measuring air pollution and access to clean water. Through various household surveys and national accounts, accurate measures of the two selected indicators can be found. Both were chosen in part for their ease of measurement, but also because they encapsulate what Maslow was seeking to describe.

Along with water and sleep, food is the most basic of human requirements. Without sufficient food or sufficient quality, survival is not possible. By measuring calories per person, an accurate understanding of the improvements not only in access to but also quality of food over time is gained. Whilst Sen (1985a) might argue that the functioning

of the food is a more accurate measure than simply calorie in-take, pragmatic considerations dictate that the latter data is used.

National income per capita adjusted for inequality is a suitable indicator for the control one has over the market (Atkinson 1970; Clarke 2001a – also see Chapter Four, Section 4.2.2). Many basic needs cannot be directly purchased (there is no market for clean air), however income levels do provide some indication as to the ability to access many of the basic needs: water, shelter, clothing, etc. Money cannot buy love (which is why this is not an indicator of higher needs), but it can reasonably purchase most basic needs.

The attainment of higher levels of Maslow's hierarchy therefore is not predicated upon high-income levels. As with Sen's (1985a) capabilities, income plays only a small role in predicating social welfare levels (also see Travers and Richardson 1993).

6.4.2 Safety Needs

Having attained the lowest level of needs required, attention shifts to focus on achieving a feeling of safety. Two indicators of safety have been chosen to measure the success of Thailand in this regard: safety from murder and life expectancy.

A constant threat to one's safety can be measured by a country's homicide rate. The safety from being murdered is a fair indicator as to how a society is succeeding in ensuring its members achieve increasing levels of social welfare. This data is reported within official Thai government National Statistical Office (NSO) quarterly and monthly bulletins. Hagerty (1999) also included a measure of safety of war in his calculations, however this measure has been excluded as the Thai population have not suffered such a threat (other than occasional border skirmishes with Burma).

Another suitable indicator for this success is general life expectancy. Whilst there are crossovers with regard to the fulfillment of basic needs, a high life expectancy is also a reasonable measure of how safe one's life is. Premature death is not only caused by war

and murder, but also by accidents. Again, this data is reported within official Thai government National Statistical Office (NSO) quarterly and monthly bulletins.

6.4.3 Belonging Needs

The relationship one has with one's own family is often rated highly as a factor of self-reported happiness. An important aspect of belonging is to belong to a family (Cummins et al. 2001; Eckersley 2000):

Measures of “belongingness” and love were related to the risk of a “broken family” – the risk of divorce, as well as the risk of a child in the family dying. Many parents report that the death of their child is the greatest suffering a parent can endure. Similarly, divorce causes great stress and suffering for the entire family. (Hagerty 1999, p. 254)

Measuring divorce rates is partially successful in measuring the rate of which people feel part of a functioning family. Data on this indicator is again reported within official Thai government NSO quarterly and monthly bulletins. Likewise, child mortality rates are also collected from the NSO quarterly and monthly bulletins to measure this impact on belongingness.

6.4.4 Esteem Needs

Having attained the first three levels necessary for measuring social welfare, a sense of esteem is the next hierarchical need. The level of political and civil freedom and women's participation in the paid workforce have been chosen as suitable indicators. Both of these indicators measure how advanced society is in ensuring its members are not feeling disenfranchised from the political and economic systems. There is a strong correlation between political freedom and social welfare (Veenhoven 2000; Frey and Stutzer forthcoming). This data was based on official Thai government NSO publications and the Freedom House time series on political and civil freedoms (Freedom House 2001).

6.4.5 Self-actualisation Needs

The highest level of needs that can be attained is self-actualisation, or more simply, being the person you were born to be. This concept is closely linked to Sen's concept of *freedom* (Sen 1985b, 1993). As with the other levels of need, a simple indicator of this level of need is not straightforward. Primary and secondary education enrollment rates have been chosen as it is felt that education is a reasonable measure of people's ability to better themselves. Whilst education does not guarantee in itself improved employment, etc, it does provide the opportunity for people to become informed and make decisions concerning their own lives. Education is a form of investment in social capital (Gylfason 1999; Muller 1996; Khoman 1993).

The data for all these indicators has been gained from various Thai NSO publications (see Appendix P).

Again, it is important to note that the attainment of self-actualisation is not based on income levels. By separating the highest level of Maslow's hierarchy from national income, it is possible that social welfare in developing countries may rate as high as that of developed countries with far higher national income levels.

As noted earlier, the selection of these indicators are based on value judgements. Alternative choices could have been made. However, as these indicators have been used in previous work (Hagerty 1999) they have been considered reasonable and accurate and therefore sufficient for this analysis.

6.5 RESULTS - A SUMMARY

The limited usage of Maslow's approach to development has primarily been interested in mapping and predicting paths of development (Hagerty 1999). However, this new approach is not interested in using the hierarchical needs approach to measure economic development but rather the issue of the relationship of hierarchical needs and the measure of society's welfare. This new social welfare function does not focus on

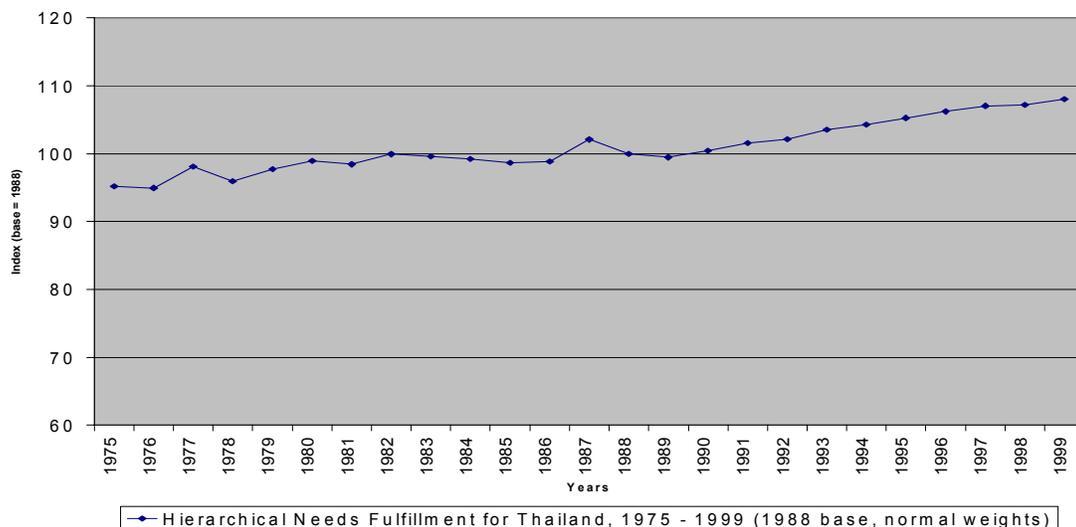
stages of economic and social development but rather is a new social choice measure of social welfare defining social welfare as the attainment of a set of hierarchical needs.

As this new fulfillment of hierarchical needs social welfare function is based on various needs within society, it is able to provide useful insights into the structure of society in terms of those needs. It provides information on which needs are being successfully attained and which needs are failing to be met.

Two sets of weights have been applied to the data. In the first set, the weights are assigned so that greater importance is given to attaining the highest level of need (self-actualisation). In the second, the greatest weight is given to ensure that priority is assigned to the most fundamental of needs (basic needs).

Within the first set of weights, the social welfare increase is quite flat throughout the twenty-five years under review. This would suggest that social welfare was quite steady throughout most of these two decades with only small rises and falls.

Figure 6.1 Hierarchical Needs Fulfillment SWF for Thailand, 1975 – 1999 (first set of weights)

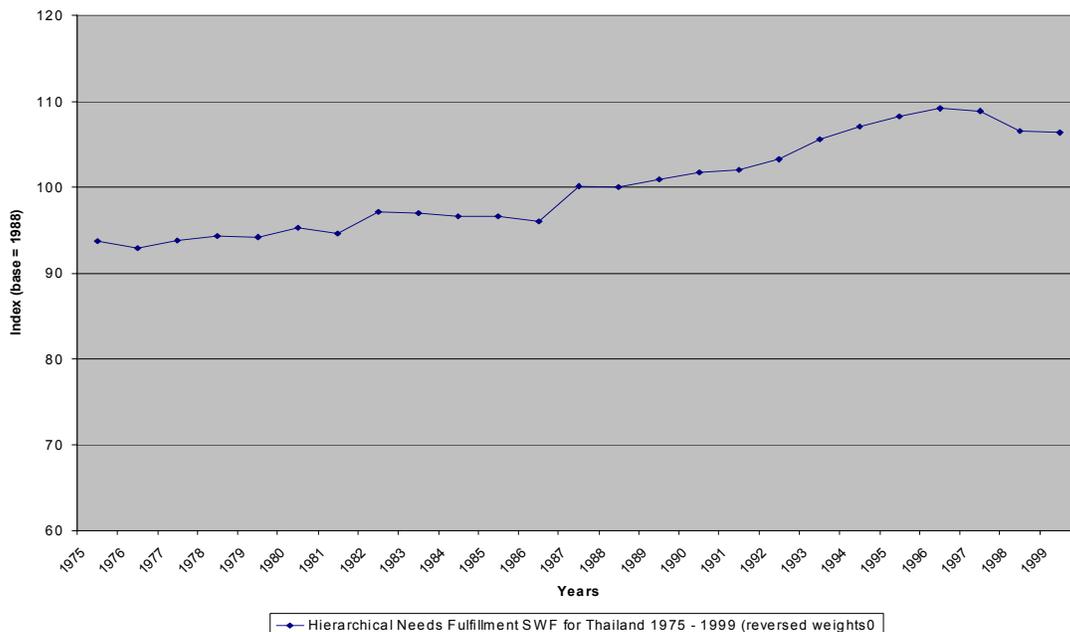


Source: Author's own calculations.

For much of the 1980s, the social welfare index did not rise at all, suggesting that this period of unprecedented economic growth did not assist the Thai population’s attainment of Maslow’s hierarchy needs.

Interestingly, the pattern of social welfare growth was virtually unchanged when the weights were reversed. This may be explained that again unprecedented economic growth has not impacted on the two most fundamental needs (basic and safety) as these can be reached with relatively low levels of national income. It may be expected that a poorer country than Thailand might have significantly different results. It might also suggest that a sufficient level of basic needs attainment has been reached in these areas and greater concentration can now be given to the next level of needs (such as Belonging and Esteem needs). This seems intuitively correct as Thailand is now considered a low middle-income country based on GDP per capita figures (World Bank 1999, 2000).

Figure 6.2 Hierarchical Needs Fulfillment SWF for Thailand, 1975 – 1999 (second set of weights)



Source: Author’s own calculations

Over an eight-year period, the social welfare index did not have an overall increase. The position in 1986 is the same as it was in 1982.

As these movements in the hierarchical concepts of social welfare and hierarchical need reflect historical experiences it is possible to say that these results have been strongly validated.

6.6 CONCLUSION

An area worthy of future study is whether alternative paths of development can be achieved whereby human needs are not fulfilled in sequence but are fulfilled simultaneously. Max-Neef (1991) proposes a non-hierarchical matrix of needs and satisfiers. The nine suggested “axiological categories” of human needs are fundamental to human evolution and are constant across all cultures. These needs are: Subsistence, Protection, Affection, Understanding, Participation, Idleness, Creation, Identity and Freedom. These needs are achieved through what Max-Neef coins “satisfiers”. Satisfiers change according to each culture and even differ within those cultures. Satisfiers can be distinguished into four “existential categories”; Being, Doing, Having and Interacting. Empirical application of this approach is difficult, but progress is being made (Choudhury 2000).

The apparent significant difference between Maslow and Max-Neef is Maslow’s condition of hierarchy. Max-Neef’s needs set are non-hierarchical and so any number of unmet needs (termed *poverties* by Max-Neef) can simultaneously exist. This divergence can be bridged however. Maslow notes that the dominant need is always shifting so that a self-actualised person does become hungry and tired and this basic need becomes the priority. The implication of this shifting dominated need (Maslow 1971) or non-hierarchy of needs (Max-Neef 1991) is that policies aimed at maximising social welfare must be more sophisticated than simply trying to achieve economic growth. Developing a social

welfare function on Maslow's approach to hierarchical need fulfillment encourages this outcome.

The approach developed in this chapter is different to previous approaches using Maslow's hierarchy of needs (Hagerty 1999) as it is not an attempt to predict movements in development (in a similar vein to Rostow's (1971) stages of growth theory), but rather it is an approach to measure welfare.

Within this calculation, the attainment of these needs for the entire society is considered. An alternative approach may be to measure the success of a society by the attainment of these hierarchical needs by a low-income section of that society. The new measure of social welfare presented in this chapter overcomes this paradox by not linking increases of social welfare with economic growth. Indeed, countries can increase their social welfare without increasing economic growth or even during times of decreasing economic growth (conversely, social welfare can fall despite increases in economic growth). Social welfare is dependent on fulfilling a given set of hierarchical needs and the role of the state should be to support this attainment. As various levels of human need are attained, higher concepts of social welfare are also attained. Therefore not only can societies aim to increase total social welfare, they can also aim to improve their performance in the hierarchy of social welfare concepts.

As Sen (see for example 1999a) has stated, social choice theory is concerned with the normative assessment of economic states and outcomes. The present chapter has applied social choice theory to a hierarchical needs based welfare measurement of social welfare in Thailand. This approach has been innovative and appropriate since it has produced plausible estimates of social welfare in the Thai economy and has provided useful information and insights into processes and changes in development dynamics in Thailand and the normative implications of these. The adoption of the systems approach has also been useful since this adoption has assisted in identifying, quantifying and measuring the various hierarchical needs that contain the elements of social welfare both systematically and rigorously.

The results of this approach in terms of analysing the desirability of economic growth on social welfare will be further discussed in Chapter Eight. Having developed two new democratic social welfare functions to measure social welfare and shed light on the desirability of economic growth in Thailand over the past twenty-five years in the previous three chapters, the next chapter will review a number of contemporary development economic issues that will be affected by this new paradigm. Chapter Eight highlights a number of illustrative policy frameworks, before Chapter Nine concludes the thesis.

CHAPTER SEVEN – APPLICATION OF CONTEMPORARY DEVELOPMENT ISSUES TO A SOCIAL WELFARE MEASURE: ISSUES, METHODS AND RESULTS

7.1 INTRODUCTION

Throughout this thesis an argument has been presented that economic growth cannot always be assumed desirable in Thailand in terms of social welfare. Such an argument is limited within mainstream economic literature as achieving economic growth holds a *privileged* place among public policies (Watkins 1998). However, by defining social welfare firstly as a function of the costs and benefits of economic growth, and secondly as a function of the fulfillment of hierarchical needs, the data presented supports this new hypothesis.

Within this chapter, the relationship between economic growth and some contemporary development issues are briefly reviewed and illustrative numerical welfare analysis of the desirability of economic growth implemented. Within contemporary development economic, two issues of central importance are sustainability, and globalisation.

The relationship between these concepts and economic growth has implications for the desirability of economic growth on social welfare. Therefore a review of these relationships will be valuable in determining illustrative policy frameworks that flow from the results of the two social welfare functions developed in the previous chapters.

The rest of this chapter is set out as following: Section 7.2 discusses the impact of economic growth on sustainability. Section 7.3 reviews the relationship between globalisation on social welfare before conclusions are drawn in 7.4.

7.2 SUSTAINABILITY

If the number of international conferences, books and journal articles are any indication, sustainability is presently a key issue within contemporary development economics. Sustainability is implicitly assumed when discussing future social welfare and such future social welfare is only possible within a sustainable society. (However, social welfare and sustainability are not identical – see Harris and Fraser forthcoming and O’Neill 2001). Future economic growth is reliant on a healthy and functioning SEE-system (Islam and Clarke forthcoming). Recorded rates of economic growth within Thailand over the past three decades have been among the world’s highest (World Bank 2000). Economic growth has been necessary to provide the foundations to increase living standards for the growing population of Thailand. However, this growth has also been accompanied by increased damages to the socio-economic systems (Islam and Jolley 1996; Islam and Clarke forthcoming).

The Thai government has incorporated the concept of sustainable growth into its policy framework (Ministry of Finance 2001). Sustainable growth is concerned with more equitable growth, improvement in technology and improved competitiveness.

Sustainability is a wide-ranging concept that has been defined in various ways (Pearce and Turner 1989; Pezzey 1992, 2000, 2001; Kolstad and Krautkraemer 1993; Cesar 1994; Faucheax et al. 1996). The Brundtland Commission developed the most widely accepted and least controversial definition. Sustainable development is ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ (WEDC 1987, p. 1). This ability is dependent on a healthy and functioning SEE-system. Economic growth can damage the SEE-system though, through loss of social cohesion, resource degradation and pollution. This has social welfare consequences.

Sustainability has implications for all facets of society and yet it is in real danger of becoming a hollow catch cry. A significant reason for this is the lack of standard and operational sustainability indicators across a broad spectrum of economic, environmental

and social realms (see Petersen 1997; Musters et al. 1998; Azar et al 1996 for attempts to overcome this).

Although welfare economic analysis of the environment and sustainability is a developed area in economics (Gerlagh 1998; Sen 1995; Maler 1985; Fisher and Krutilla 1985; Kneese and Schultz 1985; Johansson 1993), an explicit application of normative social choice theory operationalised on the basis of a numerical social welfare function has been done only recently (Islam 2001). Application of this approach to social welfare indicators for sustainability measures has not been done yet. Secondly, a systematic study of sustainability at the aggregate level has not been undertaken for Thailand. The qualitative studies focusing on sustainability that have been undertaken have focused on micro communities or eco-systems (Riggs 1995) or have been policy orientated (see for example the United Nation's Phnom Penh Regional Platform on Sustainable Development).

It is within this vacuum that standard national accounts have begun to be used as an indicator of sustainability. The possibility that standard national accounts can be used as sustainability indicators is entirely dependent upon the definition and measurability assigned to this new concept.

An important consideration is that 'sustainability is a property of the path the economy is on and not of the state of the system at any given time' (Atkinson et al. 1997, p. 62). If standard national accounts are being used as measures of sustainability, simple measures of points in time cannot measure sustainability, they can however point to the achievement of sustainability objectives. Sustainability cannot be measured in static terms.

Whilst sustainability is a relatively recent concept, its beginnings can be traced back to the 19th century economists, such as Mill, calling for acceptance of *steady* or *stationary* states (Hueting and Reijnders 1998). Fisher (1906) and Hicks (1946) also discussed the concept of sustainability (without using the actual term). Fisher (1906) classified wealth

into two spheres, capital and income. Capital is a “stock of instruments existing at an instant in time”, whereas income is “a stream of services flowing from this stock”. Hicks (1946) later used these categories to imply that a person’s maximum consumption could not be greater than the level of income that does not reduce the initial level of capital. Such a concept of maximising income flows without reducing asset stocks is key in many concepts of sustainability (Solow 1986; Maler 1990 – also see Islam et al. 2001 for further discussion on this history). At the international level, the same holds true - sustainability requires present international consumption levels to preserve initial levels of international capital (Hammond 1994).

More recently, Munasinghe (1993) has extended the concept of sustainability away from income flows to incorporate a system analysis of society. This has involved defining sustainability in terms of socio-cultural, environment and economic domains (also see Goodland 1985; Holling 2000; Azar et al. 1996; de Graaf et al. 1996 for similar treatments). These three domains closely resemble the five sub-systems discussed in this thesis in that socio-cultural can fairly represent the social, political and spiritual sub-systems (Islam, Clarke and Munasinghe 2001). Each sub-system (or domain) has different competing priorities in terms of sustainable development. Matters are further complicated when considerations of social welfare are also considered. The economic sub-system appears to increase social welfare through increased consumption, the environmental sub-system appears to increase social welfare through reduced resource use and the socio-cultural sub-system appears to increase social welfare through increased personal liberty. These priorities can clash.

The challenge when discussing sustainability is to incorporate these (occasionally competing) priorities into one approach so that all sub-systems are considered equally.

Through the use of the first democratic social welfare function, this thesis has questioned the desirability of economic growth by highlighting its consequences in terms of costs and benefits in other sub-systems. Whilst previous studies have been undertaken to examine the relationship between the economy and the environment in terms of

sustainable development (Munasinghe and Cruz 1994; Ayres 1996a), little work has been done to examine the interrelationship between a full-systems approach and sustainability (Clayton and Radcliffe 1996; Atkinson 2000). Such work is now required to fully develop the concept of sustainable development.

7.2.1 Various Components of Sustainability

7.2.1.1 Economic Sustainability

The concept of economic sustainability is not dependent on sustainable economic growth and is therefore not an oxymoron (see Daly 1993a). Economic sustainability is dependent on the following conditions; 1) the rate of decline of non-renewable resources, 2) the excess rate of harvest of renewable resources, 3) the assimilative capacity of nature to absorb waste, and 4) pollution reducing technology and capital (Islam et al. 2001). Economic sustainability does not require infinite economic growth (though this is often implicitly assumed – see Islam 2001), but rather that the economic system can remain stable and support the economic activities and needs of current and future generations in addition to withstanding the pressures and shocks emanating from other sub-systems.

7.2.1.2 Environmental Sustainability

Environmental sustainability is concerned with maintaining an ecological system that can support viable communities. Bound by the two thermodynamic laws, the bio-sphere cannot grow and must also be able to absorb the waste deposited into it. Presently, great (economic) pressures are reducing the capability of the ecological system to resist the constant stress being placed upon it. Whilst the growing economy is using natural resources, the ability of the environment to resist this stress is constantly reduced (Throsby 2001). Therefore the need for natural resources, for example, can be identified as a competing priority for both economic and environmental sustainability. One requires their use and the other requires their maintenance.

Environmental sustainability in terms of being able to increase social welfare, requires an understanding of and operation within the carrying capacity of the ecological sub-system (Holling 1973). In the past, with low consumption levels and resource use, the ecological

sub-system could be considered infinite. However, the increase in consumption and economic growth, the ecological sub-system is now approaching a closed space-ship world (Hjalte et al. 1977 – also see Boulding 1992). Operating within this level however, does not mean maintaining an ecological status quo. The environment is dynamic and fluid and the ecological sub-system is constantly adapting and evolving. What it does require though is that the boundaries, in which the ecological sub-system does move and evolve, are not corrupted or removed through excess harvesting, pollution or other pressures.

7.2.1.3 Social Sustainability

Social sustainability (and political and spiritual sustainability, which will be discussed next) is less tangible than economic or environmental sustainability. Social sustainability is concerned with maintaining social and human relationship in the face of external pressures. As with the environment, a sense of *bio-diversity* within society is an important concept. Reducing the vulnerability and maintaining the health (i.e., resilience, vigour and organisation) of social and cultural systems and their ability to withstand shocks, is also important (Chambers 1989; Bohle et al. 1994; Ribot et al 1996; Dubois and Rousseau 2001; Adger et al. forthcoming).

