THE ANALYSIS OF THE DETERMINANTS OF EDUCATION EXPENDITURES IN THAILAND

Danuvas Sagarik

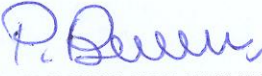**A Dissertation Submitted in Partial**
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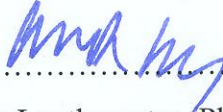
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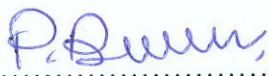
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ABTRACT

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The aim of this integrative study builds on the established theories of public policy analysis, economics, and public finance to empirically investigate and analyze the determinants of public expenditure on education in Thailand. For the purpose of this study, it is posited that education expenditure are determined by multi-dimensional determinants. A number of theories are therefore incorporated regarding economic-demographic, political, institutional, decision-making theories as well as the concept of education. This study recognizes and quantifies educational expenditures by both types and stages of education according to the allocation of government budget and the education system in Thailand. The results reveal that the education policy in Thailand is mainly determined by last year's expenditure. Industrialization also increases the total education expenditure. This is what the incrementalism theory and the Wager's Law postulate respectively. Besides, unemployment has an inverse impact on several educational expenditures. These results imply that the Thai government mainly takes into account only certain factors and neglect to incorporate the importance of other factors, such as demographic and educational indicators, when allocating education expenditures. Nevertheless, the results from the estimations of the provincial distribution are rather ambiguous and it is unclear to conclude that the distribution of educational expenditure in Thailand across provinces is able to improve the equality.

ACKNOLEDGEMENT

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CHAPTER 1

INTRODUCTION

1.1 Significance of the Study

The determinants of public policy are crucial for policy makers and policy analysts, as they provide important information to achieve desirable outcomes and can be analyzed from the public policy approach. In particular, the literature has provided the possible determinants of the different size of governments across countries. These kind of studies, in general, focus on the various single aspects that are supposed to be the driving force of overall government size.

This research places the questions regarding the determinants of public education expenditures in the proper theoretical perspective, which it is believed will generate profound findings. These findings will allow us to thoroughly understand how politics and governments operate in the formation of public policy at the national level and for the local distribution across countries with reference to education expenditure policy.

A study that analyzes and determines the dimensions of economic, social, and political decisions is therefore worth considering. More importantly, an analysis of the specific or particular kind of public policy makes the policy implications more concrete and insightful. It is widely accepted in the field of policy sciences that governments do make political choices from a number of policy options, constrained by context, which are not within their immediate influence. Further governments do not have autonomy in the policy process but are shaped by many specific contextual factors.

This paper places emphasis on education policy, as the role of education in economic and human development has been recognized for quite some time. Education is desirable not only for the individual but also for the society as a whole.

Education benefits directly those that receive it in the form of the individual's future income. At the aggregate level, a better-educated workforce is thought to increase the stock of human capital in the economy and consequently increase its productivity (Sen, 1999). Education subsidies serve to promote the positive spillover of human capital investment. Indeed, human capital is a link which enters both the causes and effects of economic-demographic changes (Mincer, 1981).

A study or an analysis of education policy should play an important role in promoting the optimal action of government to achieve development goals. As defined by Dye (1978), public policy is what the government chooses to do or not to do to fulfill its functions. This traditional definition leaves space for the government to use public policy to achieve desirable outcomes.

One of the channels in public policy comes from fiscal policy, such as the changes in the regulations, tax structures, and expenditures, which can have both a direct and indirect effect on policy goals (Agenor, 2002). Among the many policy tools, a number of studies have attempted to analyze public expenditure since it provides an opportunity for research into how governments behave in practice. Public expenditure has become an important aspect of public policies and has generated wide interest among governments across the world.

A number of previous studies focused on cross-country analysis. Nevertheless, one must consider further, when conducting a research or an analysis of the determinants and impact of public expenditures, whether the work is to be done on an international or national basis. Although a cross-country analysis is theoretically valuable, previous studies found that cross-country evidence is uninformative in pointing out the determinants of policy goals (Kraay, 2004). It should be noted that different governments face different constraints that vary according to the socio-economic and political context of each society. This leaves an important and comprehensive research agenda to explore an in-depth analysis of a specific country. Therefore, there is a need for more country-level studies on the underlying determinants of changes in education expenditure.

In Thailand, two crucial issues are associated with Thai education expenditure policy. First, education expenditures in Thailand have been increasing substantially in the past few decades. This trend in education expenditures allocation has made it

significant and it deserves a thorough analysis. There is a strong need for further knowledge on this particular issue to provide such analysis for policymakers. Of interest is the vast gap in the knowledge of the determinants of Thai education expenditures, which has had the largest share of Thailand's budget in many recent years. It would be interesting, therefore, to find out what determines the allocation of education expenditures over time and across provinces in Thailand. Such an analysis is indispensable as it would be quite helpful in the debate on whether there should be policies that try to benefit as many as possible or to determine which type of expenditure would benefit the country most.

Secondly, Thailand has encountered a structural problem of inequality for decades, including the distribution of public expenditure across regions and provinces. Additionally, most poor households in Thailand tend to be able to afford only a relatively low level and low quality of education. This pattern could lead to an even wider gap between the rich and the poor, which generates more complex structural problems. The issue of education expenditures distribution across provinces in Thai society is also taken into account in this study. This study, therefore, attempts to explain whether education expenditures are distributed equally across provinces and what determine this provincial distribution. Particularly, what are the factors that the Thai government takes into account when allocating education expenditures to small or poor provinces, and what influences the Thai government in allocating education expenditures to the relatively large or rich provinces? These questions will be explored in this study.

This study is significant as it recognizes some of the weaknesses associated with cross-country analysis and it obviously adds to the literature by using the country-level analysis of Thailand. The context and constraints of a particular country provide a more insightful empirical analysis for this field of study. It is of interest here since Thailand has faced different political economy pressures from the structural problems in the country, such as that of inequality, which is different from some other countries.

This study is also significant because the use of evidence from recent statistics provides fresh opportunities to compare national experiences. Moreover, the analysis of this paper focuses on the composition of public expenditure, which is an illustration

of the government's actual behavior with respect to educational policy making. Previous studies on public expenditures in Thailand paid only little attention to the composition of public expenditure and were limited by the short periods of studies. This study will not only rely on the time-series basis, but will also use panel data to obtain a more profound analysis regarding the inequality of education expenditure allocation in Thailand.

The result of this study can produce both a theoretical contribution, to the extent that it conforms to theory and previous cross-country analyses, and a contribution to the development strategies of Thailand. This line of research may also help establish more useful benchmarks in assessing the determinants and impacts of governments' effort in making education policy.

1.2 Objectives of the Study

This study seeks to examine and analyze the dimensions and empirical basis of the determinants and impact of education expenditure using the most recent, extensive, and comparable data in Thailand. The objectives of this study are as follows:

1) To investigate the historical development and the importance of the public education expenditures policy in Thailand during the past few decades

2) To investigate the concern of the provincial distribution of education expenditures policy

3) To examine and analyze the key determinants of public education expenditures in Thailand at different stages of education and regarding different types of expenditures at the national level during the past few decades

4) To examine the determinants and the cause of the provincial distribution of public education expenditures in Thailand

5) To provide policy recommendations that will improve the allocation of education expenditures in Thailand

1.3 Scope and Limitations of the Study

Despite the use of several public policy instruments in education policy, this study focuses only on public expenditures because it provides the opportunity to investigate the actual behavior or stance of the government. Analysis is placed on the determinants of education expenditure of various kinds and levels. The analysis will cover a number of determinants of public expenditures that are likely to determine the level of education expenditure. More and better data over the past decade have presented new opportunities to investigate the possible linkages among those factors and the actual expenditure.

This study includes both time-series analysis, which indicates changes in the policy-decision making in Thailand over the past 30 years, and also uses pane data to analyze the variation in budget allocation across different areas within the country. This paper focuses on the annual data of Thailand by looking at the relationship between independent variables and dependent variables in a given time period. When analyzing the panel data, the same basis will be used but only the most recent data during 2007-2010 will be applied. This will allow the study to comprehensively and precisely analyze the significance of the determinants of public expenditure in relation to education in the case of Thailand at both the central government level and at the local level.

Despite the advantage of using the most recent data, compared to previous studies, the period of analysis examined in this study is still limited to the availability of data. The completeness as well as the confidence in the results of a time series analysis critically depends on the length of the data period. While the general degrees of freedom are judged to be adequate, a more comprehensive set of data would strengthen the results. The data on education indicators were obtained from the ministry of education and a survey by the national statistical office. Also, the panel data may not be complete due to poor data at the provincial level. Moreover, even though various explanatory variables are included in this study, there could be more significant variables that are not included.

Lastly, public spending is only part of the picture. This study confines itself to public expenditures on education. Therefore it gives only a partial picture of the total

resources devoted to the education section in Thailand. Private spending on education is significant in many countries. According to the World Bank, private spending averages 25% of all education expending in developing countries. There might be some missing data from the total education expenditure of Thailand. This study, therefore, can only explain the behavior of government policy makers and leaves private households aside.

1.4 Benefits of the Study

The benefits of this study were of high concern when initializing the research. The contributions made from this study will add to the literature in the field of policy analysis and to the field of public economics, particularly education expenditure policy. The results obtained from this study should be beneficial and should make a contribution to theory and to policy practitioners in the following ways:

1) The findings of this study reaffirm the robustness of the theory of public expenditure and its determinants when analyzing at the country-level. It can also explain the increase in education expenditures in Thailand during the past few decades. Further research on the country level will be motivated by the results of this study.

2) The analysis of the determinants of education expenditures distribution across provinces in Thailand can fulfill the element of education policy analysis and public expenditure policy analysis. Particularly interesting is that the findings can fill the gap in the understanding of the issue of distribution of education expenditures at the local level. New knowledge of public policy is strongly expected from this study.

3) The analysis in this study can increase the understanding of the determinants of the government's actual behavior in the given context of political economy pressure. This will help policy makers to be more cautious when analyzing public policy making.

4) This study can immensely contribute to the development strategies of Thailand, which will lead to more efficient and equitable outcomes. The policy recommendations in this study should be used critically to provide better policy advice for better allocation of education expenditures.

1.5 Types of Data and the Unit if Analysis

Both qualitative and quantitative analyzes are used in this study. The qualitative analysis is intended to analyze the content and character of both education policy and education expenditures in Thailand. A time series multiple regression analysis will be employed in this study using secondary data. The unit of analysis is number of years. A panel data analysis will also be employed where the unit of analysis is the province.

1.6 Organization of the Study

Six additional chapters, each embracing particular themes, organize the rest of this study. Chapter 2 reviews the related literature both regarding theory and empirical evidence, as well as the formulation of conceptual frameworks which form the basis of the studies in subsequent chapters. Chapter 3 explains the research methodology and provides a specific rationale for the variable selections on which empirical analysis will be performed.

Chapter 4 presents the qualitative analysis of education policy making in Thailand. Some key issues and concerns regarding education policy in Thailand, such as educational reform and the character of educational expenditure, are addressed in this chapter. Chapter 5 presents the findings from the proposed models based on actual time-series data, particularly the possible determinants of education expenditures at the national level. Chapter 6 provides a further analysis and interpretation of the results of provincial distribution. The rationale behind these results will also be discussed thoroughly. Chapter 7 provides a summary of the results, discusses the possible policy implications of the findings, and suggests a possible line of further study.

CHAPTER 2

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Thomas R. Dye (1978) identifies a type of analysis of the determinants of public policy as "policy determinant" analysis and the consequences of public policy as "policy impact" analysis. The latter tends to pay attention to the consequences of public policy as a dependent variable and public policies as the independent variable. It is, therefore, necessary for governments to pay careful attention to whether public policies produce desirable outcomes and what determines such policies.

The main purpose of this chapter is to review previous literature regarding the concepts of the determinants of public expenditure on education. In fact, government expenditure policy is the most complicated form of the three expenditures (private consumption, private investment, and government expenditure) because there is no theory of government expenditure (Domar, 1957). Various public policy determinant theories are reviewed in order to provide a solid framework for the analysis. Although much of the literature explores the determinants of government expenditures, they always focus on major economic variables such as economic growth. In the review of the literature, this study seeks to critically assess the multi-layered dimensions of the factors that theoretically affect the allocation of public expenditure on education.

Research on public expenditure in the early stages focused on both the overall pattern of expenditure as well as the pattern of the specific purpose of expenditure, such as defense, healthcare, or educational expenditure. The work of Wagner (1958), Peacock and Wiseman (1967), and Musgrave (1969) are key pieces of work at the early stage of public expenditure analysis. More recently, studies on public expenditure have focused more on specific purpose expenditure. Some examples of these studies include study of the determinants of public education expenditure in the U.S. during 1950-1990 (Fernandez and Rogenson, 1997) and cross-country analyses (Hanushek and Rivkin, 1997; Ram, 1995).

The analysis of education policy can go beyond economic determinants, as seen in many studies, such as political and social determinants (Cameron, 1978; Quade, 1982; North 1985; Mueller, 1987; Castles, 1989; Huber and Stephens, 2001). To gain comprehensive knowledge and analysis of education policy, one should consider further the multidimensional determinants of policy. That is, a sound analysis should incorporate social, political, and other important determinants as well as provide further understanding of how public policy is made.

Before developing the proposed model for analysis, this paper takes into account some necessary background information and provides an overview of the important conceptual issues. The theoretical linkages between policy determinants and educational expenditure are also reviewed as they serve as a basis of an understanding in analyzing such topics. A review of some of the empirical evidence is also required to explore and discuss major concepts in order to obtain an appropriate conceptual framework for the research.

2.1 Trends in Public Expenditure on Education

The economic objectives of the public sector are conventionally described under four headings: the efficient allocation of resources, the stabilization of economic activity, an equitable distribution of income, and the promotion of economic growth (Burkhead and Miner, 2008). The public sector, in all modern governments, should adopt policies that assure the completion of these four goals.

The principal instrumentality that attempts to impose a sense of order is the government's expenditure. To analyze public policy making, public expenditure can be used as a reflection of how a government behaves in practice. It can be considered as a proxy of how the government makes policy or government decisions in policy making.

The preparation of the annual budget of a government is an occasion for a review of existing programs and of executive recommendations as to their expansion or contraction. Governments can alter the allocation or the level of expenditure according to the relative importance of the goals of stabilization, distribution, and growth. Of interest in this section is the overview of educational expenditure

allocation. The following sections will clarify the past and current trend of expenditure on education across countries, as well as the educational expenditure in Thailand.

2.1.1 Defining Public Expenditure

The term "public expenditure" or "public spending" seems to be a simple concept involving the expenditure of the state by using economic resources obtained from households and firms. Nevertheless, the details are much more complicated than they seem because in the real world, governments face many issues, making the concept difficult to analyze. As a consequence, a careful consideration is required when analyzing public expenditure, particularly when it becomes the subject of political debate.

The debate over public expenditure during the 1970s and mid 1980s was characterized by predictions of governments going bankrupt (Rose and Peters, 1979), of pluralist stagnation (Beer, 1982) and of fiscal crisis (O'Connor, 1973). Theses analyses raised the awareness of both policymakers and the public in terms of paying more sophisticated attention to the way in which public expenditures are allocated and what determines those expenditures.

The concept of public expenditure is, like other political concepts, "a contestable terrain, to be occupied by changing and competing definitions, where those that seek to do the defining represent a vested interest and where those that gain the ascendancy will also reflect a specific political ideology and therefore offer a specific series of public choices" (Mullard, 1993).

Definitions of public expenditure are mainly influenced by either a macro or micro perspective of what constitutes public expenditure. The macro perspective tends to perceive public expenditure as one aggregate in the national economic accounts that is likely to impact the macro economy, including issues of inflation, unemployment, and interest rates. In contrast, the micro perspective concentrates on individual expenditure programs and the implications of changes in expenditure and policy outputs.

It is essential, for the micro approach, to consider what public expenditure within individual expenditure programs seeks to achieve (Rose, 1984). It emphasizes

the need to study individual expenditure programs and the factors which influence these programs, where the concern is to explain changes in an expenditure program in relation to the legislation and public policy that are enshrined within an expenditure budget. The micro or program approach is therefore concerned with both the inputs as expressed in public expenditure terms, and also the policy outputs, which indicate which objectives have been achieved for certain levels of expenditure (Mullard, 1993).

Decisions on public expenditure are normally likely to involve a series of processes. The analysis of public expenditure of public expenditure data can be complicated by external factors. A good analysis needs to take into account the reality of expenditure, not just the policy statements, in order to understand the dynamics of public expenditure. The changes in public expenditure can be explained by looking at the changes within the programs so as to break down expenditure programs into components; that is, the capital, current, and transfer components which add up to an expenditure program.

2.1.2 Educational Expenditure: a Global Trend

The growing importance of citizens' entitlements in the social area has resulted in an increase in the transfer and subsidies accounted in social expenditure. In the European Union, social expenditure as a share of the GDP more than doubled between 1960 and 1980, from 10 percent to 20 percent of the GDP, and continued to grow more slowly thereafter (Tanzi and Schuknecht, 2000). Data on public spending on education suggest that real per capita expenditure for education has been increasing in developing countries. This increase has been accompanied by tangible improvements in social indicators, which implies that increasing spending for education can ensure that benefits are distributed more equally while accelerating human development (Gupta, Clements, and Tiongson, 1998).

The rise of public expenditure on education raises the demand for analysis of education policy making. The provision of public education has been generally perceived as one of the essential tasks of government. Especially noteworthy is the fact that education is frequently referred to as the key contributor to both economic growth and equity, and thus to social stability and democratic values. In the beginning

of the 20th century, the provision of universal primary education was the rule among today's industrialized countries. According to the figures compiled by Tanzi and Schuknecht (2000), in the early 1900s, public expenditure on education exceeded 1 percent of the GDP, with France, Germany, and Japan showing the highest expenditure levels. Before World War II, public spending on education had almost doubled and by 1960 secondary education up to a certain age was almost universally required and free in OECD countries, and public spending had risen to 3.5 percent of the GDP.
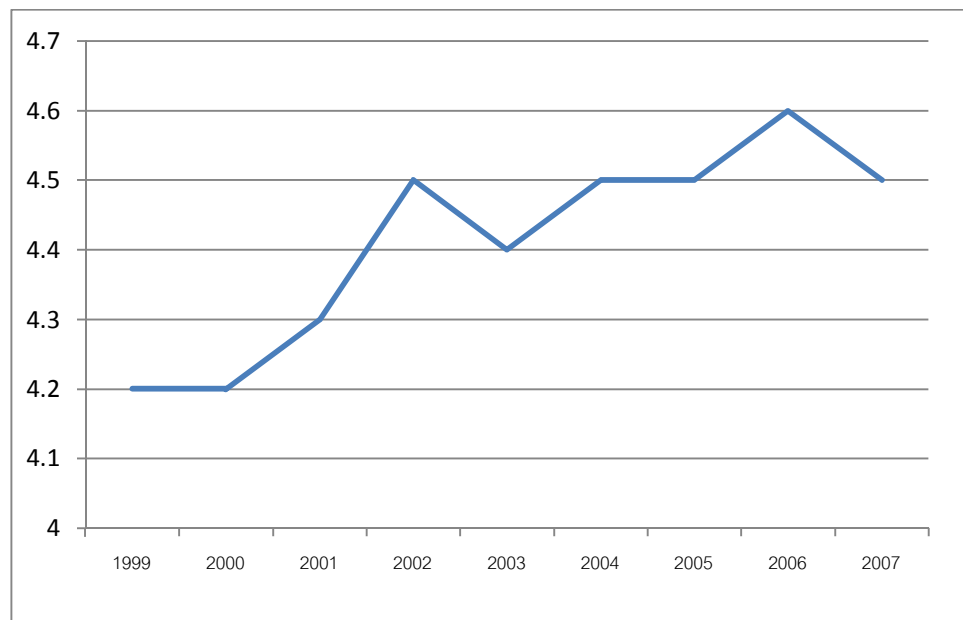
Figure 2.1 World Education Spending as Percentage of GDP
Source: World Development Indicators (2009)

The growth of educational spending can explain some of the expenditure increases in the past. It reflects growing school enrollment, especially at higher levels of education. This also reflects the government's decision to finance an increasing share of spending at all levels. The years of schooling among developed countries have actually increased further since the 1930s, and secondary enrollment on average exceeded 50 percent by 1960 (Tanzi and Schuknecht, 2000). Today, in many countries, both developed and developing, secondary education is mostly free. Tertiary education is promoted more massively by government financing. Education

is, therefore, an area in which public provision and financing of services have been very successful. However, the critical issue concerns the quality of education, which in many countries is reported to be low.

It should also be noted that public expenditure on education by big-government countries is also somewhat higher than that by small-government countries. This difference does not seem, however, to have much of an effect on the countries' education indicators. Literacy is close to 100 percent in many countries. Secondary school enrollment is the highest in the medium-sized government group, but enrollment is almost universal in the other groups as well.
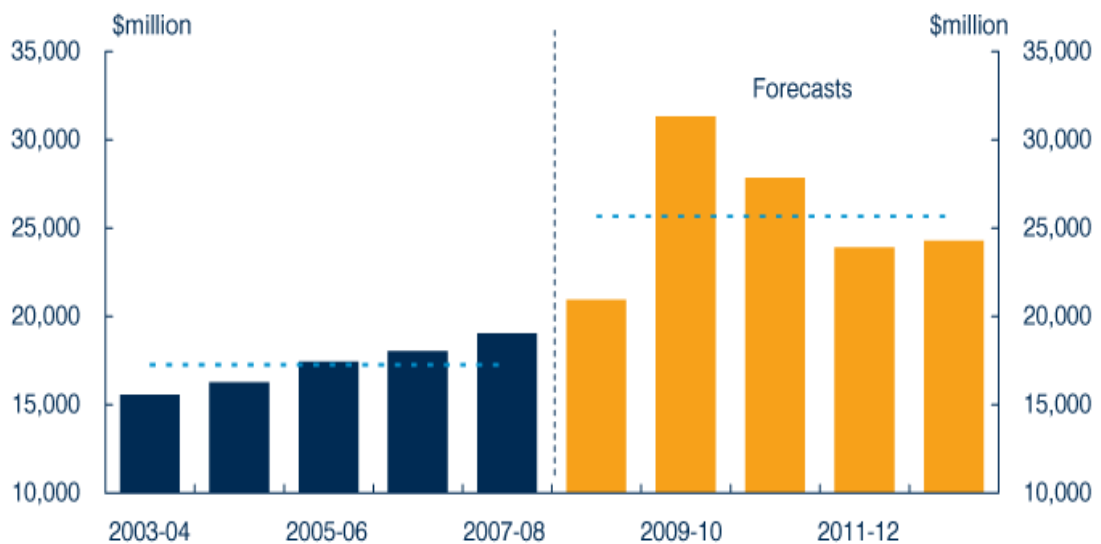
Figure 2.2 Commonwealth Educational Expenditure Excluding Student Assistance
(in 2008-09 dollars)
Source: Australian Budget

Figure 2.2 illustrates the trend of educational expenditure among commonwealth countries in dollar terms. It is obvious that the graph explains the trend of increasing educational expenditure, and this confirms what Tanzi and Schuknecht have studied regarding the change of educational expenditure during the past few decades. A study on the determinants of this type of expenditure, thus, justifies careful attention, particularly among the policymakers.

2.2 Determinants of Educational Expenditure: Theoretical Background

The analysis of public education expenditure requires a multi-layered approach. It is difficult, therefore, to isolate the concerns of economics, politics, and the social implications of public expenditure decisions. In the real world, economics cannot be divorced from the political process, and the study of public expenditure therefore must inherently involve the understanding of the economics of public expenditure as much as the processes of political choice. This pattern of analysis is more or less like that of public expenditure in general.

Additionally, in order to make this analysis more integrative, the social dimension is to be taken into account. This paper places an emphasis on the critical review of literature related to the theories of public policy determinants, particularly those that involve public expenditure, which can be applied to educational expenditure. This research paper also seeks to review a number of theories to cover the three most important dimensions that may influence public expenditure allocation.

It is noteworthy that there is no single theory that can explain the decision-making process regarding public expenditure on education completely. Therefore, several theories are needed to critically cover the multidimensional approach of this research paper. These theories provide a basis for a multi-dimensional approach analysis, including economic, demographic, social, institutional, political, and decision-making theories. The review of related theories can provide a pathway to construct an appropriate and useful conceptual framework for the analysis of the determinants of educational expenditure. It will also justify the design of the variables used in the framework for analysis.

2.2.1 Keynesian Counter-Cyclical Theory

Economic circumstances, especially during times of economic boom or economic downturn, which can lead to economic fluctuations, tend to create immense pressures on economists and policy makers in terms of formulating policies that respond to such fluctuations or to stabilize the economy. It is, therefore, worth mentioning that a theory that explains how public policy, such as education policy,

may respond to the economic fluctuations is important and should be taken into account when making development policies.

According to the Keynesian Counter-Cyclical theory, the decision to increase or decrease public expenditure, which may include educational expenditure, is determined by the economic conditions of a society. In other words, any changes in economic conditions may lead to changes in the allocation of public expenditure. In the General Theory written by Keynes in the 1930s, and in the wake of the Keynesian revolution, governments around the world began to view economic stabilization as a primary responsibility (Mankiw, 2010). Keynes's General Theory provides the tools for stabilization and, yet another powerful reason for governmental intervention (Tanzi and Schuknecht, 2000). That is, public policy should take a role in responding to economic fluctuations, i.e. economic growth or unemployment level. In other words, the economic situation determines the level of public expenditure.

According to the Keynesian Counter-Cyclical theory, in order to raise aggregate demand in the economy the government can play an important role through expansionary fiscal policy and tax cut policy. Expansionary fiscal policy calls for stimulating government spending programs when private consumption sags, for example a rise in unemployment rate, and a reduction in government spending when the economy is on the rise. By increasing the government expenditure, the government can stimulate the expansion of aggregate demand and economic growth. This could happen because more money is injected into the economy together with the multiplier effect.
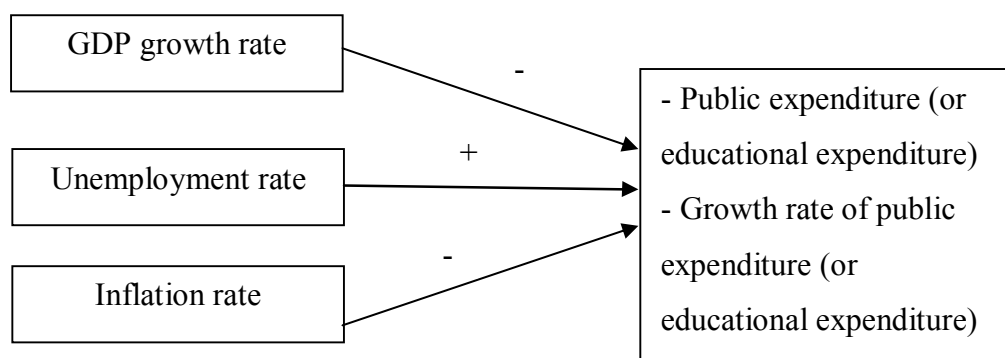
Figure 2.3 Keynesian Counter-Cyclical Theory and Educational Expenditure

Keynesian Counter-Cyclical theory attempts to explain that the decision of policy makers or the government to increase or decrease public expenditure is directly determined by the economic conditions of a society. In this sense, this theory should also cover the explanation of the changes in the allocation of educational expenditures. Figure 2.11 above illustrates how economic condition can affect the decision of a government to increase or decrease public education expenditure.