7.2.1.4 Political Sustainability

Political and civil liberties, and their accompanying freedoms, are important in social welfare (Freedom House 2001; Lane and Errson 1990; Morris 1979). These are also important in sustaining political systems. As with the other sub-system discussed, the ability to withstand external pressure is central to political sustainability. Such pressure is likely to intensify as the other sub-systems also come close to irrevocable damage and breakdown.

Political systems are fragile. Within Thailand the new military of less than 30 years standing overthrew the 300 year monarchy with relative ease (Warr 1993a; Dixon 1999). Since then there has been nearly ten successful coup d'états and as many again

unsuccessful ones. Throughout this time there have been periods of political democracy and democratic governments.

7.2.1.5 Spiritual Sustainability

Spiritual sustainability is not the continual religious belief of faith in a deity. It is the ethereal condition that covers that which cannot be easily explained but nevertheless connects humans to one another.

The breakdown of society (as evidenced by recent events in the Balkans and Rwanda) is characterised by a dehumanisation of others. Spiritual sustainability will assist the withstanding of these external pressures such as ecological destruction, political insecurity and financial crisis.

Therefore, sustainability requires successful management of simultaneous, and often competing, priorities across a number of sub-systems (Munasinghe 1993; de Graaf et al. 1996; Islam et al. 2001). It may have been that previously each sub-system had greater strength and flexibility as they were not under pressure from large populations, pollution or over resource use and therefore easily able to absorb external stresses. However, such a golden age (if it ever did exist) may no longer exist and the external pressures once able to be absorbed are now threatening sustainability.

7.2.2 Measures of Sustainability

There is a close relationship between sustainability and social welfare as future social welfare is dependent on sustainability. The high levels of economic growth achieved in Thailand and SE Asia more generally, have been accompanied by significant environmental degradation (Islam and Jolley 1996; Brandon and Tamankutty 1993). Within the literature, the present debate concerning these costs and benefits can be traced back to the late 1960s when perceived adverse consequences of economic growth on the SEE system through the reduction of environmental quality and resources were first raised (Meadows et al. 1970).

A similar approach to the first social welfare function can be undertaken to measure sustainability by considering how present economic growth can damage and irreversibly harm the SEE-system with respect to creating and maintaining wealth (Hamilton and Clemens 1999).

Previous work (Pearce and Atkinson 1993) introduced the concept of *true savings* as an indicator of sustainability. This concept has been extended to consider the depletion of natural resources (Atkinson et al. 1997 – and later human capital, Hamilton and Clemens 1999). The depletion of natural resources is a liquidation of an asset and therefore is a negative, not a positive, contribution to national savings. This is a Hicksian approach to income.

This concept is *genuine savings* (S_g) (Atkinson et al. 1997).

$$S_g = GNP - C - D - n(R - g) - \sigma(e - d) \quad [7.1]$$

where:	GNP	=	Gross National Product
	C	=	public and private consumption
	D	=	value of depreciation of productive assets
	n	=	unit resource rental rate less te value of implicit pollution tax on production
	R	=	resource extraction
	g	=	resource growth
	σ	=	marginal social costs
	e	=	pollution emissions
	d	=	dissipation of pollution

This formula has four subsets; (1) $GNP - C$ is traditionally defined as gross savings; (2) $GNP - C - D$ is traditionally defined as net savings; (3) $n(R - g)$ is the value of net depreciation of natural resources; and (4) $\sigma(e - d)$ is the value of et accumulation of pollutants. Therefore, it is possible to have a high and robust level of gross saving and a

negative rate of genuine savings due to high levels of natural resource depletion and accumulation of pollutants. This is reminiscent of countries being able to have high or increasing standards of living but low or decreasing levels of social welfare (Islam and Clarke 2001a; also see Chapter Two, Section 2.2.2.1) or high levels of income and low levels of functioning (Sen 1987a, 1987b).

Table 7.1 Genuine Savings Rate for Thailand and other selected countries, 1970 – 1993
(percentage of GNP)

	Average 1970-79	Average 1980-85	1986	1987	1988	1989	1990	1991	1992	1993
Thailand	16.4	11.6	13.6	15.8	19.7	21.8	23.7	25.7	25.6	28.1

Source: Atkinson et al. 1997 and Hamilton and Clemens 1999

Compared to other neighbouring countries and countries in other regions, the genuine savings rate of Thailand indicates sustainability is possible. However, an alternative treatment (Islam and Clarke 2002b) finds a less positive picture for sustainability within Thailand.

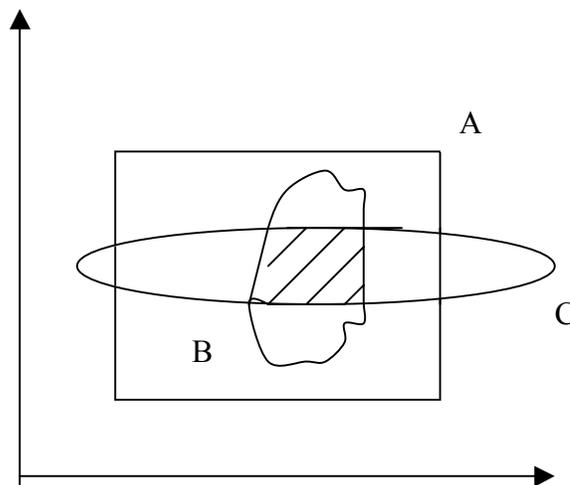
Genuine savings do not consider all the impacts of economic growth on the full range of the SEE-system, but only primarily the environmental section (and even this has key omissions such as soil erosion, fish stocks and especially important for countries consideration of SPM pollution (Hamilton and Clemens 1999). If a full genuine savings (FS_g) considered the net benefits of economic growth on the social (So), political (Po) and spiritual (Sp) sub-systems and not simply the economic ($GNP - C - D$) and environment ($n(R - g) - \sigma(e - d)$), it would more closely resemble the approach being developed within this section

One important method to measure the impact of these negative environmental impacts on present and future well-being is to adjust GDP accordingly. The resultant measure is a direct measure of social welfare and sustainability since it does indicate the extent of increase of environmental damage as the economy grows which threatens sustainability

and growth become unsustainable progressively. Economic growth is dependent upon a healthy and functioning SEE system. This adjusted GDP measure provides data on the health and robustness of this system.

As sustainability is dependent upon a healthy and robust SEE system, it is possible to illustrate this within a simplified two dimensional graph in which the axes are the control variable and whose co-ordinates are their current values (Clayton and Radcliffe 1996). As the SEE system approaches the boundaries of this region, sustainability becomes threatened, more dangerous and less comfortable. ‘Human survival depends on the system remaining within the small subset of all possible outcomes in which it is positioned and within the tolerable limits on all the critical control axes’ (Clayton and Radcliffe 1996, p. 43).

Figure 7.1 Sustainability Limits



A grossly simplified two-dimensional section through phase space for the earth. The regions shown on it suggest possible survival regions for three systems, *A*, *B*, *C*. System *A* can itself tolerate a wide range of conditions, but it depends upon systems *B* and *C* which cannot. Thus the effective survival region for system *A* is the intersection of those for *A*, *B*, and *C*, the shaded area shown.

Source: adapted from Clayton and Radcliffe 1996.

In the existing literature, national income accounts and cost-benefit analysis measures are separated. It is often argued that cost-benefit analysis provides a more accurate measure of social welfare effects of policies, projects or economic states compared to national income accounts (see for example Pearce and Nash 1981). In the present approach the limitations of national income accounts can be overcome, to a significant extent, by integrating cost-benefit analysis and national income accounts measures of social welfare.

$$\text{SEE GDP} = f(\text{EG}\{B[\text{SEE}]\} - \{C[\text{SEE}]\}) \quad [7.2]$$

where SEE GDP = social, economic and environment adjusted GDP
 EG = economic growth
 SEE = social, economic and environment system
 B = benefits
 C = costs

Within this paper, eight SEE adjustments will be made to Thailand's GDP over a period of twenty five years, 1975 – 1999 (t). These SEE adjustments are income inequality (I), commuting (C), urbanisation (U) water pollution (W), air pollution (A), noise pollution (N), deforestation (D) and long-term environmental damage (L).

Through these adjustments and the application of cost-benefit analysis to aggregated standard national accounts (in this instance the measure is national income), which are all based social choice perspectives, all social states can be ranked and explicit value judgements can be included in recommending which sustainability policies should be initiated (Clarke and Islam forthcoming b). The full explanation of these adjustments can be found in preceding chapters and corresponding appendices.

$$\text{SEE AGDP}_t = f(\text{GDP}_t - [I_t, C_t, U_t, W_t, A_t, N_t, D_t, L_t]) \quad [7.3]$$

A positive rate of growth of the SEE AGDP per capita index is the indicator of sustainable growth. Table 7.2 shows both positive and negative movements within the SEE index suggesting that the health and robustness of the SEE system for Thailand has not been uniformly positive as suggested by Hamilton and Clemens (1999).

Table 7.2 Summary of the Sustainability SEE system for Thailand, 1975-1999 (1988 prices – millions of baht)

Year	GDP	SEE AGDP	SEE AGDP per capita	Growth of SEE AGDP per capita (in baht)
1975	621555	312738	7378	8.31
1976	680778	347724	8047	-7.57
1977	750054	331187	7481	7.58
1978	824706	366036	8094	19.68
1979	867797	464742	10078	2.37
1980	913768	484766	10323	2.78
1981	967374	508037	10617	0.7
1982	1020084	522304	10693	2.64
1983	1075922	543795	10982	1.06
1984	1138329	561487	11100	-0.38
1985	1191089	572773	11058	3.88
1986	1256538	609383	11504	8.66
1987	1377026	678576	12596	11.56
1988	1559804	782725	14241	5.94
1989	1750228	846220	15141	4.15
1990	1946119	889411	15797	4.15
1991	2111740	938713	16480	3.69
1992	2282995	988815	17111	10.17
1993	2494748	1111128	19047	7.54
1994	2669573	1217428	20601	8.21
1995	2884495	1334533	22444	7.23
1996	3095336	1454480	24194	-4.62
1997	3502012	1673277	23126	-11.06
1998	2787395	1279941	20823	-5.98
1999	2823416	1211515	19648	

Source: Author's own calculations

See Appendix Q for a summary of these calculations.

7.2.3 Welfare Analysis of Sustainability

The results of Hamilton and Clemens (1999) and the approach applied in this section (also see Islam and Clarke 2002b), are similar enough to attempt to analyse them within a

welfare economics framework. The major point of departure is that the data within this new approach, does show some periods in which the health and the robustness of the SEE system is damaged and at times falling, whereas, the work of Hamilton and Clemens (1999) indicates a permanently healthy and robust SEE system. This difference can be explained by the different data used within the two approaches. What is significant though is that both approaches recognise that ‘sustainability is a property of the path the economy is on and not of the state of the system at any given time’ (Atkinson et al. 1997, p. 62). If standard national accounts are being used as measures of sustainability, simple measures of points in time cannot measure sustainability, they can however point to the achievement of sustainability objectives.

As Thailand has a high genuine savings rate (Hamilton and Clemens 1999) and a generally healthy and robust SEE system, this would suggest that economic growth has not threatened sustainability within Thailand. If Thailand maintains this status quo it would appear likely that present patterns of economic growth are not unsustainable and thus desirable.

Sustainability is defined as the present generation meeting their needs without compromising future generations meeting their own needs (WEDC 1987). Sustainability is most clearly an issue of intergenerational equity, but is also an issue of justice, value judgements, equity-efficiency and market versus social perspectives.

If future generations are to meet their own needs without compromise, they must not be hampered by the current generation’s decisions and economic activities. If they have been compromised then the current generation has assumed their needs and rights are greater thus causing an injustice to the future generation. This may come about as markets are not concerned with intergeneration equity but rather efficient allocation of resources for the current generation. Matters of equity, and in this case intergenerational equity, are not considered. However, the social choice perspective is that future generations are important. Whilst individual actions within the market place may

contradict this, the current generation does wish prosperity upon future generations, if for no other reasons that the current generation will find itself in the future at some time.

7.3 GLOBALISATION AND FINANCIAL LIBERALISATION (AND CRISIS)

Over the past three decades, numerous inter- and intra-dependent development issues, processes, innovations and public policies have intersected and accelerated social and economic change resulting in what is commonly referred to as *globalisation* (Bird and Rajan 2001 - for a review of the welfare and political issues see Sen 1999a; Gilpin 2001; Islam 2001). An indication of the wide-ranging scope of globalisation has been its infiltration into common parlance within a relatively short time span. But without a uniformly agreed upon definition (as with social welfare and sustainability), its use differs widely from one forum to another. Globalisation can therefore be simultaneously considered the last hope for developing countries as well as the final nail in the coffin for developing countries (see Lindert and Williamson 2001 for a review of these arguments).

It is possible though to analyse globalisation from a social welfare perspective. Globalisation is commonly considered characterised by the increasing interdependence of national economies, trade, corporations, financial markets, production, distribution and consumer marketing (Henderson 1999; McNutt 2002).

Over the last three decades, most economies have moved towards international economic deregulation. This deregulation has resulted in dismantling of trade barriers such as tariffs in both goods and services, relaxation of control over capital markets (including floating currencies and deregulation of financial markets and direct foreign investments), and the deregulation of internal markets for goods and services (Dooley 1996).

This has resulted in a global economy characterised by an increasing intensity of knowledge in economic activities and an accompanying increase in globalisation of economic activity (Borland et al. 2001b; Chichilinsky 1997; OECD 1994, 1996, 2001a; Oh and Islam 2001). As this new global economy has tended to reflect the values and aspirations of the United States (Max Neef 1991), globalisation is often referred to

westernisation, Americanisation, McDonaldisation and Coca-Colaisation. The global world is now dominated by the West (Sen 1999a).

Globalisation results in both winners and losers and has both benefits and costs (Lin 2002; Lindert and Williamson 2001; Williamson 2002). As such, globalisation is an important issue for evaluating social welfare of a nation, especially for Thailand, for example, due to the experience within the 1997 Asian Financial Crisis which has been blamed on globalisation (Arunsmith 1998; Siamwalla 2000; Julian 2000; Ryan 2000). A social welfare evaluation of globalisation can be preformed by adapting the framework of global welfare economics (Sen 1999a; Islam 2001a).

Globalisation in Thailand

Globalisation is not new to Thailand. As discussed previously (Chapter Two, Section 2.3), Thailand has incorporated itself into the world economy since the eighteenth century. More recently though, globalisation has resulted in financial liberalisation of the world's economy (Williamson and Maher 1998). Within Thailand, the major effects of financial liberalisation have only been more obvious since the mid 1980s. Between 1975 and this time, the Thai economy was relatively closed and tightly controlled by government regulations. Regulations on foreign investment were tight and the value of the baht was fixed and later tied to the US dollar and later still a US dollar dominated basket of currencies. The Thai government sheltered the economy from the excesses of the volatility of the world economy (Dixon 1996, 1999). However, from the late 1980s, the effects of globalisation, particularly the liberalisation of finance and capital markets began to be implemented (Warr and Nidhiprabha 1996; Leightner 1999).

Foreign investment escalated, particularly into the export manufacturing sector, as a direct result of this process (Kittiprapas 1999, 2000; Pilbeam 2001).

Globalisation also directly affects rural communities at the village level. Rural villages produce agricultural and manufactured exports, supply labour to domestic market in cities and overseas, have access to telecommunication networks and most importantly have

greater access to television (and satellite television). This globalisation of the village is considered by many non-government organisation to be responsible for increased debt and its ensuing poverty and the inability to become self-reliant (Kaosa-ard 2000). However, less-globalised villages suffered more during the Financial Crisis of 1997, as they had fewer coping mechanisms and options available to them (Kaosa-ard 2000).

For the purposes of this illustrative numerical implementation, the costs and benefits of globalisation will focus on those arising from the financial liberalisation process.

7.3.1 Costs and Benefits of Financial Liberalisation (and Crisis)

7.3.1.1 Illustrative Numerical Estimation of the Costs and Benefits of Financial Liberalisation

A recent experience of globalisation has been financial liberalisation and deregulation that has occurred through much of the world (including the developing countries) over the last three decades. This liberalisation occurred within structural adjustment programs prepared for developing countries by the IMF and World Bank (Munasinghe 1996). These packages of liberalisation closely reflect the policies adopted by developed countries in removing trade barriers, reducing barrier to capital movements and investments, privatisation of state owned enterprises, reduction in government fiscal spending, deregulation of labour markets and a focus on global trade. The support for economic openness is now widespread (see Edwards 1992; Dollar 1992; Ben-David 1993; Sachs and Warner 1995; Frankel and Romer 1999; Alesina et al. 2000). However, opposing views have recently resurfaced (see Rodrik 1998; Harrison and Hanson 1999; Rodrik and Rodriguez 2000; Nye et al. 2001).

The costs and benefits of financial liberalisation are not easy to estimate or quantify (McKibben 1997, 1998) but are more readily identified.

Financial Benefits

The benefits of globalisation, focussing on financial liberalisation and crisis (Wacziarg 2001; Lin 2002; Singh 1999; Intriligator 2002) include (but are not limited to):

- 1) technological spillovers;
- 2) transmission of knowledge;
- 3) gains in efficiency due to a wider scale of market interactions;
- 4) improved government fiscal and monetary policies;
- 5) productivity increases; and
- 6) personal gains to currency traders which has grown to be valued at US\$1.5 trillion per day..

Financial Costs

The major costs of globalisation, focussing on financial liberalisation and crisis (Borland et al. 2001b; Wacziarg 2001; Lin 2002; Arunsmith 1998; Siamwalla 2000; Intriligator 2002) have been identified as (but are not limited to):

- 1) an increase in divergence of earnings in various employment classifications;
- 2) an increase in polarisation of households between those with access to well-paid employment and those in poorly paid casual employment;
- 3) pressure to decrease government size and market presence and government interference in resource allocation;
- 4) loss of manufacturing jobs to cheaper overseas locations; and
- 5) the floating of currencies and degradation of financial markets has left countries exposed to capital flight and unstable investments. The Asian financial crisis in 1997 was largely due to this financial deregulation and freedom from investment controls (Julian 2000; Ryan 2000);
- 6) immediate increases in poverty levels and reduced incomes following the financial crisis.

Often though, these costs are not blamed on the process of globalisation but rather on insufficient financial liberalisation (Aziz 1999).

Following the relaxation of government regulation on capital movements in the mid-1980s, foreign capital flooded Thailand's financial markets (Dixon 1996,1999). The result was speculative spending, lending and borrowing. This speculation created

macroeconomic imbalances aggravating the current account deficits and inflation. These outcomes occurred through poor management of both the domestic and the international financial systems (Kaosa-ard 2000; APEC 2000). However, despite these poor controls, the resultant financial crisis can be considered a consequence of globalisation. The Thai investment boom which occurred over the decade 1987 to 1996 was responsible for both the extraordinary growth rates experienced during that decade, and simultaneously responsible for the financial crisis in 1997 (Vines and Warr 2000). Following the July 1997 crisis, a massive capital flight occurred leaving Thailand in debt to the value of US\$89 billion (APEC 2000).

The traditional method of welfare analysis in international issues is the use of consumer surplus theory involving either compensation variation or equivalent variation (Paavola and Bromley 2002). However, this method will not be used in this instance. Three illustrative numerical estimates of the net benefits of globalisation will be made within this section using social choice theory.

The first measure of the net benefits of globalisation will be represented by movements within GDP per capita. The second measure will be an adjusted measure of GDP per capita. The final measure will incorporate non-welfaristic costs of globalisation previously not considered within previous estimates.

As discussed (see Chapter Two, Section 2.2.2.2) whilst GDP per capita was not designed to measure social welfare, it has assumed such a role (Hicks 1940,1946; Kuznets 1968). As an aggregate of economic activities it has assumed the authority as a proxy for social welfare.

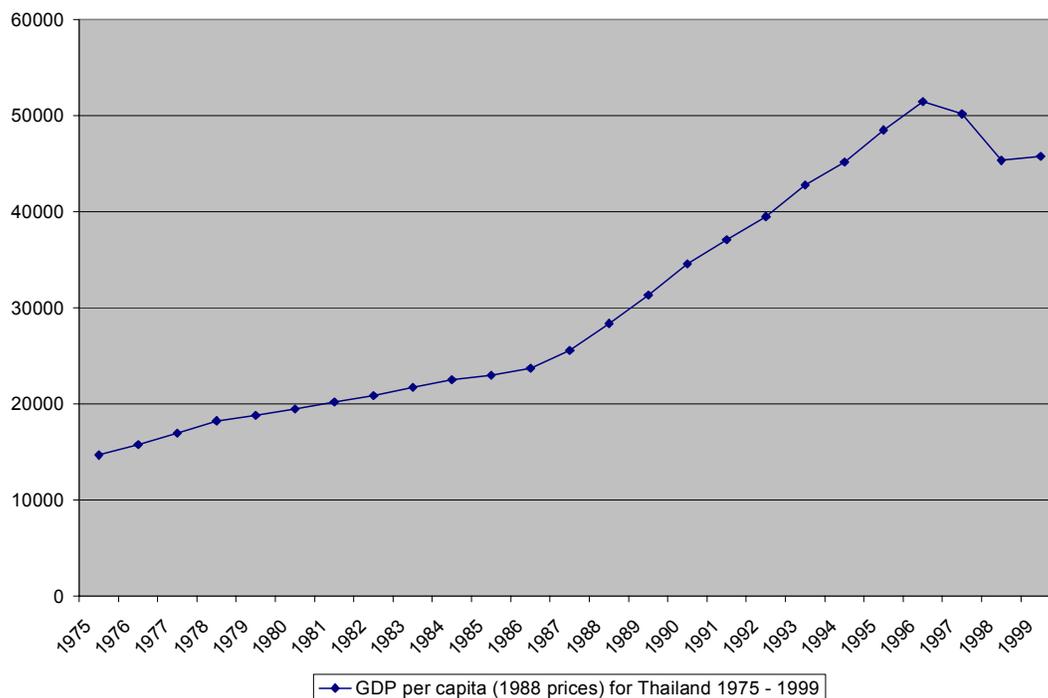
$$SW = f(GDP) \qquad [7.4]$$

where SW = social welfare

GDP = gross domestic product

Within this grossly simplified illustrative cost-benefit analysis, the net benefits of globalisation (financial liberalisation) will be considered to be economic growth (measured in terms of GDP per capita). As stated, this is an over simplification, but for the illustrative purposes of this paper, such a claim will be accepted (indeed, globalisation is considered to be the driving force of economic growth - see World Bank 1999, 2001). *No additional benefits will be attributed to globalisation as it is considered that all benefits are aggregated within this figure.* The benefits that are captured within GDP per capita include increased investment, technology, productivity, employment and higher incomes.

Figure 7.2 GDP per capita for Thailand, 1975-1999 (1988 prices – million of baht)



Source: NSO (various publications)

Achieving economic growth has been the major public policy priority for some time (NESDB 1996, 2000) – often to the exclusion of other possible goals (Parnwell 1996; Schmidt 1996). All policies to plan or control the direction and outcome of economic

growth in the early 1990s were abandoned (Phongpaichit and Baker 1995). In this regard, it has been very successful.

However, this approach fails to consider that achieving economic growth may involve certain costs such as environmental degradation and growing inequality. If these are considered, the social welfare implications of globalisation can be reconsidered (Islam and Clarke 2002c; Clarke and Islam 2002d).

As with the welfare analysis of sustainability in the previous section, eight adjustments are made to Thailand's GDP over a period of twenty five years, 1975 – 1999 (t) to estimate the costs of achieving economic growth. (These adjustments reflected the specific costs to achieving sustainability in the previous section but are analysed within this exercise to reflect the general costs of achieving economic growth). These SEE adjustments are income inequality (I), commuting (C), urbanisation (U) water pollution (W), air pollution (A), noise pollution (N), deforestation (D) and long-term environmental damage (L). The full calculation of these adjustments can be found in the previous chapters and corresponding appendices.

$$NSW = f(B\{GDP\} - C\{GDP\}) \quad [7.5]$$

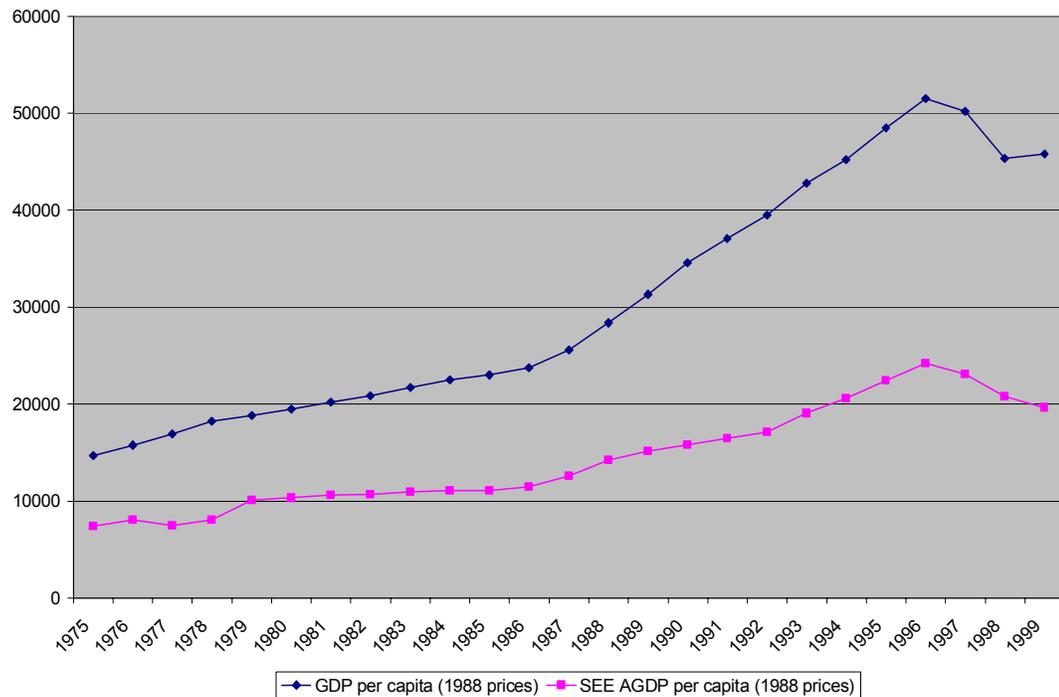
where NSW = net social welfare

B{GDP} = benefits of growth associated with a level of GDP

C{GDP} = costs of growth associated with a level of GDP

A noticeable difference between GDP and adjusted GDP exists (see *Figure 7.3*). Not only are the absolute values different, there is a growing divergence between the two trend lines that suggests the net benefits of economic growth (globalisation via financial liberalisation) are reducing.

Figure 7.3 Comparison of GDP per capita and adjusted GDP per capita for Thailand, 1975-1999 (1988 prices)



Source: Author's own calculations

Having considered these additional costs of achieving economic growth, the most serious costs of the globalisation process experienced within Thailand was the absolute reduction in GDP following the financial crisis of July 1997. Sufficient evidence now exists that the crisis of July 1997 was caused by various factors attributed to financial deregulation (see Corsetti et al. 1998, 1999; Julian 2000; Ryan 2000; Gab 2000). The most visible short-term cost of financial liberalisation within Thailand (and the region) occurred in 1997. The impact of the 1997 financial crisis has been high. The costs of this crisis were obvious and not simply contained to multi-national corporations. Within southeast Asia, there was an immediate and large fall in the standard of living of all sectors of society (Barro 1997; McKibben 1998; Aziz et al. 2001; Kakwani and Pothong 2000). The average reduction in real income across Thailand was over 21% in 1998 and up to 28% in rural Thailand (Kakwani and Pothong 2000; also see Kaosa-ard 2000). Those living

under the poverty line increase by 1.5 million people, 7.9 million to 9.4 million and nearly one million extra people were classified as ultra poor (Kakwani 1999). The level of this fall in real income is not dissimilar to those experienced in other countries (see Aziz et al. 2001). However, this initial fall has not continued in the long-term and the levels of real income have begun to recover (Kakwani and Pothong 2000).

Other costs of financial liberalisation may also be considered. Often these short term costs result from the adjustment of capital movements (see, for example, Webber and Weller 2002 for a sectoral analysis of the textile industry of these adjustment costs in Australia). Further, these short term adjustment costs (such as factory closures and unemployment) can cause a loss in the political will for further trade liberalisation required to for the benefits to become apparent (McKibben 1997, 1998). These costs are not readily captured within total GDP but it might be assumed that their social welfare impact might equal two percent of GDP (Clarke and Islam 2002d; Islam and Clarke 2002c).

$$NSWG = f[(B\{ADP(G\&FC)\} - C\{AGDP(G\&FC)\})] \quad [7.6]$$

where: NSWG = net benefits of economic growth adjusted for SEE adjustments and globalisation and financial crisis
B = benefits of growth associated with a level of GDP adjusted for SEE adjustments and globalisation and financial crisis
C = costs of growth associated with a level of GDP adjusted for SEE adjustments and globalisation and financial crisis
G&FC = the process of globalisation and financial crisis

Following the financial crisis, GDP per capita fell by 2.1 percent in 1996, 9.6 percent in 1997 and only increased by 1 percent in 1998. If this fall in GDP per capita reflects the direct costs of globalisation process (of financial liberalisation) such as the fall in incomes, increases in poverty, then the additional social welfare costs of the globalisation of financial liberalisation must also be added to estimate the total costs. If we accept the

above assumption that these indirect costs can be assumed to be 2 percent of GDP then the total costs of globalisation were 4.1 percent in 1996, 11.6 percent in 1999 and 1 percent in 1998. These are significant costs in terms of social welfare.

7.3.2 Welfare Analysis of Globalisation

The process of globalisation can be effectively analysed from a welfare economic perspective. A global welfare economic perspective is the relevant paradigm for this analysis (Sen 1999; Islam 2001). As has been discussed, globalisation has both benefits and costs. By analysing these costs and benefits from such a perspective new insights can be gained in whether social welfare has been enhanced or stunted by this process.

A large set of controversial issues has emerged in regard to the process of financial liberalisation, its causes, consequences and welfare impacts. The set of issues relevant for social welfare analysis and measurement include:

1. Will globalisation and financial liberalisation increase social welfare via economic growth?
2. How can social welfare be measured and assessed within an open economy?
3. How much importance should be given to the influence of foreign factors relative to national factors especially to evaluate the importance of welfaristic and non-welfaristic elements of social welfare in a global economy?
4. Are globalisation and financial crisis beneficial for society given its consequences?

The above issues in welfare economics of globalisation and financial crisis can be investigated by adopting a quantitative and empirical framework (assuming the aforementioned principles and features) of social choice theory based cost-benefit analysis.

As a part of the process of globalisation and financial liberalisation, developing countries will continue to further incorporate their domestic economies into the rise of the global

economy. The impact on social welfare of the net benefits of the rise of globalisation must be considered when discussing the desirability of economic growth.

In terms of equity, like all other markets, the newly fashioned global market is efficiency based and equity-neutral. Considerations of equity are thus ignored (or more accurately, efficient outcomes are considered to be Pareto optimal in an equity sense). For instance, in terms of changes within labour markets, a significant shift that has been evidenced in developing countries is the movement towards the casualisation of labour and the divergence of labour rates between well-paid employment and poorly paid casual labour (Sheehan 2001; Borland et al. 2001a; Sheehan and Tikhomivora 1998). These new characteristics of the labour market in developed countries have increasingly come to more closely reflect the labour conditions (insecurity, high wage differentials, casual employment) typical of developing countries such as Thailand. Within developing countries, in which dualistic economies exist, these characteristics might be exacerbated by the increasing impact of globalisation. In this regard, the widening gap between high income and low income earners in Australia has increased (Borland 1998), reflecting the increase in income inequality in Thailand (Clarke 2001a, 2001b).

Thailand is currently a dualistic economy with a significant proportion of its population wholly or partially reliant on agriculture for their main source of income. In addition, income distribution is already quite unequal in Thailand (Clarke 2001a, 2001b; Warr 2001) and the movements towards globalisation may exacerbate the inequality between those engaged at the “global” level and those who are not. However, the changing economy may also lead to changing patterns of consumption and resource use and may be better distributed across societies and nations (Chichilinsky 1997). This is a large assumption though and yet to be empirically tested.

Further, the process of globalisation will have lasting effects as it has reshaped the global economy and by implication the domestic Thai economy. Within Thailand therefore, future generations will have to operate within an economy that is less regulated, outward focussed and open to international events. The welfare impacts of this change in

economic organisation may be profound but are difficult to assess. An open economy may bring improved opportunities whilst bring higher levels of uncertainty. Most likely though, the benefits and costs will not be equally shared (Bird and Rajan 2001).

The results of this illustrative cost-benefit analysis appear intuitively correct and plausible. It is reasonable to assume that the benefits of globalisation were real and were significant in increasing the social welfare within Thailand. Likewise, the resultant financial crisis had serious negative implications for the Thai economy, particularly those on low incomes (Kakwani and Pothong 2000; Kaosa-ard 2000). It is expected that the results in this exercise would be replicated in other Asian countries.

7.4 CONCLUSION

This thesis is concerned with the desirability of economic growth on social welfare. This chapter has expanded somewhat from this initial focus. Two important contemporary development economic issues have been reviewed in terms of their interrelationships with both social welfare and economic growth, i.e. the desirability of economic growth in the contemporary world.

The first issue discussed in this chapter was sustainability. A link exists between sustainability and social welfare. Future social welfare is only possible within a sustainable SEE system. Thus the link between sustainability and economic growth is also strong. Economic growth can damage the SEE system by being heavily reliant on environmental resources or exerting pressure on social, political or spiritual sub-systems. Sustainability is clearly central to all welfare and economic debates (Munasinghe 2001). The desirability of economic growth can be considered in terms of sustainability. Numerical estimates of sustainability, using the concept of *genuine savings* (Atkinson et al. 1997; Hamilton and Clemens 1999) and the health of a SEE system (also see Islam and Clarke 2002b), suggest that the net benefits of economic growth in Thailand are generally desirable.

Little work has been undertaken on preparing numerical estimates of the net benefits of economic growth in terms of globalisation and financial liberalisation. The process of globalisation and financial liberalisation from the mid-1980s fueled much of Thailand's economic growth (Phongpaichit and Baker 1995; Warr and Nidhiprabha 1996; Krongkaew 1995). The most obvious negative economic consequence of this process was the financial crisis in July 1997. Studies within developed countries such as Australia indicate that the negative social and economic consequences focus on the labour market and the divergence with secure high paid employment and the low wage casual worker. Such a divergence is also a characteristic of developing countries. The implication is that the process of globalisation may further worsen the polarisation of the minority wealthy class and the majority poorer bulk of the population. The desirability of growth encouraged by this type of economic growth is therefore questionable. Within Thailand, real income levels (a measure of the standard of living rather than social welfare – see Chapter Two, Section 2.2.2.1) fell dramatically following this crisis (Kakwani and Pothong 2000). Future work is required to determine if the public policy focus on achieving economic growth (NESDB 1996; Parnwell 1996; Schmidt 1996; Phongpaichit & Baker 1995, 1996) fully or partially can be held responsible for the rush of financial liberalisation that is being blamed for the resulting crisis.

The final two chapters of this thesis focus on summarising the results of the implementation on the social welfare functions and possible policy frameworks that may assist in increasing the desirability of economic growth.

CHAPTER EIGHT – INTEGRATED SYSTEMS AND WELFARE ANALYSIS APPROACH: RESULTS AND IMPLICATIONS FOR SOCIAL WELFARE, DEVELOPMENT ECONOMICS AND POLICIES

8.1 INTRODUCTION

The previous chapters undertook welfare economic analysis of the desirability of economic growth on social welfare using two social choice theory based social welfare functions. Welfare economic analysis of the impact of economic growth on two contemporary development issues, sustainability and globalisation, was also undertaken. This chapter will analyse the results of these empirical estimates to determine the desirability of economic growth in Thailand. Certain implications for social welfare, development economics and associated policies arise through the analysis of these results. Illustrative policy frameworks are therefore also briefly suggested.

This thesis primarily used two social welfare functions to analyse the desirability of economic growth in terms of social welfare. The first tool (see Chapters Three, Four and Five) focussed on the net benefits of social welfare generated by economic growth by using cost-benefit analysis. It was possible utilising a systems analysis approach and social choice theory to make explicit the type of social welfare required by society and determine whether the net benefits of economic growth were positive or negative in terms of social welfare. The findings suggested that at times the net benefits of economic growth in Thailand have been negative and certainly never as positive as the conventional GDP measure of social welfare would suggest.

The second tool (see Chapter Six), based on the achievement of a given set of hierarchical needs, supported the evidence that within Thailand, the rapid rates of economic growth have not been transposed into greater levels of social welfare. Indeed this economic growth has resulted, at times, in the reduction in social welfare. In

addition, the relationship between economic growth and social welfare in terms of the contemporary development issues of sustainability and globalisation has also be reviewed in this system and welfare analysis of the desirability of economic growth on social welfare.

This thesis therefore argues that economic growth is not at all times desirable. Such economic growth can be termed *stunting* economic growth as either reduces social welfare or dampens increases in social welfare. Such growth also can damage the health and robustness of the SEE system required for sustainability (also see Islam and Jolley 1996; Daly 2000 for a similar analysis of damaging economic growth). Although limited to developed countries, there is support for such a finding within the literature (Daly and Cobb 1990; Lawn and Sanders 1997; Jackson et al. 1997). However, as this literature focussed on developed countries and the negative consequences of economic growth therein, suggesting that economic growth in developing countries is (sometimes) undesirable is a substantial departure from the dominant paradigm within contemporary development economics (see Daly 1996 as an exception).

To suggest that developing countries should cease and desist from seeking economic growth is provocative, more so when the suggestion originates from a developed country. If further work is undertaken which supports the results of this thesis, public policy implications follow for contemporary development economic paradigms.

This chapter is set out as following. Section 8.2 analyses the results of the first social welfare function, adjusted national income. Section 8.3 analyses the results of the second social welfare function, hierarchical needs fulfillment. Section 8.4 reviews the results of the numerical estimates made for the two contemporary development economic issues. Final findings and interim conclusions are drawn in Section 8.5. Section 8.6 sets out the policy implications of this analysis and suggests some policy alternatives, whilst Section 8.7 concludes the chapter.

8.2 AN INTEGRATED SYSTEMS AND WELFARE ANALYSIS OF THE ADJUSTED NATIONAL INCOME SOCIAL WELFARE FUNCTION

This adjusted national income (ANI) social welfare function is predicated on the assumption that the sum of revealed preferences of individuals does not equate to the optimal revealed preference of society. Social choice theory can be used to realign these two different outcomes (Clarke and Islam forthcoming a).

Society is a system, made up of sub-systems, and it is the interrelationships of these various sub-systems that impact upon social welfare. Economic growth results in various costs and benefits in terms of these sub-systems, including increased income and consumption, government expenditure on health and education, increased inequality, environmental degradation, social dislocation and corruption. By calculating these economic costs and benefits, it is possible to measure social welfare and therefore analyse the desirability of economic growth. The desirability of economic growth in this instance can be determined by movements between time periods of the net benefits of economic growth.

The results of this adjusted national income index are intuitively correct. Social welfare has increased throughout the first two decades of this study, with occasional dips and falls associated with increased inequality and social and environmental concerns. The net benefits of economic growth have been positive but on occasion have been less than the associated costs resulting in negative net benefits of economic growth. Certainly this measure of social welfare has not increased as dramatically as economic growth nor has it moved in such an uniform manner.

According to the hierarchy of welfare (set out in Chapter Two, Section 2.2.2.1), national income is more appropriate as a measure of standard of living, whereas the adjusted national income social welfare function is a measure of social welfare (see *Figure 8.1*).

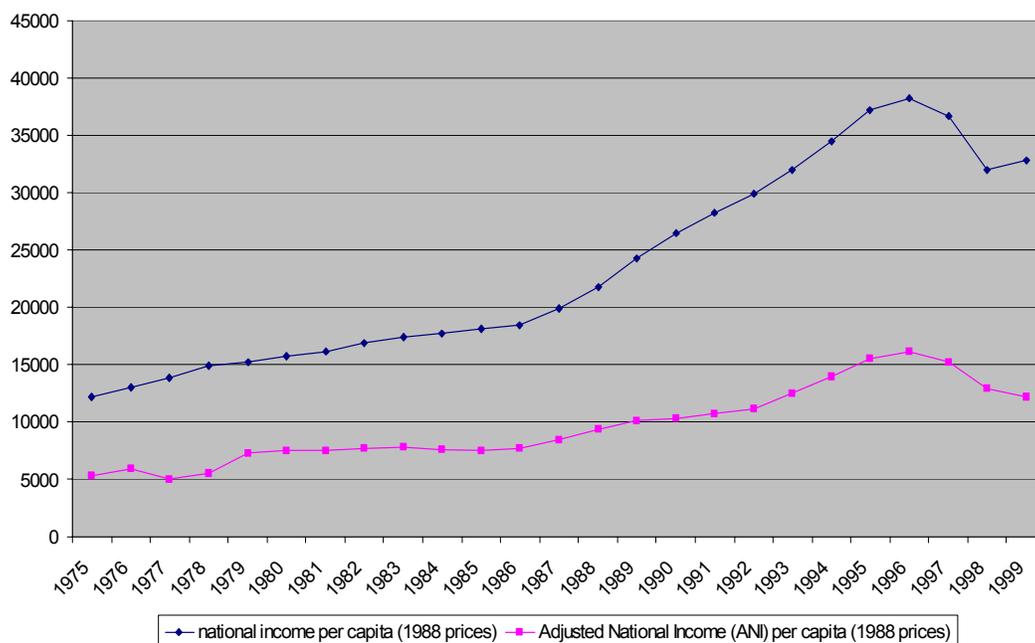
Table 8.1 ANI per capita in 1988 prices (baht) for Thailand, 1975 – 1999 (1988 prices)

Year	Economic (millions of baht)	Social (millions of baht)	Political (millions of baht)	Environ- mental (millions of baht)	Spiritual (millions of baht)	Adjusted National Income (millions of baht)	Population	Adjust -ed ANI per capita
1975	343934	-14242	-3336	-81373	-18646	226337	42391454	5339
1976	374279	-14392	-2771	-80580	-20371	256165	43213711	5928
1977	405089	-17645	-5263	-137464	-22430	222287	44272639	5021
1978	442804	-17843	-4460	-145862	-24558	250081	45221625	5530
1979	455909	-17816	-5865	-70782	-25744	335702	46113756	7280
1980	476613	-16440	-7034	-75363	-27190	350586	46961338	7465
1981	497902	-20631	-8540	-79451	-28562	360718	47875002	7535
1982	517973	-17631	-10231	-83773	-30133	376205	48846927	7702
1983	532025	-17687	-11473	-83698	-32043	387124	49515074	7818
1984	542662	-22050	-13914	-87772	-33754	385172	50583105	7615
1985	555913	-25787	-15881	-90177	-35137	388931	51795651	7509
1986	565994	-28330	-18989	-74774	-36950	406951	52969204	7683
1987	626626	-35479	-17922	-78871	-40599	453755	53873172	8423
1988	706795	-43454	-17445	-85397	-46051	514448	54960917	9360
1989	771961	-49280	-16382	-91478	-51838	562983	55888393	10073
1990	816898	-55089	-10593	-113112	-57650	580454	56303273	10309
1991	862840	-61062	-7050	-120985	-62420	611323	56961030	10732
1992	907247	-63649	-2937	-126737	-66967	646957	57788965	11195
1993	994204	-58415	781	-134028	-72808	729734	58336072	12509
1994	1100005	-58340	3409	-141474	-79645	823955	59095419	13943
1995	1211737	-60443	8159	-150382	-86771	922300	59460382	15511
1996	1274728	-67059	10343	-158653	-91513	967846	60116182	16100
1997	1239809	-66852	2765	-163368	-89590	922764	60816227	15173
1998	1094307	-56116	-292	-163192	-79414	795293	61466178	12939
1999	1061309	-70978	-7335	-148076	-82165	752755	61661701	12208

Sources: compiled from appendices.

Both indices peak in 1996. This is just prior to the financial crisis of 1997. After 1996 both indices begin to fall. Whilst national income per capita increased in 1999, adjusted national income per capita did not increase but fell by another 10 per cent. It is too early to confirm whether this is a trend or a fluctuation. However, by drawing on the results of other studies (Daly and Cobb 1990; Jackson et al. 1997), predictions may be made that this divergence could be expected to continue.

Figure 8.1 Comparison of Adjusted National Income per capita and National Income per capita measures of social welfare for Thailand, 1975 – 1999 (1988 prices)



Source: Author's own calculations

Over the past 25 years, there are five years in which the adjusted national income index fell; 1977, 1984, 1985, 1997, 1998, and 1999. During these years, social welfare can be said to have fallen.

This adjusted national income per capita index increased by just over three times during this period. This is compared with national income per capita which increased more than four and half times during the same period.