The central and crucial question here is whether educational expenditure behaves counter or pro cyclically. Social spending is normally increased because of deterioration in the economic environment and decreased because of a rise in the economy. For instance, the Thai government may allocate a higher budget in a year in which high unemployment is experienced, and vice versa, and allocate a smaller budget in the year in which economic growth is high, and vice versa.

In education, nevertheless, the connection between public education expenditure and economic environment seems to be more indirect: an economic downturn does not directly lead to school closure or teacher layoffs. If the impact of the economic factors on educational spending is more indirect and long term in nature, the analysis of cross-sectional differences rises in importance in relation to a pure, time-series analysis (Busemeyer, 2007). It could be the case that the government might allocate educational expenditure to the provinces that have a high rate of unemployment rather than to the year when high unemployment can be seen.

2.2.2 Economic-Demographic Theory and Wagner's Law

The focus of economic-demographic theory is placed upon the importance of socioeconomic and political environment factors in shaping public policy or public expenditure, including educational expenditure. This theory is based on the traditional democratic system theory, which believes that the political system must be responsive to the forces or demands from the environment. Public policy or public expenditure, which is considered as an output of the political system, is to be responsive to the socio-economic and political forces of the society. Therefore, this theory brings to attention the proposition that the environment or the factors in the particular system are the determinants of certain policies.

Political system, as defined by Easton, comprises those identifiable and interrelated institutions and activities in a society which make authoritative allocations of values that are binding on society. The environment consists of all phenomena, including the social system, the economic system, and the biological setting, that are external to the boundaries of the political system. Figure 2.4 below illustrates the components of the system model.
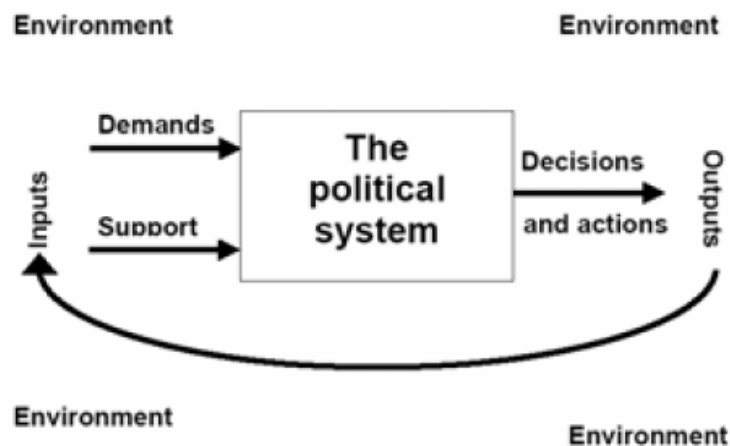
Figure 2.4 The System Model
Source: David Easton (1965)

According to Dye (1973), the concept of system implies a set of institutions and activities in society that function to transform demands into authoritative decisions requiring the support of the whole society. The concept of system also indicates that the system is to respond to the forces in its environment. Therefore, according to system theory, policy makers should pay careful attention to the environment, as it has an impact on the public policy.

Any crucial factors in the system should be taken into account when we attempt to analyze changes in public policy or even public education expenditure. This general theory leads us to pay more careful attention to and deep consideration of more specific theories or models that explain how particular factors in the system can alter the level of public expenditure.

Adolf Wagner (1958) illustrated the model of public expenditure growth in an attempt to generalize and explain the changes in levels of public expenditure. Wagner explains three main reasons for increased government involvement. First, industrialization and modernization would lead to a great amount of public activities as a substitution for private ones. There is more need for public protective and regulative activity. In addition, the greater division of labor and urbanization accompanying industrialization would require higher expenditure on contractual enforcement, as well as on law and order, to guarantee the efficient performance of the economy. Wagner's law, thus, predicts that industrialization is accompanied by an increase in public expenditure as a share of gross domestic product. Wagner's law attempts to explain the state's increasing actual behavior, particularly regarding public expenditure.

Second, Wagner argues that the growth in real income would facilitate the relative expansion of welfare expenditure. Education, in particular, was an area cited by Wagner, where collective producers were in general more efficient than private ones. We could expect from Wagner's law that the economic environment has an impact on educational spending.

The degree of economic development, measured through the GDP per capita, influences the availability of economic resources on hand for the purposes of public spending. This could be considered as a core of Wagner's law, as economic growth has been the focus or goal of development for decades and it plays an important role in much of the public policy literature. Having pointed out the significance of economic growth, it is quite a solid argument, as seen from the work of Wagner.

Finally, Wagner believed that "natural monopolies" are best managed by the public sector. He cited the case of railroads as a natural monopoly and pointed out that the private sector would be unable to raise huge finances and run such natural monopolies efficiently. This could also imply that an increase in the rate of population growth would raise the need for public services, which also leads to increased public spending. Wagner's law can be well described diagrammatically as shown in figure 2.5 below.

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┌──────────────┐        ┌──────────────┐        ┌──────────────┐
│   Economic   │───────▶│ Modernization │───────▶│ State Activity│
│    Growth    │        │               │        │    Growth     │
└──────────────┘        └──────────────┘        └──────────────┘
                                                         │
                                                         ▼
┌──────────────┐        ┌──────────────┐
│  Increased   │        │   Growth of  │
│  Government  │◀───────│  Government  │
│Expenditure to GDP│    │ Expenditure  │
│    Ratio     │        │              │
└──────────────┘        └──────────────┘
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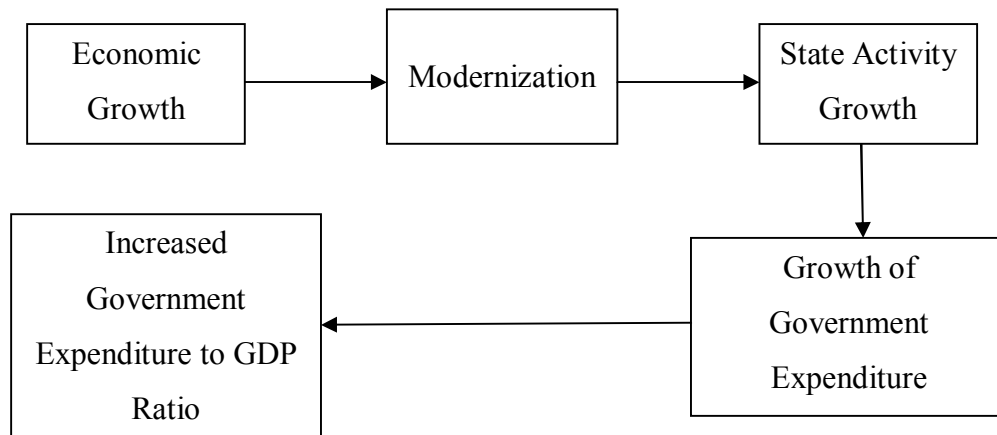
Figure 2.5 Wagner's Law Model

There seems to be a reasonable consensus in the literature that Wagner's law should be interpreted as predicting an increasing relative share of the public sector in the total economy as per capita real income grows. This can be illustrated (in Henrekson, 1992) algebraically as:

$$\frac{G}{GDP} = f\left(\frac{\overline{GDP}}{N}\right) \qquad\qquad 2.1$$

where G represents the relevant measure of nominal public spending, N denotes total population, and $\overline{GDP}$ and GDP real and nominal GDP, respectively. Nevertheless, there have been other formulations proposed to test the Wagner's law. Goffman and Mahar (1971) and Musgrave (1969) make use of the relation:

$$G = f\,(GDP) \qquad\qquad 2.2$$

from which elasticity estimates are derived. G and GDP are either in current prices or deflated by the GDP deflator. A further requirement for this to hold true is that per capita productivity is increasing. Gupta (1967) has tested the relation:

$$\frac{G}{N} = f(\frac{GDP}{N}) \qquad\qquad 2.3$$

where G and GDP are in constant prices, but it is not clear which deflators he has used. Finally, two additional formulations have been suggested and tested by Mann (1980):

$$G = f(\frac{GDP}{N}) \qquad\qquad 2.4$$

$$\frac{G}{GDP} = f(GDP) \qquad\qquad 2.5$$

It is important to distinguish cross-sectional from over-time effects. On the one hand, Wagner's law stipulates a positive association between economic development and public expenditure, which also covers educational expenditure as a percentage of the GDP that unfolds overtime. The cross-sectional perspective, on the other hand, emphasizes the association between economic development and spending in a given time period (Wilensky, 1975, 2002). We could also expect a society that exhibits higher economic growth to demand more skilled labor and to emphasize the provision of higher education, whereas in a society with a lower GDP per capita, demand for education services is not as pronounced. In this case, it could be expected that provinces with higher income per capita tend to receive a higher allocation of educational expenditure.

Wagner's view, that economic development is accompanied by higher public expenditure, is not the only view that discusses the relationship of both variables. Alan Peacock and Jack Wiseman proposed a hypothesis, the so-called displacement effect, that government spending tends to evolve in a step-like pattern, coinciding with social upheavals. This pattern of government spending should also be applied to the case of educational expenditure. There are three fundamental propositions underlying Peacock and Wiseman's analysis. First, governments can always find profitable ways to expend available funds. Second, citizens, in general, are unwilling

to accept higher taxes. Third, governments must be responsive to the wishes of their citizens. This proposition should as well include the desire for education.

According to Peacock and Wiseman, the ratio of government expenditures to GDP follows an upward sloping trend in normal times. In times of crisis, formerly unaccepted revenue-raising methods will be tolerated, and a higher tax tolerance will persist even after the crisis subsides. In other words, this trend is shifted permanently upward following a social upheaval. Educational expenditure should also be tested as to whether it is affected by a time of economic crisis.

In several subsequent treatments of Peacock and Wiseman, for example Musgrave (1969), the displacement effect has been significantly reinterpreted. It is assumed that the government share relative to GDP rises over time as a result of growth income per capita, mostly as a result of Wagner's Law.

Despite the frequent references, from a number of scholars, to the theory of Peacock and Wiseman, Bird (1972) has interestingly claimed that "… the final verdict on the "displacement effect" cannot yet be handed down because an appropriate hypothesis has not yet been rigorously formulated and tested" (p.463). This should be taken into account in this study.

Although this interesting remark was stated more than three decades ago, it is no less relevant today. We still see this kind of effect exhibited in government spending from time to time in the present day. Table 2.1 below summarizes the determinants of the economic-demographic theory.

The economic-demographic theory, especially Wagner's law, is a good test against Keynesian Counter Cyclical theory in terms of the impact of economic environment on public education expenditure, as we can see that a number of factors or variables have been postulated from the theory as determinants of public expenditure and whether they will affect educational expenditure. These variables may affect certain types of expenditure, such as welfare expenditure, and they may not affect other types, such as defense expenditure. This paper will analyze this with particular reference to educational expenditure.

Table 2.1 Summary of the Economic-Demographics Theory of Public Education
Expenditure Determinants

Scholars	Public Expenditure Determinants
Easton	Political Environment
	Economic Environment
	Demand and Support
Wagner	Industrialization
	Income Growth
	Population Growth
Peacock and Wiseman	Social Upheaval
	Growth of Income per Capita
Wilensky	Economic Development

Wagner's approach is crucial, as it provides an opportunity to investigate the linkages between environmental factors, particularly economic and demographic factors, that affect public policy, particularly education policy both over time and across provinces.

Nevertheless, Wagner's model as well as Peacock and Wiseman's hypothesis neglects other factors in the environment that may affect public education expenditure, so the model fails to incorporate how political and institutional factors play a role in determining public policy, particularly at the level of public education expenditure. It is crucial to take into account other types of determinants, apart from economic resources, that could have effects on educational expenditures in Thailand over time and across provinces.

2.2.3 Decision-Making Theory

In much of the public decision literature, the way in which policy makers make decisions is very crucial and has a significant impact on policy formulation. Perhaps it can be argued that the styles of decision making are involved in every single step in the policy-formulation process. Decision making is expected to play a solid role in determining the output or outcome of public policy and particularly public expenditure. It is, therefore, crucial to review the major styles or models of decision making that tend to affect public policies.

The incrementalism theory of decision making is presented as a decision theory that focuses on the effect of decision-making factors on public expenditure. The incrementalism theory is based on the bounded rational decision-making model proposed by Herbert Simon and Charles Lindblom. According to the rational decision-making model, to make a rational decision about public expenditure allocation or policy, policy makers are required to have certain information, including the preferences or demands of every group of the people in a society, all of the program or policy alternatives available, all the consequences of each program or policy alternatives, and finally they need to select the best program or policy alternative.

Lindblom contends that incrementalism is a typical decision-making procedure in pluralist societies (Lindblom, 1959). Incrementalism is politically expedient because it is easier to reach agreement when the matters in dispute among various groups are only modifications of existing programs rather than policy issues of great magnitude or of an all-or-nothing character (Anderson, 1994). From the view of incrementalism, policy making proceeds through chains of political and analytical steps, with no sharp beginning or end and no clear-cut boundaries, and policies are to be changed incrementally from the existing ones.

Incrementalism's style of making decisions should be incorporated into the framework when we attempt to analyze public decisions, such as decisions on educational expenditure, as it is perceived as one of the most common ways in which human beings tend to behave. This style of decision making is easy to adopt, as it requires only little or an incremental change from the existing policies or programs.

In reality, moreover, rational decision making can hardly happen. This is due to the fact that policy makers have limited information or knowledge of all people's preferences, and it is also impossible for the policy makers to know all of the policy alternatives and all of the consequences for each alternative. The view of the policy process expressed by Lindblom is more realistic than that which seems to be assumed in many studies (Quade, 1982).

Decisions about public education expenditure allocation or policy in reality are characterized more as incrementalism. Policy makers normally use last year's expenditure or the existing programs as a base, and modify or adjust the current expenditure or programs from that of the last year. Therefore, one might also expect to see slight changes in educational expenditure compared to the previous year. To understand how incrementalism works for the allocation of educational expenditure, it is worth taking into account the basic framework, where the current year's expenditure is modified slightly from the previous year. Table 2.2 below displays a concrete example of the determinants derived from incrementalism theory, where the public education expenditure of one year lagged (t-1) directly determines the public expenditure of the current year (t).

Table 2.2 Summary of Public Education Expenditure Determinants from Decision-Making Theory

Scholars	Public Expenditure Determinants
Lindblom	Existing Policies
Etzioni	Element of choice
	Both rational and incremental decision-making

Even though incremental decisions reduce the risks and costs of uncertainty, it is argued that incrementalism causes inefficiency in public resource allocation, as public expenditure on education is less likely to be responsive to new demands and

the changing needs of a society. Nevertheless, policy makers can overcome the inefficiency in public resource allocation by moving towards more participation and providing broader-based participation of the people in the budgetary process.

According to Etzioni, social decision-making includes an element of choice and it is remarkable to question to what extent social actors can decide what their course will be, and to what extent they are compelled to follow a course set by forces beyond their control (Etzioni, 1967). He criticized the weakness of both the rational and incremental manner of decision making and proposed a third approach to decision-making theory, the so-called mixed scanning approach, which combines the elements of both rational and incremental decision-making. This approach takes into account the environment, so it leads a more significant change than incrementalism and less than the rational approach.

2.2.4 Public Choice Theory

Political factors play a crucial role in public choice theory. Based on the neoclassical economics theory, public choice theory assumes that individuals, such as politicians, voters, and bureaucrats, are profit-maximizers acting in their self-interest. The voter is also a profit-maximizer, as his or her objective is to maximize the benefits from government policy and expenditure programs. In order to get more votes, therefore, politicians have to offer policies or expenditure programs which meet the interests of the voters. It is the interactions of these self-interested politicians and voters which shape public policy and expenditure.

Even though in much of the literature in many of the academic journals, public choice is a branch of political science or political economy, public choice is sometimes regarded as its own discipline or field of study. This has provided public theory with a number of models that attempt to explain the theory. To have a profound understanding of public choice theory and educational expenditure policy, it is worth considering public choice models, including the median voter model, the voting bias model (fiscal illusion), the budget-maximizing bureaucrat model, and the political business cycle model.

2.2.4.1 Median Voter Model. The median voter model has been proposed by many public choice scholars, such as Meltzer and Richard (1983) and Peltzman (1980). The objective of the median voter model is to explain the growth of welfare expenditure in advanced industrialized countries. After the 1960s, welfare expenditure, which of course included education, in developed countries expanded rapidly. Like other public-choice models, the median voter model assumes that politicians are profit maximizers, acting in their own self-interest.

According to Meltzer and Richard (1983), the size of government changes with the ratio of mean income to the income of the decisive voter and with the voting rule or qualifications for voting. This change in the size of government should also include the size of educational expenditure. A similar argument was made by Peltzman (1980), who claimed that the entire growth can be attributed to the combination of vote-maximizing politicians and citizens demanding income redistribution. The validity of this theory may be tested by including the ratio of median to mean pre-tax income as an explanatory variable (Henrekson, 1992). An increase in this variable towards unity signifies more even income distribution, and hence a smaller demand for government growth. This should also include expenditure on education.

Median voter participation may lead to an overexpansion of public expenditure and to fiscal crisis if the public debt is tremendous and governments run into a severe budget deficit. In other words, median voters, which are largely the poor, may cause inefficient fiscal expansion. Tanzi and Schuknecht (2000) suggest a possible solution to this problem by imposing constitutional limits on public expenditure growth when there is a tendency that governments will overspend to get more popularity from the constituents.

2.2.4.2 Voting Bias Model (Fiscal Illusion). The voting bias model is another model in public choice theory that has received strong attention from public choice theorists such as Buchanan (1975). The model attempts to explain public expenditure growth, just as in other models of public choice theory. In order for politicians to gain more votes, they have to offer many expenditure programs that satisfy the demands of voters, such as free education. Governments have to increase taxes to meet the higher demand for public expenditure, such as educational

expenditure. Higher taxes, however, distress voters. Thus, in order to please voters, governments sometimes attempt to disguise tax burdens in indirect taxes or run into budget deficits. In this way, their burdens are less visible to the voters.

In other words, the voters are likely to underestimate the true tax burden as the burden they see is just an illusion and not the true one. Indirect taxes, such as those imposed in the course of market transactions, are obviously less visible to people. Also, individuals may have trouble estimating future real tax burdens if the government resorts to debt financing. Increases in indirect taxes could be one of the ways to increase public expenditure on education.

In a society with a more complex revenue system, it is difficult for the individual to assess his or her total fiscal burden. Theoretically, both indirect tax and future tax burdens are considered as a fiscal illusion and this illusion can be a useful key for the government increasing public expenditure and in turn gaining popularity from the constituents.

2.2.4.3 Budget-Maximizing Bureaucrats Model. In public choice theory, the budget-maximizing bureaucrat model also helps to explain the determinants of public policy. It is argued that public employees have preferences for larger budgets, and the requisite monopoly power over public production and the legislature to have their way in realizing their objectives. The requirement or the demand for a larger budget is due to the levels of power, pay, and prestige that arise along with them (Buchanan and Tullock, 1977).

Romer and Rosenthal (1978) proposed a model in which bureaucrats can force voters to choose a higher level of public spending than that most preferred by the median voter. Mueller (1987) claims that there is likely to be a positive relationship between the absolute size of the bureaucracy and the rate at which the government grows. That is, the bigger the size of the education staff, the higher the educational expenditures.

Therefore, "the bigger the bureaucracy is, the more difficult it is for outsiders to monitor its activity, and the more insiders there are who are working to increase the size of the bureaucracy" (Mueller, 1987)

In this model, the level of public education expenditure may exceed the need of society and in this case it can be argued that resources are allocated inefficiently or the excess resources are wasted, which is due to the demand or the pressure the bureaucrats, or it varies according to the size of the bureaucracy. In Thailand, public employees receive a large number of benefits apart from their salary, much more than those that work in the private sector, such as free health and medical expenses. Therefore, it can be assumed that the more employees in education, i.e. teachers, or the more bureaucrats, the larger the amount of public education expenditure.

2.2.4.4 Political Business Cycle Model. Macroeconomics and politics are always interconnected across the globe. Many times, elections are won or lost as a result of economic conditions. Electoral incentives always influence politicians' choices of macroeconomic policies. Therefore, economic policy is influenced by the electoral motivation of politicians. We have witnessed this phenomenon both in developed and in developing countries, and this model strongly suggests that politics do play a very influential role in public policy making.

The model of the Political Business Cycle has been discussed by many scholars, such as Alesina and Sachs (1988) and Hibbs (1994). The model assumes that politicians are profit-maximizers, acting in their own self-interest. As the prime objective of politicians is to win an election, the politicians, especially those in a government party, will try to increase expenditure programs during the period before the election in order to satisfy the voters and to win the election. Education is one type of expenditure that can perhaps directly impact voters' decisions.

The model assumes that the closer the time period of an election, the higher the expansion of public expenditure. According to this view, politicians attempt to create the most desirable economic conditions immediately before elections, even though their policies may require costly adjustments after the elections. For example, governments may increase subsidies for the mass population or the needy, such as education for the low-income group of people. In particular, the economy can be over stimulated before the election with expansionary policies.

It has been argued that the Political Business Cycle model causes inefficiency in public resource allocation because public expenditure is responsive

more to the short-term election as in the long-term even a good policy has no impact on short-sighted voters. That is, short-sighted voters reward the incumbent government without realizing that a recession will be needed after the election to reduce inflation (Alesina and Sachs, 1988). This will occur like a wheel or a cycle, which will repeat itself again and again with the same pattern across time.

Table 2.3 Summary of Political Theory's Public Expenditure Determinants

Scholars	Public Expenditure Determinants
Meltzer and Richard	Median Voter
	Mean income of decisive voters
Peltzman	Citizens demanding income redistribution
Buchanan	Indirect tax
	Debt financing (future tax burden)
Buchanan and Tullock	Size of bureaucracy
Romer and Rosenthal	Bureaucrats
Mueller	Size of bureaucracy
Hibbs	Period before election
Alesina and Sachs	Period before election

2.3 Empirical Evidence on the Determinants of Education Expenditures at the National Level

Various types of variables can be considered as the policy determinants of educational expenditures. As only the economic or political variable alone may fail to explain all of the variations in public education expenditure policy, the question to be answered in this research is what variables determine this kind of expenditure. In the past, a number of researches have attempted to analyze these determinants using time-series analysis at the national level over a long period of time in several countries, mostly developed countries. These researches should be given emphasis in order to build an appropriate framework for the analysis of policy determination of educational expenditures in Thailand over time and at the national level.

2.3.1 Socio-Economic and Demographic Determinants

Economic research has highlighted the importance of economic resources in the public policy-making process (Dye, 1978). The impact of changes in the socio-economic and demographic environment has been regarded as an important variable since the beginning of research in the field of public policy (Wilensky, 1975). This can be implied as well to the making of decisions on education policy, as it was interestingly pointed out by Jacob Mincer (1981) that human capital is a link which enters both the causes and effects of economic-demographic changes.

There is now a huge literature on Wagner's Law and government expenditure in total. A number of comparatively early studies were based on samples that included both developing and developed countries. Kolluri, Panik, and Wahab (2000) studied Wagner's Law using time series data for the G7 countries for 1960-1993. They found that the Law holds for some of the components of government expenditure for these countries.

There has also been a number of studies that included a theoretical background in economics that analyzed the dynamics of educational policy from the point of view of an international or intranational comparison, particularly the determinants of educational expenditure (Hanushek and Rivkin 1997; Fernandez and Rogerson 1997;

Ram 1995). These studies focused on the impact of socio-economic variables such as gross domestic product (GDP) per capita, enrolment, number of teachers, etc.

Changes in public school enrollment have substantially affected educational expenditure as well as the increase of the cost of staff and outside expenditure (Hanushek and Rivkin, 1997). Personal income also counts as a significant determinant of expenditure on education (Fernandez and Rogerson, 1997).

In his seminal contributions to the study of educational spending, Castles (1989) considers the impact of tertiary enrolment on educational spending. He finds a positive association between educational spending and student enrolment in the tertiary sector. Educational indicators, thus, can serve as interesting variables to test for their impact on educational expenditure.

An analysis of demographic structure and its impact on public education spending can be seen in the work of Poterba (1997). His study with panel data for the states of the United States over the 1960–1990 period, at the primary and secondary level, suggests that an increase in the fraction of elderly residents in a jurisdiction is associated with a significant reduction in per-child educational spending.

The analysis of Poterba indicates some interesting points for policy makers. The difference in the size of the school-age population does not result in proportionate changes in educational spending; thus, students in states with a larger school-age populations receive lower per-student spending than those in states with smaller numbers.

Nevertheless, some studies illustrate the positive effect of aging population on educational expenditure. Kemnitz (1999) investigates the influence of society's age structure on the extent of education subsidies and found out that a decrease in population growth rate results in changes in educational subsidies. This is particularly interesting, as it leads to higher education subsidies. Therefore, populating aging has a positive effect in the long run.

In a study of Kempkes (2006), the impact of demographic change and the allocation of public education resources from East Germany have also been determined. The result shows that resource adjustment in the East German Lander appears to be particularly strong in times of decreasing student cohorts (1993-2002).

Table 2.4 below presents a summary of previous studies related to economic-demographic theory.

Table 2.4 Summary of Determinants Used in Empirical Studies on the Economic-Demographic Model

Author	Year	Determinants Used
Williamson	1961	GDP per capita
Castles	1989	Tertiary enrollment
Ram	1995	GDP per capita/enrollment rate
Hanushek and Rivkin	1997	GDP per capita/enrollment rate
Fernandez and Rogerson	1997	GDP per capita/enrollment rate
Poterba	1997	Proportion of aging population
Kemnitz	1999	Population growth
Kolluri, Panik and Wahab	2000	GDP per capita
Kempkes	2006	Number of students
Grob and Wolter	2007	School-age population

The recent work of Grob and Wolter (2007), using panel data of Switzerland from 1990-2002, shows that the education system there has exhibited little elasticity in adjusting to changes in the school-age population, and that the share of the elderly

population has a significantly negative influence on the willingness to spend on public education. This implies that a society with high proportion of aging population tends to spend less on education in general.