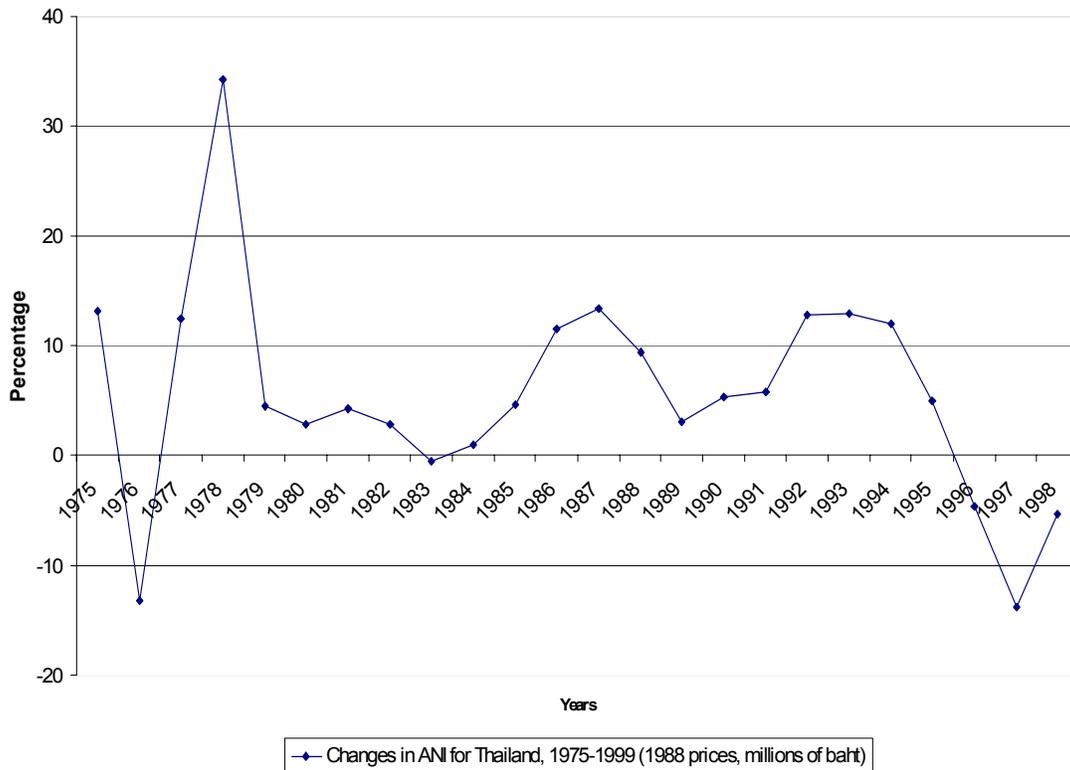
Changes in the net benefits in the total ANI social welfare index are also of interest in this analysis. After 1993, the increase in net benefits was actually reduced in each of the subsequent years. This also occurred between 1979 to 1980, 1982 to 1984, and 1987 to 1990. So whilst the net benefits of economic growth were actually positive during these times and therefore notionally desirable, an aspect of diminishing returns can be assigned to this phenomena. Such a movement in net benefits suggests that whilst economic growth is still desirable, it may be reaching a *Threshold Point* (Max-Neef 1991) after which economic growth is no longer positive but actually reduces social welfare. It is significant that a country such as Thailand could reach this position with such low national income. Compared to developed countries where this phenomena has been recorded such as the US (Daly and Cobb 1990), the UK (Jackson and Marks 1994) and Australia (Lawn and Sanders 1997), it appears the crossing of this point is premature.

As discussed previously (Chapter Two, Section 2.2.1), the measure of social welfare is not cardinal simply because the index is money-metric. The measure of social states (Chakravarty 1990) is ordinal and so it is the shape of the two trend lines that should be analysed, not the money-metric value of each social state. The most stark difference between national income per capita and ANI per capita indices is that they continue to diverge throughout the time series. This suggests that social welfare, as defined by the ANI social welfare function, is becoming increasingly disengaged from economic growth. Indeed, as mentioned above, the ANI social welfare function index, actually falls in spite of rises in economic growth. Such a divergence can be used to dispute the social welfare desirability of economic growth.

The application of cost-benefit analysis to aggregated standard national accounts results in an adjusted national income measure of social welfare as both the benefits and costs associated with economic growth are fully taken into account. This thesis argues that adjusted national income per capita is a better measure of society's welfare than national income per capita.

It is evident that the social welfare measured by this new social welfare function shows completely different trends to that of national income per capita.

Figure 8.2 Changes in Net Benefits, 1975 to 1999



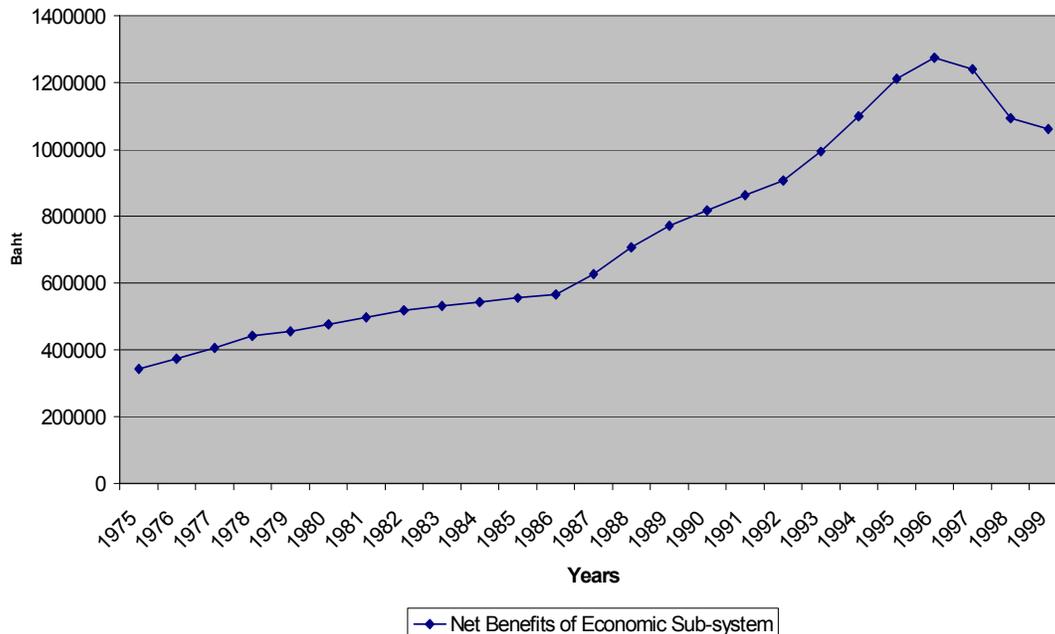
Source: Author's own calculations

Within this analysis, it is also valuable to view the movements in each of the various sub-systems to determine if any of these have a major impact on the final measure of social welfare.

The net benefits of economic sub-system are based on national income levels adjusted by Atkinson's (1970) equally distributed equivalent level of income measure. The growth in this sub-system has been impressive. The three distinct phases are similar but the levels of growth experienced are not as great. In fact the growth in the first phase (1975 to

1986) is quite modest. Also, there is no upturn in net benefits within this subsystem in 1999 as there is in the economic sub-system, which would suggest that the financial crisis has had longer term effects than those experienced in the economic sub-system.

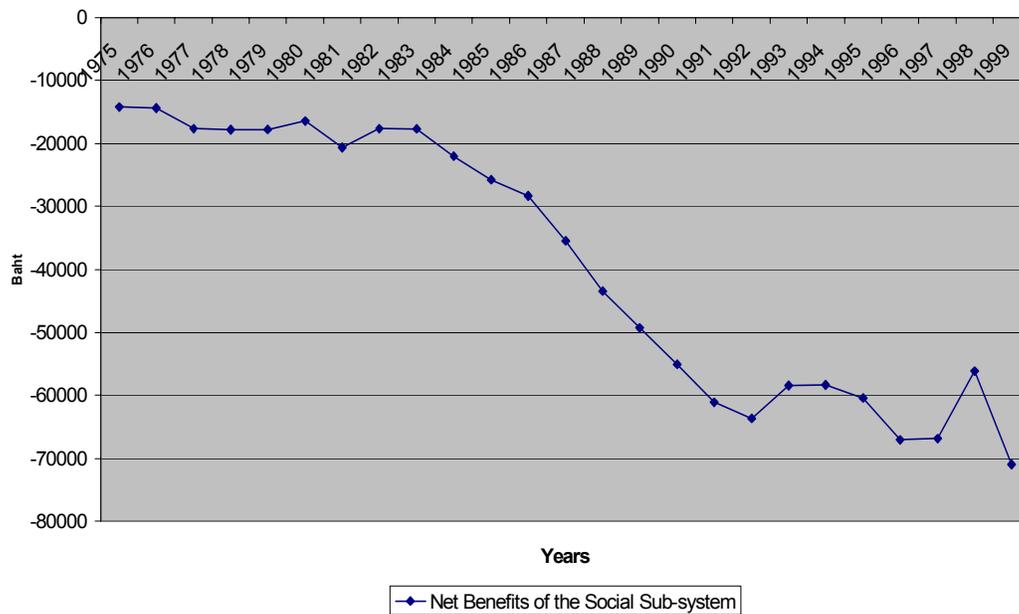
Figure 8.3 Net Benefits of Economic Growth for the Economic Sub-system



Source: Author’s own calculations

The second sub-system is the social sub-system. The costs and benefits of economic growth that are included in this sub-system are income inequality, public expenditure on education and health, private expenditure on health, urbanisation and commuting. The social sub-system has been negatively impacted on by economic growth. The net benefits of economic growth have been negative throughout the time series. For the first decade, the net benefits remained relatively stable, however, they fell dramatically over the second decade, before smoothing out over the last few years.

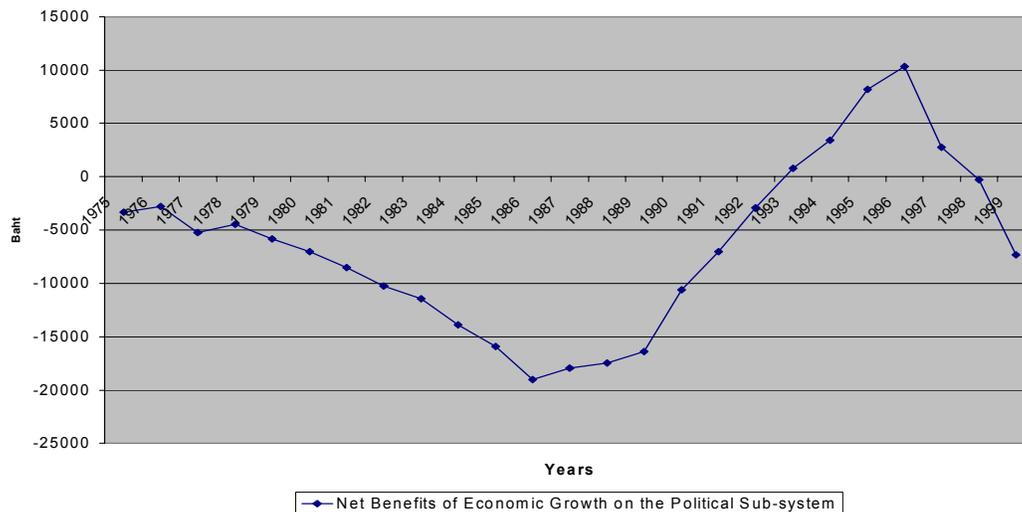
Figure 8.4 Net Benefits of Economic Growth for the Social Sub-system



Source: Author’s own calculations

The net benefits of the political sub-system show such a large movement between negative and positive benefits over the course of the time series. The adjustments made to national income within the political sub-system included government provide public roads, the flow of benefits from consumer durables, corruption and debt. Between 1975 to 1987, the net benefits becoming increasingly negative. This can be explained by the rise in public debt and high levels of corruption. The net benefits improved from this point and actually became positive in 1993. This rise in net benefits within the political sub-system continued until 1997 and can be traced to the fall in public debt and the rise in the flow in services from the purchase of consumer durables. The final phase of the net benefits began decreasing again from the financial crisis.

Figure 8.5 Net Benefits of Economic Growth for the Political Sub-system

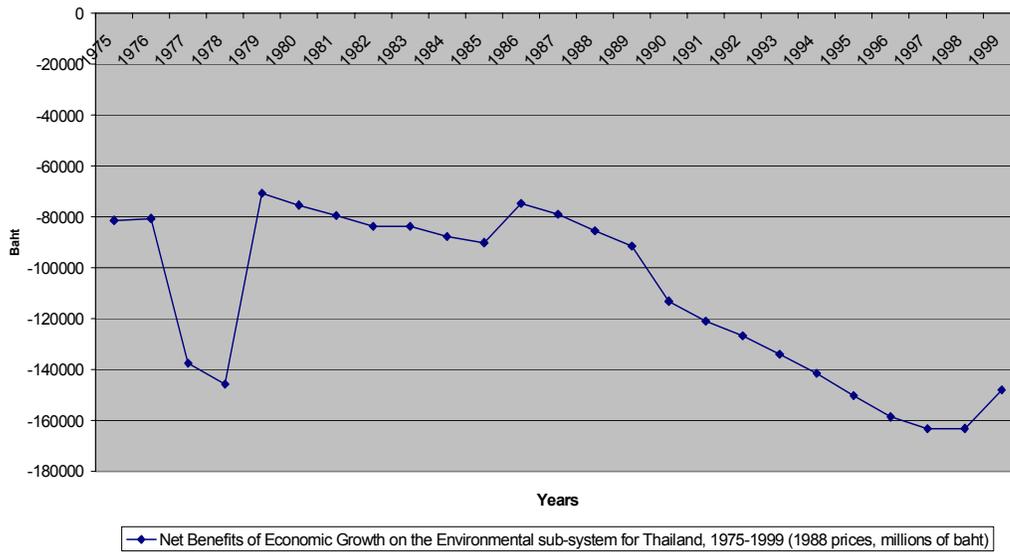


Source: Author's own calculations

The environmental sub-system shows increasing negative net benefits of economic growth. The trend is downward reaching its lowest point in 1997. The environmental sub-system includes costs of air pollution, water pollution, noise pollution, loss of forests, costs of non-renewable resources and the costs of long-term environmental damage. Increased economic growth over the past twenty-five years has led directly to environmental damage in Thailand (Warr 1993a; Kakwani and Krongkaew 1997; Dixon 1999; Bello 1995). Therefore, environmental costs have increased in line with economic growth. Such an outcome is not inevitable as difference types of economic growth can have different impacts on issues such as poverty (Warr 2001) and presumably the environment and social welfare.

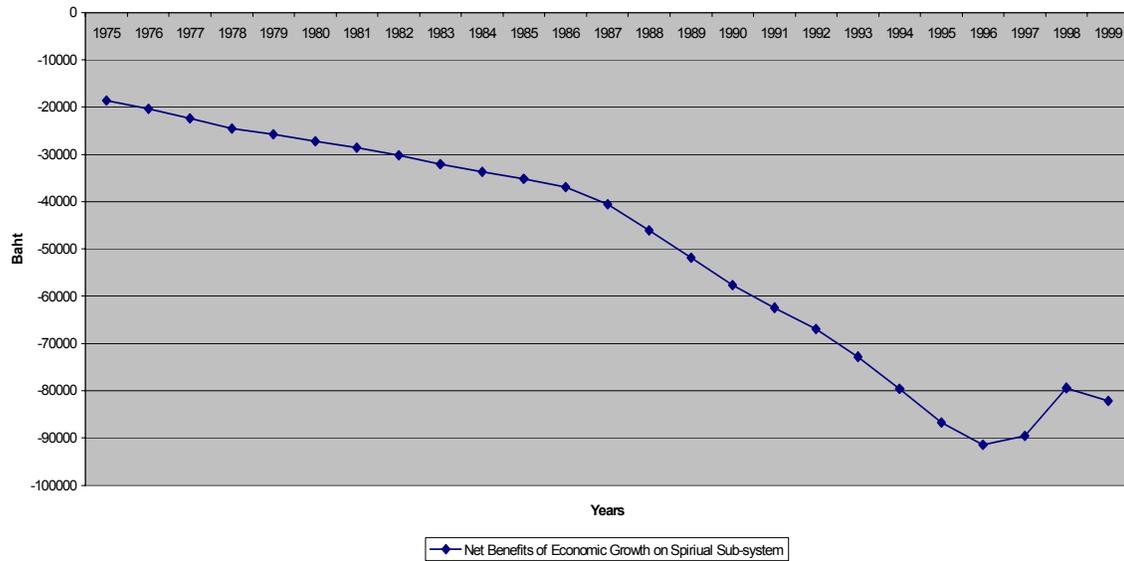
The final sub-system is spiritual. It is represented by commercial sex work as such activities are dehumanising. As this calculation is based on a percentage of GDP (see Phongpaichit et al. 1998), the patterns of costs follows the same pattern of economic growth.

Figure 8.6 Net Benefits of Economic Growth for Environmental Sub-system



Source: Author’s own calculations

Figure 8.7 Net Benefits of Economic Growth on the Spiritual Sub-system



Source: Author’s own calculations

By disaggregating this social welfare function, it allows increased analysis of the changes in the net benefits of economic growth to be identified, which in turn allows an increased understanding of what impacts economic growth has had on social welfare for policy makers. It is evident that the income equality, the worsening environment,

corruption and commercial sex work have been the major consequences of economic growth that have reduced its desirability in terms of social welfare. Therefore, special consideration of these outcomes is required. Likewise, the increased spending on health and education by the government has been important in improving social welfare.

An adjusted national income social welfare function provides a more realistic description of welfare. Not only does adjusted national income per capita increase at a slower rate, but it also decreases at times when of positive economic growth. The adjusted national income per capita index rose and fell throughout the 1980s, effectively being unchanged in 1985 from the 1979 figure. In comparison, national income per capita rose 30 per cent over this same period. The adjusted national income per capita index rose steadily during the next decade though at significantly different rates than unadjusted national income per capita. Within this period, the divergence between the two indices becomes quite apparent.

An important point to note is that social welfare, as defined by the adjusted national income per capita, can rise and fall independently of movements in economic growth. As they are not therefore always correlated, social welfare can not be said to have a direct and positive relationship with economic growth. For policy makers, the implications of this are serious. Policy makers aiming at increasing economic growth can no longer be justified in terms of seeking to increase social welfare. Policies that result in economic growth may actually assist in reducing social welfare leading to *stunting* economic growth. In light of this, policy makers will need to re-evaluate their underlying assumptions and motivations.

This experience of stunting economic growth is also reflected in the relative low performance of Thailand in other social welfare measures, such as the HDI, in which it ranks only slightly higher than the Philippines which has significantly lower national income (UNDP 2002). Such a “stunted” or “sub-optimal outcome” welfare outcome occurred as Thailand chose a path of achieving economic growth that was not necessary. This path yielded significant SEE costs that were not inevitable. Economic growth can be

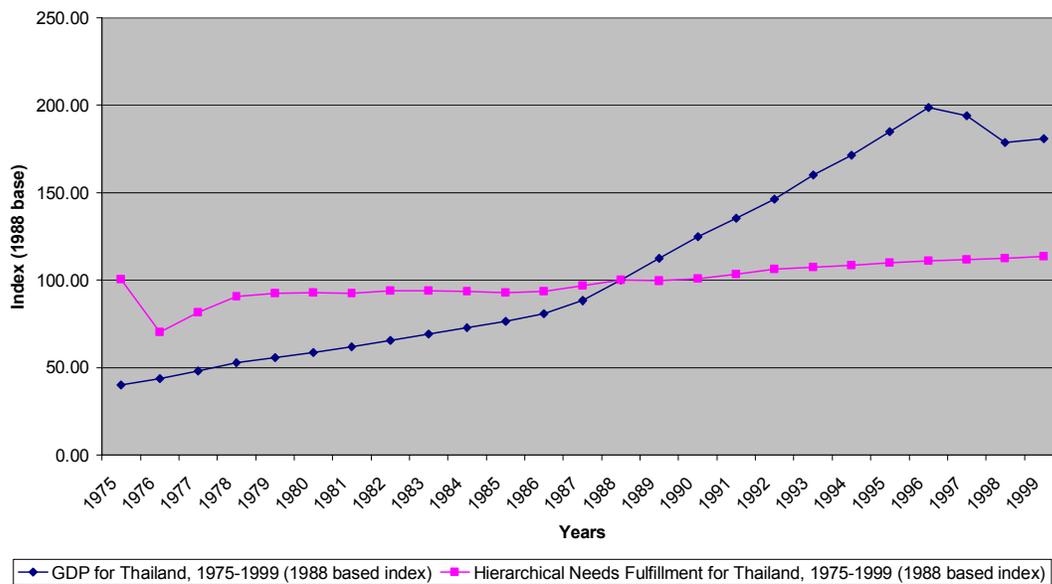
important in increasing welfare but the experience of Thailand did not realise this and it appears that current policies remain on this stunting or sub-optimal path of development.

The conclusion of analysing the results of the first social welfare function, is that economic growth is of itself not always desirable in terms of increasing social welfare. Sometimes this growth has a stunting effect on social welfare. Social welfare is disengaged sufficiently from economic growth that rises in economic growth do not automatically translate into rises in social welfare. Indeed, on a number of occasions, social welfare fell whilst economic growth rose. More importantly, on a number of more occasions the net benefits gained from economic growth, whilst still positive, fell from the year before, further suggesting that the benefits of economic growth are reducing and possibly approach Max-Neef's (1991) *Threshold Point*.

8.3 INTEGRATED SYSTEMS AND WELFARE ANALYSIS OF THE FULFILLMENT OF HIERARCHICAL NEEDS SOCIAL WELFARE FUNCTION

A large proportion of this thesis has been devoted to estimating the sub-system costs and benefits of economic growth on social welfare. However, in order to test the results found in this first social welfare function, a second social welfare function based in the attainment of specified hierarchical needs was also developed and empirically applied to Thailand for the same twenty-five year period, 1975-1999. Compared to the large increases in social welfare as measured by national income per capita and adjusted national income per capita, the rise in social welfare as measured by the fulfillment of hierarchical needs is quite modest. It seems that rapid increases in economic growth have had little or no effect on increases in social welfare as measured by the social welfare function developed in Chapter Six. During years of constant and high levels of economic growth, social welfare actually rose and fell independently of these constant increases. If social welfare is able to fall or remain unchanged during periods of economic growth, such growth must have little impact on social welfare.

Figure 8.8 Comparison of GDP and Hierarchical Needs Fulfillment Measures of Social welfare for Thailand, 1975-1999 (1988 base year)



Source: Author’s own calculations

As GDP is money-metric and the hierarchical needs fulfillment index is not, they must be converted to a common index base to be comparable. It is necessary to transform the two trend lines into indexes with a base year of 1988. This will allow a reasonable comparison of each measure of social welfare.

By using a systems analysis approach, it can be seen that the various systems within Thailand have also changed over time (see Figure 8.9). By disaggregating this new measure of social welfare based on the fulfillment of hierarchical needs, it is possible to view how the structure of the vector of needs that impact on social welfare have changed, and thus changing the total system, over time.

There are three main advantages to this new measure of social welfare based on the fulfillment of hierarchical needs compared to GDP. Firstly, as with the ANI adjusted social welfare function it provides an intuitively correct measure of social welfare compared to GDP per capita. Secondly, it provides insights into the structure of society

and how society is assisting its members achieve various needs. Thirdly, it provides policy implications.

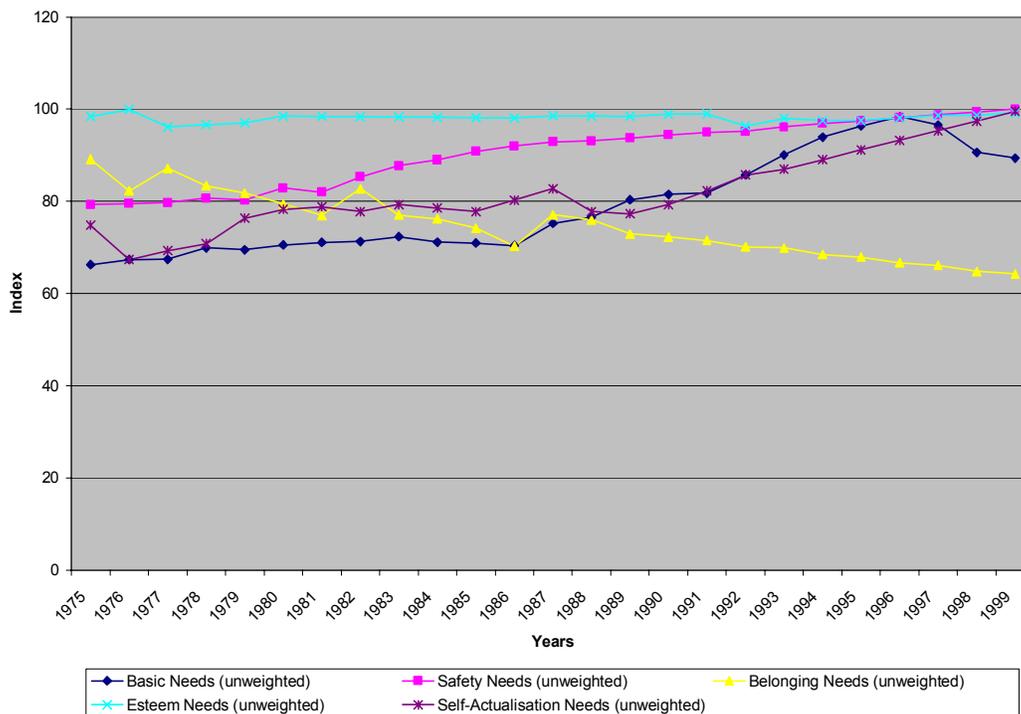
Figure 8.9 shows the disaggregated hierarchical needs (unweighted) during this time period. It highlights that Basic and Safety needs have improved over time whereas, the sense of Belongingness has fallen during the same period. Esteem needs remain quite static over the period whilst Self-actualisation has improved overall during the period under study but a closer examination reveals a numbers of falls and rises over this period.

The significance of being able to disaggregate this new hierarchical measure of social welfare is two-fold. First of all, it allows policy-makers to view society as a system and understand how different policies can impact on those different systems. Secondly, and closely related, it allows a greater understanding of the hierarchical nature of both human needs but also how these needs are linked to a hierarchical understanding of different concepts within social welfare.

These results reflect the historical conditions experienced by Thailand during this time. Economic growth has been dramatic therefore increasing incomes and calorie intake. The fall in Belonging may reflect the effect of liberalisation and globalisation of social values experienced by Thais over the period. Whilst infant mortality rates have substantially reduced, it has been more than offset by even higher levels of divorce rates resulting in increased family breakdown. Of course, the choice of indicators is an important determinant in this analysis and alternative indicators could be chosen.

The purpose of developing this second social welfare function was to test the results of the first social welfare function. The analysis of the results from this second analytical tool supports those results from the first analytical tool. Economic growth is not at all times desirable in terms of social welfare. At times therefore, Thailand has experienced stunted economic growth in terms of social welfare.

Figure 8.9 Disaggregated Hierarchical Needs (unweighted) for Thailand, 1975 - 1999



Source: Author’s own calculations

8.4 INTEGRATED SYSTEMS AND WELFARE ANALYSIS OF THE CONTEMPORARY DEVELOPMENT ISSUES OF SUSTAINABILITY AND GLOBALISATION

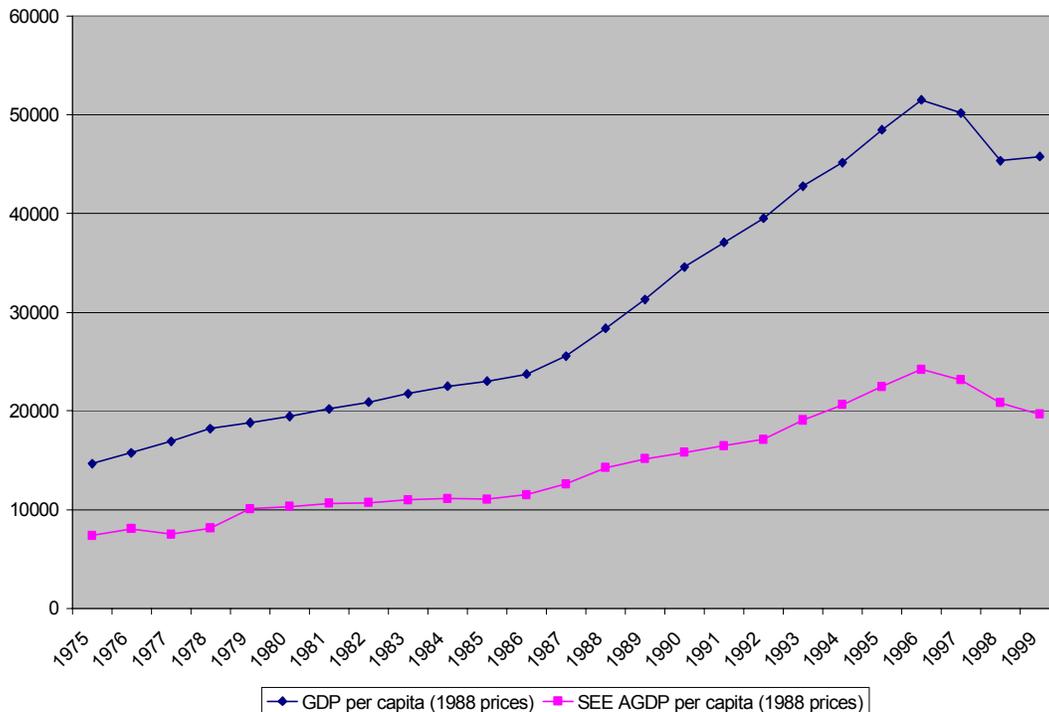
Having analysed the results of the two social welfare functions developed in this thesis and concluded that at times economic growth in Thailand may be undesirable, the numerical estimate of two important contemporary development issues, sustainability and globalisation, can also be used to analyse the desirability of economic growth.

8.4.1 Sustainability Results

An important consideration is that sustainability is determined by the path the economy is on, not the state of the system at any given time (Atkinson et al. 1997). If standard national accounts are being used as measures of sustainability, simple measures of points in time cannot measure sustainability, they can however point to the achievement of

sustainability objectives. Sustainability cannot be measured in static terms. The results of the SEE GDP developed in Chapter Seven suggest that the SEE for Thailand has been damaged in recent years and is falling.

Figure 8.10 Comparison of GDP per capita and SEE AGDP per capita for Thailand, 1975 – 1999 (1988 prices)



Source: Authors' own calculations

The properties of the economy's path are different when comparing GDP per capita and SEE AGDP per capita. The overall trend of the SEE AGDP per capita is much flatter resulting in a divergence between the two indices. The SEE AGDP per capita measure is diverging from the unadjusted measure indicating that the associated SEE system costs of economic growth are increasing throughout the period. This divergence therefore indicates that sustainability is becoming less likely as the costs of economic growth begin to impact on the health and functioning ability of the SEE system. This is more evident in the final year in which positive economic growth is recorded in 1999, but the SEE AGDP per capita continues to fall. Such a fall indicates *stunting* growth. Future work will need

to continue this time series to see if this movement is simply a fluctuation or the beginning of a new trend. If it the beginning of a new trend, future sustainability is under threat from the present damages being caused to the SEE system by economic growth.

When these SEE adjustments are made to GDP per capita, the social, economic and environmental costs of economic growth are evident. As mentioned previously, this new SEE AGDP per capita measure is a measure of sustainability since it does indicate that the SEE may not be as robust and healthy as expected when simply considering unadjusted GDP per capita as an indicator.

8.4.2 Globalisation (Financial Liberalisation) Results

The social welfare impacts of globalisation (financial liberalisation) are important when reviewing the desirability of economic growth. Even though only an illustrative representation of cost-benefit analysis was undertaken for this process, this is sufficient to highlight the welfare issues that need to be discussed within this framework.

The process of globalisation characterised by financial liberalisation and the subsequent financial crisis of July 1997, can also be analysed within a welfare framework to assist in determining the desirability of economic growth in terms of social welfare.

The trend lines of the globalisation adjusted GDP per capita are similar to the trend lines of the SEE AGDP per capita calculated for the measure of sustainability. Compared to GDP per capita, this trend line is flatter and increasingly divergent from the GDP per capita. This suggests that the net benefits of globalisation have decreased over time in spite of the high levels of economic growth experienced in Thailand.

As both globalisation quantitative exercises are illustrative in nature, no firm conclusions can be drawn from them in terms of the desirability of economic growth on social welfare. They are useful though as they both highlight the need to review the desirability of economic growth within a welfare analysis framework. By considering various welfare

issues (equity, poverty, justice) a fuller picture - in this case that the desirability of economic growth on social welfare cannot always be assumed) can be gained.

8.5 FINAL FINDINGS AND INTERIM CONCLUSIONS

Comparing the trend lines of GDP, adjusted national income, sustainability and globalisation is possible as they have the same money-metric base (See Chapter Two, Section 2.2.1). However, it is of analytic value to also compare the second analytical tool, the hierarchical needs fulfillment social welfare function against these two trend lines. The difficulty in this though, lies with the fact that the hierarchical needs fulfillment social welfare function is not a money-metric measure. To overcome this lack of consensus, it is necessary (and possible) to transform all three trend lines into indexes with a base year of 1988. This will allow a reasonable comparison of each measure of social welfare.

Comparing the two social welfare functions against economic growth, new insights into the desirability of economic growth can be gained. The adjusted national income measure of social welfare shows a level of independence from economic growth rates. This suggests that not only might the net benefits of economic growth be negative at various times, but that social welfare is able to move independently of economic growth at various times as well. The implication of this is that policy makers seeking to increase social welfare, can no longer assume that policies aimed at achieving high levels of economic growth will result in increased levels of social welfare. Policies focussing on increasing economic growth are not the same as policies aiming to increase social welfare. This implication has recently been recognised by the Thai government (NESDB 2000; Ministry of Finance 2001).

The comparison of the hierarchical needs fulfillment social welfare function further supports this analysis. Compared to the large increases experienced by GDP per capita and to a lesser extent, adjusted national income per capita, the rise in social welfare as measured by the fulfillment of hierarchical needs is quite modest. Again this seems to be

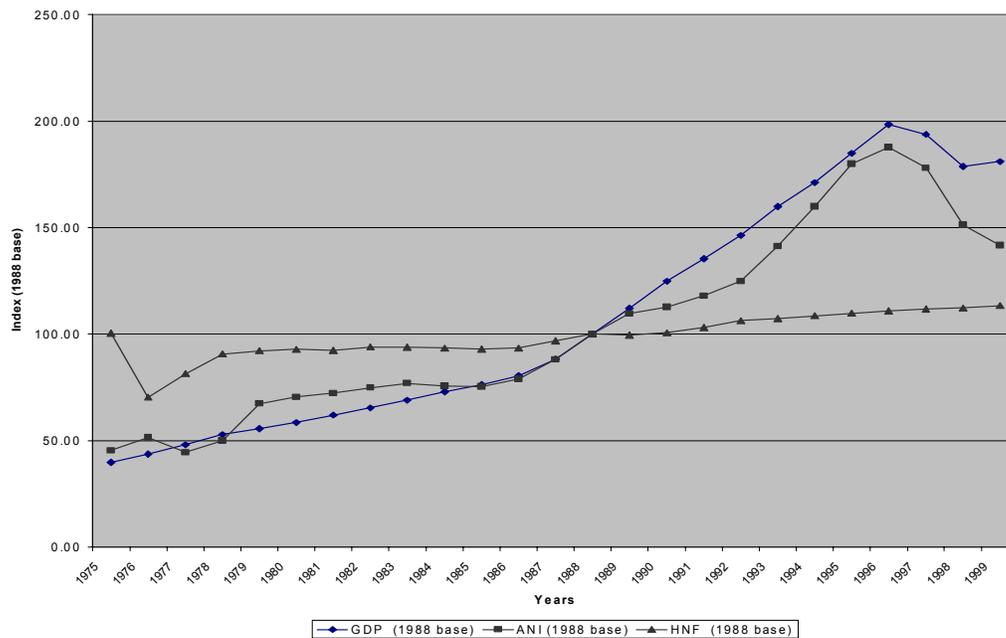
intuitively correct and supports the finding that social welfare is not a direct and positive function of economic growth.

Unlike adjusted national income per capita, the impact on economic growth of social welfare was less emphasized in the second social welfare function.

But despite the reduced emphasis on economic growth when defining social welfare within this social welfare function, it still appears that economic growth is not of extra importance when determining social welfare. The rapid increases in economic growth had little or no effect on increases in social welfare. During the years of constant and high levels of economic growth, social welfare actually rose and fell independently of these constant increases. If social welfare is able to fall or remain static during periods of economic growth, such growth must have little impact on social welfare

The desirability of economic growth is even less assured when consideration is taken of the relationship between social welfare, economic growth and various contemporary development economic concepts. According to the numerical estimates made by Atkinson et al. (1997) and Hamilton and Clemens (1999), the economic growth currently being experienced in Thailand, is sustainable. Using these studies, economic growth can not be considered undesirable due to sustainability concerns. However, the numerical estimates of sustainability found within this thesis dispute this view (Islam and Clarke 2002b). Regarding globalisation and financial liberalisation, illustrative numerical estimates have been on the net benefits of this process, suggesting the economic growth experienced in Thailand was certainly fuelled by the capital inflows of the late 1980s and 1990s. The resultant financial crisis resulted in reducing real income per capita levels (a measure of the standard of living rather than social welfare), fell on average by 21% in Thailand immediately after the crisis (Kakwani and Pothong 2000). This experience dampens the desirability of economic growth.

8.11 Comparison of GDP, ANI and HNF Measures of Social Welfare for Thailand, 1975-1999



Source: Author's own calculations

The ultimate conclusion, based on the evidence gathered in this thesis, is quite dramatic; *economic growth is not always desirable in terms of increasing social welfare in developing countries*. Economic growth should not be considered an end goal in and of itself. Whilst economic growth may be useful in increasing standards of living, it can actually worsen levels of social welfare through the destruction and pressures it places on the SEE system: economic growth can therefore be social welfare stunting. Further, increasing social welfare is dependent on much more than simple increases in income, including social relationships, political freedom and achieving self-actualisation. The pursuit of economic growth does not guarantee the achieving of these outcomes.

Economic growth can be valuable, but only if it is used as a tool to further increase social welfare. As an end in itself, economic growth is not always desirable.

8.5.1 A Theory on the Desirability of Economic Growth

The findings of this thesis, whilst applicable to Thailand for the period 1975-1999 can be generalised to a wider theory on the *desirability of economic growth* and a *social choice theory based on analysis of social welfare indicators*. As discussed in Chapter Two, Section 2.2.2.1, well-being can be understood within a hierarchical framework.

Within this thesis, the focus has been on the impact of economic growth on social welfare. As social welfare is a function of income and all relevant welfare and non-welfaristic considerations, a systems analysis of the impact of economic growth is necessary (see Dopfer 1979). Exact specification of the elements of the social welfare system can be based on social choice theory which provides a framework for incorporating the costs and benefits of economic growth and social value judgements and preferences in evaluating the net benefits of growth and thus the desirability of growth.

As economic growth has both positive and negative affects on the various sub-systems of society, the net benefits may either increase or decrease social welfare. The results of the studies undertaken within this thesis, show that at different times, social welfare (measured either as adjusted national per capita or as the attainment of hierarchical needs) both fell and rose during periods of economic growth. This suggests that that the relationship between economic growth is neither predictable nor positive. This can be explained by viewing the relationship between economic growth and social welfare as non-linear (see Ormerod 1994; Clayton and Radcliffe 1996), rather than linear (see Rostow 1971).

Predicting the path of social welfare due to economic growth is not possible due to its non-linear nature. The impact of economic growth will depend on where the various sub-systems of society are in relation to one another and their subsequent interactions. The expectation that economic growth will always be desirable can be understood when well-being is defined as the *standard of living* rather than as *social welfare* (see Chapter Two, Section 2.2.2.1). This is because the functional relationship between the standard of living and economic growth is positive and linear (though possibly curtailed by the laws

of diminishing returns (also see Hirsch 1995). The desirability of economic growth can only, therefore, be determined by resorting to social choice theory to apply value judgements of society in evaluating the consequences of economic growth.

Although this thesis focuses on Thailand as a case study, the above analysis shows the framework developed for social welfare analysis is general and can be applied to study the desirability of growth in all countries.

8.6 POLICY PERSPECTIVES: ILLUSTRATIVE GUIDELINES

Having reviewed the results of this thesis, the natural progression is to discuss policy perspectives that logically follow from this welfare economic analysis. These are not policy prescriptions but rather are issues that should be considered by those determining policies. Within Thailand, the National Economic and Social Development Board (NESDB) is responsible for coordinating policy making with regard to economic growth and social welfare issues. As with many developing countries, they operate on five-year plans (see NESDB 1996, 2000). The NESDB is currently implementing its ninth five-year plan (NESDB 2000). There has been in the past discrepancy between that stated in the plans and the actual implementation, particularly with social welfare often being given a lower priority than economic growth (Parnwell 1996; Schmidt 1996; Dixon 1999).

The conventional measure of social welfare is to use the aggregated standard national accounts (World Bank 2001). Within this thesis, this approach was rejected after a number of limitations were noted. However, the use of economic growth to measure social welfare has resulted in economic growth policies in Thailand taking precedence over other policies goals that may have more immediate impact on social welfare (Parnwell 1996).

Policy makers are in the position to determine which priorities are given to national goals. Value judgements by policy makers are central to this process. Despite some

disagreement (Beckerman 1992; Kaldor 1939), value judgements must play a role (Sen 1970; Slesnick 1998). The most appropriate value judgements are those based on social choice theory whereby the expectations and hopes of society itself determines the boundaries and levels of social welfare to be achieved (Bonner 1986).

Therefore, social welfare must be de-linked from economic growth – not only in terms of measurement but also in terms of definition. This thesis proposed and empirically applied two such measures.

The results of these two measures show that social welfare can rise and fall independently of economic growth. This occurs as the two social welfare functions are defined either as an adjusted national income or as the fulfillment of a set of hierarchical needs. They show that economic growth is not the only way to measure social welfare and in fact economic growth may not be utterly desirable in terms of increasing social welfare.

Whilst these policy suggestions are based on the data found in this thesis for Thailand, it is reasonably expected that they would be valid for all developing countries showing similar characteristics to Thailand.

8.6.1 Re-focus away from Economic Growth

As has been shown in this thesis, economic growth is not always desirable with regards to increasing social welfare as its net benefits are sometimes negative and rarely as positive as unadjusted aggregated standard national accounts growth rates would suggest. Therefore the first policy suggestion is to re-focus government priorities away from resource consumption based economic growth (see Smith 1998 on the Pacific Islands). Whilst such growth does have benefits and does assist in increasing living standards, its subsequent costs can outweigh these benefits. Further, the sustainability of such economic growth is questionable.

However, negative economic growth may also have serious negative benefits as well:

A fall of total gross national product, of say, even ten percent, may not look like much, if it follows the experience of past economic growth of five or ten percent every year for some decades. And yet this decline can decimate lives and create misery for millions, if the burden of contraction is not shared together but allowed to be heaped on those – the unemployed or those newly made economically redundant – who can least bear it (Sen 1999a, p. 186).

The poor who are last to benefit from economic growth are the first to be hurt by negative growth as they have the least buffer in the forms of assets, savings or education. This is illustrated within Thailand. After three decades of high levels of economic growth, the economic contraction of 9.6 percent immediately after the July 1997 financial crisis resulted in loss of income of up to 28% in rural Thailand, an additional 1.5 million people falling back under the poverty line and an extra one million people classified as ultra poor (Kakwani and Pothong 2000; Kaosa-ard 2000; Kakwani 1999). Yet previous growth rates, greater than 9.6 percent, did not have the reverse effect. Similar experiences occurred in Indonesia and other Southeast Asian countries (Aziz et al. 2001).

If economic growth is necessary, it should not be a priority within government policies. Economic growth aimed at specific sectoral areas (Warr 2001) and for specific purposes would be better ‘rather than pursuing economic growth for its own sake and hoping that the benefits will be spread widely enough that the poor derive some gains’ (Fields 1995, p. 76).

If economic growth is to be pursued, it must be done so for specific purposes.

8.6.2 Pro-poor Policies

If economic growth is pursued, one of its specific purposes may be to reduce poverty. Within Thailand, the Northeast region has traditionally been the poorest region within Thailand with poverty rates similar to parts of sub-Saharan Africa (Watkins 1998). Whilst economic growth has been extremely high, it is reasonable to suggest that this recent growth has largely bypassed the majority of the population who remain rural (Dixon 1999; Warr 2001). And whilst poverty levels have decreased (Kakwani and

Krongkaew 2000), a large absolute number of Thais are still struggling to survive despite three decades of remarkable growth (Tinakorn 1995).

Whilst absolute poverty was reduced, relative poverty may have increased as income inequality also worsened during this period of sustained economic growth (Clarke 2001a, 2001b, Ahuja et al 1997; Ikemoto 1991; Krongkaew 1985, 1993). Therefore, despite the increases in economic growth, the poorest members of the Thai economy have not benefited from this economic growth (Kakwani 1997b; Dixon 1999). Indeed, the ultra-poor have become worse off because the distribution of this new income has been received by the rich rather than the poor (Kakwani 1997c). Such an inverted relationship between economic growth and income distribution is not inevitable.

Pro-poor policies are required to ensure that the poor do receive the benefits of any future economic growth or any residual benefits from previous growth.

Whilst controversial, a pro-poor policy that should be seriously considered is income redistribution. Whilst there are attendant costs with re-distribution (Pigou 1962), it is more likely to reduce income inequality than simple economic growth (Dagdeviren et al. 2001). Such redistribution though is not undertaken to increase prospects for future growth (Chenery et al. 1974), but rather for the expressed purposes of reducing poverty and hence lifting social welfare. It is a social choice perspective on equity. This shift in motivation is significant.

As will be discussed below, government services should also be aimed to target the poor. The urban bias of government services must cease and priority given to those near or below the poverty line. Increasing social welfare is dependent on this section increasing their quality of life.

8.6.3 Re-focus on other Sub-systems

By defining and measuring social welfare using systems analysis, the importance of non-economic sub-systems in determining social welfare have become apparent. Government

policies can focus on these other sub-systems to increase social welfare. All policies have winners and losers. Perhaps some sort of compensation will be required for certain policies, however, generally the losers of these policies have been winners from government inaction for many years previously.

8.6.3.1 Policies for the Environmental Sub-system

There are three main policy areas that would positively impact social welfare levels; 1) natural resource protection, 2) pollution control and abatement programs, and 3) limits on harvesting renewable resources. Whilst such government policies might exist, they may not be adequately enforced. Re-emphasising these policies areas is therefore important.