2.3.2 Decision-Making Determinants

A number of empirical studies have devoted an effort in finding the impact of decision-making styles on public expenditures on education. Saeki (2005), interestingly, tests the determinants of state education spending. In Saeki's study of elementary and secondary educational spending by the state governments of the United States in 2000, it was found that the systematic determinants, such as incrementalism, had a greater influence on educational spending. This confirms the incrementalism theory of decision making.

In a study of Shelley and Wright (2009), panel regressions were used to analyze various measures of state higher-educational expenditures for 45 states over a time period from 1986 through 2005 in the US. The results of panel data tests indicate that each expenditures series contains a unit root. This finding is consistent with the incremental theory of public expenditures and implies that the time series of these variables should be differenced if used as dependent variables in regression models. Cleary, the results from this study indicate that expenditure increments are significantly pro-cyclical. This confirms the incrementalism theory, although only for the higher level of education.

The recent works of Tanberg (2009; 2010) also lend more support to the significance and the hypothesis of incrementalism theory. He uses the prior year's spending on higher education as his independent variables to test their impact. Among the many policy determinant variables used in his study, the results indicate that higher-educational expenditure varies partly from the prior year's spending.

According to the above empirical evidence, it is challenging to test the impact of the incremental variable on Thai educational expenditure both over time and across provinces, as these two approaches not only can test the soundness of the theory but also can provide a sound analysis of the policy determinants of educational expenditure in Thailand.

Table 2.5 Summary of the Determinants used in Empirical Studies on the Decision-
Making Model

Author	Year	Determinants Used
Saeki	2005	Last year expenditure
Shelley and Wright	2009	Last year expenditure
Tanberg	2009, 2010	Last year expenditure

2.3.3 Political Determinants

There has been the assertion that economic variables fail to explain all of the variation in public policy, and that this fact is itself evidence of the influence of political factors (Dye, 1966). A number of empirical studies in the field of political economy or public choice have attempted to find empirical evidence for the theory and they have particularly focused on how politics determines public policy. This can provide us with evidence of the political determinants of public expenditure and in some cases on educational expenditure. This is worth taking into consideration in order to construct a framework for the analysis of Thai educational expenditure policy, both over time and across regions.

A number of studies in the political field have attempted to test the median voter model. Particularly, political variables have been used in the analysis of policy determinants, where some test the dynamics of welfare expenditure and some particularly test educational expenditure. This kind of research began perhaps from several studies which studied how economic and political systems affect policy output, such as education, health, and welfare policy in developed countries. Particularly prominent is the work of Kristov and Lindert (1992), which emphasized that voter participation or voter turnout can have an impact on welfare expenditure.

Lindert (2004) also explains the growth of welfare expenditure by using voter participation as one of the determinants. Weert (2005) includes voter participation in

his independent variables to test its impact on higher education in the United States during 1985-2005. This variable can be tested at the province and local level of policy determinants, as it can reflect how each province's participation in politics can determine the allocation of educational expenditure.

Fiscal illusion, which is another public choice model, obviously plays a role in determining public policy. In the general case of the determinants of public expenditure in total, Heyndels and Smolders (1994) examined the fiscal illusion theory by using tax revenue structure as a determinant of the growth rate of public expenditure. Fiscal illusion theory can also be tested by taking into account the budget deficit and determining its impact on the growth rate of public expenditure.

Fiscal illusion can also be applied to test for educational expenditure, as it has appeared in some empirical studies. In the work of Radcliff and Saiz (1998) and Saeki (2005), it is shown that the size of educational spending is largely influenced by the size of the government. That is, the larger the size of government, the higher amount of expenditure is allocated to education. This goes in line with the budget-maximizing bureaucrat model discussed in the earlier section.

Rate of return from tertiary education was found to be a key policy determinant of investment at the tertiary education of OECD countries (Martin et al., 2007). Their study also implies that the tax system has an impact on educational investment. In particular, a less progressive tax system will increase average returns to tertiary education, although it may raise general distributional concerns. In addition, a less progressive tax system implies a higher dispersion of returns, thereby potentially raising the risk of investing in education.

Cameron used the number of members in the labor union as a determinant of public expenditures of various types. Tandberg (2009) tested a number of political factors affecting higher-educational expenditure. Interest groups were found to be a significant factor affecting higher-educational expenditure. This is in line with the work of McLendon et al. (2009), which found that political factors, such as partisanship and interest groups, have an influence on higher-educational expenditure. It can be considered that the number of teachers in the education system can be used as a proxy of interest groups in the education policy-making process in Thailand.

A number of studies have been carried out to test the political business cycle model with regard to public expenditure as a whole. Potrafke (2006) analyzed spending at the federal level in Germany for the period from 1950 to 2003 and found evidence for partisan politics and election year effects. He also examined the impact at the state level in his panel data framework. In comparison to the federal level, policy had weaker impacts on the allocation of expenditure in the states.

Election or electoral competition can send a signal and has strong impact on public spending, especially on welfare (Comiskey, 1993). In his study, Comiskey points out that electoral competition determines the growth of public spending and candidates foresee the demand for higher welfare from voters and attempt to satisfy them by raising the amount of welfare expenditure. Therefore, we can expect that when there is an election, the amount of public expenditure will be higher.

Cusack (1997) also observes how politics play a role in public spending. His study focuses on the role that an election plays in determining public spending and he includes the industrialized democracies from the period of 1955-1989 in his sample. The result of this interesting analysis lends firm support to the partisan politics model. Especially noteworthy is the dominant role that the electorate plays in determining and altering public spending.

The political business cycle model has also been analyzed with regard to educational expenditure. The length of the period in office of politicians or electorates also matters and has a clear signal towards public expenditure. Kemnitz (1999) notes that a longer voting cycle would imply a lower subsidy rate for public education. This clearly indicates the significance of the influence of politics on public policy making, particularly on welfare expenditure.

Table 2.6 below summarizes the long list of empirical studies that have tested political variables as the determinants of public choice models. Notably, there are some studies that employ exactly the same factor or variable, which could imply that these variables are of interest by many scholars in public choice journals. The empirical evidence shown can help develop a conceptual framework for the analysis of the educational expenditure determinants in Thailand in a more sophisticated way.

Table 2.6 Summary of the Determinants used in Empirical Studies on Public Choice
Models

Author	Year	Determinants Used
Dye	1966	Voter Turnout
Cameron	1987	Member of labor union
Kristov, Lindert, and McClelland	1992	Voter participation
Comiskey	1993	Election year
Heyndels and Smolders	1994	Tax structure (ratio of indirect tax)
Cusack	1997	Distance election period
Radcliff and Saiz	1998	Size of government (total budget)
Kemnitz	1999	Length of voting cycle
Lindert	2004	Voter participation
Weert	2005	Voter participation
Saeki	2005	Size of government (total budget)
Potrafke	2006	Election year
Martin et al.	2007	Rate of return from tertiary Education
Tanberg	2009	Interest groups
McLendon et al.	2009	Interest groups

The framework in this study was conceptualized by connecting the important concepts from the related theories and incorporates them with the relevant empirical evidence. Especially noteworthy is the fact that the conceptual framework was designed based on the context of Thailand both over time and across provinces.

2.4 Empirical Evidence on the Determinants of Educational Expenditures at the State-Local Level

The research in socio-economic and political determinants of public policy also deals with local-level public expenditure. This is of interest as a sound public policy analysis should also take into account the public policy-making process at the local level to ensure that sound policy recommendations are to be made. A local level public policy analysis could ensure a micro-lens analysis and look into the environment and demand of people in a particular state or province.

At the local level, educational expenditure could be determined differently compared to the federal or the national-level determinants. An emphasis, therefore, should also be given to local-level policy as well as to the national level. It is vital to consider some of the previous work done on local-level public expenditure policy.

The analysis of the economic determinants of both state and local government expenditures began with the publication of Solomon Fabricant (1950), followed by Glenn F. Fisher (1964), Dye (1966), and Sachs and Harris (1974). These studies attempted to explain the policy determinants of local government expenditures in the states of the United States. They produced sound policy analyzes as well as demonstrated an understanding of how socio-economic and political resources can determine public expenditure policy at the local level. Interestingly, these researches can be taken into account to apply to the case of educational expenditure policy determinants of Thailand at the local level.

Fabricant (1950) studied the determinants of state total expenditure and found that per capita income, population density, and urbanization explained more than 72 percent of the variation in the expenditure, whereas in the study of Fisher (1964), per capita income was the strongest single factor associated with state and local expenditure. Sachs and Harris (1974) explained that federal grants tended to free the

economic resource constraints of local governments, especially those with the heaviest federal involvement such as welfare.

Political variables can also play a role in determining state policy, particularly regarding welfare policy, as appeared in the research effort of Dawson and Robinson (1963). A political variable such as voter participation was included in this research to test for the linkages of a pluralist political system and its impact on state welfare policies. Dye (1966) published a comprehensive analysis of public policy in the American states and aimed to describe a linkage between economic variables (i.e. industrialization, wealth, and education) and political system characteristics (i.e. voter turnout) of over ninety separate policy output measures in education, welfare, and public regulations, etc. The characteristics of a pluralist political system were found to have less effect on public policy at the state level compared to variables that reflected economic development.

Fry and Winters (1974) found that voter participation had a significant independent effect in bringing about progressivity in the distribution of taxing and spending burdens. Obviously, according to their study, voter participation tends to have an impact on the distribution issue. This coincides with the questions that this study attempts to answer at the local level of public education expenditure allocation.

It is interesting, therefore, to apply this kind of research to the construction of a framework that will be applicable to the case of education-expenditure policy in Thailand and to see if the determinants of educational expenditure vary across provinces. This will involve the issue of equity and the distribution of budgets to the wealthy and poor provinces.

At the local level analysis a set of variables is given emphasis, including economic and political variables. The analysis at the local level can be a good response to the model of the policy-making process, as it can test the underlying theoretical notions by making the theoretical relationships clear and more meaningful in terms of the completeness of the relationship between variables. These kinds of findings can generate thorough understanding of how politics and government operates in the formation of public policy.

Table 2.7 Summary of the Determinants used in Empirical Studies on Public Educational Expenditures at the State-Local Level

Author	Year	Determinants Used
Fabricant	1950	Income per capita, population, urbanization
Dawson and Robinson	1963	Voter Participation
Fisher	1964	Income per Capita
Dye	1966	Urbanization, Industrialization, Wealth, Education
Sharkansky	1967	Past Expenditure
Sachs and Harris	1974	Federal grants
Fry and Winters	1974	Voter Participation

The variation among states should be given strong emphasis as it could lead to systematic policy recommendations. This would be interesting to test with the particular type of expenditure, such as educational expenditure at the provincial level in the case of Thailand. Dye (1978) confirmed that on the whole economic resources were more influential in shaping state policies than any of the political variables thought to be policy determiners. The government and the political process, of course, may indeed help to determine the content of public policy, but we should not insist that political variables influence policy outcomes simply because of the traditional

understanding. It would be interesting to answer this research whether political variables also determine public educational expenditure at the local level.

It is as well important to realize that the incremental model can play an important role in determining state-local level public policy, including educational expenditure policy. There is systematic evidence in support of incremental decision making in state-level policy. For example, the single factor that shows the closest relationship to state government expenditures in a current year is the state government expenditures from the previous year (Dye, 1978).

Ira Sharkansky (1967), who is widely known for his work incrementalism, offered a correlation between current and past expenditures by noting that current state expenditures are more closely tied to previous expenditures than to any socioeconomic or political variable. It is, nevertheless, arguable whether it can be the case that the same environmental resources will shape the same expenditure. This issue is worth studying, especially in the case of a developing country.

The analysis in this study also attempts to investigate and identify the policy determinants of educational expenditures in Thailand at the local, which is the provincial level. This shares the same purpose of those researches done at the state level discussed above. It is expected that a local-provincial level analysis can answer the questions of educational expenditure policy determinants from the proper theoretical perspective, which can in turn generate some useful findings that will enable us to understand how the Thai government, politics, and economic resources operate in the formation of public-educational expenditure policy. The next section draws upon the conceptual framework based on the review of the literature and empirical evidence discussed in this study.

2.5 Conceptual Framework

To reflect a thorough analysis in education-expenditure determinants, a careful consideration of theories and reality needs to be taken into account. The conceptual framework provides obvious connections from all aspects or approaches that may determine public expenditure on education. From the above review of the literature, it was found that educational expenditure can be determined multi-dimensionally. That

is, more than one type of factor can alter the allocation of public expenditure. Further, different kinds of expenditure may be determined by different sets of variables.

Specifically, the framework for the determinants of public education expenditure was carefully designed and the variables were carefully selected in the present study to match the context of Thailand and educational policy there. The following sub-sections explain the selection of each dimension of the determinants of educational expenditure in Thailand. The variables are denoted by N, which represents the independent variables used at the national level of analysis, and P, which represents the independent variables used in the provincial-distribution analysis.

2.5.1 Economic-Demographic Variables

Particularly important is perhaps the issue of whether theories should be tested on data for a single country over time or whether a cross-section test for a number of countries is more appropriate. However, cross-sectional results may have little to do with Wagner's Law; for example, the Law asserts that government will increase in relative importance as per capita income rises. From the literature and empirical studies above, a number of economic-demographic variables were carefully selected to match the objective of this study and to match the context of Thailand's educational expenditure.

To prove the economic-demographic or the system theory in the case of educational expenditure in Thailand, GDP at current prices per capita, growth rate of labor in the industrial sector or industrialization, inflation rate, and unemployment rate were chosen. These variables appear in the Keynesian Counter-Cyclical theory and in Wagner's Law (Wagner, 1958), as well as in many empirical studies such as those of Fernandez and Rogerson (1997), Gupta (1967), and Ram (1995). Both Wagner's Law variables, which are GDP per capita and industrialization, and Counter-Cyclical variables, which are unemployment rate and inflation rate, are expected to have a positive relationship with government spending. Particularly, they should positively and significantly affect educational expenditure in Thailand during the period of study.
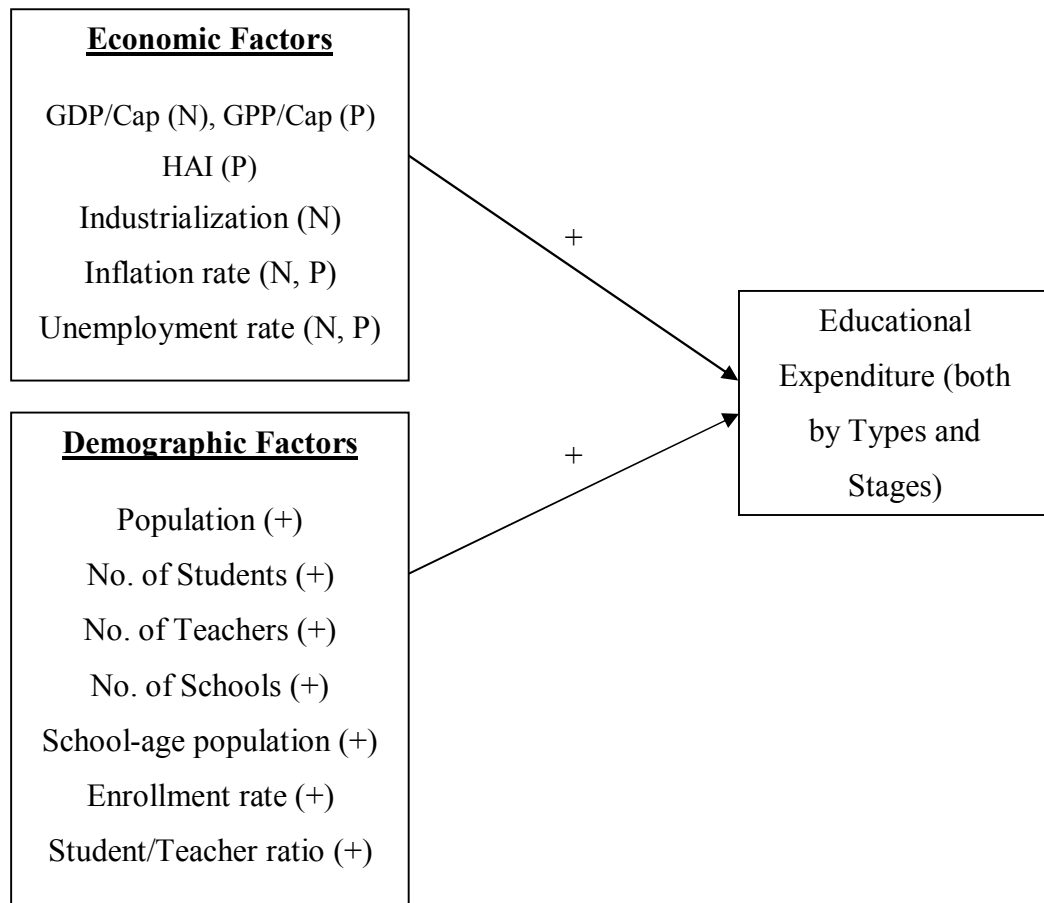
Figure 2.6 Conceptual Framework Derived from Economic-Demographic Theory

In addition to these variables, as this paper seeks to test the determinants of educational expenditure in particular, the education indicators should also be taken into account as they can represent a demographic pattern in the aspect of education policy and they are applicable to the case of Thailand. This includes the school-age population, and enrollment rate and student/teacher ratio, which are used in many empirical analyses, including those of Fernandez and Rogerson (1997), Kempkes (2006), Grob and Wolter (2007). Each demographic variable on education is expected to have a positive relationship with government spending on education. Figure 2.12 above illustrates the framework of the economic-demographic variables used in this study.

As for the case of the provincial- local-level policy determinants, some variables had to be adjusted to match the context and the availability of the data. GDP per capita was replaced by the GPP, the provincial income per capita, because per

capita as GDP was not available at the provincial level. Industrialization was replaced by the Human Achievement Index as industrialization was not available and the HAI is a multi-dimensional indicator of the level of development of provinces in Thailand that can well indicate disparity. Size of the province was added to this socio-economic framework as the size of the province varies. Enrollment rate and student-teacher ratio were removed as they were not available and number of schools replaces it.

2.5.2 Decision-Making Variable

For the decision-making variable, the framework of this study focuses on the decision-making theory and applies it to the case of educational expenditure in Thailand. To test this theory, a one-year lagged public expenditure was an appropriate factor and was employed as the independent variable. The lagged expenditure was also applicable to the context of policy making in Thailand, as the data were observable and could be seen from many time-series analyses.

The lagged expenditure variable was derived from the incremantalism theory (Lindblom, 1959) and it also has appeared in a number of empirical works (Saeki, 2005; Wright, 2009; and Tanberg, 2009 and 2010). In these studies, the incremental variable has demonstrated its significance and it affects educational expenditure in a positive direction. Therefore, it should as well be tested for the case of Thailand.

It is expected that there will be a high positive relationship between the lagged public expenditure variable and current spending. This implies that the current year expenditure allocation was based on how the previous year's expenditure was allocated. Certainly, as governments tend to increase their budget incrementally every year, we can expect a positive coefficient of the lagged expenditure.
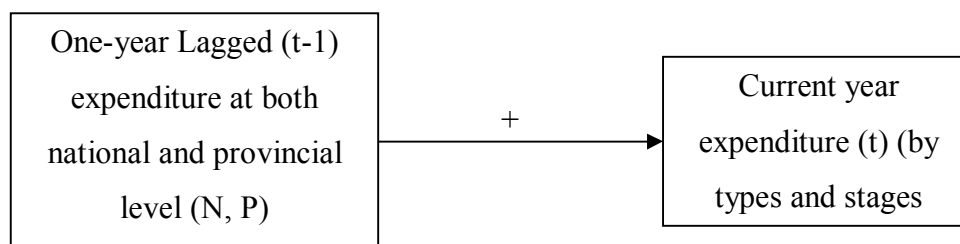
Figure 2.7 Conceptual Framework Derived from Incrementalism Theory

To test the policy determinants of educational expenditure in Thailand, both an analysis over time and across provinces were therefore taken into account. For the time-series analysis, the one-year lagged educational expenditures of each year were needed as the independent variable. As for the provincial-level analysis, the one-year lagged educational expenditures of each province were used as the independent variable. These patterns could help this research find out whether the incremental variable was the policy determinant of educational expenditure.

2.5.3 Political Variables

The political variables were derived from public choice theory and some empirical works in this field to illustrate that politics plays an important role in determining public policy. Indeed, as the literature in public choice as well as the empirical work have demonstrated a number of public choice models, several public choice models are therefore to be incorporated into the present study in order to have a concise framework, as well as to cover a range of variables in public choice theory.

To prove the validity of public choice theory for the case of educational expenditure in Thailand, the independent variables were selected carefully based on each public choice model and relevant empirical studies considering the context of Thailand and the nature of educational expenditure. Five variables were included in the public choice framework for the analysis of educational expenditure in Thailand.

First, budget deficit as a percentage of total budget was included to represent the size of government, as appeared in Radcliff and Saiz (1989) and Saeki (2005). Second, the proportion of indirect tax to total tax was taken into account as the proxy of the fiscal illusion theory. Third, this study intends to test the interest group theory, which was confirmed by Tanberg (2009), who points out that interest groups tend to affect educational expenditure. In this study, I will proxy the strength of the interest group by using the number of members of the labor union.

Fourth, the GDP of non-agricultural sectors as a proportion of the agricultural sector (a measure of income inequality) was used to test the median voter model of public choice because in the context of Thailand most of the poor people are in the agricultural sector. Fifth, the election cycle was taken into account to test the political business cycle. The election cycle has been used in a number of studies reviewed

above, such as those of Kemnitz (1999) and Potrafke (2006). Therefore, as Thailand is a democratic country, it should be included in our study to test for its impact on educational expenditure. Lastly, voter participation may tend to have a positive impact on the allocation of educational expenditure as well. In the case of voter participation, it can be tested in the case of a cross-provincial analysis, as one can compare the provinces with high voter participation and those with lower voter participation, as seen in the work of Dye (1966).
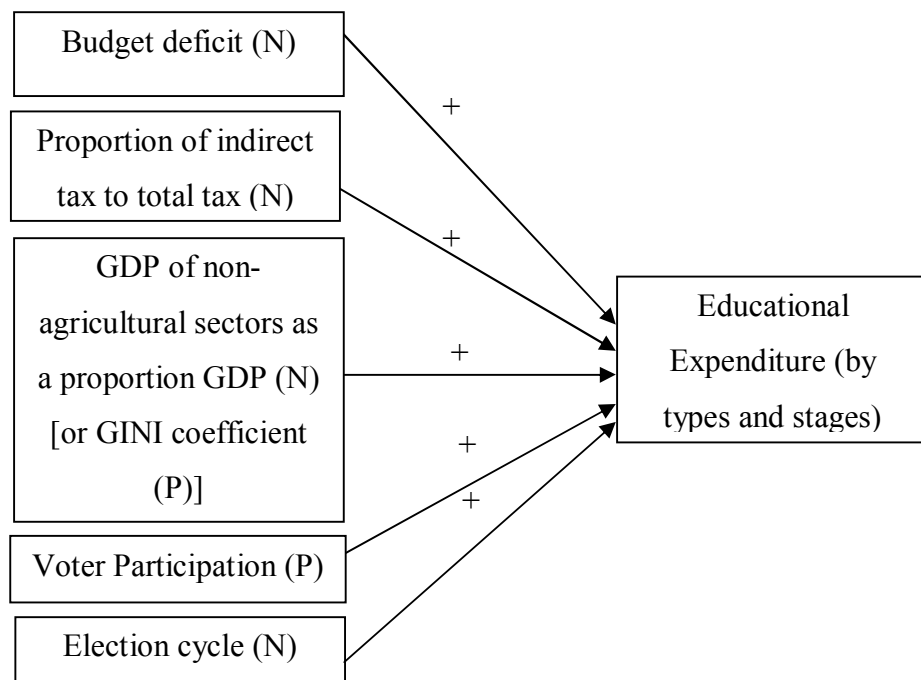
Figure 2.8 Conceptual Framework Derived from Public Choice Theory

Each variable from the diagram above tends to have a positive relationship with public education expenditure at both national level and at the provincial and local distribution. As for the election cycle, it is likely to have a positive relationship with educational expenditure, as Thailand has elections frequently.

It should be noted that the independent variables are different between the time-series (national level) and the panel data (provincial distribution) analyses due to the availability of the data and the context of each type of analysis. Figure 2.14 illustrates how politics may have effects on educational expenditure.

In the time-series analysis, which aims to analyze the determinants of educational expenditure in Thailand over time, four independent variables were used, including budget deficit, proportion of indirect tax, GDP of non-agricultural sector as a proportion of total GDP, and election cycle because these variables were available at the nation level over time. As for the provincial distribution analysis, the GINI coefficient was used to represent the distribution of income instead of the agricultural GDP, and voter participation was added as another independent variable. Other indicators were not available at the provincial level and were not included in the panel data analysis.

2.5.4 Conceptualizing Educational Expenditure

When analyzing public expenditure, it is crucial to remind the researcher that the absolute amount of expenditure may not reflect the true implication. The reason behind the use of relative value rather than absolute value is somewhat worth considering. Because the economy or total expenditure tends to change during every time period, the relative amount of expenditure to GDP or the relative amount of a certain kind of expenditure to total expenditure can be a better proxy, which reflects a true change of budget. This reflects the true meaning for a comprehensive analysis and can also produce better policy implications.

In educational expenditure allocation, there is another type of category worth analyzing. That is, expenditures on education are allocated differently at each stage of education. A number of previous studies in this field only focus on one stage of education; however, this paper has attempted to add to the literature by analyzing several stages of education.

In Thailand there are four main stages or levels of education, which are primary, secondary, higher, and non-formal education. For this study, primary and secondary education are grouped together as basic education according to the allocation of educational expenditure, and other stages or levels of education are excluded. Below is the framework of the expenditure side of educational policy making by stages of education.

Total Educational Expenditure (TEDU)

Basic Educational Expenditure

Higher Educational Expenditure

Non-Formal Educational Expenditure
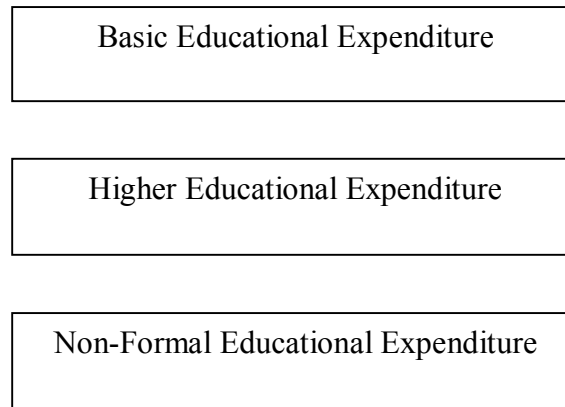
Figure 2.9 Educational Expenditures by Stage

At each stage of education, the allocation decision may be different and the policy determinants of each stage of education may also be different. For example, one set of variables may affect lower levels of education while the higher level may not be affected, and vice versa. This makes the analysis of educational expenditure challenging; further, the inclusion of several and different levels of education is challenging but they are worth studying.