Thailand has suffered a significant decline in its natural forest cover (Bello 1995). The impact of this is wide-ranging. It has immediate impacts on local inhabitants who rely on the forest for subsistence farming, but it also had impacts for Thailand's bio-diversity and the ability of the ecology to withstand other stresses. Policies may cover limits on deforestation and the implementation of re-forestation programs.

Again, Thailand does have pollution emission and control policies in place but these are not vigorously enforced (Poungsomlee and Ross 1992). Pollution control and abatement programs are required for water, air, noise, and industrial pollution.

Stricter controls over the harvesting of renewable resources is required to ensure that such resources are not destroyed or forced below sustainable levels (Duraiappah 1999). Such resources may include marine or land animals and vegetation. Ensuring sustainability of these resources is a large part of ensuring sustainability of social welfare.

8.6.3.2 Policies for the Political Sub-system

Increased attention on the provision of government services and the actual mechanisms of government is required. Policies ensuring the 1) protection of political and civil freedoms, 2) reduction of corruption, and responsible management of debt can all improve social welfare.

Political and civil freedoms are important in determining social welfare (Islam and Clarke 2001b). Within Thailand, such freedoms have not always been promoted resulting in violent crackdowns and uprisings (Phongpaichit and Baker 1995). Whilst the current climate is one of democracy and relative freedom (Freedom House 2001), there is a responsibility by those in position of influence to ensure such a climate continues.

Even during periods of democratic freedom, the social welfare of Thailand has been negatively affected by political corruption (Phongpaichit and Piriya-rangsan 1994; Linter 1998) at all levels of society. Corruption leads to inefficient allocation of resources (Parnwell 1996). Of all the policies areas required, this is perhaps the most difficult as the policies needed must be prepared and enforced by those with most to gain through their lack of implementation. External organisations, such as Transparency International, may be required to assist in monitoring the effectiveness of anti-corruption.

Whilst Thailand's public debt does not compare to the debt burdens of other developing countries, it is still a matter of concern. In the past, public debt was acquired for unproductive use such as fuel subsidies (Warr 1993a). Whilst short-term benefits may be received in the form of cheaper or increased consumption, the longer-term costs are greater. Servicing debt results in fewer funds available for essential services that can positively affect social welfare such as health and education spending. Various policies capping debt or limiting it to productive uses only could be considered.

8.6.3.3 Policies for the Social Sub-system

Social welfare can be enhanced with appropriate policies focussing on issues of 1) commuting, 2) urbanisation, 3) provision of education services, and 4) provision of health services.

Throughout the world, commuting has been recognised as a significant cost of economic growth (Mishan 1971). Within Thailand, this cost is extremely high as Bangkok is one of the most primate cities in the world (Dixon 1999). Thai authorities have long struggled

with how to ease congestion in Bangkok but with an additional 800 cars a day being registered in Bangkok (Bello 1995), solutions appear impossible. Whilst the construction of new road lanes and the Skytrain, have reduced some travel times, this area must remain a priority for policy makers as it does impact on social welfare levels (Ross and Thandaniti 1995).

More generally, urbanisation is a problem. Whilst the overall level of urbanisation for Thailand is very low, the concentration of the urban population into one main city (and a small number of provincial cities) means that for 10 percent of the population live in very crowded cities (Arbhabhirma et al. 1988). Policy measures might involve decentralisation incentives for government departments, business and industry, disincentives for locating new or expanding existing industries within urban centres, increasing services and rewards for those living in rural areas, or actively encouraging relocation to rural areas.

The access to education and health services is significant when determining social welfare. Presently an urban bias exists for the provision of these services within Thailand (Khoman 1993). Government policies must actively target the removal of these biases as the majority of Thailand's poor live in the rural areas. Policies should ensure that the poor have access to these services.

8.6.3.4 Policies for the Spiritual Sub-system

Thailand is officially a Buddhist country and whilst this has some affect on its present unique character (Hutanwutr 1998; Schumacher 1993b), it is not being suggested that this (or any other) religious belief become a government policy. As with spiritual sustainability above (Section 7.2.1.5), this refers to the protection of the most vulnerable within society from being de-humanised. This may involve the protection from exploitation of women, and children from commercial sex work or from utter abject poverty.

8.6.4 Re-focus on Hierarchical Needs

The second definition and measure of social welfare developed within this thesis focussed on the impact on achieving certain hierarchical needs (Maslow 1971, Islam 2001a; Islam and Clarke 2001b). The five levels within this hierarchy of needs were basic needs, safety needs, belonging needs, self-esteem needs and self-actualisation needs.

There are many points of convergence between these needs and the policies suggested in the previous section arising from systems analysis, such as the provision of access to minimum levels of food and shelter through redistribution of income, access to health and education services and the protection of political and civil liberty.

The only additional policies areas that could be considered as priorities using this approach to social welfare would be to 1) bolster law and order policies and, 2) increase support for family structures.

Feeling safe is a fundamental human need (Maslow 1971). Reducing personal and property crimes enhances a sense of safety. Whilst the crime rate in Thailand is not particularly high, any improvements will impact positively on social welfare.

Likewise, feeling connected to one's family is also important in any measure of social welfare (see Cummins et al. 2001; Henderson et al. 2000). Certain government policies in taxation, income transfer, working conditions, housing, etc can support families and reduce breakdown and stress.

8.6.5 Emphasis on Further Work

Seeking to increase social welfare long been considered a rational pursuit of governments (Cochrane and Shaw Bell 1956). Governments exist to further the interest of their constituents. The Thai government therefore has a responsibility to prioritise further research into improving the measure and defining of social welfare. Resources should be made available to researchers to explore further the issues touched upon in this thesis in order to improve and extend what has been set out here.

The priority for all governments and those interested in public policy must remain how to improve the lives of those within their society. Future five-year plans must emphasize this continuing commitment to improve social welfare as the overriding criteria of all economic and social interventions.

8.7 CONCLUSIONS

These new tools of social welfare provide new insights into the desirability of economic growth. Both indicate that whilst Thailand has had significant success at achieving economic growth (GDP per capita has more than tripled in 25 years), increases in social welfare have been more modest. More importantly, on occasions, social welfare has actually fallen simultaneously to economic growth increases thus strongly suggesting that the correlation between economic growth and social welfare is neither strong nor positive. The numerical estimates of sustainability and globalisation also support this finding.

Not only does social welfare encompass more than economic welfare, but because society consists of sub-systems, changes in the economic sub-system can have serious negative consequences for overall social welfare. Hence, economic growth is not necessarily desirable for at times it can stunt social welfare.

This penultimate chapter has completed analysing the results of the data presented in this thesis. This thesis set out to determine the desirability of economic growth in terms of social welfare. Having rejected using GDP per capita as a suitable measure of both economic growth and social welfare, two democratic social welfare functions were developed as analytical tools.

The results suggested that economic growth was not necessarily desirable as its net benefits were increasingly becoming negative or at least increasing by a lesser amount than the previous year.

This chapter has analysed the implications of these results and three contemporary development economic issues and suggested that new policy perspectives are now required. These new policy perspectives are characterised by the loss in priority of achieving economic growth, particularly growth based on resource consumption.

The remaining chapter summarises the thesis as a whole, highlighting the important findings, analysis and conclusions.

CHAPTER NINE - CONCLUSIONS AND SUMMARY

9.1 INTRODUCTION: ISSUES

This thesis asked “Is economic growth desirable?” Welfare economic analysis was undertaken using social choice theory for Thailand over a twenty-five year period, 1975-1999. The general conclusion drawn from the empirical work undertaken is that economic growth is not inherently desirable in terms of social welfare. Economic growth is only a means to an end, and that end is to increase social welfare. If economic growth fails to do this then its attainment ceases to be desirable and it becomes stunting economic growth. The difficulty many policy makers face is that economic growth is widely presented itself as a measure of social welfare and implicitly that social welfare increases directly and proportionally to increases in economic growth. When social welfare is explicitly defined as a function of national income levels, this relationship is presented as positively correlated and therefore economic growth is viewed as positive (see Dollar and Kraay 2001; Quay 2001). Under these circumstances it is not surprising that such emphasis is given to achieving economic growth within national development plans (NESDB 2000).

This thesis set out to question this *desirability* by developing new objective, and empirical measures of welfare based on social choice theory. If economic growth increases social welfare it can be considered desirable. If it does not increase social welfare or is social welfare neutral, its desirability *per se* is questionable.

This thesis investigated the desirability of economic growth on social welfare in Thailand. The primary approach taken within this thesis on the issue of the desirability of economic growth focused on considering the costs and benefits of economic growth across a range of social sub-systems within a social choice perspective framework using subjective and objective conceptualisations and numerical estimates of social welfare. Alternative approaches focussed on the impact of economic growth on the attainment of hierarchical needs. Sustainability and globalisation were also considered.

This present study found that the benefits of economic growth outweighed the costs of economic growth in general, but under certain circumstances (i.e. within the environmental sub-system) the costs became higher than the benefits. Also, from a long-term perspective, the costs may become so high across all sub-systems that growth may become unsustainable and net benefits of economic growth may become negative, resulting in stunting economic growth.

Therefore this thesis concludes that socially responsible economic growth is desirable. Socially responsible economic growth occurs within appropriate economic policies and institutions so that the costs of economic growth are minimised to provide the highest possible social welfare from the benefits of economic growth. Socially responsible economic growth is consistent with social preferences and value judgments explicitly made within this thesis. The benefits of socially responsible economic growth include: 1) greater production of and access to goods and services; 2) improved standard of living; 3) higher control within the market place; 4) improved opportunities leading to possibly higher functionings and capabilities; and 5) improved freedoms.

The rest of this chapter is set out as following. Section 9.2 summarises the value of these results. Section 9.3 briefly reviews the historical experience of social welfare and economic growth experienced in Thailand. Section 9.4 highlights the new approach adopted in this thesis before Section 9.5 notes the applications, results and analysis of this work. Section 9.6 highlights the contribution of the thesis and Section 9.7 notes the limitations and need for further work in this area. Finally, Section 9.8 concludes this chapter and the thesis.

9.2 THE VALUE OF THIS APPROACH

This thesis concludes that economic growth cannot always be assumed to be desirable in terms of economic growth. Based on analysis of the results of two social welfare functions and reviewing three important contemporary development economics issues

using systems analysis and social choice theory, it is argued that at time Thailand has experienced stunting economic growth. Such stunting growth either reduces or dampens growth in social welfare. Similar implicit findings can be found in mainstream literature (UNDP 2002). However, similar explicit findings for developing countries are rare in the literature (see Smith 1998; Castaneda 1999 as exceptions), but can be found for developed countries (see Daly and Cobb 1990; Cobb et al. 1994; Daly 2000).

The suggestion that economic growth does not always increase social welfare has long existed (see Von Tunzelmann 1985 for a review of the debate on the Industrial Revolution). More recently, the beginning of this modern dissenting view can be traced to Sametz (1968); Mishan (1971), Meadows et al. (1972) and Forrester (1973). A major limitation of the existing literature is that the underlying value judgements used in estimating social welfare are not usually stated or clearly applied. This was remedied in this thesis by adopting a social welfare function, derived from the principles of social choice theory, as the conceptual and methodological framework for estimating social welfare. A large part of this thesis focussed on adjusting national income per capita to be measure social welfare. Previous work upon which this approach was built includes Sametz (1968), Nordhaus and Tobin (1973), Daly and Cobb (1990), Jackson and Marks (1994) and Lawn and Sanders (1997). This thesis however, expands the above method further by introducing adjusted national per capita as a social welfare function. Not only does this allow social value judgements to be explicit but it also incorporates a systems based approach to development. In extending this work, this approach incorporates the concept that development is the outcome of interrelationships between many systems and can be measured through appropriate adjustments of the aggregation of revealed preferences based on certain value judgements.

Expressing adjusted national income per capita as a social welfare function allows the following social value judgements to be made explicit and testable in the measurement of welfare:

- Costs and benefits of economic growth

- Intertemporal time preferences
- Optimal distribution of income for society
- Others including organisational and structural change effecting freedom, liberty, morality, etc.

Through the application of social choice theory to social welfare via a social welfare function, the new measure of welfare can no longer be considered a version of the standard national accounts. It is now a measure of social welfare and not just a reflection of national accounts. Therefore many of the limitations of GDP per capita as a measure for development or welfare are overcome. These limitations include time preference concerns, aggregation concerns and the exclusions of non-welfare concerns (Sen 1985; Islam 2001). The new measure of welfare is no longer an aggregation of preferences because it explicitly takes into account value judgements through the use of a social welfare function.

Social welfare as defined by this function can rise and fall independently of movements of economic growth. Therefore, social welfare does not have a direct and positive relationship with economic growth. For policy makers, the implications of this are important. Policies aimed at increasing economic growth can no longer be justified in terms of seeking to increase social welfare. Policies that result in economic growth may actually reduce social welfare. In light of this, policy makers will need to re-evaluate their underlying assumptions and motivations.

This thesis has further expanded the current literature by developing a social welfare measure based on the attainment of a given set of hierarchical needs within a framework expressed by Maslow (1971). Whilst some studies have utilised this hierarchy (see Sirgy 1986; Hagerty 1999), the use of it to measure social welfare is new (Islam and Clarke 2001b; Clarke and Islam 2002c). As with the first social welfare function based on adjusting GDP, this measure of social welfare also found that at times increases in economic growth occurred during falls in social welfare.

These intuitively correct measures of social welfare in which social welfare has fallen during periods of unprecedented increases in economic growth suggest that at times Thailand has experienced episodes of stunting economic growth. Whilst social welfare has increased during the last twenty-five years, it has increased at a rate far less than is suggested when pursuing the conventional measure of economic growth. Both of the new applications developed in this thesis provide improved measures of social welfare compared to the dominant measures within the literature. The consequences for policy makers are important as social welfare can no longer be assumed to be an outcome of achieving economic growth. Specific public policies (as suggested in Chapter Eight, Section 8.6) must therefore be considered if governments aim to increase social welfare.

This thesis has focussed on the social welfare implications of economic growth within Thailand over a twenty-five year period, 1975-1999. However, the approaches developed can be generalised to any country, developed or developing. Therefore, whilst the results will be different for other countries, the same *social welfare analysis based on social choice* can be replicated in all countries.

9.3 A REVIEW OF THAILAND'S ECONOMIC GROWTH AND SOCIAL WELFARE EXPERIENCE

Over the past two centuries, Thailand has been open to the economic and political forces changing the region and the world. In the nineteenth century, it was drawn into colonial trade. From the 1940s, it became a theatre for the political rivalry of the cold war's Great Powers. From the 1950s, it was open to the internationalization of economic forces --the spread of multinationals, the expansion of Japan, the relocation of manufacturing, and the globalization of capital.

Whilst these outside forces have affected Thailand's economic and social systems, there have also been domestic forces that have resulted in significant economic and social changes within Thailand (Phongpaichit & Baker 1995). These local forces have included periods of high levels of both political stability and instability, an emphasis on

economic nationalism followed by an emphasis on export orientation, and an increasing reliance on foreign capital for investment. However, through all this, the twin pillars upon which Thailand was built have remained constant; exploitation of local resources and a reliance on the agricultural sector. The latter is an extension of the former. The agricultural sector not only provided employment and food for the majority of the population, but also provided the majority of exports that financed the subsequent development of the manufacturing and services sectors.

The shift of the Thai economy from an agrarian economy to an economy with substantial manufacturing and service sectors primarily occurred in the late 1970s (Phongpaichit & Baker 1995). This occurred quickly, taking little more than a decade. This rapid economic age mirrored the tumultuous political upheavals simultaneously occurring. By the early 1980s, Thailand was no longer an agrarian economy exporting agricultural goods but an industrial economy exporting manufactured goods and services.

In the 1960s, the agricultural sector was three times that of the manufacturing sector in terms of GDP and its contribution to exports was 40 times greater. Three decades later, manufacturing has become twice the size of agriculture in terms of GDP and contributed three times the value to exports. This complete reversal occurred in a relatively short time period.

Two main views exist as to whether economic growth has had a positive impact on the general welfare of the Thai population. The first is that it has; ‘the vast majority of Thais have seen a quantitative, and to some extent also a qualitative improvement in their living conditions’ (Parnwell 1996, p. 282). This is the view held by the World Bank (1986). The second view is that whilst economic growth has certainly provided new employment opportunities, particularly within the manufacturing and services sectors, there has been little improvement in the general standard of living for the bottom section of society. The end result of such disparity could lead to ‘economic dislocation, social tension and political unrest’ (Dixon 1999, p. 237). Because of skewed income distribution, the benefits of economic growth experienced in Thailand has only been enjoyed by a

minority of the population. Economic growth has had a severe urban bias, often at the expense of investment and development within the larger rural sector (Muller 1996; Parnwell & Arghiros 1996; Bell 1996). ‘It is not unreasonable to suggest that the recent growth has largely bypassed the majority of the population who remain rural’ (Dixon 1996). At the same time, the costs of economic growth have been more social in nature (environmental degradation, pollution, urbanisation) have been particularly felt by the bottom income group in society whom also failed to receive the individualistic benefits of economic growth (Kaosa-ard 2000).

One important outcome of economic growth in Thailand has been the increasingly unequal distribution of income (Krongkaew 1995; Tinakorn 1995; Hutanuwatr 1998; Clarke 2001a, 2001b). Prior to industrialisation, rural farmers in Thailand had relatively high standards of living. There was little poverty or starvation reported and agricultural work had a relatively low intensity. But now

the picture from unadjusted poverty lines show that despite the remarkable record of growth over the past three decades, about 11.7 million are still living in poverty (Tinakorn 1995, p. 225).

If it is true, as suggested earlier in Chapter Two, that Thailand has been a benefactor of historical and global economics forces rather than specific government policies and interventions, the outlook for Thailand is bleak

the Pacific Asian region has been characterised by four successive and continuing waves of industrial development: Japan after the Second World War, the NIEs during the 1960s and 1970s – the ASEAN Four, particularly Malaysia and Thailand, since the early 1980s; and from the early 1990s the re-emerging socialist economies of the PRC and Vietnam (Dixon 1999, p. 252).

Thailand has had high levels of economic growth as part of the third wave of economic growth, but as that passes and the next wave of industrial growth occurs, Thailand is now characterised by;

- an imbalance between employment and production;
- very low levels of urbanisation;
- the concentration of the urban population in Bangkok resulting in a primate city;
- the concentration of manufacturing and modern service sectors in Bangkok and its environs; and
- an imbalance between education and training needs (Dixon 1999).

9.4 SUMMARISING THIS NEW APPROACH

Economic growth was described as modern phenomenon. It has only been quite recently in historical terms, perhaps the last 50 to 100 years, that the *normal* growth rates of 3-5 percent per annum have been achieved. However, the concept of economic growth was first explored in Petty's *Political Arithmetik*, Smith's *Wealth of Nations* and Marshall's *Principles of Economics*. Interestingly, similar debates to those found in this thesis concerning the desirability of economic growth in terms of social welfare focus on the Industrial Revolution (Hartwell 1972; von Tunzelmann 1985). Whilst the debate is old, a resolution remains illusive.

Economic growth is often not a Pareto activity, resulting in winners and losers, costs and benefits. Whilst the predominant mood within the literature has been on winners and potential winners, this mood shifted in the late sixties and concerns were raised regarding the costs of economic growth. It was becoming evident that economic growth resulted in various costs and these costs were increasingly being borne by people least able to bear them and who were not receiving the benefits of the growth either (Adelman and Morris 1973; Meadows et al. 1972).

Numerous costs of economic growth have been identified, ranging from pollution, loss of leisure, reliance on technology, urbanisation, extraction of non-renewable resources and the illusion that growth brings benefits. More recently the costs of economic growth have centred on the concern of sustainability. Using various scientific concepts, such as the

two laws of thermodynamics, new Malthusian predictions of environmental, economic and social catastrophe and collapse have been made. Sustainability became the rallying call for those more recently concerned with the costs of economic growth.

Throughout this increase in concerns, the prevailing view of policy makers remained that the benefits of economic growth were still substantially higher than the costs. (Indeed, some argued that “costs” were not costs but actually market failures that could be rectified if the market was less governed – see Beckerman 1995.) In short this paradigm held that the main benefits of economic growth were increased income leading to increased control over the market and therefore greater freedoms. For most involved in policy prescription, the only differences of opinion on the benefits of economic growth have been the prescriptions for achieving economic growth.

A concern raised by the focus on the rising costs of economic growth is that at a certain point, the *Threshold Point*, (Max-Neef 1991), the costs of economic growth may outweigh the associated benefits (Daly and Cobb 1990). From this point onward, further economic growth may become stunting economic growth as social welfare is negatively affected by this growth (also see Islam and Jolley 1996). The possibility that the Threshold Point could be reached *prematurely* within a low or mid-income country was the starting point for this thesis.

Determining the desirability of economic growth in terms of social welfare though requires that social welfare be defined. Welfare has been defined in numerous ways but welfare can be defined in any manner as long as its usage is clear and stated clearly (Sen 1985a). Chapter Two reviewed welfare defined in terms of functionings and capabilities (Sen 1987a, 1987b), capital stock (Boulding 1949-50), primary goods (Rawls 1971), amongst others.

Two major approaches have traditionally been used to measure social welfare. The first uses data limited to observations of consumers’ revealed preferences. When aggregated, these revealed preferences are measured by total GDP. Pigou (1962) built on Hicks

(1940) proposal that national income per capita could be used as a measure of social welfare. Just as an individual's revealed preference can indicate his/her level of welfare, a national estimate of social welfare can be attained by summing the revealed preferences for the entire economy (i.e. total GDP). The logic of using GDP per capita as a measure of welfare is therefore simple and attractive – if the economy is growing so must welfare, if GDP per capita falls so too does welfare. However, as attractive as it is, it is also limited.

In order to overcome these limitations, a number of adjustments to standard national accounts have been made (Nordhaus and Tobin 1973; Daly and Cobb 1990; Cobb et al. 1995). These adjusted measures were limited by a lack of consideration of social choice theory and systems analysis.

The alternative major approach to measuring welfare is to view welfare as mental well-being. All activities that lead to increased levels of mental well-being/happiness increase welfare. The major difficulty with this approach to measuring welfare (aside from its operationalisation) is that human beings are very adaptive. The rich are as happy as the poor and sudden increases (or decreases) in wealth or social circumstances are quickly assimilated and levels of self-reported happiness return to the original level (Pusey 1998).

Having determined that welfare has no universally agreed definition or method of measurement, the next aim of this thesis was to introduce two new democratic social welfare functions being developed and empirically applied to Thailand over a twenty-five year period to determine the desirability of economic growth in terms of social welfare.

The first new democratic social welfare function was a cost-benefit adjusted national income measure of welfare. This social welfare function is an expression of the costs and benefits of economic growth. Normally GDP is a criterion of a social welfare function, but in this social welfare function, the costs and benefits of economic growth are used. Therefore it was possible to specify a social welfare function which includes such things as the environmental and socio-economic impacts of economic growth. This social

welfare function was not the sum of individual welfare but rather a function of the costs and benefits of economic growth on various sub-systems. One of the major costs is income distribution and it is reasonable to ‘incorporate distributional considerations in a cost-benefit analysis’ (Varian 1992, p. 409).