Apart from considering education by the stages or level of qualification, educational policy can be seen from another angle. More sophisticatedly, educational expenditure, like other kinds of public expenditure, can be categorized by types. It is widely accepted that public expenditure has two main types, capital expenditure and current expenditure. This is the same for educational expenditure. Precisely, total educational expenditure is mainly comprised of these two kinds of expenditure, which are capital expenditure and current expenditure. Total educational expenditure can take the form of

$$TEDU = ECAP + ECUR$$

where *TEDU* is the total educational expenditure, *ECAP* is education capital expenditure, and *ECUR* is the current education expenditure. Further, education

capital expenditure is assumed to be critical for a country's development and the improvement of governmental services, such as the purchase of new equipment or the construction of new buildings. As for current expenditure, it mainly consists of wages and salaries, subsidies, and transfers. Wages and salaries maybe a tool of the government in seeking support from bureaucrats.

Moreover, educational expenditure can be analyzed from two perspectives. At the national level, the educational expenditure can be analyzed and it will provide a macro view for policy implications. In Thailand, the education system also gives room for localization, where authority is distributed to school districted for the primary and secondary level of education. Educational expenditure distribution across provinces can as well provide insightful implications for policy makers.

2.5.5 MAPD Frameworks for Quantitative Analysis of Educational Expenditure

To construct a framework the analysis of the determinants of educational expenditures in Thailand, all of the elements were drawn from the previous review of the literature in the field of public policy and public finance regarding education, together with a review of previous evidence in this field of study. The multi-dimensional analysis of policy-determinant frameworks below brings together the independent variables that match the socio-economic and political context of Thailand.

The MAPD framework comprises the independent variables from several dimensions and the dependent variable, the educational expenditures from different types and stages of education. This framework is applied at both the national level over time and to the provincial distribution or panel data analysis, comprising 76 provinces. In particular, the framework for the provincial distribution analysis aims to consider the socio-economic factors as the control variables, as the focus of policy determinants is on the education-related variables. The following diagrams illustrate the MAPD frameworks for the analysis of the determinants of educational expenditures in Thailand.

2.5.5.1 Conceptual Framework I

Economic-Demographic Factors

- GDP/Cap (+)
- Industrialization (+)
- Inflation rate (+)
- Unemployment rate (+)
- Population (+)
- No. Students (+)
- No. Schools (+)
- School-age population (+)
- Enrollment rate (+)
- Student/Teacher ratio (+)

Decision-Making Factors

- Lagged expenditure (+)

Political Factors

- Budget deficit (+)
- Proportion of indirect tax to total tax (+)
- GDP of non-agricultural sectors as a proportion GDP (+)
- Election cycle (+)

Educational Expenditures

1. Total Expenditure
2. Expenditure by level of education
   2.1 Basic
   2.2 Higher
   2.3 Non-Formal
3. Expenditure by type
   3.1 Current
   3.2 Capital

Figure 2.10 A Multi-Dimensional Analysis of Policy Determinants (MAPD)
Framework for Quantitative Educational Expenditure Analysis

2.5.5.2 Conceptual Framework II

The MAPD framework for the analysis at the provincial level had to be modified to match the context of provincial data and the availability of data. Some variables found in the time-series macro-level analysis could not be applied to the case of the provincial or micro-level analysis in order to deal with the issue of distribution. The figure below illustrates the framework adjusted for the analysis of provincial distribution with appropriate variables.

Education-Related Factors

- Number of Schools (+)
- Number of Students (+)
- Number of Teachers (+)

Decision-Making Factors

- Lagged expenditure (+)

Political Factors

- Indirect Tax
- Poverty

Control Variables

- GPP (+)
- Population (+)
- Inflation rate (+)
- Unemployment rate (+)
- Size of Province (+)
- Industrialization

Provincial Educational Expenditures

1. Total Expenditure
2. Basic Educational Expenditure:
   2.1 Total (Absolute)
   2.2 Per School
   2.3 Per Teacher
   2.4 Per Student

Figure 2.11 A Multi-Dimensional Analysis of Policy Determinants (MAPD)
Framework for Quantitative Educational Expenditure Analysis for
Provincial Distribution

The literature and the evidence discussed above can now be crystallized to the point of proposing a useful framework for the analysis. The framework illustrated above, named a multi-dimensional analysis of policy determinants (MAPD) framework, was developed to analyze the policy determinants of educational expenditures in Thailand based on the above review of the literature and discussions.

The educational expenditure allocation decision needs to be analyzed at two levels. At one level the public expenditure decision requires a macro approach since public expenditure cannot be separated from the national economy. It is an approach that places an emphasis on public expenditure as an aggregate, where decisions on public expenditure are made in the context of wider decisions relating to the macro economy. In contrast, the micro approach implies that the aggregate for the public expenditure represents the decisions that are made at the local or program level.

In order to examine the determinants of educational expenditure in Thailand, I conceptualized the link between a number of determinants and educational expenditure at two levels, the national level and the level of provincial distribution. Educational expenditure was classified into different levels of educational provision. I will generate a regression model based on the proposed conceptual framework, which represents the determinants of educational expenditure at both the macro and micro levels.

Notably, the variables at the micro level are partly different from those at the national level. Therefore, some variables were excluded from the model at the micro or provincial-distribution level due to the lack of the availability of data. Moreover, some variables were adjusted to match the context of development at the provincial level; for example, GDP was replaced by GPP (income per capita) to represent income at the provincial level, the income of agricultural sector (GNA) was replaced by the ratio of people living in poverty in each province, and the size of the provinces and the number of teachers in each province were added to the model.

CHAPTER 3

METHODOLOGY

In order to investigate the determinants of educational expenditure in Thailand, education policy background, as well as all of the important variables used in the proposed MAPD framework, need to be clarified. This includes the pattern and character of educational expenditure, politics and education policy, decomposition, and the type and sources of both the dependent and independent variables in the quantitative analysis. This chapter also seeks to add to the paper by elaborating the selection method for the appropriate variables for each set of equations.

3.1 Research Approach

This study uses both the qualitative and quantitative method. The qualitative is first employed to generate the analysis from the case study of education policy making in Thailand, before moving on to analyzing the empirical results. In the qualitative analysis, some interesting dimensions of educational expenditure policy in Thailand are analyzed to provide its background. For the quantitative method, specifically the time-series and panel data are analyzed by multiple regression analysis. The panel data are regressed with random effects. In this time-series, where the analysis is made at the national level, the unit of analysis is year. In the panel data analysis, nevertheless, the unit of analysis is the province.

Multiple regression analysis is applied to the empirical test of the quantitative data at both national and local levels. This allows this researcher to analyze the relationship between several independent or predictor variables and the dependent variable. In other words, multiple regression analysis is used to determine a number of factors or dimensions that contribute to the dependent variable, which are educational expenditures in this study. As a result, this research can determine what the best predictors of educational expenditures in Thailand are over time and across country.

3.2 Defining Variables for Quantitative Analysis

3.2.1 The Decomposition of the Dependent Variables

The dependent variables in this study can be subdivided into more specific categories of expenditure, as illustrated in the MAPD framework for educational expenditure analysis. Having discussed in the literature review and the conceptual framework of this research paper, it was seen that a number of previous studies in this field only focus on total educational expenditure or focus only on a particular type or particular stages of education, while the analysis in this paper fills this gap and intends to create new knowledge where several types of educational expenditure are used as dependent variables. Precisely, the specific types of educational expenditure investigated in this paper include:

1) Total educational expenditure (TEDU)
2) Current Educational expenditure (ECUR)
3) Capital Educational expenditure (ECAP)
4) Basic educational expenditure (BEDU)
5) Higher educational expenditure (HEDU)
6) Non-formal educational expenditure (NEDU)

The above dependent variable provides meaningful insight for the analysis of educational expenditure, as the variation allows us to arrive at an in-depth analysis. Therefore, there are in total seven dependent variables, which in turn will formulate 6 different regression equations for the estimation. Each of the dependent variable is weighted by relative value. Precisely, each type of expenditure is assigned different set of variables according to the national and provincial distribution analysis. Each dependent variable is elaborated below.

3.2.1.1 Total Educational Expenditure (TEDU)

The total educational expenditure is one of the most common types of expenditure in policy analysis. It gives us the overall picture of how government allocates and pays attention to the education system, measured by the exact amount or the relative amount of budget used in this type of expenditure. The total educational expenditure (TEDU) is the total value of all expenses allocated to the Ministry of Education in each year for the time series analysis. As for the panel data analysis,

TEDU is the total value of educational expenditure allocated to each province. This total value at the provincial is the sum of expenditure allocated to the province from the Budget Bureau, which covers the higher-education expenditure and only development and education expansion expenditure of the basic education expenditure.

3.2.1.2 Current Educational Expenditure (ECUR)

The education current expenditure (ECUR) is the current expenditure part of the total educational expenses allocated to the ministry of education in each year. The current expenditure mainly covers the cost of the salary and the hiring of teachers and educational staff. This value is used for the time series analysis. In the panel data analysis, we will use the current expenditure of each province, which is arrived at by summing the district offices of each province.

3.2.1.3 Education Capital Expenditure (ECAP)

The education capital expenditure (ECAP) refers to the capital or investment expenditure part of the total educational expenditure. This mainly includes the investment in new buildings or new equipment. The annual amount of this type of expenditure in the budget of the education ministry is used for the estimation in the time-series analysis. The figures for the provincial distribution, calculated by the sum of the district offices of the Ministry of Education of each province, are used in the panel data analysis.

3.2.1.4 Basic Education Expenditure (BEDU)

The very important and considered core part of education system is the basic education, which includes primary education and secondary education. Primary educational expenditure has been analyzed in many empirical studies. The primary educational expenditure covers all of the expenses allocated to the Office of the Basic Education Commission for primary education spending.

Secondary education can also be considered as a key to the country's development. The secondary educational expenditure covers the expenditure allocated to the Office of Basic Education Commission, which is spent on secondary schools from grade 7 onwards. As in the analysis of basic education, the BEDU accumulated annually from expenditure on both primary and secondary education, for the whole country, will be used for the time-series analysis.

The annual figure will be used for the time-series analysis. In the panel data analysis, the amount of expenditure allocated for basic education in each province is utilized differently. In the provincial distribution analysis, the basic education expenditure in this study only covers the expenditure on education development and expansion of educational opportunity. This is quite small relative to total education, as it does not take into account the per head subsidy. It does not cover any other expenses covered at the national level.

3.2.1.5 Higher Education Expenditure (HEDU)

Higher-education is another important stage of education, which a number of empirical studies have emphasized. In the analysis of higher-education expenditure (HEDU), the annual budget allocated to the Office of Higher Education Commission under the ministry of education will be employed for the time-series analysis. In panel data analysis, the data for the provincial distribution, where the budget is distributed to higher-education institutions in each province, will not be taken into account for the estimation, as in several provinces there is no higher-education institution.

3.2.1.6 Non-Formal Education Expenditure (NEDU)

The last dependent variable in our study is non-formal education expenditure (NEDU). As lifetime learning is the focus of the Thai education ministry, this study then incorporates non-formal education expenditure (NEDU) as our last dependent variable in the analysis. The NEDU covers the budget allocated under the non-formal education category of the education ministry in the annual budget. In the panel-data analysis, the budget distributed to provinces will not be taken into account as the data are not variables.

3.2.2 Explanatory or Independent Variables

The independent variables in this study represent economic-demographic, institutional, decision-making, and political dimensions that may affect the relative weights or the allocation of government expenditure on education. The significance of these variables is the key to explaining the policy determinants of public education expenditure. Some variables may affect total expenditure while some others may indeed affect its composition. The same variable may have different effects between

the time-series and panel data analysis. Careful attention needs to be paid to these variables.

A closer look, together with careful clarification, needs to be made precisely to each of the independent variables, as they are crucial to the analysis and interpretation. According to Tait and Heller (1982), demographic variables are likely to be the key determinants of the demands for government services. For example, an increase in the school-age population tends to increase the pressure on the government to increase educational expenditure. Therefore, these kinds of variables are to have precise and accurate figures for the completeness of this analysis.

Other types of variables, which are difficult to quantify, are also included in the empirical equations in the form of dummy variables. These variables must be clarified and discussed concerning their importance. For example, the year of an election cannot be easily quantified but it tends to have an impact on public expenditure.

The following subsections are an elaboration of each independent variable used in this analysis from the proposed MAPD framework. In-depth discussions are necessary to defend any shortcomings of the models.

3.2.2.1 GDP Per Capita (GCAP) or Income Per Capita

Economic development is considered as a very crucial determinant of the levels of public expenditure. In the development process of any developing countries, the governments tend to invest immensely in infrastructure as well as education in order to create human capital. In this study, economic growth measured by the Gross Domestic Product per capita (GCAP) is used for the analysis. GDP per capita can be a good reflection of how the economy performs in general or in average in a given period of time. The annual data of GCAP is utilized for the time-series analysis, whereas in our panel data analysis the GCAP at the provincial level is collected for the analysis, as calculated from income per capita.

3.2.2.2 Inflation Rate (IFL)

A change in price level is bold in many macroeconomic models, as it determines many activities in the economy. These changes are normally calculated in the form of inflation rate. This is another key variable in the MAPD framework, as it reflects how the economy and political intention can alter the allocation of expenditures in Thailand.

Inflation rate (IFL) is intended to capture the generally-accepted fact that prices are an important factor that affects the performance of an economy, and prices also pay an important role in determining the nominal level of spending. Inflation rates are, thus, taken into account as they represent how changes in price level will affect educational expenditure. This variable is used only for the time-series analysis due to the applicability of the data.

3.2.2.3 Industrialization (IND)

Industrialization refers to the process of social and economic change that transforms a human group from an agricultural society into an industrial one. Higher technological advances and skills are crucial in the process of industrialization. Industrialization is the extensive organization of the economy for the purpose of manufacturing. Therefore, this process may require a higher level of educational expenditure as a key to improving the skills for labor.

The IND variable can be obtained by using the share of the labor-industrial sector relative to total labor in both the industrial and agricultural sectors. This share reflects the relative importance of the industrial sector, which is considered as a good proxy for industrialization. In the panel-data analysis at the provincial level, IND takes into account the number of employees that work at a factory due to its availability of the factory in each province.

3.2.2.4 Unemployment Rate (UNEM)

Unemployment is another potential factor that could determine educational expenditure. For example, during a time when there is a high unemployment rate, a number of people might decide to obtain higher-education qualifications, thus the government will have a higher burden of educational expenditure. It is, therefore, a critical factor that can determine the level of educational expenditure. Unemployment rate (UNEM) is used as the indicator of the unemployment situation in the country.

3.2.2.5 Population (POP)

Population is the total number of people during a given period of time and in a given area, both male and female. The size of the population may be an important determinant of public expenditure and it is worth testing regarding the case of educational expenditures. In the time-series analysis, the size of the population is

taken from each year, whereas in the panel data analysis the size of the population is taken from each province in the year 2010.

3.2.2.6 Number of Schools (SCH)

The number of schools is the total number of public schools in a given period of time, which is the annual data, and in a given area, as shown in the statistical yearbook of the National Statistical Office. This includes all of the schools under the Office of Basic Education Commission. The government may decide to allocate educational expenditure depending on the number of schools—the more schools, the higher the expenditure that is allocated.

3.2.2.7 Number of Students (STU)

Number of students is the total number of students in the public schools in a given period of time and in a given area, as shown in the statistical yearbook of the National Statistical Office. They are actually the students that are in the public education system. This variable has the similar characteristic as that of the number of schools, the more students the more expenditure is expected be allocated.

3.2.2.8 Number of Teachers (TEA)

Number of Teachers is the total number of teachers hired in the public education system as shown in the statistical yearbook of the National Statistical Office. Number of teacher should be another indicator that has direction towards the movement of educational expenditures. This socio-demographic factor is expected to have an effect in the same direction as the number of schools and of students.

3.2.2.9 School-Age Population (SAP)

School-age population (SAP) is another important demographic factor that could place pressure on the allocation of educational expenditure. This variable is defined as the share of citizens younger than 15 years of age, as this is the criteria used in many countries for the dependency ratio. In most countries, an increase in the population should imply a corresponding increase in government expenditure on education. Nevertheless, this increase could also imply a smaller share of population that pays taxes, which could create pressure on decreasing expenditure. The annual data are used for the time-series analysis, while the provincial data for the panel-data analysis were not available.

3.2.2.10 Enrollment Rate (ENR)

Enrollment rate (ENR) is a factor that tends to have a significant impact on educational expenditure because the higher the enrollment, the more likely the government is to increase its budget allocation on education. The average enrollment rate at every stage is used for the analysis of total educational expenditure in order to see its effect.

At each educational stage, a different enrollment rate is applied. For example, the primary enrollment rate is used for the analysis of primary educational expenditure, and so on and so forth. Nevertheless, this variable cannot be used for the estimation of non-formal education, as at the non-formal education stage and at the panel-data level the enrollment rate is not applicable.

3.2.2.11 Student/Teacher Ratio (STR)

The student/teacher ratio is another crucial variable that has a tendency to determine educational expenditure. This STR variable tends to reflect how the number of students affects educational expenditure allocation. The ratio helps us to have a relative perspective on the importance of the number of both students and teachers. This was not utilized for the provincial distribution analysis.

3.2.2.12 Lagged Expenditure (LEXP)

Lagged expenditure is a variable that reflects decision-making theory. This variable is intended to capture the fact that governments allocate their budget based on the preparation of the previous year's expenditure. Normally, the term of government is four years, so most governments base their decision on the previous year's expenditure. Therefore, 1 year lagged or 2 years lagged is a good proxy for our estimation.

3.2.2.13 Budget Deficit (DEF)

Instead of increasing the tax, the government sometimes chooses to borrow money and run a budget deficit in order increase expenditure so as to please voters. This variable is intended to capture the fact that government tends to spend more if it is running a budget deficit, which is straightforward. DEF is calculated by using the ratio of the budget deficit to the total budget. This variable is used only for the time-series analysis due to the applicability of the data.

3.2.2.14 Indirect Tax (IDT)

Indirect tax is another way to finance public expenditure. An increase in indirect tax can sometimes be neglected by the citizens, as the indirect tax is less visible than a direct tax. Governments sometimes choose to increase the indirect tax when they want to increase public expenditure, so this is another crucial political tool and it is an explanatory variable in this study. The IDT is obtained by using the percentage of indirect tax relative to total tax. This variable is used only for the time-series analysis due to the availability of data.

3.2.2.15 GDP of the Non-Agricultural Sector (GNA)

This variable is intended to capture the fact that in Thailand, the majority of poor people are in the agricultural sector. Therefore, the GNA is a good variable to measure income inequality in Thailand, as the Gini coefficient data are not sufficient for our analysis.

3.2.2.16 Election Cycle (ELEC)

This variable captures the role of the political business cycle in the determination of public expenditure. This variable takes the form of a dummy variable in our analysis. The value of 0 indicates the year of a non-election and the value of 1 indicates an election year. Particularly noteworthy is the fact that our analysis only counts the year that has a general election.

3.2.2.17 Income Per Capita (GPP)

Income per capita or GPP is conceptually equal to the Gross Domestic Product, but it indicates the total value of goods and services produced within a province in a given period. This variable is used at the provincial or in the micro-level analysis.

3.2.2.18 Size of Province (SIZE)

The size of the province is the variable used in the panel data or the provincial distribution analysis. Many times governments tend to allocate the resources or expenditure according to the size of the province. It is interesting to see whether this applies to the case of educational expenditure as well.

3.2.2.19 Poverty (POV)

Poverty is used as an independent variable for the provincial distribution (panel data) analysis. This is the percentage of people living in poverty

for each province in Thailand. This variable can be used to test the median voter theory, as it represents the situation of poverty, which is different from the national level analysis, which uses the GNA.

3.3 Model Specifications

3.3.1 Defining the Variables for the Time-Series Equations

In examining the determinants of educational expenditure by different types and stages, the annual data on government expenditure from the Bureau of Budget from 1982-2010 were utilized. This is considered as a quality source of data concerning the government budget in Thailand. Each type of educational expenditure is calculated as a percentage of GDP in order to provide a comparable indicator, which also includes the one-year lagged variable. This produces a dynamic estimation of educational expenditure over time.

Given the dependent variables explained in the last section, there are potential conditions for the independent variables for the educational expenditure equations with a distinguished influence on the allocation pattern. For each of the educational expenditures, all of the variables should be incorporated into the estimation. First, all of the economic variables, including growth of GDP per capita, industrialization, inflation, and unemployment (GCAP, IND, IFL, and UNEM respectively) should have direct and significant impacts on the total educational expenditure. This is because as the economy grows (i.e. higher growth of GDP per capital and higher degree of industrialization), governments tend to increase their public expenditure, especially on education. Further, a higher rate of employment may force people to obtain more education and also put pressures on the government to increase public expenditure in order to stimulate the economy. Especially noteworthy is the fact that the estimation can clarify whether the expenditure on education is pro-cyclical or if it behaves as the Keynesian counter-cyclical pattern has predicted.

Second, demographic variables should be incorporated in the equation. This includes all of the demographic variables, which are population, number of schools, number of teachers, number of students, school-age population, enrollment rate, and student/teacher ratio (POP, SCH, TEA, STU, SAP, ENR, and STR respectively). As

suggested in the previous chapter in table 2.1, a number of studies clarify that demographic factors and educational factors can affect the expenditure on education. Therefore, by incorporating these variables, our estimation should provide an insightful estimation and analysis. However, in the case of the different types of education, some variables may be modified or excluded, i.e. the number of students should match the stage of education (number of students in basic education for basic educational expenditure). As for the non-formal education, some variables may be excluded.

It is worth noting that these demographic and educational variables are expected to have positive relationships with the government's total expenditure on education. This is because as the number of the school-age population increases the demand for public services on education tends to be higher and places pressure on the government to set a higher budget to facilitate it. As for urbanization, it is explained that the process requires higher public expenditure to deal with the increasing demand of infrastructure in the urban areas. Our analysis will test whether educational expenditure is in line with the theoretical underpinning. The educational variables also put pressure on government to allocate a greater budget for education and are a subject for the test.

Third, other dimensions of variables, including decision-making, and institutional and political variables, are all included in this equation. The incrementalist variable, which is a one-year lagged total educational expenditure, is to be included as another independent variable. This variable is expected to be significant and has a positive coefficient, implying that government increases its total educational expenditure based on the previous year's expenditure.

The institutional variable is included in this equation. This institutional variable to be included in this equation is the constitutional framework, which takes into account the number of years of compulsory education.

As for the political variables, all of them are to be included as independent variables in the equation. This includes budget deficit, proportion of indirect tax to direct tax, ratio of agricultural GDP to total GDP, and election cycle (DEF, IDT, GNA, and ELEC respectively). The first four political variables tend to be significant and to have a positive effect on total educational expenditure. Election cycle is

included in the model as a dummy variable, where 0 is the year of a non-election and 1 is the year of an election. The estimation result can provide the analysis on public choice theory, which was suggested in the previous chapter. After all of the critical explanations and discussion above, the total educational expenditure determination can be illustrated as the following function:

Regressing the economic-demographic, institutional, decision-making, and political variables separately for each type and stage of education can identify the possible counteracting determinants of educational expenditure. The total educational expenditure equation will incorporate every independent variable. Each type of educational expenditure will incorporate different sets of independent variables according to the characteristic of the expenditure.

The model specifications are:

$$TEDU = f\ (GCAP, IND, IFL, UNEM, POP, SCH, STU, TEA, SAP,$$
$$ENR, STR\ , LEXP, DEF, IDT, GNA, ELEC)$$

$$ECUR = f\ (GCAP, IND, IFL, UNEM, POP, SCH, STU, TEA, SAP,$$
$$ENR, STR\ , LEXP, DEF, IDT, GNA, ELEC)$$

$$ECAP = f\ (GCAP, IND, IFL, UNEM, POP, SCH, STU, TEA, SAP,$$
$$ENR, STR\ , LEXP, DEF, IDT, GNA, ELEC)$$

$$BEDU = f\ (GCAP, IND, IFL, UNEM, POP, SCH, BSTU, TEA, SAP,$$
$$ENR, STR\ , LEXP, DEF, IDT, GNA, ELEC)$$

$$HEDU = f\ (GCAP, IND, IFL, UNEM, POP, SCH, HSTU, TEA, SAP,$$
$$ENR, STR\ , LEXP, DEF, IDT, GNA, ELEC)$$

$$NEDU = f\ (GCAP, IND, IFL, UNEM, POP, LEXP, DEF, IDT, GNA, ELEC),$$

The six functions above incorporate all of independent variables from the MAPD framework for each dependent variable to explain the determinants of total educational expenditures. All of the dependent variables, which are different types and stages of educational expenditure, are calculated as a percentage of GDP. These relative measures can truly reflect educational expenditure from a policy perspective.

TEDU, ECUR, ECAP, BEDU, HEDU, and NEDU denote total educational expenditure, current educational expenditure, capital education expenditure, basic education expenditure, higher-education expenditure, and non-formal education expenditure. In particular, TEDU, ECUR, and ECAP have the same set of independent variables, whereas BEDU, HEDU, and NEDU have different sets according to the stages of education.

3.3.2 Defining the Variables for the Equations at the Provincial or Micro-Level for the Panel Regression Analysis

In order to make the analysis in this study more insightful, a deeper analysis is to be conducted to look at the provincial distribution using province as a unit of analysis. By mentioning this, the panel data are required at the provincial level, and this provides a useful micro-level analysis in addition to a macro-level analysis at the national level. The analysis at this level takes into account the data from each province for four years, from 2007 until 2010.

As for the panel data regression analysis used in the provincial distribution analysis, there are several adjustments made from the equations at the national level. This is to match the condition and the availability of the data at the provincial level. The functions below illustrate the five dependent variables for the estimation of determinants of educational expenditure distribution for provinces. These educational expenditure functions reflect the determinants of total, basic, basic per school, basic per teacher, and basic per student.

The analysis of the provincial distribution focuses on the determinants of different types of education, which is slightly different from the macro-level analysis because it can reflect the policy perspective in another dimension, particularly regarding the issues of distribution and equity. Within the analysis of the determinants of educational expenditure for provincial distribution, this study attempts to analyze

the determinants of each type of educational expenditure distribution for provinces, such as the average basic expenditure per school, teacher, and student.