The second new democratic social welfare function was based on the hierarchical needs fulfillment approach based on Maslow (1971). This approach is operational and its intuitively correct measures of society’s welfare are an important contribution to welfare literature. Human needs are hierarchical in nature and humans strive to reach the highest levels of their needs. Only hindrances constructed by society stop people fulfilling their hierarchical needs. That is why this approach can be applied to national welfare measures. This approach can demonstrate if a society is assisting or hindering its citizens from becoming self-actualized. This approach can be operationalized and provide new insights into a country’s level of social development and welfare. It also moves beyond the limits of trying to determine the functional relationship between economic growth and poverty.

9.5 APPLICATION, RESULTS AND POLICIES

The thesis has been seeking to determine the desirability of economic growth on social welfare generally and in particular in terms of a developing country. Such studies are limited, particularly for Asia (see Lu and Montes 2002 as exceptions). If the costs of economic growth have outweighed the benefits in a developing country, serious consequences follow for traditional developmental thinking, which holds that development is a linear process (Rostow 1971).

It is expected that the two new social welfare functions developed in the thesis could be applied to other developing countries (and probably developed countries as well) without serious adaptation. The emphasis of the thesis has not been the economic and social welfare circumstances of Thailand *per se*, but has focussed on the theory of measuring

social welfare through social choice theory. As social welfare is essentially an empirical concern however, an application of the new approaches has been necessary.

Chapters Four and Five described the various adjustments to national income for each of the various sub-systems. These sub-systems included the economic, the social, the political, the environment and the spiritual. These chapters were lengthy as they described the methodology of nearly 20 adjustments to national income in order to provide a systems analysis of social choice in terms of welfare economics. Likewise, Chapter Six presented a new approach that fully encapsulated in an index form the five levels of human needs that make up a sophisticated measure of social welfare; basic needs, safety needs, love needs, self esteem needs and self actualization needs. Self actualization is the highest level of social development. It excludes poverty and other short term effects often associated with economic growth such as unemployment, economic insecurity and environmental degradation.

The purpose of these two approaches was to incorporate social choice theory into social welfare measurement to move away from subjective measures of welfare to more objective measures. Social choice theory should be applied to social welfare measures as it highlights social preferences and value judgements. It is concerned with economic and non-economic activities that are important in determining social welfare levels, quality and composition. Social choice theory can highlight changes within society and how these changes impact on social welfare (Bonner 1986).

The results of both new social welfare functions shed new light on to the desirability of economic growth in terms of social welfare. By defining social welfare by these two new social welfare functions it became obvious that over the last twenty-five years, economic growth has become increasingly less desirable within Thailand. At times these new measures of welfare fell during times in which economic growth increased.

Within the first social welfare function, it became evident that social welfare was not a direct function of national income. Social welfare rose at lower levels over the period

under study than national income. Social welfare was able to move independently of movements in national income levels. At various times, social welfare fell whilst national income rose. During these periods economic growth could be termed stunting economic growth, impoverishing economic growth (Islam and Jolley 1996) or uneconomic growth (Daly 2000) as it actually resulted in diminished levels of economic growth due to its economic, environmental, social, political and spiritual costs being greater than its associated benefits.

The second social welfare function had results that supported these findings. Social welfare was defined as the fulfillment of certain hierarchical needs. Again, there was no correlation between economic growth rates and social welfare increases. Indeed, for much of the 1980s, the social welfare index did not rise at all, suggesting that this period of unprecedented economic growth did not assist the Thai population's attainment of hierarchical needs.

There are a number of policy consequences of the results. Policies makers must re-focus to be pro-poor. This means that issues of inequality, redistribution of income and government services all be developed with the poor as the primary targets.

Policies should also focus on sub-systems other than just the economic. Priorities must be given to policies that enhance the environment, social, political and spiritual aspects of society. All of these sub-systems play an important role in enhancing social welfare. Finally, policy makers must also consider the provision of services and support that also enhance the ability of society to fulfillment certain hierarchical needs.

9.6 CONTRIBUTION OF THE THESIS

By incorporating social choice theory and systems analysis, these new approaches became very effective measures of social welfare for Thailand. The development of these new methodologies is a contribution to the literature as they are operational and provide intuitively correct results.

The original contributions of this thesis were the application of social choice theory and systems analysis to welfare measurement through the development of two new social welfare functions. These two new analytical tools assisted in understanding the relationship between economic growth and social welfare. Both tools allowed new measures of social welfare to be made that could then be plotted against standard measures of economic growth (GDP per capita). In doing so the desirability of economic growth could be determined.

Such work had not been undertaken before, especially in regard to Thailand. Thailand has been held out as an example of a successful country due to its high records of economic growth. However, as this thesis has shown, this economic growth has occurred at the cost of environmental and social costs, which have (at times) reduced social welfare. Few studies have been undertaken for Thailand with respect to measuring social welfare. Kakwani and Krongkaew (2000) reviewed poverty in Thailand (using an income-based poverty line) and found that absolute poverty had decreased. Kakwani and Pothong (2000) studied the effect of the financial crisis of 1997 on standard of living (defined as real income per capita) and found that there were short term losses in this level of welfare across the Kingdom. These studies, whilst valuable and important, though are limited by their focus on linking welfare concepts to income. As this thesis has argued, income is a limited measure of social welfare, primarily because it is contained within the economic sub-system. To fully analyse movements of social welfare within Thailand, it is necessary to move beyond the economic sub-system and consider the entire range of domains that make up society. This includes, in addition to the economic, the environment, the social, the political and the spiritual. This thesis has undertaken this exercise.

This thesis adds to the debate on the desirability of economic growth in terms of social welfare but it does not resolve it. However, by applying social choice theory to social welfare, new insights have been gained which further highlight the need to question the assumed desirability of economic growth as matter of course.

9.7 LIMITATIONS AND FURTHER WORK

This thesis focused on Thailand as a representative developing economy. Whilst certain characteristics of Thailand are not shared by all developing economies, it was considered reasonable that Thailand is seen as a suitable representative economy. Further work will include applying the methodologies developed within this thesis to a range of other developing countries to test the results and analysis presented in this thesis.

Both social welfare functions developed in this thesis rely on explicit assumptions. This was unavoidable. Within the first social welfare function, these assumptions included the identification and estimation of what should be included in the adjustments to national income in order to measure social welfare. Within the second social welfare function various assumptions were made on how to identify and estimate the various indicators of needs. Both social welfare functions were also reliant on numerous assumptions, weights and discount rates.

It was noted, therefore, that exclusions, inclusions and methods of calculations could easily manipulate the results of such an aggregate index. All methodology, inclusions and obvious exclusions were justified.

This thesis accepted the validity of normative economics. Whilst these new measures of welfare began as normative exercises, the calculations made were based on objective, scientific information and data.

The growth of environmental economics and increase in methodologies and techniques for numerically measuring resources is constantly increasing and improving (See Heal and Kristrom 2001; Heal 1997, 2001; Harris and Fraser forthcoming for a review of these advances and UN 1999 for the practical methodologies now officially approved). The estimates of various adjustments undertaken within the first social welfare function should be continually updated in light of improvements in *best practice*. Further work is also required for the second social welfare function. A limited number of indicators were

chosen to represent the five levels of hierarchical needs. Whilst it is believed that the choices made regarding these indicators were reasonable, alternative indicators could be selected.

This thesis has been concerned with numerically measuring social welfare for the past twenty-five years. Whilst current levels of social welfare are related to future levels of social welfare, this relationship has only been slightly touched upon in this thesis (see Chapter Seven, Section 7.3). Further work is required, either through the adaptation of the concepts such as the *genuine savings rate* to incorporate all sub-systems of society and not just the environment, or to develop new dynamic models using social choice theory, to predict future social welfare levels. Whilst it has been an important exercise to numerically measure past performances of social welfare, it is also important to predict the continual desirability of economic growth to plan future policy initiatives.

As stated, this thesis does not provide a resolution to the current debate on the desirability of economic growth in terms of social welfare. Further work is required before such a resolution is possible (as remote as this may presently seem). However, this thesis has been valuable in adding to the preset knowledge and extended the debate through the use of social choice theory and systems analysis to gauging the desirability of economic growth.

9.8 CONCLUSION

The desirability of economic growth has been questioned throughout this thesis. It has been argued that it is no longer sufficient for policy makers, in developing countries and therefore probably even more so in developed countries, to seek economic growth for its own sake. Economic growth is a means to an end, not an end in itself. This thesis has argued that economic growth is not a measure of social welfare and therefore public policies cannot simply seek to increase economic growth without consideration of wider social welfare concerns.

Increasing social welfare is desirable, unless economic growth aids this outcome; it in itself is not desirable.

All economists are familiar with the following simple point. As production or income is not the ultimate thing we value, an increase in GNP (even in real and per capita terms) may not be desirable, as a high enough... increase in environmental disruption may offset the benefits of the increase in GNP. (Ng 2001, p. 36)

The motivation underlying the approach of “development as freedom” is not so much to order all states – or all alternative scenarios – into one “complete ordering”, but to draw attention to important aspects of the process of development, each of which deserves attention. Even after such attention is paid, there will no doubt remain deficiencies in possible overall rankings, but their presence is not embarrassing to the purpose at hand. (Sen 1999b, p. 33)

The Thai government has set a target of 5 – 6 percent growth per annum during the next five-year period, 2002-2006 (Ministry of Finance 2001). This is an explicit recognition of the belief that economic growth remains desirable for improving social welfare in Thailand. However, ‘one could perhaps measure Thailand’s success or failure... in terms of the opportunity cost in human development of pursuing the current development strategies (Bell 1993, p. 25).

Thailand’s rapid growth in manufacturing occurred when it implemented export orientated industrialisation policies in the mid to late 1970s (Kakwani and Krongkaew 1997). It is self evident that such economic growth is considered a success of the economic policies implemented. However, economic growth has also long been considered a sign of successful social policies (Kuznets 1968). Within such an environment it is difficult therefore to argue that these feelings of success in economic and social policies might be misplaced despite rapid economic growth having been achieved.

It is likely therefore that the results of this thesis will not be enough to overcome the ‘official blessing of immutability and personal validity’ (Kuznets 1968, p. 81) of the policy undertaken to achieve rapid economic growth, even if these policies have had undesirable effects on social welfare levels.

Appendix A Calculation of the Net Benefits of Public Expenditure on Education

$$\text{BPE} = \text{PE}(0.75)$$

where BPE = Benefits of Public Education expenditure

PE = Public Education expenditure

Year	Public Expenditure on Education (1988 prices, millions of baht)	Ratio of Benefits (75%)	Benefits of Public Expenditure on Education (1988 prices, millions of baht)
1975	16319.67	0.75	12240
1976	17829.08	0.75	13372
1977	18243.49	0.75	13683
1978	22510.14	0.75	16883
1979	24569.88	0.75	18427
1980	28606.9	0.75	21455
1981	28818.07	0.75	21614
1982	35806.06	0.75	26855
1983	37698.6	0.75	28274
1984	41652.07	0.75	31239
1985	43717.02	0.75	32788
1986	46494.46	0.75	34871
1987	45698.09	0.75	34274
1988	46178	0.75	34634
1989	50930.25	0.75	38198
1990	56196.97	0.75	42148
1991	59724.52	0.75	44793
1992	69387.9	0.75	52041
1993	79073.38	0.75	59305
1994	80435.46	0.75	60327
1995	92608.7	0.75	69457
1996	97568.15	0.75	73176
1997	99438.55	0.75	74579
1998	106126.78	0.75	79595
1999	108731.54	0.75	81549

Source: NSO (various issues), Quarterly Bulletin of Statistics and author's own calculations

Appendix B Calculation of the Net Benefits of Public Expenditure on Health

$$BPH = PH(0.75)$$

where BPH = Benefits of Public Health expenditure

PH = Public Health expenditure

Year	Public Expenditure on Health (1988 prices, millions of baht)	Ratio of Benefits (75%)	Benefits of Public Expenditure on Health (1988 prices, millions of baht)
1975	3209.02	0.75	2407
1976	4609.04	0.75	3457
1977	5003.72	0.75	3753
1978	5337.84	0.75	4003
1979	6040.37	0.75	4530
1980	6277.24	0.75	4708
1981	6955.47	0.75	5217
1982	8335.76	0.75	6252
1983	9537.38	0.75	7153
1984	10230.41	0.75	7673
1985	11406.99	0.75	8555
1986	11445.68	0.75	8584
1987	11581.57	0.75	8686
1988	11686	0.75	8765
1989	13050.9	0.75	9788
1990	13829.77	0.75	10372
1991	14726.2	0.75	11045
1992	17729.84	0.75	13297
1993	22331.77	0.75	16749
1994	23885.01	0.75	17914
1995	28277.7	0.75	21208
1996	30083	0.75	22562
1997	34538.16	0.75	25904
1998	35375.59	0.75	26532
1999	34491.15	0.75	25868

Source: NSO (various issues), Quarterly Bulletin of Statistics and author's own calculations

Appendix C Calculation of the Net Costs of Commuting

$CC = NRC(219.XR)$
 where CC = cost of commutin
 NRC = Number of Registered Cars in Bangkok
 XR = Exchange rate

Year	Number of cars registered in Bangkok	Cost per car (in 1988 US dollars prices)	Exchange Rate (baht per US\$)	Deflator for 1988 prices	Costs of Commuting (1988 prices, millions of baht)
1975	334804	219	20.4	48.8	-3066
1976	394804	219	20.4	50.9	-3466
1977	461205	219	20.4	53.8	-3829
1978	522316	219	20.39	59.2	-3939
1979	545249	219	20.425	64.4	-3787
1980	571267	219	20.63	72.5	-3560
1981	733920	219	23	78.6	-4704
1982	891241	219	23	82.5	-5441
1983	1048562	219	23	85.6	-6171
1984	1205883	219	23.64	86.8	-7192
1985	1363204	219	27.16	88.7	-9141
1986	1520526	219	26.3	90.2	-9710
1987	1677847	219	25.72	94.4	-10012
1988	1835169	219	25.29	100	-10164
1989	1721586	219	25.7	106.1	-9133
1990	2045814	219	25.59	112.2	-10218
1991	2112518	219	25.52	118.7	-9947
1992	2373288	219	25.4	124	-10647
1993	2656107	219	25.32	128.1	-11497
1994	2963043	219	25.15	134.8	-12107
1995	3241681	219	24.92	142.6	-12406
1996	3549082	219	25.34	148.2	-13289
1997	3849082	219	31.36	154.6	-17099
1998	4149082	219	41.36	168.8	-22264
1999	4449082	219	37.84	163.9	-22495

Source: NSO (various issues), Quarterly Bulletin of Statistics, Tanaborrboon (1990) and author's own calculations

Appendix D Calculation of the Net Costs of Urbanisation

$$CU = BY(0.08) + BY(0.1)$$

where CU = cost of urbanisation

BY = average income for Bangkok residents

Year	Average income for Bangkok Residents per capita (1988 prices)	Cost of Air Pollution for Bangkok Residents (8% of average income)	Cost of Water Pollution for Bangkok Residents (10% of average income)	Bangkok Population	Costs of Urbanisation (1988 prices, millions of baht)
1975	16289	1303	1629	6167883	18084
1976	17502	1400	1750	6400483	20164
1977	18608	1489	1861	6644460	22255
1978	20042	1603	2004	6828375	24634
1979	20368	1629	2037	7013117	25712
1980	21047	1684	2105	7227779	27382
1981	21710	1737	2171	7465007	29172
1982	22591	1807	2259	7686871	31258
1983	23368	1869	2337	7338883	30869
1984	23831	1906	2383	7557852	32420
1985	23982	1919	2398	7839816	33843
1986	24333	1947	2433	8031374	35177
1987	25435	2035	2544	8292009	37963
1988	27012	2161	2701	8509386	41374
1989	30941	2475	3094	8728335	48611
1990	34834	2787	3483	8538610	53538
1991	39878	3190	3988	8701374	62459
1992	45397	3632	4540	8661228	70775
1993	44934	3595	4493	8769341	70927
1994	44288	3543	4429	8851180	70560
1995	50898	4072	5090	8896506	81507
1996	55846	4468	5585	9009004	90561
1997	56806	4544	5681	9114852	93200
1998	52742	4219	5274	9242038	87740
1999	58624	4690	5862	9308924	98231

Source: NSO (various issues), Quarterly Bulletin of Statistics and author's own calculations

Appendix E Calculation of the Net Benefits of Private Expenditure on Health

$$\text{CPrHE} = \text{PrHE}(0.5)$$

where CPrHE = Cost of Private Health Expenditure

PrHE = Private Health Expenditure

Year	Private Expenditure on Health (1988 prices, millions of baht)	Ratio of Benefits (5)%	Benefits of Private Expenditure on health (1988 prices, millions of baht)
1975	15447	0.50	7723
1976	15157	0.50	7579
1977	17963	0.50	8981
1978	20282	0.50	10141
1979	22143	0.50	11071
1980	23655	0.50	11828
1981	27009	0.50	13504
1982	28011	0.50	14005
1983	32090	0.50	16045
1984	42570	0.50	21285
1985	48157	0.50	24078
1986	53694	0.50	26847
1987	60665	0.50	30327
1988	69955	0.50	34978
1989	78217	0.50	39108
1990	86854	0.50	43427
1991	87909	0.50	43955
1992	94149	0.50	47075
1993	102496	0.50	51248
1994	105738	0.50	52869
1995	112102	0.50	56051
1996	115787	0.50	57893
1997	112038	0.50	56019
1998	102616	0.50	51308
1999	113419	0.50	56710

Source: NSO (various issues), Quarterly Bulletin of Statistics and author's own calculations

Appendix F Calculation of the Net Benefits of Public Expenditure on Roads

$$\text{BPR} = \text{PR}(0.5)$$

where BPR = Benefits of Public Roads expenditure

PR = Public Roads expenditure

Year	Public Expenditure on Roads (1988 prices, millions of baht)	Ratio of Benefits (5)%	Benefits of Public Expenditure on Roads (1988 prices, millions of baht)
1975	6433	0.50	3216
1976	8228	0.50	4114
1977	4824	0.50	2412
1978	8315	0.50	4157
1979	7648	0.50	3824
1980	8183	0.50	4091
1981	9045	0.50	4523
1982	7689	0.50	3845
1983	7384	0.50	3692
1984	7768	0.50	3884
1985	9092	0.50	4546
1986	8708	0.50	4354
1987	9108	0.50	4554
1988	9940	0.50	4970
1989	10774	0.50	5387
1990	12702	0.50	6351
1991	13513	0.50	6757
1992	15682	0.50	7841
1993	17119	0.50	8560
1994	18245	0.50	9123
1995	20252	0.50	10126
1996	22081	0.50	11041
1997	21504	0.50	10752
1998	21087	0.50	10544
1999	22163	0.50	11082

Source: NSO (various issues), Quarterly Bulletin of Statistics and author's own calculations

Appendix G Calculation of the Net Benefits of Consumer Durables

$$\text{BCD} = \text{CD}/0.1$$

where BCD = benefits of consumer durables

CD = consumer durables

Year	Expenditure on Consumer Durables (1988 prices, millions of baht)	Ratio of Benefits (50%)	Benefits of Expenditure on Consumer Durables (1988 prices, millions of baht)
1975	24576	0.50	2458
1976	28552	0.50	2855
1977	34190	0.50	3419
1978	37171	0.50	3717
1979	39981	0.50	3998
1980	44368	0.50	4437
1981	47375	0.50	4738
1982	48539	0.50	4854
1983	58078	0.50	5808
1984	60419	0.50	6042
1985	55902	0.50	5590
1986	58884	0.50	5888
1987	71504	0.50	7150
1988	91589	0.50	9159
1989	114173	0.50	11417
1990	144907	0.50	14491
1991	145275	0.50	14527
1992	167360	0.50	16736
1993	195183	0.50	19518
1994	206373	0.50	20637
1995	232177	0.50	23218
1996	241499	0.50	24150
1997	206862	0.50	20686
1998	142975	0.50	14297
1999	161799	0.50	16180

Source: NSO (various issues), Quarterly Bulletin of Statistics and author's own calculations

Appendix H Calculation of the Net Costs of Corruption

$$\text{CPC} = \text{GDP}_{1975-81}(0.0088) + \text{GDP}_{1982-88}(0.0074) + \text{GDP}_{1989-99}(0.007)$$

where CPC = Cost of Political Corruption

GDP = Gross Domestic Product

Year	Gross Domestic Product (1988 prices, millions of baht)	Ratio of Costs (1975-81 is .0088, 1982-88 is .0074, 1989-99 is .007)	Costs of Corruption (1988 prices, millions of baht)
1975	621555.33	0.0088	5470
1976	680778	0.0088	5991
1977	750053.9	0.0088	6600
1978	824706.08	0.0088	7257
1979	867796.58	0.0088	7637
1980	913768.28	0.0088	8041
1981	967374.05	0.0088	8513
1982	1020083.64	0.0074	7549
1983	1075921.73	0.0074	7962
1984	1138329.49	0.0074	8424
1985	1191089.06	0.0074	8814
1986	1256537.69	0.0074	9298
1987	1377026.48	0.0074	10190
1988	1559804	0.0074	11543
1989	1750228.09	0.007	12252
1990	1946118.54	0.007	13623
1991	2111739.68	0.007	14782
1992	2282995.16	0.007	15981
1993	2494747.85	0.007	17463
1994	2669572.7	0.007	18687
1995	9884495.09	0.007	20191
1996	3095336.03	0.007	21667
1997	3502012.29	0.007	24514
1998	2787395.14	0.007	19512
1999	2823416.11	0.007	19764

Source: NSO (various issues), Quarterly Bulletin of Statistics and author's own calculations

Appendix I Calculation of the Net Costs of Public Debt

$$\text{CPD} = \text{IPD}(0.5)$$

where CPD = Cost of Public Debt
 IPD = Interest on Public Debt

Year	Interest paid on Public Debt (1988 prices, millions of baht)	Ratio of Costs (.5)	Costs of Public Debt (1988 prices, millions of baht)
1975	7080	0.50	3540
1976	7497	0.50	3749
1977	8989	0.50	4494
1978	10154	0.50	5077
1979	12101	0.50	6050
1980	15041	0.50	7521
1981	18575	0.50	9288
1982	22761	0.50	11381
1983	26022	0.50	13011
1984	30832	0.50	15416
1985	34407	0.50	17203
1986	39866	0.50	19933
1987	38872	0.50	19436
1988	40061	0.50	20031
1989	41867	0.50	20934
1990	35625	0.50	17812
1991	27104	0.50	13552
1992	23066	0.50	11533
1993	19668	0.50	9834
1994	15331	0.50	7664
1995	9989	0.50	4994
1996	6362	0.50	3181
1997	8318	0.50	4159
1998	11242	0.50	5621
1999	29667	0.50	14833

Source: NSO (various issues), Quarterly Bulletin of Statistics and author's own calculations