The model specifications of the analysis of the provincial distribution indicate a number of variables included in each function. This is slightly different from those in the time-series analysis. Some variables were not available at the provincial level and hence were deleted from the model. The total educational expenditure equation does not incorporate the number of schools, teachers, or students because the total educational expenditure covers mostly the expenditure for higher-education institutions and the basic education expenditure is the expenditure for development and opportunity expansion only, which share a very small portion of the total expenditure. The model specifications for the provincial distribution are as follows.

$$PTEDU = f\ (GPP, POP, SIZE, IFL, UNEM, IND, IDT, POV, LAG)$$

$$PBEDU = f\ (GPP, POP, SIZE, IFL, UNEM, IND, SCH, TEA, STU, IDT, POV, LEXPB)$$

$$PBSCH = f\ (GPP, POP, SIZE, IFL, UNEM, IND, SCH, TEA, STU, IDT, POV, LBSCH)$$

$$PBTEA = f\ (GPP, POP, SIZE, IFL, UNEM, IND, SCH, TEA, STU, IDT, POV, LBTEA)$$

$$PBSTU = f\ (GPP, POP, SIZE, IFL, UNEM, IND, SCH, TEA, STU, IDT, POV, LBSTU)$$

All five dependent variables denote the expenditure of each type of education distributed to the provinces. As noted, the total educational expenditure has a smaller number of variables than other dependent variables due to the fact that the basic education expenditure distribution is more focused on in this study.

3.4 Data Collection

3.4.1 Date Collection and Analysis for the Qualitative Analysis

In the qualitative analysis, this study uses the case-study approach to analyze the case of educational expenditure policy making in Thailand. Particularly, this study takes into account the development of educational policy in Thailand as in accordance with the national economic and social development plan, beginning with plan one. This can provide a basis for the analysis of the determinants of educational expenditures by looking at the socio-economic context of Thailand. The case of education policy in Thailand utilizes the national development plan obtained from the national economic and social development board.

In terms of the education policy itself, it also considers the current education system as well as the education reform taking place in Thailand. The trends of educational expenditure as well as the distribution of educational expenditure across the country are also taken into consideration. Both descriptive and exploratory approaches are employed to analyze the factors affecting the allocation of educational expenditure in Thailand.

3.4.2 Date Collection for the Quantitative Analysis

In any sound research, the data collection phase indicates the methodology that will be employed to generate the necessary and useful data that can produce an insightful analysis. The analysis of this study relies on secondary data as the source of data. The use of secondary data, which are mostly important statistics from government agencies, is an appropriate method of inquiry for making inferences and for quantitative analysis. Secondary data are the most common way to collect data in many quantitative researches, particularly in economics.

The time series data, which have been used in the regression analysis, cover the period from 1982 to 2010, while the panel-data analysis applies the latest year's data of 2007-2010 from each province. Although many data series dated back to 1960s, such as the GDP, some limitations were encountered in the attempt to estimate equations back to those years. The secondary data used in this study were obtained from various sources, mainly government agencies. By using secondary data from

government agencies, the data were considered to be highly reliable, as these government agencies employ a consistent and reliable method to collect data as they have tools and systems that reach international standards.

First, the data on educational expenditures, which are the dependent variables, were extrapolated from the Bureau of the Budget and from the Ministry of Education. The data will be classified as well into different levels of education and different types of spending. This includes the data on expenditure for primary, secondary, vocational, higher, and non-formal education. The data on expenditure can also be classified as capital expenditure and current expenditure. In this study, the annual expenditure on education will be calculated as percentage of GDP to reflect the significance of budget allocation for education. The lagged expenditures of each type, which are the independent variables, were obtained from the same sources.

Second, in this study there are various sets of independent variables from the MAPD framework. The first set of independent variables is used to test the determinants of educational expenditure, taking into account the economic-demographic perspective. The data on economic variables, which are GDP per capita, inflation rate, industrialization, and unemployment, were obtained from government agencies, including NESDB and the National Statistical Office.

Third, a number of educational indicators were also obtained as the independent variables (demographic variables) in order to examine the impact of education policy, particularly those widely-accepted educational indicators, on different types of educational expenditures. The educational indicators used in this study are universal and many countries in the world use these indicators to evaluate the performance of education policies and education systems, as well as the output and outcome of such policies and systems. The educational indicator data were collected from the Ministry of Education and UNESCO.

Considering the political determinants of educational expenditure, there are five political variables in the MAPD framework, including budget deficit, proportion of indirect tax to direct tax, number of labor union members, ratio of agricultural GDP to total GDP, and election cycle (DEF, IDT, LUN, GNA, and ELEC respectively). The data on the political variables were obtained from various government agencies, including the Bureau of Budget for the budget deficit and tax data, the National

Economic and Social Development Board for the agricultural GDP and GDP, and the Election Commission for the election cycle. The voter participation rate was collected from the publication of the Election Commission for the year 2008.

The panel data for the analysis of the provincial distribution were collected for each province from the years 2007-2010. The educational expenditure of each province was collected from the Bureau of Budget, which provides the allocation of educational expenditure for each province. This reflects only the part of educational expenditure, called the "development and the opportunity increasing budget" at the level of basic education.

The entire educational expenditure at the basic education level was not available and requires a large amount of resources to collect. In each province, there are several sizes of provinces and number of students and schools. This set of data has to be gathered again by the author in order to obtain the total educational expenditure, the current educational expenditure, and the capital educational expenditure for each province. The independent variables at the provincial level, which are socio-economic data, were collected from the National Statistical Office as well as by computation by the author.

Table 3.1 at the end of this chapter provides a summary of both the dependent and independent variables used in this study, as well as their definitions and the source of data collection.

3.5 Estimation Procedure and Method

Both the qualitative and quantitative methods are employed in this study using secondary data. The qualitative analysis in chapter 4 attempts to analyze the development of education policy making in Thailand by considering the substance of policy, as well as by looking at the trend and the distribution aspect of education policy. In this study, two types of quantitative analyses are assigned to test and clarify the determinants of public expenditure on education in Thailand.

First, the time series data, which cover the period of 1982 to 2010 of 30 years is used to analyze educational expenditure policy at the macro level. The time-series data are analyzed using the multiple regression method.

Second, panel-data are used taking into account data at the provincial level from 2007 to 2010. The panel data multiple regression analysis with random effect is used to analyze the panel-data. The use of panel-data to analyze educational expenditure distribution for provinces helps to increase the degree of freedom because there are greater numbers of observations with this method. Additionally, as the number of observation increases, it can reduce the likeliness of a collinearity problem, which in turn makes the economic estimation more accurate.

The random effect is chosen because the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model. The regression analysis is employed using SPSS version 17 and STATA version 12.

The problem of multicollinearity is first tested in order detect the pair of independent variables that have highly and significant correlations. These variables were removed from the equation to eliminate the multicollinearity problem.

Every equation will be tested independently using the multiple regression analysis method. Equations will be estimated independently using the Ordinary Least Square (OLS) method with the assumption of a best, linear, unbiased estimation (BLUE).

This study examines the relationship between the independent and dependent variables, which has been discussed in previous parts, where the independent variables are the determinants of educational expenditure, which is the dependent variable. The one-year lagged variable in this study is the previous year's expenditure (expenditure t-1). This lagged variable was taken from the incrementalism theory.

Other variables take the actual data of each observation as the dependent variables and independent variables, which are the determinants of the dependent variables and they can occur at the same time. This is because the analysis of public expenditure takes into account the socio-economic and political environment that may affect the public decision making on public expenditure. Therefore, as the analysis of this paper focuses on the actual environment or condition that affects the actual education at each particular time, the actual data of each period of time for each variable are appropriate for the analysis, apart from the one lagged variable, which is the previous year's expenditure (t-1).

All of the statistical results will be tested for their significances with formal statistical tests: t-test, R square test, and F ratio test. Moreover, as this study is a time-series study with a large number of independent variables, it is therefore anticipated that it can cause the problem of autocorrelation, which has to be tested for because if we face a problem of autocorrelation, one of the conditions for the best, linear, unbiased estimation (BLUE) of the regression equation will not hold, causing the parameter estimates to be biased and misinterpreted. With that in mind, this study pays special attention to the problem of autocorrelation.

In general, the common way to detect a serial correlation or autocorrelation problem is the Durbin-Watson statistics (DW stat). The Durbin-Watson statistics is a parameter with a predictable distribution pattern around a level 2 normally presented in the regression output, which will be used to test for the autocorrelation problem.

Table 3.1 Definitions and Sources of Data

Variable	Definition	Source of Data
1. Total educational expenditure as percentage of GDP (TEDU)	Government total expenditure on education in nominal term of the central government	Bureau of Budget
2. Current educational expenditure (ECUR)	Government expenditure on education classified as a current expenditure	Bureau of Budget
3. Capital educational expenditure (ECAP)	Government expenditure on education classified as a capital expenditure	Bureau of Budget
4. Basic education expenditure (PEDU)	Government expenditure on primary and secondary education	Bureau of Budget

Table 3.1 (Continued)

Variable	Definition	Source of Data
5. Higher education expenditure (HEDU)	Government expenditure on higher education	Bureau of Budget
6. Non-formal education expenditure (NEDU)	Government expenditure on Non-formal education	Bureau of Budget
7. GDP per Capita (GCAP)	Gross domestic product in nominal term per capita	NESDB
8. Inflation rate (IFL)	Rate of changes in price level calculated from the changes in consumer price index (CPI).	NESDB
9. Industrialization (IND)	The share of labor industrial sector relative to total labor in both industrial and agricultural sectors	National Statistical Office
10.Unemployment rate (UNEM)	The ratio of unemployed workers to total labor force	NESDB
11. Population (POP)	Number of population	NESDB

Table 3.1 (Continued)

Variable	Definition	Source of Data
12. Number of Schools (SCH)	Number of public schools	National Statistical Office/Ministry of Education
13. Number of Students (STU)	Number of students in public education system	National Statistical Office
14. Number of Teachers (TEA)	Total number of teachers in public schools	National Statistical Office
15. School-age population (SAP)	The share of population younger than 15 years old relative to the total population	National Statistical Office
16. Enrollment rate (ENR)	Rate of student enrollment in public schools	Ministry of Education
17. Student/teacher ratio (STR)	The ratio of student to teacher	Ministry of Education
18. Lagged expenditure (LEXP)	One year lagged expenditure of any category of expenditure	Bureau of Budget
19. Budget deficit (DEF)	Amount of budget deficit	Bureau of Budget
20. Indirect tax (IDT)	The ratio of indirect tax over total tax	Ministry of Finance

Table 3.1 (Continued)

Variable	Definition	Source of Data
21. GDP of non-agricultural sector (GNA)	GDP of non-agricultural sector relative to total GDP	NESDB
22. Election cycle (ELEC)	Year of election	Election Commission
23. Income per capita per Capita (GPP)	Value of goods and services produced in each province per capita	National Statistical Office
24. Size of province (SIZE)	Size of land of each province	National Statistical Office
25. Poverty (POV)	The percentage of people living in poverty	National Statistical Office

CHAPTER 4

THE ANALYSIS OF THE DEVELOPMENT AND POLITICS OF EDUCATIONAL EXPENDITURE POLICY IN THAILAND

Before moving on to discuss the empirical estimations, a qualitative analysis provides a meaningful and crucial view of the case of education policy in Thailand. In particular, it focuses on how public education policy in Thailand is made, as well as the development of educational expenditure policy. The qualitative analysis in this chapter serves as a basis to thoroughly understand why educational expenditure policy making in Thailand deserves careful analysis.

The case of education policy in Thailand can be considered as an information-rich case, providing a lot of crucial information to be discovered. In particular this chapter also attempts to figure out what determines educational expenditure over time, as well as to deal with the issue of the distribution of educational expenditure across provinces. The analysis in this chapter uses both the descriptive and exploratory approach. Section 4.1 and 4.2 provide an overview of the development plan and the education system in Thailand. Section 4.3 and 4.4 illustrate important issues and concerns regarding Thai education policy making. The last section employs a descriptive analysis, whereas section 4.3 uses the exploratory approach to analyze the determinants of educational expenditure policy in Thailand. Especially noteworthy is the fact that both of the approaches employed in this chapter serve as a foundation for the quantitative analysis in the next two chapters.

In order to have a profound understanding of the determinants of educational expenditure in Thailand, careful consideration should be paid to the development of Thai education policy, as well as the formation of the Thai education system and education reform. The review of both education policy and the education system provides an overall picture of what has happened to education administration in Thailand. The schooling structure can be seen from this review, as it is one of the

most important parts of the big picture and it serves as well as a basis for the analysis of public expenditure on education.

4.1 The National Economic Development Plan and Education Policy in Thailand

During the 1930s, education was considered as an instrument for furthering democracy. Since the 1950s, while education has become a key element in social and economic development, it has also grown in terms of complexity and has become institutionalized, as it appears to be one of the main objectives in every government.

In the past few decades, there have been considerable changes in the aims, policies, and objectives of Thai education, as the society and economy have begun to change and become more complex and as political pressures have become more acute. The disparities in the country have become more glaring, making the whole process of education as the factor of economic and social development changed.

The National Educational Plan came into effect on 5 July, 1951. For the first time it was realized that the desire for education must somehow be deflected towards that which will contribute to the building of an independent national economy. Education was also seen as a means of developing both the individual and society with the economic and political development of the country. In 1960, the National Scheme of Education came into effect after the creation of the National Council of Education in 1959, whose immediate task was to develop long-term educational policies.

The National Economic Council was established to create National Economic Development plans before its name was changed to National Economic Development (NEDB) Board in 1959. In the first National Economic Development Plan (1961-1966), education development aimed to improve and expand lower elementary education and to increase the length of compulsory education from four to seven years. It also aimed to improve and expand secondary education as well as to produce sufficient qualified teachers. The expansion of university education was also included in the first plan.

The first plan was essentially a program of action for central government expenditures, while the scope of the Second Plan (1967-1971) was broadened to assess the potential of the economy as a whole, and hence offer a more overall economic policy. Education policy dealt mainly with the creation of skilled manpower to fulfill national requirements, especially in the field of science and technology (Watson, 1980).

In 1972, social development was officially recognized as an essential part of the National Plan. The NEDB therefore became the National Economic and Social Development Board (NESDB), as it is known today, under the Office of the Prime Minister (NESDB website). The educational aspects of the Third National Economic Development Plan (1972-1976) placed emphasis on improving the quality and effectiveness of all levels of education, with some concentration on secondary education. This third plan focuses relatively more on equity and distributional issues, which also apply equally well to education policy. Specific policies were put in place to improve and expand vocational schools at the upper secondary level and to increase support for teachers of vocational subjects (World Bank, 1989).

The third plan reflects the equity approach to educational development, as it also aimed at improving rural access to schooling for those in the provincial areas. Similarly, there were policies for non-formal education, and agricultural education and training programs, all of which aimed at better rural access rather than quantitative manpower targets.

The fourth plan (1977-1981) continues to reflect the strategy proposed by the third plan. Public expenditure was to be increased to extend education and health services to rural areas where they were lacking and to those in the rural areas, which are the majority of the population.

The fifth plan (1982-1986) intends to develop and expand compulsory education both in terms of quantity and quality in order to provide all children, aged 6 and over, with an opportunity to receive an education. Early secondary education and out-of-school education in remote rural areas were expanded. The government promoted the private sector to invest in upper-secondary education and higher education with technical assistance from the government. In the sixth plan (1987-1991), support was given to education and training by developing a system of

vocational counseling at education institutions, expanding the apprenticeship system, and encouraging the people to take a more active role in safeguarding their own health. An emphasis on the development of science and technology was also part of the sixth plan.

Basic education was expanded from 6 to 9 years in the seventh plan (1992-1996) and the government promoted the transition rate to secondary school by encouraging poor parents to send their children to secondary school. The private sector was encouraged to play a stronger role in education provision, while the government introduced more scholarship systems to assist children in the underprivileged group.

The eighth plan (1997-2001) shifts away from the expansion of quantity of education to a more holistic approach, with emphasis on the development of the quality of education. Continuous training for school teachers is to be provided and the government has begun working towards the further extension of basic education to 12 years. The quality of life was the focus of the ninth plan (2002-2006), where young children should have an opportunity to receive at least 9 years of education and at the same time the government promotes a knowledge-based society, where every Thai person should have access to develop the ability to adapt to changes.

The tenth plan sets specific targets for education, particularly to increase the average period of education provided to 10 years and to improve test scores (higher than 55%) in core subjects, at all levels. It also aims to raise the percentage of the mid-level workforce to 60% of the national labor force and to increase the ratio of research personnel to the population by 10:10000 (Ministry of Education, 2008).

4.2 The Education System in Thailand

The new Constitution of the Kingdom of Thailand, promulgated in October 1997, provides challenging guidelines for the future development of education in the country. According to Section 43, every person shall enjoy the equal right to receive basic education for the duration of not less than twelve years; such education shall be of quality and shall be provided free of charge. Every person shall have both the duty and the right to receive education and training (Sections 30 and 69). In providing

education, maximal public benefit in national communication resources (Section 40), as well as the conservation and restoration of local wisdom (Section 46), will be taken into account. Under the present education system, various types and methods of learning are offered to learners regardless of their economic, social, or cultural backgrounds. Formal education approaches are classified by four levels.

4.2.1 Pre-School Education

According to local conditions, there are three types of pre-primary education available for children aged 3-5: pre-school classes, kindergartens, and child-care centers. In general terms, private schools offer a three-year kindergarten program. There are two types of pre-school education available in state schools: two-year kindergarten and one-year pre-school classes attached to primary schools in rural areas. The current trend is to expand the one-year pre-school classes to two-year kindergartens nationwide. Pre-school education is not compulsory.

4.2.2 Primary Education

Primary education is compulsory, lasts six years, and caters to children aged 6-12. According to the National Education Act of 1999, formal education is divided into two levels: basic and higher education. Basic education refers to the twelve years of schooling before higher education and since May 2004, it also includes two years of pre-primary education.

4.2.3 Secondary Education

Secondary education is divided into two cycles: lower and upper secondary, each one lasting three years. The upper secondary system is divided into two parallel tracks: general or academic, and vocational (leading to the lower certificate of vocational education). Formal vocational education at the post-secondary level (vocational colleges) generally lasts two years, leading to a diploma. Students may continue their vocational education at the university level (degree level, two-year program).

4.2.4 Higher Education

According to the National Education Act of 1999, higher education is now divided into two levels: lower-than degree level or diploma level (two-year courses mainly related to vocational and teacher education offered by colleges and institutes under the Ministry of Education); and degree level. Degree-level programs take two years of study for students that have already completed diploma courses, and four to six years for those students that have completed upper secondary education or equivalent courses. The first professional qualification is a bachelor degree. Most bachelor's degrees take four years of study; however some fields such as medicine, dentistry and veterinary science, take six years.
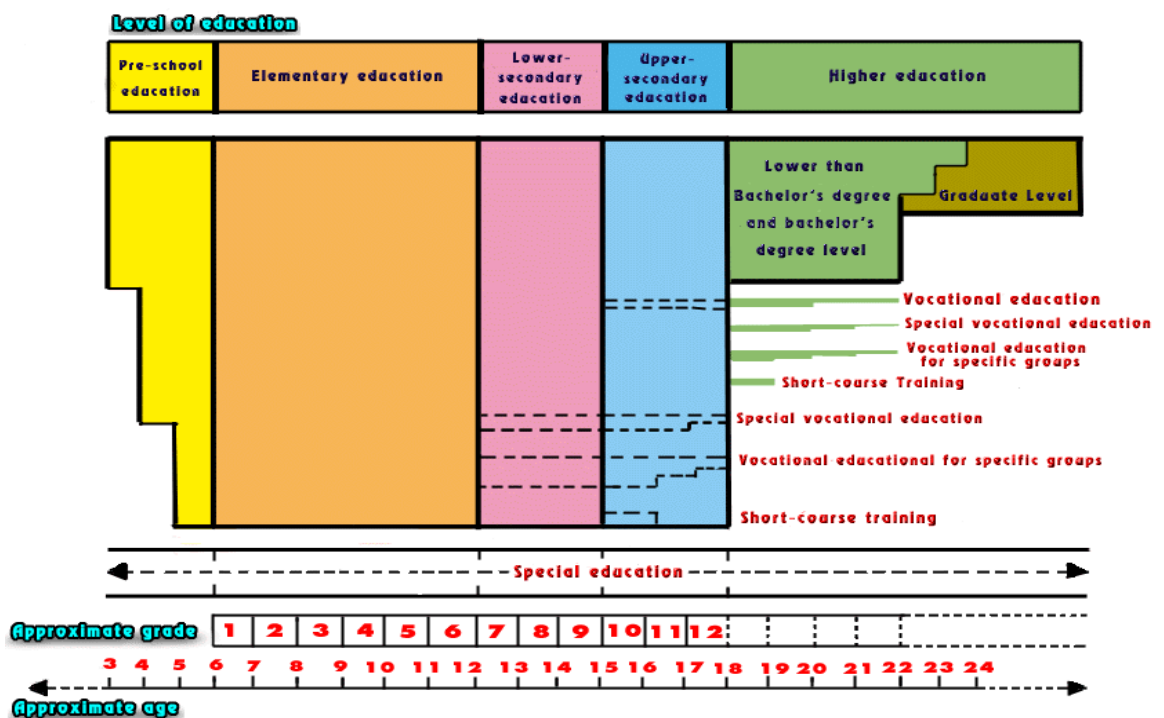
Figure 4.1 Education System in Thailand
Source: Office of Education Council

Regarding the education system in Thailand, the non-formal education sector should also be taken into account. This will fill the whole picture of the education system in Thailand, which covers people from all ages and from all walks of life. As the philosophy of education provision in Thailand places emphasis on lifetime

learning, therefore a non-formal education is supposed to play a significant role in promoting such learning. If this is the case, then a certain amount of resources are to be considered as an engine of this promotion. An analysis of education policy in Thailand should appropriately accommodate this issue. The organization of the present school system, which can give us the clearer view of how the education system in Thailand is structured, is illustrated in figure 4.1 above.

4.2.5 Educational Indicators

The challenge, in this era of expanding, deepening, and diversifying demand for education, is how best to meet the volume of demand while ensuring that the nature and types of learning respond effectively to needs. Effective policies are needed to improve access to education in order to make lifelong learning a reality for all, to improve the quality of educational opportunities, and to ensure effective use of resources and fair distribution of learning opportunities.

The growing diversity in educational provision has been one of the policy responses to increasing variety in the demand for skills. In order to make an analysis of education policy and to create effective education policy, the appropriate type of educational indicators should be taken into account. UNESCO has developed a concept of educational indicators which is accepted worldwide.

In fact, educational indicators are statistics that reflect important aspects of the education system. Ideally, a system of indicators measures the distinct components of the system and also provides information about how the individual components work together to produce the overall effect (Qureshi, 2007). Thus, an indicator system is more than just a collection of indicator statistics, i.e. the whole of the information provided by a system of indicators is greater than the sum of its parts.

The enrollment indicator is one of the most frequently-used indicators and is considered as the core indicator of education evaluation. There are two main indicators of enrolment: gross enrolment ratio and net enrolment ratio. This kind of indicator helps us to see the whole picture of the percentage or the rate of students that are enrolled in the education system. Higher enrollment rates imply that more children are taken care of by the education system and are educated in schools.
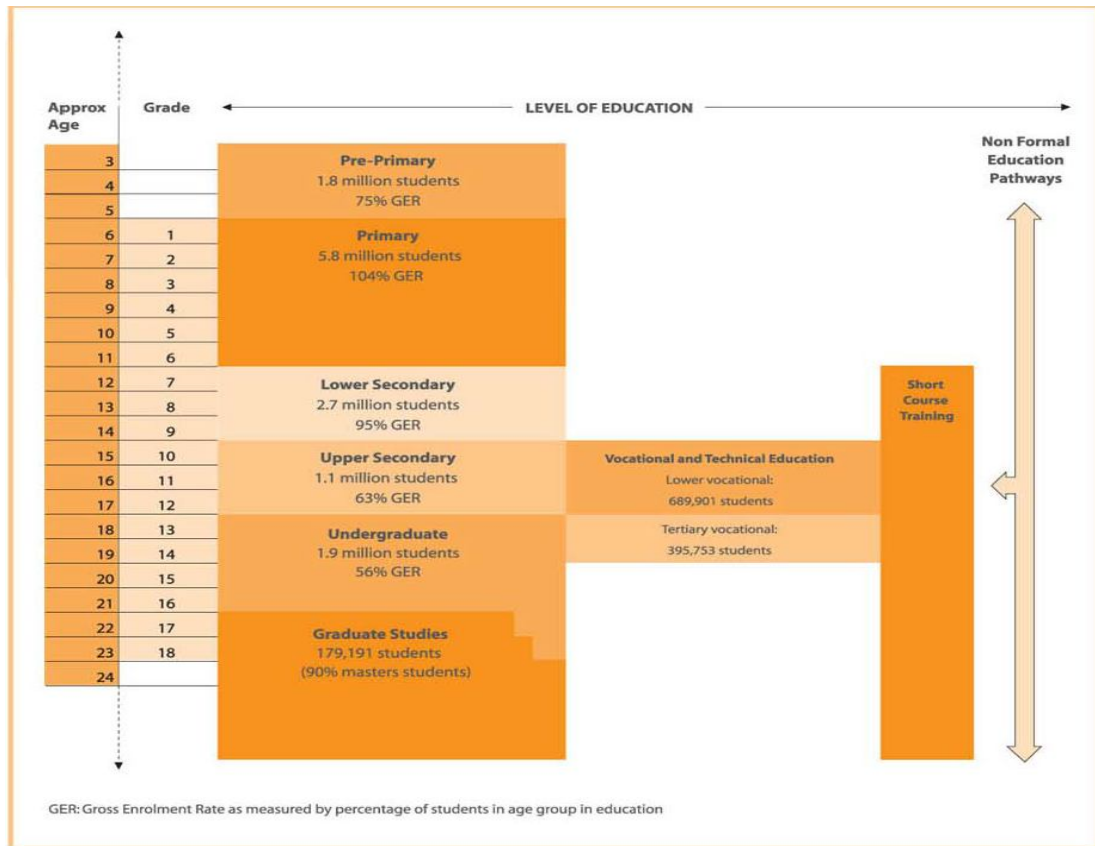
Figure 4.2 Thailand's Gross Enrolment Rate
Source: Ministry of Education

The second educational indicator concerns teachers. This includes the percentage of primary school teachers having the required academic qualifications and the percentage of primary school teachers that are certified to teach according to national standards. The efficiency indicator is another type of indicator attempting to explain another dimension of education quality, such as pupil-teacher ratio, repetition rates by grade, survival rate, as well as the literacy rate, one of the most common indicators of education efficiency.

UNESCO also has succeeded in forming the Education for All Development Index, which currently constitutes four indicators. These indicators include the net enrolment ratio in primary education, the adult literacy rate or that of the population group aged 15 and over, quality of education or survival rate, and gender parity. Figure 4.2 below illustrates an overview of the gross enrollment rate of Thailand in the 2008, with very high rate at the primary education level.

4.3 The Development of Education Policy and Current Education Reforms in Thailand

This part of the present study provides an overview of Education Policy in Thailand in terms of the general background of education policy making, the content and goals of education policy in Thailand, and the educational administration and management systems as well as the involvement of Thai politics in education. It also summarizes the educational reforms in progress, ranging from development of teaching-learning to the outcomes of education and learning. Such discussion could provide a pattern of the influence of Thai education policy. By considering these useful pieces of information, one can thoroughly understand that public expenditure on education in Thailand is worth studying.

4.3.1 Education Policy and Thai Politics

Particularly important is the influence of politics on the creation of education policy and expenditure in Thailand. The period since 1983 represents the end of communism in Thailand and therefore politics in Thailand has changed with this new era. Starting from this period, education seems to be given more emphasis.

In the past, the Minister of Education has generally refrained from or has been not tied to the Prime Minister in that his position did not come from the same political party as the Prime Minister, especially prior to the period of 2001, the year that Thaksin Shinawatra came into power. More recently, however, the appointment of this position shifted decisively. The minister of education always came from the largest party, or came from the same party as the Prime Minister.

From table 4.1, it can be seen that most of the ministers of education during 1981-2001 represent political parties that were different from the party that the Prime Ministers came from. It should be taken into account also that Thai politics during the past 30 years have experiences several times a coup d'état. Of course, during a military regime, the ministers of education always come from the people in the education sector, not politicians. Table 4.1 clearly illustrates the increasingly important role of education.

Table 4.1 Ministers of Education, 1981-2012

	Education Minister and Party		Prime Minister and Party	
Term	**Education Ministers**	**Political Party**	**Prime Ministers**	**Political Party**
1981-1983	KasemSirisampants	Social Action	General PremTinsulanonda	Military
1983-1986	ChuanLeekpai	Democrat	General PremTinsulanonda	Military
1986-1988	MarutBunnag	Democrat	General PremTinsulanonda	Military
1988-1990	General ManaRatanakoses	People	General ChatichaiChoonhavan	Chart Thai
1990 – 1991	General TienchaiSirisumpan	People	General ChatichaiChoonhavan	Chart Thai
1991-1992	KorSawaspanit	Deputy Minister of Education	National Peace Keeping Council	Military
			AnandPanyarachun	Independent
1992	Air Chief Marshal SomboonRahong	Chart thai	General SuchindaKraprayoon	(House of Representatives Resolution)
1992-1995*	Mr. SumpunTongsamuk	Democrat	AnandPanyarachun	Independent
			ChuanLeekpai	Democrat
1995-1997	SukavichRangsitpol	New Aspiration	BanharnSilpa-archa General ChavalitYongchaiyudh	Chart Thai New Aspiration

Table 4.1 (Continued)

	Education Minister and Party		Prime Minister and Party	
Term	Education Ministers	Political Party	Prime Ministers	Political Party
1997*	Chingchai Mongkoltham	New Aspiration	General ChavalitYongchaiyudh	New Aspiration
1997- 1998	ChumpolSilpa-archa	Chart Thai	ChuanLeekpai	Democrat
1998-1999	PanjaKesornthong	Chart Thai	ChuanLeekpai	Democrat
1999-2001	SomsakPrisana-anantakul	Chart Thai	ChuanLeekpai	Democrat
2001	KasemWatanachai	Senator	ThaksinShinawatra	Thai Rak Thai
2001*	ThaksinShinawatra	Thai Rak Thai	ThaksinShinawatra	Thai Rak Thai
2001 2002*	SuwitKhunkitti	Social Action	ThaksinShinawatra	Thai Rak Thai
2002-2003*	PongpolAdireksarn	Thai Rak Thai	ThaksinShinawatra	Thai Rak Thai
2003-2005*	AdisaiPotharamik	Thai Rak Thai	ThaksinShinawatra	Thai Rak Thai
2005–2006*	JaturonChaisang	Thai Rak Thai	ThaksinShinawatra	Thai Rak Thai
2006-2008*	VichitSrisaarn	Independent	General SurayudChulanont	Independent
2008*	SomchaiWongsawat	People's Power	SamakSundaravej	People's Power

Table 4.1 (Continued)

Term	Education Minister and Party		Prime Minister and Party	
	Education Ministers	**Political Party**	**Prime Ministers**	**Political Party**
2008*	SrimuangCharoensiri	People's Power	SomchaiWongsawat	People's Power
2008–2010*	JurinLaksanawisit	Democrat Party	AbhisitVejjajiva	Democrat Party
2010-2011*	ChinnawornBoonyakiet	Democrat Party	AbhisitVejjajiva	Democrat Party
2011-2012*	VorawatUaapinyakul	Pheu Thai	YingluckShinawatra	Pheu Thai
2012-Present*	SuchartThadathamrongvej	Pheu Thai	YingluckShinawatra	Pheu Thai

Source: Prime Minister's Office and the Cabinet

Note: *Denotes the Year that the Minister of Education Came from the Same Party as the PM

According to table 4.1 above, it should be noted that since Thaksin came into power, his cabinet has achieved political reform in Thailand as well as the introduction of a series of populist policies to Thai society. The populist initiative was claimed to result in higher government expenditures, where educational expenditure should be assumed to increase as well. This occurred almost at the same time as the public sector reform in Thailand in 1999.

Even more notable is the fact that since 2002, every Minister of Education has come from the same party as the prime minister, including two Ministers of Education from the Democrat party during 2008-2-11, except from 2006 to 2008, when appointed Prime Minister General Surayud Chulanont was the prime minister. From theses phenomena, it is evident that the Ministry of Education should be regarded as an "A grade" ministry which is considered as a very important ministry. This

important role of the Ministry of Education emphasizes that educational expenditure policy is worth analyzing.

Equally striking, the Democrat party also chose to pursue a similar kind of populist policy, with a particular focus on education. During Abhisit's government, education was emphsized and 12 years of free education policy were implemented. It is interesting to see whether this free education policy also results in quality of education or the expansion of opportunity of education.

4.3.2 The Substance of Thai Education Policy

Despite the fact that Thai education policy is somewhat tied with politics, the role of policy substance itself should also be taken into account. First of all, the current Thai education policy is claimed to invest in raising the quality of the entire educational system, to address the development of teachers, curricula, instructional media and information technology, to improve the quality and knowledge of students in accordance with educational plans, available resources, and surrounding factors, and to create a system of life-long learning for the Thai people.

Secondly, the education policy intends to ensure that every Thai citizen has access to at least 12 years of basic education, free of charge, focusing on reaching the disadvantaged, the disabled, and those living in difficult circumstance, as well as increasing access to further education through student loan schemes. It is clearly linked to policy concerning the production of knowledgeable and capable graduates. This implies that a higher budget allocated to education could be expected due to this second objective of Thai education policy.

The third point that has been emphasized is the adjustment of teacher training and development to order to ensure quality and high moral standards among teachers, while guaranteeing teachers appropriate remuneration and welfare for a good quality of life. It should be noted also that another goal of education policy is to develop and modernize the curricula and instructional media in line with global changes. This could be done by expanding the role of creative learning systems, the development of a modern library system, and the establishment of new learning environments.

It is also seen that the Thai education policy also aims to promote the intensive use of information technology to enhance learning efficiency in order to ensure access

to the necessary infrastructure, technologies, and software to complement learning, and to give particular attention to the development of foreign language learning.

Considering the goals of Thai education policy, it can be argued that the budget allocated to this sector should keep increasing in order to meet the requirements and aims of the policy, as it requires a substantial amount of resources both physically and in human capital, to complete the goals of education policy.

Another emphasis of Thai education policy is to develop the quality and standard of higher education institutions in order to guarantee a high level of academic and professional services, to achieve excellence in research and innovation, and to produce and develop a workforce that corresponds to structural changes within the manufacturing and services sector. The aim of this policy is to accelerate the development of a high-quality workforce with clear career paths to enhance the country's competitiveness in various sectors. By achieving this, Thailand can provide occupational and professional competence certification and continue the expansion of its role at the community level. Again, higher education policy seems to require an increasingly substantial amount of budget.

It should be noted also that the education policy in Thailand also aims to promote the decentralization of educational administration and management to district education offices and academic institutions, as well as to encourage the involvement of the private sector in educational management. This will allow Thailand to build the capacity of local administrations and to prepare them for the transfer of responsibility and to ensure that required quality standards are met. This could be concerned with the fact that the centralized budgeting may not meet the demands at the local level, as well as the fact that there are some unequal distributions of resources across provinces. By considering this issue, it is crucial to pay attention to the allocation of a budget for provincial distribution.

4.3.3 Education Reforms in Thailand

The implementation of the 1999 National Education Act has prompted a major concern in the education sector in terms of both teaching and learning methods, as well as in learning environments. This process of transformation is focused on identifying learning outcomes within the 12 year basic education system, improving

provision and practices in basic education, and the implementation of a vocational and technical training system.

The education system in Thailand is equipped with a strategy based upon enhancing moral and ethical values, together with a core program for improving quality in education. This strategy is reinforced by His Majesty's philosophy of Sufficiency Economy, which promotes moderation and harmony among local communities in order to meet their needs in a sustainable manner.

Other key platforms of education reform include professional development, new standards of professional capability for teachers to improve and transform subject knowledge, the introduction of new methods in teaching practices, classroom management, and professional development.

4.4 The Character of Public Expenditures on Education in Thailand: A Recent Trend

A brief look at the character of educational expenditures in Thailand serves as a basis for understanding educational expenditure policymaking in Thailand. An analysis is made to compare and contrast the development of education policy presented in the previous section with the expenditure presented below. The change in the character of educational expenditure could perhaps match the political and education policy making contexts. Both a brief view of educational expenditures at the national level as well as those for provincial distribution should critically be taken into account.

4.4.1 Educational Expenditure in Thailand from Past to Present: an Issue of Institutional Shift

This part of the paper attempts to review and present some useful information as well as preliminary figures concerning educational expenditure in Thailand during the past couple of decades. By a careful consideration of these figures, we can overview the past trend of public expenditure on education. The figures presented below include the amount of public expenditure on education and the relative amounts with regard to the key economic indicators, such as GDP and total public expenditure.

Expenditure by types or stages of education should also be taken into account in order to have a wider and deeper view with which to analyze educational expenditure. The issue of institutional shift is worth taking into account, as it can well explain the pattern and character of educational expenditure in Thailand from past to present.
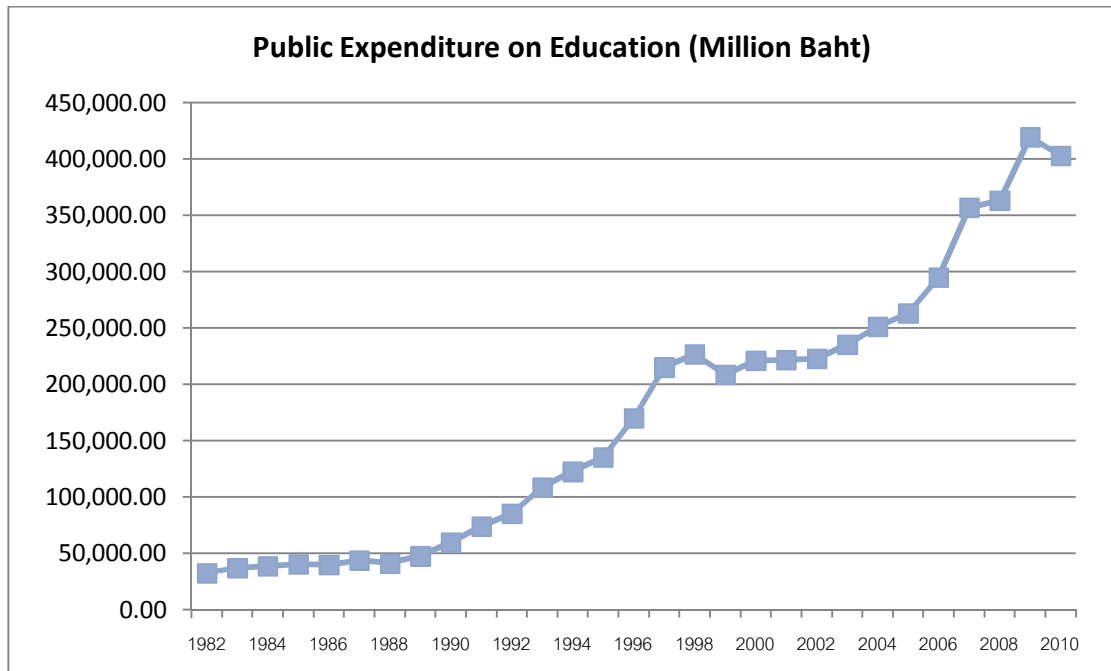
Figure 4.3 Public Expenditure on Education in Thailand During 1982-2010
Source: Ministry of Education

Government funding has been the main source of financial resources for educational development in the past decades. On average, during the period 1987-97, the total government spending on education equaled 3.16 percent of the GDP or 18.64 percent of the total expenditure. The amount devoted in the main budget for education affairs rose nearly threefold from 1995 to 2009.

Educational expenditure began to increase sharply in 1990 when General Chatichai Chunhawan was the Prime Minister. This goes in line with the expansion of basic education from 6 to 9 years since the 1992 development plan and the slight drop of education expenditure in 1998 is because the problem of the East Asian economic crisis in 1997.

Another big uphill movement of educational expenditure occurred again from 2003 to 2007 under Thaksin's administration. This could have come from the result of his populist policy, together with the implementation of Education Act of 1999 and the public sector reform around 2000. It could be said that this sharp increase in educational expenditure comes from the institutional shift since 1999.

In 2008, under Abhisit's administration, with the policy of free education, educational expenditure clearly jumped from 2008 to 2009. In 2009, the annual budget on education was approximately 400,000 million baht. One could argue that politics do play some roles in determining educational expenditures, as the change in political power from one party to another can lead to a big jump or a shift in educational expenditure allocation, especially in recent decades. These increases are illustrated in figure 4.3.

In terms of the relative amount of educational expenditure as the share of total public expenditure, it is also worth considering the changes. Figure 4.4 below shows that budgeted expenditure rose from below 20 percent prior to 1995 to levels that are much higher than 20 percent after 1995 and was about 25.7 percent in 2000.
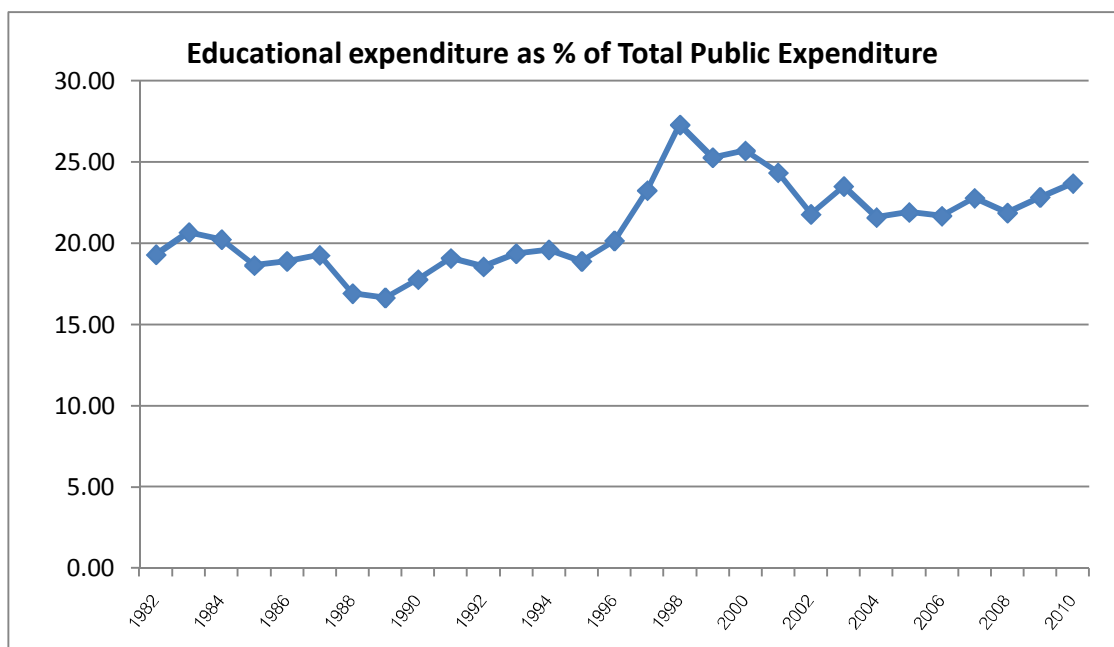
Figure 4.4 Educational Expenditure as Percentage of Total Public Expenditure from 1982-2010

Source: Ministry of Education

A significant increase in the relative amount of education expenditure as a percentage of total expenditure was seen from 1995 to 1998 and dropped after that; this shares the same pattern of movement with the absolute amount of educational expenditure. This increase in educational expenditure could have come from the economic bubble prior to 1997 and the expansion of basic education to 12 years.

The relative amount of education budget began to decline, but very slightly, in 2001 because the total government budget increased significantly while the education budget itself remained the same amount. The pattern of changes in educational expenditure as a percentage of total public expenditure stayed at around 19 percent and 27 percent, with the highest in 1998, and started to have a steady and slightly declining trend.

In 1997, the amount devoted to the main budget for education affairs was about 214,297 million baht, representing 22 percent of the total public expenditure and 4.1 percent of the GDP. In 1998, due to the impact of the economic crisis, the total government budget for education decreased to 201,707 million baht or about 3.5 percent of the GDP; however, it represented 25.2 percent of the total expenditure. The education sector has received the largest share of the total public expenditure since 1991. In 2004, it represented 4.2 percent of the GDP and rose to 4.9 percent in 2008.
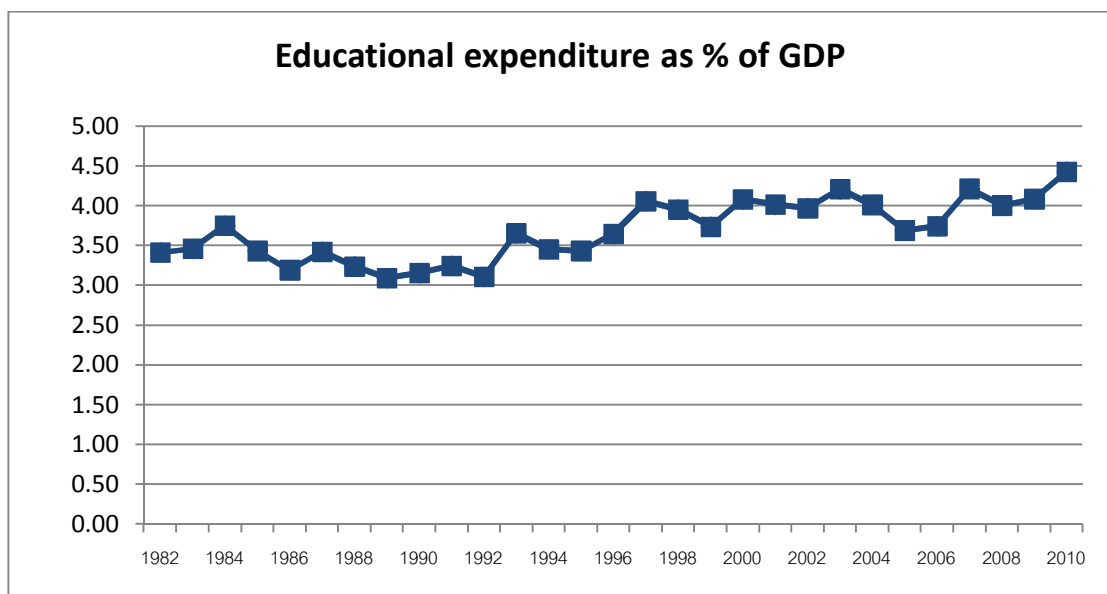
Figure 4.5 Educational Expenditure as Percentage of GDP from 1982-2010

Source: Ministry of Education

Figure 4.5 illustrates these changes in educational expenditure as a percentage of the GDP, the usual measure for the size of the economy, in order to see how the relative amounts have been changing over time. Educational expenditure rose as a proportion of GDP from 1995 to 1997, but then fell until 2000, and after that it has increased and decreased in a narrow band.

Figure 4.5 also exhibits the fluctuations of educational expenditure as a percentage of the GDP during the past 2 decades, even though we can see an increasing trend of educational expenditure. Nevertheless, if we look at the whole picture, we can see that the relative amount of educational expenditure to GDP increased almost 1.50 percent from 1982 to 2010. This clearly shows that education is an important sector that public policy makers place emphasis on, and this is evident from the public expenditure on education, which reflects how the government behaves in practice.

Apart from considering education in terms of relative amounts, it is worth taking a brief look at the trends of educational expenditure by stages of education, as this will provide another insightful dimension of education for policy analysis. Figure 4.6 graphically illustrates these expenditures by stages.
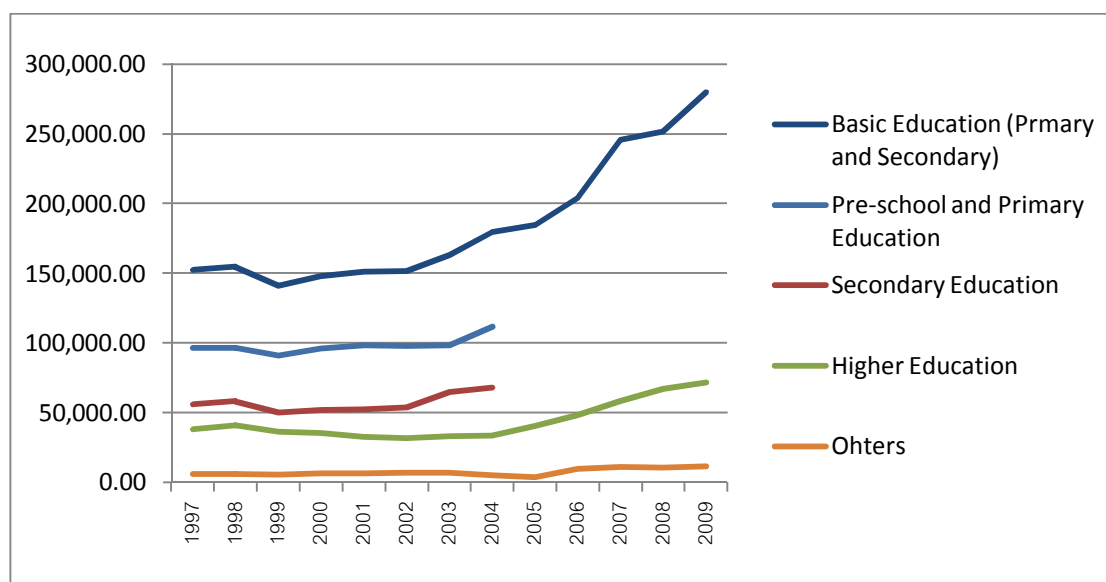
Figure 4.6 Educational Expenditure (in million baht) by Stages of Education from
1997-2009

Source: Ministry of Education

Figure 4.6 provides a picture of how public expenditure on education is distributed into different categories or different stages of education over time. Every stage of education exhibits increasing trends of expenditure since 1997, despite the fact that these expenditures drop in the period between 1998-1999. Especially noteworthy is the fact that expenditure on basic education, which after 2004 combines primary and secondary education, increased nearly double from 2004 to 2010. Higher education expenditure also increased significantly from 2004, which can be seen from the upward slope in the higher education expenditure graph (second from the lowest). Other stages of education, mainly non-formal education, seem to be very stable, with a slightly higher amount devoted to since 2006 in terms of expenditure.
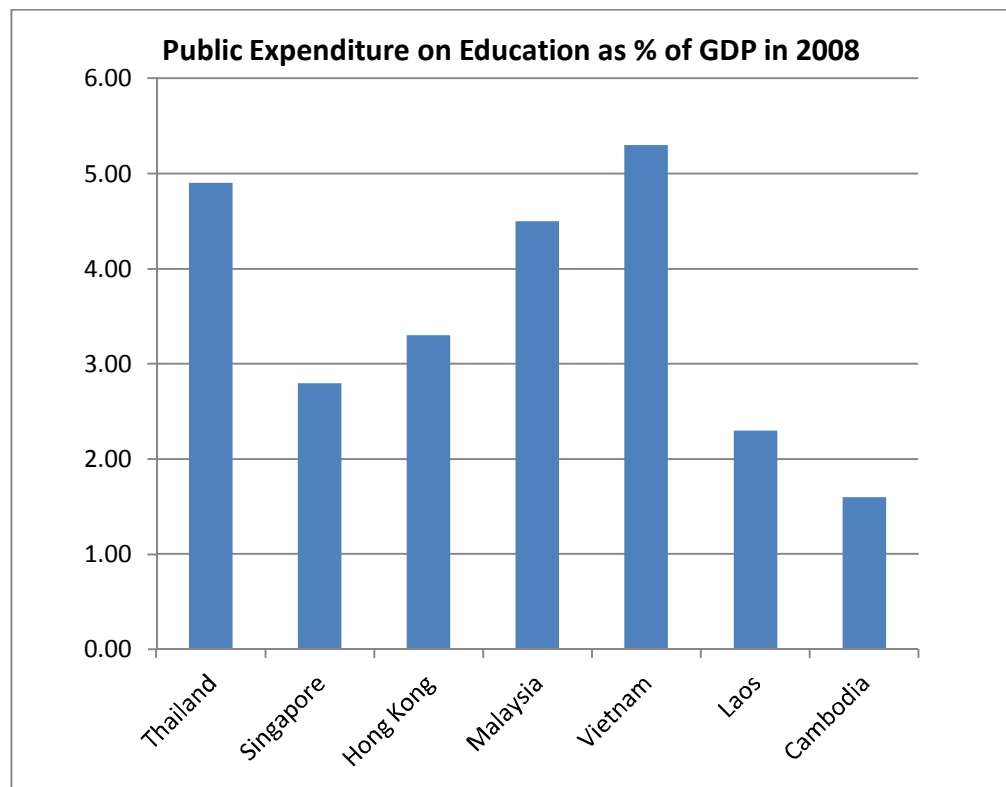
Figure 4.7 Public Expenditure on Education as % of GDP in Selected Asian
Countries, 2008
Source: World Development Indicators

Figure 4.7 shows how public education in Thailand compares to other Asian countries using 2008 data from the World Bank (World Development Indicators).

Measured as a proportion of GDP, Thailand spends more than any other Asian countries in the diagram above, except Vietnam. Thailand spends far more than Laos and Cambodia, as well as the average spending from the above countries. Compared to higher-income countries, such as Singapore, Hong Kong, and Malaysia, Thailand also spends a higher amount on education.

This could imply that the Thai government places relatively higher emphasis on promotion and pays higher attention to public education. Nevertheless, difficulty with such comparisons may arises because they do not give a true reflection of the total resources devoted to education since they exclude private expenditures. Some countries may rely much more on publicly-financed education systems than others. In this case, one cannot conclude whether the country spends in total more than others in terms of overall educational expenditure.