Appendix J Calculation of the Net Costs of Air Pollution

$$AP = cCO_2 + cCO + cNOX + cSOX + cSPM$$

where AP = Air Pollution
 cCO₂ = cost of carbon dioxide (.03335 baht per kg)
 cCO = cost of carbon monoxide (.03335 baht per kg)
 cNOX = cost of nitrogen monoxide (2.84 baht per kg)
 cSOX = cost of sulfur monoxide (7.4 baht per kg)
 cSPM = cost of suspended particulate matters (4.15 baht per kg)

Year	Total CO and CO ₂ for Bangkok (in kilotons)	Cost for abatement (0.03335 baht per kg, 1988 prices)	Net Costs of Air Pollution caused by CO and CO ₂ (1988 prices, millions of baht)	Total NOX Bangkok (in kiloton)	Cost for abatement (2.84 baht per kg, 1988 prices)	Net Costs of Air Pollution caused by NOX (1988 prices, millions of baht)
1975	52588.90	0.03335	1753.84	220.34	2.84	625.78
1976	57596.10	0.03335	1920.83	241.32	2.84	685.37
1977	62740.61	0.03335	2092.40	263.61	2.84	750.52
1978	67288.52	0.03335	2244.07	282.74	2.84	804.98
1979	70795.29	0.03335	2361.02	289.62	2.84	824.56
1980	70687.81	0.03335	2357.44	290.99	2.84	828.45
1981	72879.03	0.03335	2430.52	300.89	2.84	856.65
1982	85901.40	0.03335	2531.31	311.59	2.84	887.11
1983	80062.09	0.03335	2670.07	336.40	2.84	957.76
1984	85705.13	0.03335	2858.27	370.01	2.84	1053.44
1985	90031.02	0.03335	3002.53	389.90	2.84	1101.52
1986	92631.53	0.03335	3089.26	401.66	2.84	1143.54
1987	103813.57	0.03335	3462.18	449.80	2.84	1280.59
1988	115374.01	0.03335	3847.72	502.97	2.84	1431.97
1989	133749.06	0.03335	4460.53	586.23	2.84	1669.03
1990	151441.91	0.03335	5050.59	664.32	2.84	1891.35
1991	165832.16	0.03335	5530.50	717.95	2.84	2044.04
1992	180329.54	0.03335	6013.99	771.41	2.84	2196.25

1993	201600.08	0.03335	6723.36	851.60	2.84	2424.55
1994	225034.04	0.03335	7504.89	952.12	2.84	2710.74
1995	249357.61	0.03335	8316.08	1060.96	2.84	3020.60
1996	274150.06	0.03335	9142.90	1162.48	2.84	3309.63
1997	373717.54	0.03335	12463.48	1565.86	2.84	4447.06
1998	404374.21	0.03335	13485.88	1694.32	2.84	4811.86
1999	435018.29	0.03335	14507.86	1822.71	2.84	5176.51

Total SOX for Bangkok (in kilotons)	Cost for abatement (7.4 baht per kg, 1988 prices)	Net Costs of Air Pollution caused by SOX (1988 prices, millions of baht)	Total SPM Bangkok (in kilotons)	Cost for abatement (4.15 baht per kg, 1988 prices)	Net Costs of Air Pollution caused by SPM (1988 prices, millions of baht)	Total Cost of Air Pollution (1988 prices, millions of baht)
267.53	7.4	1679.74	13.89	4.15	57.64	4117.00
248.60	7.4	1839.67	15.21	4.15	63.13	4509.00
270.80	7.4	2004.54	15.913	4.15	66.02	4913.47
321.65	7.4	2380.95	20.649	4.15	85.67	5515.67
336.24	7.4	2488.93	20.309	4.15	84.25	5758.77
371.99	7.4	2753.63	25.761	4.15	106.87	6046.39
362.63	7.4	2684.33	23.522	4.15	97.58	6069.08
376.12	7.4	2784.16	23.846	4.15	98.93	6301.50
409.70	7.4	3032.74	27.250	4.15	113.05	6773.62
451.99	7.4	3345.80	30.033	4.15	124.60	7382.10
497.66	7.4	3683.87	34.328	4.15	142.41	7930.33
494.36	7.4	3659.41	33.223	4.15	137.83	8030.04
591.84	7.4	4381.01	42.336	4.15	175.63	9299.42
678.52	7.4	5022.66	49.658	4.15	206.01	10508.37
781.89	7.4	5787.84	55.216	4.15	229.07	12146.48
946.97	7.4	7009.82	70.335	4.15	291.79	14243.55
1109.27	7.4	8211.21	86.386	4.15	358.38	16144.13
1205.13	7.4	8920.78	93.994	4.15	389.94	17520.97
1337.66	7.4	9901.81	103.563	4.15	429.64	19479.37
1510.89	7.4	11184.15	115.772	4.15	480.29	21880.07
1680.79	7.4	12441.75	127.502	4.15	528.95	24307.39
1897.28	7.4	14055.29	146.490	4.15	607.73	27104.56

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1613.50	7.4	11936.86	98.70	4.15	409.60	29257.00
1745.41	7.4	12916.06	106.80	4.15	443.20	31657.00
1852.65	7.4	13894.85	114.90	4.15	476.78	34056.00

Source: Department of Energy Development and Promotion, Agotini and Col (1992 cited in Guenno and Tiezzo 1998) and author's own calculations

Appendix K Calculation of the Net Costs of Water Pollution

$$WP = (7.5 \times IP) + (7.5 \times 4.6 \times MP)$$

- where
- WP = cost of water pollution
 - IP = industrial pollution
 - = FI + DI + PI + CI + TI
 - FI = food industry BOD
 - DI = drink industry BOD
 - PI = paper industry BOD
 - CI = chemical industry BOD
 - TI = textile industry BOD
 - MP = municipal population BOD
 - = municipal population x 4.6 kgs per years

Year	Total BOD for the Food Industry (in tons)	Total BOD for Beverage Industry (in tons)	Total BOD for the Textiles Industry (in tons)	Total BOD for Paper Industry (in tons)	Total BOD for the Chemical Industry (in tons)	Total BOD for All Industries (in tons)
1975	126252	100300	3507	3039	701	233800
1976	141084	112083	3919	3396	784	261266
1977	159469	126692	4436	3855	1081	295534
1978	171874	138440	5133	4741	1340	321427
1979	161920	153814	6051	6684	1363	329832
1980	169518	185059	5826	9671	1371	371445
1981	199583	182531	6099	9638	1505	399356
1982	229250	188745	6284	9567	1498	435343
1983	221811	225426	6720	10067	1609	465633
1984	249194	246130	7090	10539	1842	514795
1985	260482	212677	7401	10593	1924	493076
1986	288786	203468	8408	11463	2138	514263
1987	282309	226943	9814	13064	2436	544566
1988	336041	270772	11466	13902	2739	634920
1989	379852	311294	12840	15013	2909	721909
1990	377931	350981	13645	18104	3262	763923
1991	421510	395014	15003	20705	3423	855655

1992	453417	419004	16504	23165	3715	915806
1993	446363	462804	16516	26989	4013	956685
1994	486078	525849	17000	32877	4412	1066215
1995	511264	607720	17702	36280	5233	1178198
1996	539619	644207	17263	41868	5707	1248663
1997	547601.9	676146.9	16710.86	39848.96	5141.802	1285450
1998	500121.2	617520.5	15261.91	36393.79	4695.973	1173973
1999	506919.3	625914.4	15469.37	36888.49	4759.805	1189951

Year	Cost for abatement (7.5 baht per kg, 1988 prices)	Net Costs of Water Pollution caused All Industries (1988 prices, millions of baht)	Total BOD for Municipal Population (in tons)	Cost for abatement (7.5 baht per kg, 1988 prices)	Net Costs of Water Pollution by Municipal Population (1988 prices, millions of baht)	Total Costs caused by Water Pollution (1988 prices, millions of baht)
1975	7.5	1753502	37333	7.5	279998	4067
1976	7.5	1959498	35667	7.5	267502	4454
1977	7.5	2216505	34897	7.5	261728	4956
1978	7.5	2410703	36019	7.5	270143	5362
1979	7.5	2473740	37012	7.5	277590	5503
1980	7.5	2785838	38088	7.5	285660	6143
1981	7.5	2995170	39593	7.5	296948	6854
1982	7.5	3265073	41390	7.5	310425	7151
1983	7.5	3492248	39919	7.5	299393	7583
1984	7.5	3860963	40918	7.5	306885	8336
1985	7.5	3698070	42462	7.5	318465	8033
1986	7.5	3856973	43390	7.5	325425	8364
1987	7.5	4084245	44316	7.5	332370	8833
1988	7.5	4761900	45966	7.5	344745	10213
1989	7.5	5414318	46933	7.5	351998	11533
1990	7.5	5729423	45740	7.5	343050	12145
1991	7.5	6417413	46204	7.5	346530	13528
1992	7.5	6868545	47057	7.5	352928	14443
1993	7.5	7175138	47325	7.5	354938	15060
1994	7.5	7996613	49317	7.5	369878	16733

1995	7.5	8836485	49947	7.5	374603	18422
1996	7.5	9364973	50858	7.5	381435	19493
1997	7.5	9640878	50083	7.5	375622	20033
1998	7.5	8804950	45740	7.5	343050	18296
1999	7.5	8924635	45582	7.5	341865	18533

Source: Phansawas et al. (1987), TESCO (1993), Department of Industrial Works (1986) and author's own calculations.

Appendix L Calculation of the Net Costs of Noise Pollution

$$NP = GDP(0.01)$$

where NP = Cost of Noise Pollution

GDP = Gross Domestic Product

Year	Gross Domestic Product (1988 prices, millions of baht)	Ratio of Benefits (10%)	Costs of Noise Pollution (1988 prices, millions of baht)
1975	621555.33	0.10	6216
1976	680778	0.10	6808
1977	750053.9	0.10	7501
1978	824706.08	0.10	8247
1979	867796.58	0.10	8678
1980	913768.28	0.10	9138
1981	967374.05	0.10	9674
1982	1020083.64	0.10	10201
1983	1075921.73	0.10	10759
1984	1138329.49	0.10	11383
1985	1191089.06	0.10	11911
1986	1256537.69	0.10	12565
1987	1377026.48	0.10	13770
1988	1559804	0.10	15598
1989	1750228.09	0.10	17502
1990	1946118.54	0.10	19461
1991	2111739.68	0.10	21117
1992	2282995.16	0.10	22830
1993	2494747.85	0.10	24947
1994	2669572.7	0.10	26696
1995	2884495.09	0.10	28845
1996	3095336.03	0.10	30953
1997	3502012.29	0.10	30520
1998	2787395.14	0.10	27874
1999	2823416.11	0.10	28234

Source: NSO (various issues), Quarterly Bulletin of Statistics and author's own calculations

Appendix M Calculation of the Net Costs of Deforestation

$$D = DF(886)$$

where D = Cost of Deforestation

DF = Hectares of Deforestation

Year	Amount of Thai forests as a percentage of Total Land	Amount of Thai forests in Hectares	Amount of Deforestation from previous period	Cost of Deforestation per hectare (1988 prices)	Total Cost of Deforestation (1988 prices, millions of baht)
1975	40.3	2128878630	69991930	886	62013
1976	39	2058886700	66415700	886	58844
1977	36.5	1992471000	127722500	886	113162
1978	34	1864748500	127722500	886	113162
1979	33.25	1737026000	38316750	886	33949
1980	32.5	1698709250	38316750	886	33949
1981	31.75	1660392500	38316750	886	33949
1982	31	1622075750	38316750	886	33949
1983	30.33	1583759000	34229630	886	30327
1984	29.66	1549529370	34229630	886	30327
1985	29	1515299740	33718740	886	29875
1986	28.75	1481581000	12772250	886	11316
1987	28.5	1468808750	12772250	886	11316
1988	28.25	1456036500	12772250	886	11316
1989	28	1443264250	12772250	886	11316
1990	27.44	1430492000	28609840	886	25348
1991	26.88	1401882160	28609840	886	25348
1992	26.33	1373272320	28098950	886	24896
1993	25.77	1345173370	28609840	886	25348
1994	25.22	1316563530	28098950	886	24896
1995	24.66	1288464580	28609840	886	25348
1996	24.11	1259854740	28098950	886	24896
1997	23.55	1231755790	28609840	886	25348
1998	23	1203145950	28098950	886	24896
1999	22.9	1175047000	5108900	886	4526

Source: Phongpaichit and Baker (1995), Trebuil (1993), Bello (1997), Dixon (1999), Panayotou and Parasuk (1990) and author's own calculations.

Appendix N Calculation of the Net Costs of Long-term Environmental Damage

$$ED = cCD + cCWR + cCF$$

where

ED = long-term environmental damage

cCD = cost of carbon emissions of deforestation
= 21.59 x tonne of carbon emission

cCWR = cost of carbon emissions of wet rice farming
= 21.59 x tonne of carbon emission

cCF = cost of carbon emissions of fuel consumption
= 21.59 x tonne of carbon emission

Year	Forest Area Loss (in rai)	Carbon released due to Forest Loss (in tons)	Wet Rice Paddy Farming (in rai)	Methane Emissions due to Wet Rice Paddy Farming (in tons)	Carbon equivalents released due to Wet Rice Paddy Farming (in tons)
1975	5311477	209059750	53254959	490797	9189440
1976	1076217	42359888	10790475	99445	1861973
1977	7436600	292704576	71497303	658919	12336750
1978	7059025	277843224	73270474	675261	12642708
1979	3122018	122882628	72957034	671450	12571370
1980	2974247	117066362	73562985	677956	12693181
1981	2836310	111637162	73523312	677591	12686335
1982	2707425	106564248	73222199	674816	12634379
1983	1607634	63276474	73634692	678617	12705554
1984	1571903	61870102	73909386	681149	12752952
1985	1537189	60503759	73902435	681085	12751752
1986	1503439	59175359	74233442	684135	12808867
1987	360683	14196483	72169171	665111	12452680
1988	1413970	55653859	70827661	652748	12221205
1989	244557	9625764	70189879	646870	1211156
1990	2147089	84509423	69436107	639923	11981094
1991	2052252	80776639	69253120	638237	11949520
1992	1092115	72985646	68835616	634389	11877480

1993	893546	35169971	68336567	629790	11791370
1994	649068	25549316	68320651	629643	11788624
1995	623394	24536788	68292753	629386	11783810
1996	1101733	43364211	68292753	629386	11783810
1997	805908	31720553	49955622	460391	8619758
1998	908457	35756851	56312176	518973	9716583
1999	908054	35741023	59287219	518743	9712281

Year	CO₂ Emissions by Fuel Consumption (in tons)	Carbon equivalents released due to Fuel Consumption (in tons)	Total Carbon (or equivalents released (in tons)	Cost of Damage due to Carbon (or equivalents) emissions (per tons)	Total Cost of Long-term Damage (1988 prices, millions of baht)
1975	42087630	11486799	229735989	21.59	4960
1976	8527835	2327466	46549328	21.59	5965
1977	58678206	16014794	321056121	21.59	6932
1978	63170668	17240903	307726835	21.59	13575
1979	66678868	18198381	153652379	21.59	16893
1980	66589310	18173938	147933481	21.59	20087
1981	68622964	18278975	143052472	21.59	23175
1982	71551834	19528339	138726966	21.59	26170
1983	75452850	20593027	96575054	21.59	28255
1984	81013157	22110578	96733631	21.59	30344
1985	85245021	23265563	96521074	21.59	32428
1986	87586900	23904722	95888948	21.59	34498
1987	98295429	26827355	53476518	21.59	35653
1988	109356238	29846135	97721199	21.59	37762
1989	127103326	34689772	56426692	21.59	38981
1990	144239628	39366711	135857228	21.59	41914
1991	158280507	43198858	135924987	21.59	44848
1992	172069327	46962153	101825279	21.59	47047
1993	192372921	52503527	99464867	21.59	49194
1994	215246696	58746369	96082309	21.59	51269
1995	238875088	65195166	101515764	21.59	53460
1996	262871574	71744425	126892446	21.59	56206
1997	19228833	52480440	92820750	21.59	58210

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1998	216756158	59158340	104631774	21.59	60469
1999	216660206	59132152	104585456	21.59	62727

Source: Royal Forestry Department (various issues), Ministry of Agriculture (1992), Office of Agricultural Economics (1986), Department of Energy Development and Promotion (1990), Nordhaus (1991)

Appendix O Calculation of the Net Costs of Commercial Sex Work

$$\text{CSW} = \text{GNP}(0.03)$$

where CSW = Cost of Commercial Sex Work

GNP = Gross National Product

Year	Gross National Product (1988 prices, millions of baht)	Ratio of Costs (3%)	Costs of Commercial Sex Work (1988 prices, millions of baht)
1975	303306	0.03	18646
1976	345632	0.03	20371
1977	402252	0.03	22430
1978	484604	0.03	24558
1979	552636	0.03	25744
1980	657088	0.03	27190
1981	748321	0.03	28562
1982	828647	0.03	30133
1983	914288	0.03	32043
1984	976619	0.03	33754
1985	1038898	0.03	35137
1986	1110960	0.03	36950
1987	1277519	0.03	40599
1988	1535034	0.03	46051
1989	1833324	0.03	51838
1990	2156107	0.03	57650
1991	2469744	0.03	62420
1992	2767953	0.03	66967
1993	3108922	0.03	72808
1994	3578705	0.03	79645
1995	4124495	0.03	86771
1996	4520748	0.03	91513
1997	4616874	0.03	89590
1998	4468387	0.03	79414
1999	4488952	0.03	82165

Source: NSO (various issues), Quarterly Bulletin of Statistics and author's own calculations

Appendix P

Individual Indicators to Measure Hierarchical Needs Fulfillment, Thailand 1975-1999												
Year	Basic Needs		Safety Needs			Belonging Needs			Esteem Needs		Self-Actualisation Needs	
	Calories	Inequality adjusted Personal Income (1988 baht) p.c.	Homicide rate	Life Expectancy	Divorce rate	Infant Mortality	Democracy	Female Workforce	Prim. Enroll	Sec Enroll		
1975	2250.00	8113	28	60.60	30	26.00	8	47.76	81.00	25.0		
1976	2240.00	8661	28	60.90	40	25.50	5	47.68	81.00	27.0		
1977	2188.00	9150	28	61.20	40	16.20	12	47.60	83.00	28.0		
1978	2235.00	9792	27.16	61.95	45	16.60	11	47.52	84.00	29.0		
1979	2205.00	9887	28.92	62.70	49	14.20	10	47.43	95.00	29.0		
1980	2226.00	10149	24.94	63.45	53	13.30	7	47.35	99.00	29.0		
1981	2224.00	10400	27.56	64.20	57	12.50	7	47.29	100.00	29.0		
1982	2211.00	10604	22.17	64.94	49	12.40	7	47.22	98.00	29.0		
1983	2245.00	10745	18.26	65.45	57	12.40	7	47.15	99.00	30.0		
1984	2190.00	10728	16.56	65.96	59	11.30	7	47.09	97.50	30.0		
1985	2178.00	10733	13.84	66.47	62	11.00	7	47.02	96.00	30.0		
1986	2160.00	10685	12.27	66.98	69	9.00	7	46.95	97.00	32.0		
1987	2284.00	11632	11.29	67.49	58	11.00	6	46.88	98.00	34.0		
1988	2209.00	12860	11.27	67.79	61	9.00	6	46.82	98.00	29.0		
1989	2282.00	13813	10.40	68.09	66	8.00	6	46.75	99.00	28.0		
1990	2259.00	14509	9.53	68.38	67	8.00	5	46.69	99.00	30.0		
1991	2200.00	15148	8.85	68.68	68	8.00	5	46.75	99.00	33.0		
1992	2326.00	15699	8.85	68.98	70	8.00	10	46.81	98.00	37.0		
1993	2382.00	17043	8.61	70.19	71	7.00	7	46.87	99.00	37.7		
1994	2387.00	18614	7.79	70.70	73	7.00	8	46.93	99.00	39.8		
1995	2305.00	20379	7.36	71.22	74	6.70	8	46.90	99.00	41.9		
1996	2310.00	21204	6.83	71.74	76	6.40	7	46.93	99.00	44.0		
1997	2316.00	20386	6.30	72.25	77	6.10	6	46.95	99.00	46.1		
1998	2322.00	17803	5.78	72.77	79	5.80	6	46.98	99.00	48.2		
1999	2328.00	17212	5.25	73.29	80	5.50	5	47.00	99.00	50.3		

Source: Hagerty (1999); Islam and Clarke (2001b); Clarke (2001a), (2001b); various NSO publications; Freedom House (2001).

APPENDIX Q

SEE Adjustments for Costs caused by Economic Growth in Thailand, 1975 – 1999 (1988 prices – millions of baht)

Year	GDP	GDP adjusted for Inequality	Commuting	Urbanisation	Air	Water	Noise	Deforestation	Long-term Environmental Damage	SEE AGDP
1975	621555	415261	3066	18084	4117	4067	6216	62013	4960	312738
1976	680778	451935	3466	20164	4509	4454	6808	58844	5965	347724
1977	750054	494736	3829	22255	4913	4956	7501	113162	6932	331187
1978	824706	540471	3939	24634	5516	5362	8247	113162	13575	366036
1979	867797	565022	3787	25712	5759	5503	8678	33949	16893	464742
1980	913768	591071	3560	27382	6046	6143	9138	33949	20087	484766
1981	967374	621635	4704	29172	6069	6854	9674	33949	23175	508037
1982	1020084	642775	5441	31258	6302	7151	10201	33949	26170	522304
1983	1075922	664532	6171	30869	6774	7583	10759	30327	28255	543795
1984	1138329	688872	7192	32420	7382	8336	11383	30327	30344	561487
1985	1191089	705935	9141	33843	7930	8033	11911	29875	32428	572773
1986	1256538	729043	9710	35177	8030	8364	12565	11316	34498	609383
1987	1377026	805423	10012	37963	9299	8833	13770	11316	35653	678576
1988	1559804	919660	10164	41374	10508	10213	15598	11316	37762	782725
1989	1750228	995442	9133	48611	12146	11533	17502	11316	38981	846220
1990	1946119	1066278	10218	53538	14244	12145	19461	25348	41914	889411
1991	2111740	1132104	9947	62459	16144	13528	21117	25348	44848	938713
1992	2282995	1196974	10647	70775	17521	14443	22830	24896	47047	988815
1993	2494748	1327580	11497	70927	19479	15060	24947	25348	49194	1111128
1994	2669573	1441569	12107	70560	21880	16733	26696	24896	51269	1217428
1995	2884495	1578828	12406	81507	24307	18422	28845	25348	53460	1334533
1996	3095336	1716983	13289	90561	27105	19493	30953	24896	56206	1454480
1997	3502012	1946944	17099	93200	29257	20033	30520	25348	58210	1673277
1998	2787395	1553137	22264	87740	31657	18296	27874	24896	60469	1279941
1999	2823416	1480317	22495	98231	34056	18533	28234	4526	62727	1211515

Source: Author's own calculations based on calculations set out above.

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