The amount of 403,516.0 million baht was allotted to education affairs and services in 2010, accounting for 52.9 percent of the expenditures on community and social services. The amount of 38,724.9 million baht was classified as capital expenditures and the remaining portion of 364,791.1 million baht was for current expenditures. The latter will be for education administration, from pre-primary level to university, and non-formal education and scholarships for students. They also include subsidies to the Bangkok Metropolitan Administration and local administration organizations' education expenses.

4.4.2 Educational Expenditures and Provincial Distribution: an Issue of Equity and Distribution

Generally, the study of the determinants of public expenditure always focuses on the country level or cross-country level in order to provide a large picture or a macro-view for policymakers or policy analysts. Expenditure data on a smaller scale can illustrate another dimension for the analysis of public expenditure. Particularly interesting is the case of educational expenditure, as this kind of expenditure is supposed to be welfare expenditure and to address the issue of equity and the fair distribution of resources across society. Therefore, the analysis of the determinants of educational expenditure at the micro-scale level serves as a useful analytical tool for an understanding both the determinants of educational expenditure and the distribution of educational expenditure across provinces.

According to a proposal of the Office of Reform for Equitable Thai Society in 2011, which analyzed data on the UNDP's Thailand Human Development Report 2009 and the provincial capital expenditures data, the analysis indicates that the capital budget is allocated more to the provinces that have a high Human Achievement Index and vice versa. Table 4.2 was derived from the report of the Office of Reform, which illustrates the distribution of capital expenditure compared with the level of development (Human Achievement Index) in each province. The data from table 4.2 can help analysts understand the distribution of public expenditure by looking at the distribution across the country categorized by provinces having different levels of development.

Table 4.2 Distribution of Capital Expenditure and the Level of Human Achievement Index (HAI) in Thai Provinces, 2011

Level of Development (HAI)	No. of Provinces	Population (Thousand)	Total Capital Expenditures (Millions Baht)	Total Capital Expenditures per Capita (Baht)
Very High	15	14,716	110,852	7,509
Very High (Exclude Bangkok)	14	9,045	29,212	3,229
High	14	8,751	31,679	3,619
Medium	16	9,878	34,683	3,511
Low	13	10,896	31,721	2,911
Very Low	18	18,747	52,422	2,796
Whole Country	**76**	**63,035**	**290,571**	**4,609**

Source: The Office of Reform (2011)

Table 4.2 indicates the unfair allocation of capital expenditure in social welfare, which can lead to a lower quality of life of people that live in the poor provinces. Precisely, the provinces with low and a very low level of development receive relatively less capital expenditure per capita compared with the highly-developed provinces. Further, it can widen the gap between the rich and the poor provinces as the poor province cannot receive sufficient budget for the improvement of the quality of life and for poverty reduction.

In Thailand, the distribution of educational expenditure to the provinces is a key issue to be analyzed in this study in order to make the analysis of the determinants of educational expenditure in Thailand more complete. By looking at the provincial data, the analysis can go beyond the macro lens and can penetrate into a deeper and more profound analysis. In other words, the result of the provincial distribution analysis or the micro-level analysis truly provides us with a way to compare and contrast the determinants of educational expenditure from two levels, macro and micro.

Especially noteworthy is the data on Human Achievement Index by provinces in Thailand, as shown in table 4.3. It illustrates the ranking of HAI by provinces in Thailand. This set of data can help exemplify the equity dimension of development in Thailand.

In 2009, the HAI ranking by region was as follows: Bangkok 0.6949, Central 0.6439, South 0.6365, East 0.6330, North 0.5868, and Northeast 0.5868. This obviously means that Bangkok is the most developed region in Thailand, whereas the North and Northeast are the lowest developed regions. Apart from the rank by region, the HAI can also be ranked by provinces, as illustrated above in table 4.2

The data in table 4.3 illustrate the fact that the process of development in Thailand still exhibits a wide gap between the highly-developed provinces and provinces with a low level of development. The most developed province is very different from the least developed province in terms of the HAI. This implies differences in many aspects, including infrastructure, education, health, and many others.

The budgeting process in Thailand can be classified into four main steps, including budget preparation, budget adoption, budget execution, and budget control.

In the allocation of the budget to provinces, decisions are made from the central government. In the case of educational expenditures, it is the expenditure allocated to each province as categorized in the budget of the Ministry of Education in each province as appearing in the provincial budget report of the bureau of budget.

Table 4.3 HAI in Thai Provinces 2009

Top Ten Highest HAI		Top Ten Lowest HAI	
Province	**HAI**	**Province**	**HAI**
Phuket	0.7212	Kampangpetch	0.5776
Bangkok	0.6949	Nakorn-Panom	0.5747
Pathumthani	0.6904	Pattani	0.5706
Songkhla	0.6742	Buriram	0.5687
Samutsongkram	0.6695	Surin	0.5686
Nakorn-Patom	0.6695	Petchabun	0.5657
Pang-Nga	0.6681	Si Sa Ket	0.5546
Rayong	0.6670	Tak	0.5536
Phra Nakorn Sri Ayuthaya	0.6647	Sa Kaeo	0.5264
Nonthaburi	0.6645	Maehongson	0.4666

Source: Human Achievement Index 2009 (UNDP)

Hence, theses budgets are under the administration at both the central and local level, which covers by region or by province. The types of the educational expenditure for provincial distribution are the same as those at the national level, which are current and capital expenditures.

From table 4.4 below, it is obvious that in absolute terms the North receives the largest allocation of education budget from the central administration, the Ministry of Education. It should be noticed that this could be due to some of provinces in the North, such as Chiang Mai, receiving a relatively large amount of educational expenditure, more than ten times that allocated to the West, which is the lowest receiver of the allocation of educational expenditure.

Second place goes to the Northeast, with about 100 million baht less than the North. The South, Central, and the East are ranked third, fourth, and fifth respectively. Both the Central and the Eastern regions are allocated a similar amount of budget and Bangkok alone receives about one thousand million.

Table 4.4 Educational Expenditure Allocation Across Regions in Thailand 2010

Region	Budget (Baht)
Bangkok	1,150,983,700
North	10,692,846,100
Northeast	9,770,583,800
Central	2,782,162,300
East	2,133,001,000
West	819,065,000
South	7,172,816,500

Source: Bureau of Budget

Interestingly, the figures of expenditure across regions raise analytical issues and concerns about distribution. Considering the expenditures on education, it is clear that there is a big difference between the region that receives the highest allocation and the region that receives the lowest allocation, not to mention Bangkok. This unequal distribution of educational expenditure across regions could lead to unequal development outcomes, especially in terms of human development.

Using the figures from 2010, Thailand has altogether 76 provinces. The distribution of educational expenditure in these 76 provinces can give us a good lesson regarding the equity dimension of the allocation of educational expenditure. Particularly important is the educational expenditure for each province, which is the total educational expenditures allocated to 76 provinces. Table 4.4 illustrates the top five provinces with the highest and the lowest allocation of educational expenditure, as categorized by the budget allocated from the ministry of education.

Table 4.5 reflects the problem of unequal distribution of educational expenditure across provinces in Thailand. The highest educational expenditure was allocated to the Chiang Mai, which is very different from the lowest-received provinces. The top-five highest allocations of educational expenditures were to the large provinces of Thailand. Moreover, Songkhla is among those provinces that have the highest HAI in the country and are still receiving a large amount of educational expenditure. This clearly indicates an issue of distribution across provinces, which is worth exploring more in detail.

Table 4.5 Educational Expenditures of the Five Lowest and Highest Provinces in 2010

Five Lowest-Budget Provinces		Five Highest-Budget Provinces	
Province	Expenditure (Baht)	Province	Expenditure (Baht)
Singburi	2,191,800	Chiang Mai	6,062,354,200
Samut Prakarn	3,520,000	Songkhla	4,555,161,500
Samut Songkram	3,750,000	Khon Kaen	3,386,811,400
Samut Sakorn	10,056,000	Nakon Ratchasima	2,002,443,000
Phang Nga	10,438,000	Phitsanulok	1,850,346,600

Source: Bureau of Budget

On the other hand, the five lowest allocations were to the provinces of small sizes. Samut Songkram and Phang Nga are among those with the highest HAI in the country, as seen from table 4.2. However, this is in contrast to the case of Songkhla. Additionally, many of the poor provinces in the Northeast are in the Middle of the league and still receive relatively less of the educational expenditure compared to the large provinces. This pattern of educational expenditure policy is quite ambiguous and could perhaps widen the gap and inequality between the poor and richer areas. This inequality in the development of human capital is of much concern considering the figures in table 4.3, 4.4, and 4.5, given that there are clearly wide gaps.

Educational expenditure can serve as a basis for dealing with the problem of inequality. In particular, the understanding of the determinants of educational expenditure across provinces provides a micro-level analysis of educational expenditure allocation of Thailand in terms of both efficiency and equity issues. Together with the macro time-series analysis, it can offer a complete analysis of educational expenditure policy in Thailand.

4.5 Economic-Demographic and Political Contexts and Educational Expenditures in Thailand

The qualitative analysis of educational expenditure policy in Thailand places immense emphasis on the issue of context sensitivity. The exploratory approach to the study of the case of educational expenditure policy in Thailand can penetrate into the most likely factors determining educational expenditures. The analysis is based on the foundation of social context, history, and time conditions. A specific-context analysis is appropriate for the analysis of a particular country's case. However, this analysis may not be accurate when applied to other contexts.

Many contexts deserve an analysis in this part of the present study in order to provide hypotheses for further analysis using the quantitative approach. This section aims to explore why and how the Thai government allocates educational expenditure for each type and stage of education by looking at the qualitative data based on the above national development and education plan, as well as some facts regarding the allocation of expenditure across the country.

4.5.1 Education Policy and Socio-Economic Context

In Thailand, education policy has developed over time in terms of both years of compulsory education and in terms of budget allocation. The development of education policy in Thailand has taken place as a response to the socio-economic environment as well as the demand and support from citizens. Education was placed as an important component in several national development plans.

The development of infrastructures in the country is followed by an expansion of education at many levels. This is considered as a national policy to encourage people to safeguard their life by attaining more education. Also, as Thailand is more industrialized today, there tends to be a higher demand for skilled labor. Hence, this could lead to higher budgets allocated to education. The economic crisis seems to have resulted also in a drop in educational expenditure, particularly after 1998.

As for provincial distribution, nevertheless, there seems to be a sign of unequal distribution of resources, particularly in the allocation of educational expenditures. Despite the fact that the government seems to distribute educational expenditures in a way that it can serve the purpose of reducing the gap between the rich and the poor provinces, the distribution of budgets for the provinces may go in line with the level of the economy of each province, but it does not meet the demands of the needy. This ambiguous impact requires further empirical analysis

The national development plans places more and more emphasis on the role of education in the process of development. Educational expenditures also increase over time. Even though when taking into account educational expenditure as a percentage of the GDP or as a percentage of total expenditure, they seem not to increase dramatically, but an increasing trend can be observed.

It can be argued that educational expenditure somewhat seems to go in line with the national economic and social development plan, as these factors place pressure on the allocation of education budgets. The demand and support from the public as the socio-economic environment changes also leads to higher allocation. This is in accordance with the system theory. In other words, the system theory seems to be applicable to the case of educational expenditure allocation in Thailand but of course including other factors that influence the making of educational expenditure allocation over time and across provinces.

4.5.2 Historical Context

Despite the existence of national development and education plans, which guide the direction of educational expenditure policy, this kind of expenditure might change in an incremental fashion over a certain period of time before a big shift is seen, just as with many other kinds of public expenditures in many countries. A change of education policy in Thailand over time can be considered very incremental, but it associated with a shift during the reform period. In particular, there were a couple of tremendous changes or a big jump from one year to the next during the last 30 years. Although it can be said that educational expenditure is mostly incremental, education reform in Thailand seems to exhibit an uphill movement in educational expenditure, with a significant shift.

Nevertheless, only absolute expenditure has a clear sign of two big jumps and expenditure as relative to total expenditure has demonstrated one large shift. The educational expenditure as a percentage of GDPhas increased very slightly, with lots of fluctuations over time, and could be considered very incremental. Moreover, there is no sharp increase or decline in the educational expenditure policy, implying that educational expenditure policy making is based on the previous year.

It is obvious that educational expenditure in Thailand always changes in only a slight portion year by year and with some increasing shifts. The case of educational expenditure policy in Thailand could provide a good example or a good test of the incrementalism theory. The empirical analysis in the next chapter can help confirm whether the characteristics of educational expenditure allocation are in line with this fashion. The quantitative analysis in the next chapter can help confirm this proposition.

4.5.3 Institutional Context

From the case of educational expenditure in Thailand, it is of interest to consider the impact of institutions. There could be some judgment whether institutions have an impact on education budget allocation over time. This is because we can observe sharp or major changes in the trend of educational expenditure during the past few decades. The major increase in educational expenditure in Thailand over time, especially after the Education Act in 1999, when educational expenditure

increased substantially afterwards, can be considered as an institutional or structural shift.

In particular, the institutions in Thailand seem to have some impact on public expenditures, including educational expenditures. The main institution related to education policy making is the Ministry of Education, especially at the departmental level, which is controlled by the director general, and the Bureau of Budget, whose director always has a close connection with the politicians from the government side. These institutions play a very important role in making education policy and educational expenditure. The Ministry of Education has actually reformed education in Thailand through policies and programs, but they seem to be somewhat inefficient and ineffective. Normally, the department and its director general have an immense influence on setting up the budget. Additionally, the Bureau of Budget is from time to time closely connected to politics, and this could also influence the allocation and distribution of educational expenditure both over time and across provinces.

4.5.4 Political Context

By considering the political context, politics seems to play some part in determining educational expenditure. The obvious example comes from the three political-era administrations of General Chatichai, Thaksin, and Abhisit, when educational expenditure always shifted or jumped from the previous period, especially in absolute value. Therefore, political power seems to determine educational expenditure and policy, just as populism seems to have recently resulted in higher expenditure, including education.

As for theoretical confirmation, according to the Public Choice theory, public expenditures are expected to increase in the area that can maximize the votes from constituencies. It is expected that public expenditures on education in Thailand should be influenced by political variables. Nevertheless, these political factors may not have a strong impact compared to other kinds of expenditures that can influence voters. For example, expenditures on transportation or other kinds of infrastructure may lead to a more obvious and concrete output that voters can see. Particularly, for example, in terms of interest groups, Thailand has no strong advocates or interest groups that can represent the demand for more educational expenditures.

The median-voter model tends to propose that expenditure allocation depends on the unequal distribution of income. Even though the income distribution gap in Thailand is quite high, the budget allocated to education does not well represent this theory. We may not expect a clear or obvious impact of the median voter in Thai educational expenditure policy. Over time, changes in income distribution in Thailand also do not reflect a clear sign of change in educational expenditure.

It is obvious that the more developed provinces in Thailand receive a higher education budget than the poorer provinces. The median-voter theory is one of the most interesting cases perhaps in the context of a developing country like Thailand, which exhibits a clear sign of income inequality both over time and across provinces. the fiscal illusion theory may be applicable to the case of Thailand, as it is one of the invisible ways to finance the income of the government when there is a need to spend more, including on education.

CHAPTER 5

EMPIRICAL RESULTS AND DISCUSSION OF NATIONAL-LEVEL ESTIMATIONS

In this chapter, the empirical results are presented for all equations using the time-series data at the national level for 29 years, from 1982 to 2010, to provide the macro point of view. The results obtained can serve as an explanation of what actually determined the allocation of educational expenditure in Thailand during the past 30 years. These empirical results are accompanied by the interpretation, as well as a discussion, of the probable underlying reasons for the estimated results, especially when the results are not consistent with expectation. The table 5.1 below presents the summary statistics of all of the variables incorporated in this study. It shows the mean values as well as the maximum and the minimum values of all the variables in this study.

Table 5.1 Summary Statistics

	Minimum	Maximum	Mean	S.D.
TEDUTE	16.655	27.302	21.095	2.680
ECURTE	12.516	22.851	17.799 2.853	2.853
ECAPTE	1.532	7.313	3.180	1.143
BEDUTE	12.553	18.598	15.158	1.417
HEDUTE	2.878	4.931	3.737	0.480
NEDUTE	0.008	0.516	0.301	0.134
GCAP	17,012.00	143,655.10	67,804.28	38,190.71
IND	0.716	2.531	1.515	0.611
IFL	-0.900	8.000	3.548	2.094

Table 5.1 (Continued)

	Minimum	Maximum	Mean	S.D.
UNEM	0.873	5.774	2.260	1.217
POP	48,846,927.00	63,878,267.00	58,674,404.44	4,621,299.27
SAP	16.884	25.786	21.379	2.927
SCH	36,093.00	39,662.00	38,037.88	808.30
TEA	537,358.00	703,463.00	621,639.81	51,297.01
STU	10,261,089.00	14,622,313.00	12,648,645.13	1,629,690.74
BSTU	9,092,841.00	10,372,274.00	9,753,624.96	417,816.02
HSTU	423,976.00	2,502,763.00	1,418,006.06	711,692.36
ENR	39.793	84.694	61.024	15.994
STR	14.884	22.399	20.177	1.587
CON	6.000	9.000	7.241	1.504
LEXPTTE	16.655	32.826	21.410	3.428
LEXPCAPTE	1.532	7.940	3.380	1.427
LEXPCURTE	12.516	22.851	17.695	2.765
LEXPBTE	12.553	18.598	15.156	1.413
LEXPHTE	2.878	4.931	3.761	0.497
LEXPNTE	0.008	0.596	0.318	0.140
DEF	-446,457.900	104,172.000	-45,392.585	110,882.666
IDT	60.893	80.030	74.134	4.079
GNA	820.600	4,214.700	2,409.928	820.600
ELEC	0.000	1.000	0.207	0.412

Table 5.2 illustrates several interesting figures, particularly the educational expenditure, with reach the highest at about 27 percent of the total expenditure of the country. This is very significant, as it is more than a quarter of total expenditure, implying that the government gives relatively high value to education policy. Current expenditure of education alone has the highest share of about 22 percent of total expenditure. This figure is more than many other types of expenditure allocated to other ministries.

5.1 Correlations and Multicollinearity

The empirical results in this chapter are presented for each equation regarding different types of educational expenditure. In each estimation, this study attempts to identify the problem of multicollinearity, which is a statistical phenomenon in which two or more predictor variables in a multiple regression model are highly correlated. This problem is severe when the value of the Pearson correlation is higher than 0.80 or when the value of the VIF is lower than 10 and the tolerance value greater than 0.10. Some variables are removed when there exists a high level of correlations. In effect, including the same or almost the same variable, they can create multicollinearity. This study considers both examining the correlations and using the VIF value.

Before moving on to the multiple regression analysis, the problem of multicollinearity is to be tested. Using Pearson correlations, VIF, and the Tolerance value, it was found that a number of independent variables had significant correlations. Even though almost every independent variable was the same across the six equations, six correlation matrices still had to be taken into account. This is because the independent variables in the six equations differ in the lagged expenditures, as they changed as the dependent variables changed. Therefore, we expected to see the correlations of the lagged variables differ in the six correlation matrices, which were calculated with the statistical program.

After the test for Pearson correlations, the Tolerance, and the VIF in the six educational expenditure equations were computed to further detect multicollinearity among the independent variables, and it was found that the GCAP had a relatively high and significant relationship (that is a value of more than .80) with the IND, SAP, ENR, CON, and GNA. It also exhibited very low Tolerance and a very high VIF value respectively. The GCAP was, therefore, removed from all six equations.

The Pearson correlations among the independent variables illustrate that the SAP, ENR, CON, and GNA had significant correlations with several independent variables. This is confirmed by their low Tolerance and high VIF values. These variables ere therefore removed from the equation. Multicollinearity was found in every regression equation as they all had the same set of independent variables, apart

from the lagged-expenditure variables, which differed according to the dependent variable of each equation.

The IND, IFL, UNEM, POP, SCH, STU, TEA, STR, DEF, IDT, and ELEC had no significant correlations with the other independent variables. Also, they exhibited a high Tolerance of more than 0.10 and low VIF values of less than 10. This set of independent variables was free from a multicollinearity problem, as they had no significant correlations with each other. These variables were, therefore, included in the six equations.

In terms of the incremental variables, the lagged expenditure variables of each type and stage of expenditure were also included in each equation, as their Tolerance and VIF values did not indicate a strong sign of multicollinearity. Consequently, each regression equation is comprised of 12 independent variables, except for that of non-formal education, and with one lagged variable, which was different. The multiple regression analysis in this part can identify those variables that determine educational expenditures, both by type and by stages.

5.2 Multiple Regression Analysis

The multiple regression analysis in this part of the present study provides an estimation of the six dependent variables. Interpretations are provided for each dependent variable, as it is necessary to understand what independent variables can determine each of the dependent variables. The statistical significances are provided with the explanation to see whether these estimations are meaningful.

The multiple regressions are considered an appropriate technique to deal with the issue of the determinants of educational expenditure in Thailand given the data set in a time-series format and with a various independent variables. The results of the following regressions can later be analyzed to provide useful policy implications and recommendations.

After removing the variables that exhibit multicollinearity, the six regression equations then become:

$$TEDU = \alpha1 + \beta_1\ IND + \beta_2\ IFL + \beta_3\ UNEM + \beta_4\ POP + \beta_5 SCH + \beta_6 STU$$
$$+ \beta_7 TEA + \beta_8 STR + \beta_9\ LEXP + \beta_{10}\ DEF + \beta_{11}\ IDT + \beta_{12}\ ELEC$$
$$+ e \qquad\qquad (1)$$

$$ECUR = \alpha2 + \beta_{13}\ IND + \beta_{14}\ IFL + \beta_{15}\ UNEM + \beta_{16}\ POP + \beta_{17} SCH$$
$$+ \beta_{18} STU + \beta_{19} TEA + \beta_{20} STR + \beta_{21}\ LEXP + \beta_{22}\ DEF + \beta_{23}\ IDT$$
$$+ \beta_{24}\ ELEC + e \qquad\qquad (2)$$

$$ECAP = \alpha3 + \beta_{25}\ IND + \beta_{26}\ IFL + \beta_{27}\ UNEM + \beta_{28}\ POP + \beta_{29} SCH$$
$$+ \beta_{30} STU + \beta_{31} TEA + \beta_{32} STR + \beta_{33}\ LEXP + \beta_{34}\ DEF + \beta_{35}\ IDT$$
$$+ \beta_{36}\ ELEC + e \qquad\qquad (3)$$

$$BEDU = \alpha4 + \beta_{37}\ IND + \beta_{38}\ IFL + \beta_{39}\ UNEM + \beta_{40}\ POP + \beta_{41} SCH$$
$$+ \beta_{42} BSTU + \beta_{43} TEA + \beta_{44} STR + \beta_{45}\ LEXP + \beta_{46}\ DEF$$
$$+ \beta_{47}\ IDT + \beta_{48}\ ELEC + e \qquad\qquad (4)$$

$$HEDU = \alpha5 + \beta_{49}\ IND + \beta_{50}\ IFL + \beta_{51}\ UNEM + \beta_{52}\ POP + \beta_{53} SCH$$
$$+ \beta_{54} STU + \beta_{55} TEA + \beta_{56} STR + \beta_{57}\ LEXP + \beta_{58}\ DEF + \beta_{59}\ IDT$$
$$+ \beta_{60}\ ELEC + e \qquad\qquad (5)$$

$$NEDU = \alpha6 + \beta_{61}\ IND + \beta_{62}\ IFL + \beta_{63}\ UNEM + \beta_{64}\ POP\ \beta_{65}\ LEXP$$
$$+ \beta_{66}\ DEF + \beta_{67}\ IDT + \beta_{68}\ ELEC + e \qquad\qquad (6)$$

The above six regression equations are to be used for the multiple regression analysis in order to determine the estimation of the determinants of educational expenditures in Thailand. Regressing these sets of independent variables separately for each type and stage of education can identify possible counteracting determinants of educational expenditure. Each type of educational expenditure will incorporate the same set of independent variables but with different lagged expenditures.

In the estimation of each equation, all of the important statistics are provided as well as a test for goodness of fit so as to ensure the robustness of the estimation made in this study. To provide a systematic and meaningful analysis for the determinants of educational expenditure, a careful consideration is made considering important statistics.

All of the tables below illustrate the regression results, with 29 observation from 1982-2010, and statistics on the determinants of different types and stages of the education model. The results also include the R-square, adjusted R-square, F-stat, and Durbin-Watson statistics. The symbol * in the table denotes that it is statistically significant at a 95 percent level of confidence.

5.2.1 The Empirical Estimation of the Total Educational Expenditure Equation

According to the test of multicollinearity, it was found that there were some independent variables that had significant correlations. The independent variables that had high and significant correlations were removed from the equation in order to solve the multicollinearity problem. The equation for the total educational expenditure then had fewer variables than proposed in the model specifications.

To obtain a clearer and a more thorough understanding of the impacts of each independent variable on total educational expenditure, an investigation from the multiple regression analysis was needed, as presented below. The important statistics are illustrated to provide how well the equation can explain and predict the pattern of total educational expenditure. This is followed by a graph showing the goodness of fit of the model.

Table 5.2 OLS Estimates of TEDU

| Variable | Coefficient | Std. Error | T-stat | Sig. | Collinearity Statistics | |
					Tolerance	VIF
IND	.138	13064.506	2.135	.049*	.088	11.319
IFL	-.085	1920.011	-2.555	.021*	.336	2.975
UNEM	-.063	3355.824	-1.944	.070	.351	2.851
POP	-.133	.003	-1.149	.268	.028	36.097
SCH	.038	8.958	.658	.520	.112	8.958
TEA	.181	.207	2.134	.049*	.052	19.310
STU	-.046	.009	-.376	.712	.025	39.807
STR	-.031	3774.358	-.639	.532	.157	6.365
LEXP	.781	.097	8.483	.000**	.044	22.812
DEF	.040	.039	1.174	.258	.317	3.156
IDT	-.123	1001.537	-3.632	.002**	.326	3.070
ELEC	.029	6333.711	1.350	.196	.797	1.254
CONSTANT	98102.216	216986.713	.452	.657		

$R^2 = 0.994$ Adjusted-$R^2 = 0.990$ F-stat = 222.765   Durbin-Watson = 2.254**

Note: **Significant at 1%

   *Significant at 5%

The estimated equation for the model is:

$$TEDU = 98102.216 + 0.138IND * - .085IFL * -.063\,UNEM - .133POP + \\ .038SCH + .181TEA * - .046STU - .031STR + .781LEXP ** + .040\,DEF - \\ .123IDT ** + .029ELEC$$

The above equation can be accepted as a sound explanation of the determinants of government total educational expenditure based on its statistical significance as shown by the F-statistic being significant at more than 95 percent. Additionally, considering the value of both Tolerance and the VIF, which are most of all more than 0.10 and less than 10 respectively, they imply no concern for the multicollinearity problem. That is, there are no significant correlations among the independent variables.

The R^2 adjusted-R^2 value also indicates that the movement of the total educational expenditure determined by this set of independent variables by about 99 percent. This value of the adjusted-R^2 implies that the independent variables can explain the change in the dependent variable up to 99 percent.
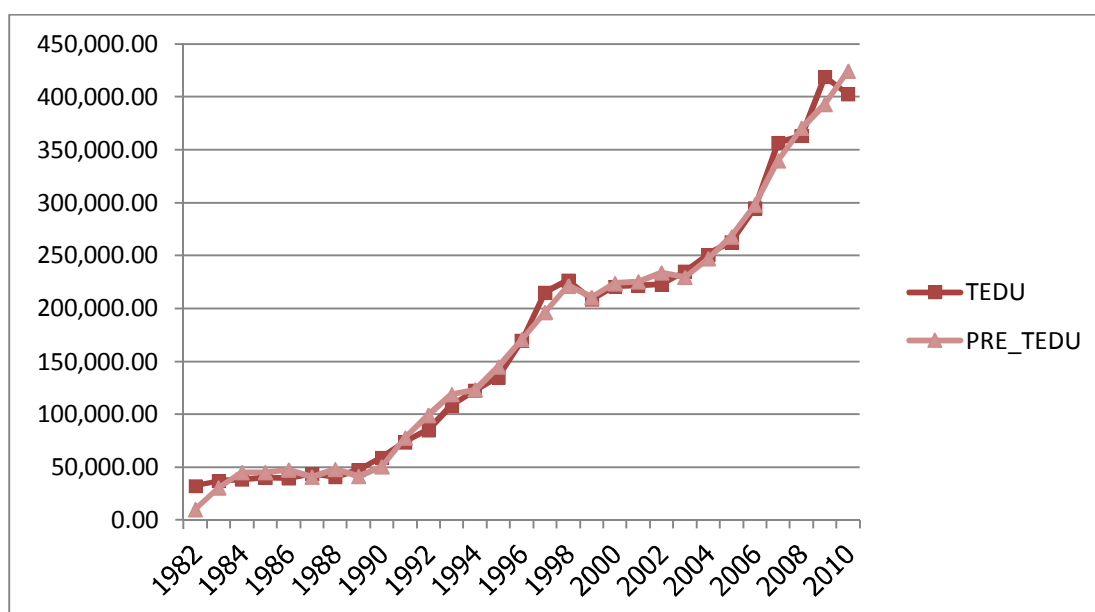
Figure 5.1 The Goodness of Fit of the Total Educational Expenditure

In Figure 5.1, the path of actual total educational expenditure is plotted along with the predicted total educational expenditure derived from the above table. The goodness of fit of the predicted total educational expenditure is well matched with the actual data, implying that this model is precisely robust, except for a little deviation from the actual levels observed from 2008 to 2010. This presents the robustness of the estimation from the total educational expenditure equation. Therefore, this equation

can be considered as an accurate prediction of the pattern of total educational expenditure in Thailand, and each variable can explain the movement of total educational expenditure relatively well.

5.2.1.1 The Impacts of the Economic-Demographic Variables

The first three variables in the equation reflect how economic factors or economic environment can determine the level and the allocation of total educational expenditure. First of all, the coefficient of the industrialization (IND) is positive and it is insignificant, indicating that industrialization positively determines the total educational expenditure in Thailand. This result could go in line with Wagner's Law—that government responds to the demand from society, so as industrialization increases, the aggregate demand decreases, and hence higher public expenditure on education. This is perhaps because the process of industrialization requires higher skills of labor, which in turn are reflected in the higher demand for education as education can help develop the skills of labor. This is why industrialization can lead to higher expenditure on education. This goes, however, against the Keynesian Counter-Cyclical theory.

Secondly, as for inflation, the coefficient of IFL is also significant but it has a negative sign. This indicates that inflation is negatively related to the total educational expenditure. On the one hand, it could be the case when price levels increase, the government expenditures on education decrease. This estimation also has crucial implications for theories. That is, it lends support to the Keynesian Counter-Cyclical theory to the extent that inflation has a negative impact on government expenditure, and particularly in this case of educational expenditure in Thailand. Precisely, the government raises its expenditure to boost the economy in the time of low inflation. On the other hand, it could be the case that government increases educational expenditure in less proportion compared to an increase in inflation.

Thirdly, as for unemployment, the UNEM has an insignificant and negative coefficient, implying that the total educational expenditure is insignificantly determined by unemployment. It is possible that policymakers do not take into account the issue of unemployment.

The demographic variables have no significant impact on total education policy at all, apart from the number of teachers. The only demographic variable in the above equation that seems to significantly determine the total educational expenditure is the number of teachers, which has demonstrated a positive and significant relationship with the dependent variable. The results seem to send a signal that policymakers hardly take into account the demographic factors, particularly the demand from the educational sector, as the important factors to determine the level of expenditures. In other words, the government may have overlooked these factors when making decisions on educational expenditure.

5.2.1.2 The Impacts of the Decision-Making Variable

As for the decision-making variable, or the incremental variable, it represents the idea of the Incrementalist school, which believes in the bounded rationality and limited proactive of government officials. It was suggested in the previous chapter, according to the incrementalism theory of Charles Lindblom, that the lagged variable should be positively and significantly related to government expenditure if the government bases its decision making on the previous year. In other words, the government allocates its expenditure based on the previous year.

Under this circumstance, the estimation result illustrates that the one-year lagged total educational expenditure has a statistically positive and highly significant relationship with the total educational expenditure. Its coefficient of 0.781 indicates the relatively high importance of this variable. This result also lends support for the incrementalism theory—implying that the Thai government allocates its educational expenditure by relying significantly on its latest budget experience in setting current policy on total educational expenditure, with little regard for demographic variables.

5.2.1.3 The Impacts of the Political Variables

As a result of the multicollinearity problem, only three political variables still remained in the equation of total educational expenditure. As for the budget deficit, the public choice theory predicts that the larger the size of the governments, the more deficit the budget will be. As a result, it is expected that a greater budget deficit will lead the government to makes the decision to increase its expenditure. Statistically, nevertheless, the budget deficit has no significant

relationship with the total educational expenditure and thus makes no confirmation of the budget maximizing bureaucrat model of public choice theory.

As for the proportion of indirect tax to total tax (IDT), it was found to be negatively and significantly related to the total educational expenditure, which indicates that total educational expenditure decreases as the government collects more indirect tax. This contradicts the fiscal illusion theory.

According to the fiscal illusion theory, a positive relationship between the proportion of indirect tax to total tax and the public expenditure is expected, as the government tends to increase its income that is less visible to constituencies in order to increase its expenditure. However, the impacts of indirect tax may be analyzed in a different way. This study focuses only on educational expenditure, so other types of expenditure may be likely to increase with indirect tax.

The last political variable in the above equation is the year of election. Even though it shows a positive coefficient, it indicates an insignificant impact on total educational expenditure. This could mean that the political business cycle theory is not applicable to the case of total educational expenditure policy in Thailand. The Thai government did not change its allocation of total educational expenditure significantly during the election period.

5.2.2 Empirical Estimation of the Current Educational Expenditure Equation

Table 5.3 below presents the OLS estimation of the current educational expenditure equation. It can also be accepted as a sound explanation of the determinants of government current expenditure on education based on its statistical significance, as shown by the F-statistic being significant at more than 95 percent. The very high R^2 adjusted-R^2 values of .997 and .995, respectively, also indicate that the movement of the current educational expenditure can be explained by this set of independent variables precisely well at about 99 percent. The Tolerance and the VIF values have demonstrated almost no sign of concern for multicollinearity.

The independent variables in the above equation can therefore explain most of the changes in the dependent variable. According to the above equation, there are only two types of factors determining current educational expenditure in Thailand, which are economic-demographic and decision-making variables.

Table 5.3 OLS Estimates of ECUR

Variable	Coefficient	Std. Error	T-stat	Sig.	Collinearity Statistics	
					Tolerance	VIF
IND	.065	9478.662	1.232	.236	.067	14.879
IFL	-.031	1370.517	-1.167	.260	.264	3.785
UNEM	.007	2113.212	.320	.753	.354	2.823
POP	-.046	.002	-.541	.596	.026	39.047
SCH	-.052	5.591	-1.274	.221	.115	8.714
TEA	.177	.132	2.910	.010**	.051	19.589
STU	-.082	.006	-.895	.384	.023	43.882
STR	.032	2387.224	.914	.374	.157	6.358
LEXPCUR	.891	.079	11.968	.000**	.034	29.323
DEF	.051	.026	1.989	.064	.292	3.426
IDT	-.101	610.432	-4.366	.000**	.351	2.848
ELEC	.029	3982.257	1.926	.072	.808	1.238
CONSTANT	323666.475	134776.368	2.402	.029*		

$R^2 = 0.997$ Adjusted-$R^2 = 0.995$ F-stat = 439.422   Durbin-Watson = 2.462**

Note: **Significant at 1%
        *Significant at 5%

The estimate equation for the current educational expenditure model is:

$$ECUR = 323666.475 + 0.65IND - .031IFL + .007\,UNEM - .046POP - .052SCH + .177TEA ** - .082STU + .032STR + .891LEXP ** + .051\,DEF - .101IDT + .029ELEC$$

Figure 5.2 illustrates the goodness of fit of the estimated current educational expenditure, which seems reasonable except for some fluctuation and deviation from the actual levels observed during 1997-1998. During this period, Thailand was experiencing a financial crisis and was subject to constraint imposed under the IMF program, along with its financial support. Despite the fact that there is small deviation, the prediction of this equation can well present the pattern of movement of the current educational expenditure in Thailand, and the coefficients of the significant variables in this equation can be considered as fairly accurate.
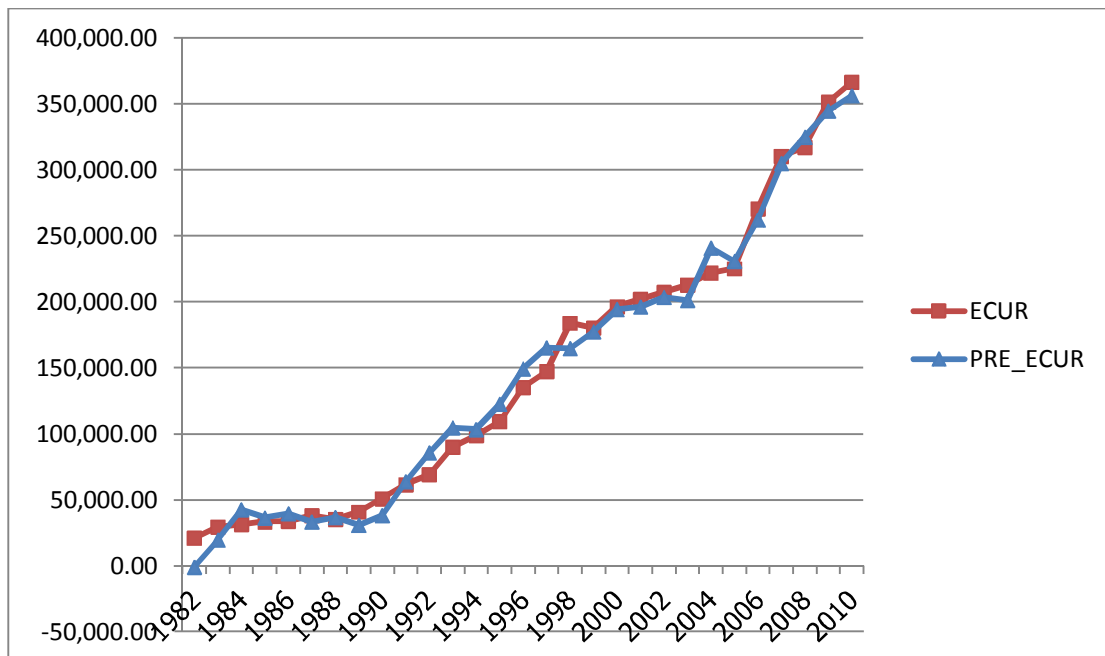
Figure 5.2 The Goodness of Fit of the Current Educational Expenditure

5.2.2.1 The Impacts of the Economic-Demographic Variables

As for the impact of economic-demographic factors on current expenditure, some interesting and insightful implication can be found from the estimations. It is obvious that none of the economic variables has demonstrated a significant relationship, although there are both positive and negative signs. The Tolerance and VIF values of every independent variable represent no concern for high correlations.

First of all, industrialization (IND) is positively but insignificantly related to the current expenditure on education, which means that the IND has an unclear impact on the current expenditure. This is not what was expected by the Wagner's Law, nor from the Keynesian Counter-Cyclical theory.

It can be argued that the Thai current educational expenditure allocation cannot be predicted by Wagner's Law or by the Keynesian Counter-Cyclical theory. The current expenditure on education expands not because of an increase or decrease in the aggregate demand as the economy grows. The process of industrialization does not affect how the government makes decisions about increasing current educational expenditure.

According to the above estimation, both inflation (IFL) and unemployment (UNEM) are insignificantly related to the current expenditure on education despite their negative and positive coefficients, respectively. This is contradictory to Wagner's Law and the Keynesian Counter-Cyclical theory. Arguably, the Thai government does not take into account an increase in price level or the issue of unemployment when considering the allocation of current expenditure on education. In this situation, those that receive wages and salary, which come from current expenditure, may suffer from an increase in price level.

The government expands its fiscal stance on the current type of educational expenditure to meet the increase in the number of teachers, as seen from the highly-statistical significance of the TEA. This is perhaps because current expenditure is largely spent on wages and the salary of teachers and other staff members in the Ministry of Education, which tend to increase every year, as well as the increase in the number of teachers, which leads to spending on wages and salary. Therefore, current expenditure on education is highly and significantly determined by the number of teachers.

The other demographic and educational variables have a insignificant impact on the current expenditure. That is, the allocation of current expenditure on education is not affected by the size of the population, number of schools, number of students, or student-teacher ratio. This could be because the government does not take into account any other kind of educational variable, apart from the number of teachers, when making decisions on the change of current expenditure, which mainly

deals with wages and salaries. Also, the size of the population also has no impact on current expenditure on education.

5.2.2.2 The Impacts of the Decision-Making Variable

The lagged expenditure variable reflects whether the decision-makers in the government base their decisions on the previous year's budget. In other words, if the budget is allocated based on the previous year, it can be inferred that this is an Incrementalist decision. Incrementalism predicts a positive and significant relationship between lagged expenditure and the current expenditure.

In the above equation, the lagged expenditure variable (LEXPCUR) has illustrated that its coefficient is significantly and positively related to the capital expenditure in education. Additionally, the magnitude of its coefficient is relatively high, with the value of .891, indicating a strong impact of the lagged variable. In short, an increase in the allocation of current educational expenditure is mostly a result of the previous year's allocation. Incrementalism theory is also applicable in the case of current educational expenditure in Thailand, with a moderate impact compared to other types of expenditure.

This result confirms the Incrementalist theory, implying that the Thai government allocates its current expenditure in education by heavily relying on its latest budget allocation in setting current policy on current educational expenditure, with little regards for other sets of variables. It can be argued that the current expenditure in education is best explained by the Incrementalist theory.

5.2.2.3 The Impacts of the Political Variables

The last variable that significantly determines the total educational expenditure is the indirect tax. The IDT is the only political variable that exhibits a significant but negative impact, indicating that current educational expenditures decrease with indirect taxes. In other words, as the government collects more indirect taxes, fewer budgets are allocated to educational expenditure. This result can lead to a controversial theoretical argument, as it contradicts the prediction of fiscal illusion theory. The impact of the IDT shares the same character as that of total educational expenditure. Nonetheless, the IDT has nothing much to do with the demand in the educational sector.

The other two political variables included in this equation show insignificant coefficients and therefore have no significant impact on the allocation of current educational expenditure in Thailand. Neither the budget-maximizing bureaucrat model nor the political business cycle theory are applicable to the case of current educational expenditure in Thailand.

5.2.3 The Empirical Estimation of the Capital Educational Expenditure Equation

The equation below represents another sound explanation of the determinants of government capital educational expenditure based on its statistical significance, shown by the F-statistic being significant at more than 95 percent. The R^2 adjusted-R^2 value in the above estimation also indicates that the movement of the capital educational expenditure is explained by this set of independent variables is about 85 percent or so.

The value of the adjusted-R^2 is quite high, with a value of about .857, which is large enough to represent the movement of the capital expenditure on education in Thailand. This implies that the independent variables can explain the change of the dependent variable fairly well. The Durbin-Watson statistics indicate no problem of autocorrelation because of their value close to 2.

Table 5.4 OLS Estimates of ECAP

Variable	Coefficient	Std. Error	T-stat	Sig.	Collinearity Statistics Tolerance	VIF
IND	.274	4089.586	1.565	.137	.167	5.992
IFL	.037	697.896	.359	.724	.471	2.123
UNEM	-.071	1436.625	-.589	.564	.354	2.822
POP	-.541	.001	-1.551	.140	.042	23.817
SCH	.304	3.790	1.444	.168	.115	8.663
TEA	.238	.087	.773	.451	.054	18.510

Table 5.4 (Continued)

| Variable | Coefficient | Std. Error | T-stat | Sig. | Collinearity Statistics | |
					Tolerance	VIF
STU	.411	.004	1.003	.331	.031	32.746
STR	-.271	1624.856	-1.502	.153	.157	6.372
LEXPCAP	.450	.171	2.627	.018*	.174	5.743
DEF	.124	.015	1.063	.303	.374	2.670
IDT	-.258	392.621	-2.258	.038*	.392	2.549
ELEC	-.017	2652.095	-.222	.827	.842	1.188
CONSTANT	-78448.587	93880.290	-.836	.416		

R^2 = 0.918   Adjusted-R^2 = 0.857   F-stat = 439.422   Durbin-Watson = 2.462**

Note: **Significant at 1%

   *Significant at 5%

The estimate equation for the education capital expenditure model is:

$$ECAP = -78448.587 + .274IND + .037IFL - .071\,UNEM - .541POP +$$
$$+ .304SCH + .238TEA + .411STU - .271STR + .450LEXPCAP*$$
$$+ .124\,DEF - .258IDT * - .017ELEC$$

As for the concern about multicollinearity, although a few variables seem to have quite a low value of Tolerance, the Tolerance and the VIF values of most of the independent variables in this equation have a tolerance value greater than 0.10, and a VIF value of less than 10, implying that they are free of the multicollinearity problem. In other words, none of the independent variables in this equation has a high correlation among each other. Before moving on to the discussion of these variables, Figure 5.3 below illustrates the goodness of fit of this equation.
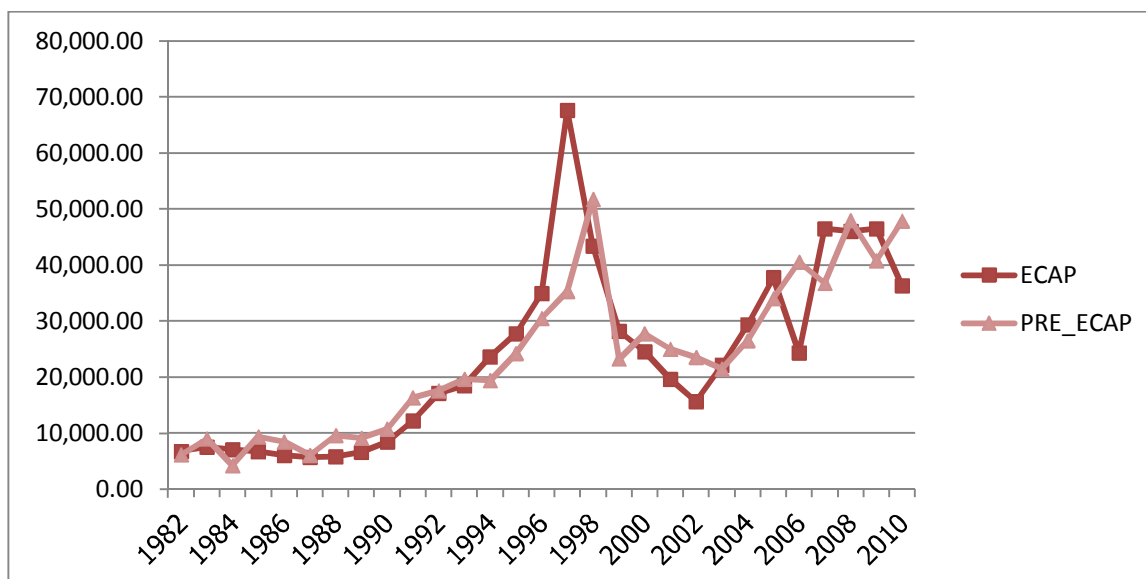
Figure 5.3 The Goodness of Fit of the Capital Educational Expenditure

The goodness of fit of the capital educational expenditure appearing in Figure 5.3 is somewhat less than that in the previous two equations. Correspondingly, the adjusted R^2 of this equation is about 87 percent, compared to around 99 percent of the previous two equations. This is partly because the capital expenditure in education is relatively small and the number of applicable condition variables in this equation is limited. Therefore, this equation may not well represent the prediction of capital educational expenditure.

5.2.3.1 The Impacts of the Economic-Demographic Variables

Interestingly, the economic variables included in this model, IND, IFL, and UNEM, do not show significances or demographic variables, which are also included in the model and also have no significant relationship with the dependent variable.

As for the economic variable, industrialization (IND), inflation (IFL), and unemployment (UNEM) have no statistical significance despite the positive coefficients of the IND and IFL, and the negative coefficient of the UNEM. The capital expenditure in education is statistically not determined by industrialization. This may be because this type of education is relatively small and tends not to respond to the change in the pattern of the Thai economy as it has grown during the last few decades.

Inflation and unemployment, which indicate the conditions of the economy, also have an insignificant impact on the capital expenditure on education. This is obviously not the case of Wagner's Law or of the Keynesian Counter-Cyclical theory, which predict that the government should expand its expenditure in response to economic conditions. The explanation of this theoretical contradiction could be that the amount that the Thai government spends on capital expenditure of education is relatively small and policymakers have to place priority on the current expenditure.

All of these demographic and educational variables demonstrate insignificant coefficients. This pattern is similar to that of the economic variables, which confirms that the Thai government does not take into account the demographic conditions when allocating capital expenditure on education. This is also different from the prediction of Wagner's Law. Particularly interesting is the educational variables, which reflect the condition in the education sector, indicating whether more investment is needed from the government.

It should be noted here that capital expenditure is an important type of expenditure that could lead to investment projects, which in turn can result in the development of a country. The statistic clearly shows that policymakers surprisingly neglect to take into account the economic-demographic and education factors, which are very important for development when allocating this type of expenditure.

5.2.3.2 The Impacts of the Decision-Making Variable

As for the decision-making variable, or the incremental variable, it has a statistical significance, as expected from the Incrementalist theory. Particularly interesting is the fact that the capital expenditure is also determined by the incremental variable. It has the same pattern as those of the total and current expenditure. Particularly, the previous year's expenditure is taken into account when the capital expenditure on education is allocated.

Under this circumstance, the estimation result illustrates that the one-year lagged total educational expenditure has a positive and significant relationship with the current educational expenditure. Its coefficient of just .450 indicates the relatively moderate importance of this variable. This confirms this variable has influence on the allocation of capital expenditure. It should be noted that the capital expenditure may not produce efficient and effective results if it moves in an

incremental direction, as it may not be able to respond to the real need of the demand for education.

From this result, it may be argued that the Thai government allocates its capital educational expenditure by relying significantly more on the previous year's expenditure rather than looking at the economic and demographic environment in setting current policy. The reason behind this argument could be from the fact that capital expenditure has a relatively small share in total expenditure, and policymakers fail to incorporate the demand driven by the economic conditions in the society.

5.2.2.3 The Impacts of the Political Variables

In terms of the impact of political variables, the indirect tax (IDT) is the only variable in this category that has a significant impact on capital expenditure. The negative coefficient of the IDT indicates that as indirect tax increases, the capital expenditure tends to decrease. This, nevertheless, contradicts the fiscal illusion theory. It may be quite surprising that this variable is one of the determinants of capital expenditure on education.

Even though the IDT has a negative and significant coefficient, other political variables (DEF and ELEC) do not statistically determine the capital expenditure on education. The results obtained in this study, therefore, indicate that the budget-maximizing bureaucrat model and the political business cycle theory cannot be applied to the case of the allocation of capital educational expenditure in Thailand.

5.2.4 Empirical Estimation of the Basic Education Expenditure Equation

The regression results obtained in table 5.5 can be accepted as a relatively complete explanation of the determinants of government educational expenditure based on its statistical significance, as shown by the F-statistic being significant at more than 95 percent. Further, it has the highest R^2 adjusted-R^2 value of .994 and .990 respectively, which also indicates that the movement of basic education expenditure is explained by this set of independent variables by almost 100 percent. The estimation in this stage of category seems to be convincing and could lead to very sound policy implications. Additionally, the Durbin-Watson stat has no autocorrelations problem.

Table 5.5 OLS Estimates of BEDU

| | | | | | Collinearity Statistics | |
Variable	Coefficient	Std. Error	T-stat	Sig.	Tolerance	VIF
IND	.077	9899.884	1.087	.293	.072	13.951
IFL	-.047	1278.328	-1.454	.165	.353	2.830
UNEM	-.080	2290.024	-2.491	.024*	.351	2.849
POP	-.081	.002	-.797	.437	.036	28.034
SCH	.037	6.076	.656	.521	.113	8.847
TEA	.022	.143	.264	.795	.051	19.743
BSTU	-.013	.012	-.225	.825	.106	9.402
STR	-.051	2445.108	-1.112	.283	.174	5.733
LEXPB	.929	.111	9.000	.000**	.034	29.232
DEF	.046	.026	1.361	.192	.322	3.102
IDT	-.082	675.366	-2.496	.024*	.334	2.997
ELEC	.032	4347.725	1.466	.162	.788	1.269
CONSTANT	129249.273	183283.157				
$R^2 = 0.994$	Adjusted-R^2 = 0.990		F-stat = 227.4**		Durbin-Watson = 2.470	

Note: ** Significant at 1%

*Significant at 5%

The estimated equation for the model is:

$$BEDU = 129249.273 + .077IND - .047IFL - .080UNEM * - .081POP + .037SCH + .022TEA - .013BSTU - .051STR + .929LEXPB ** + .046\ DEF - .082IDT + .032ELEC$$

All of the independent variables included in this model can be claimed to be free of the multicollinearity problem, as indicated by the value of both the Tolerance

and the VIF shown in the regression table. The tolerance value of greater than 0.10, and the VIF value less than 10 of the independent variables in the basic education expenditure equation, indicate that they are free from the multicollinearity problem. In other words, none of the independent variables in this equation has a high correlation among each other.
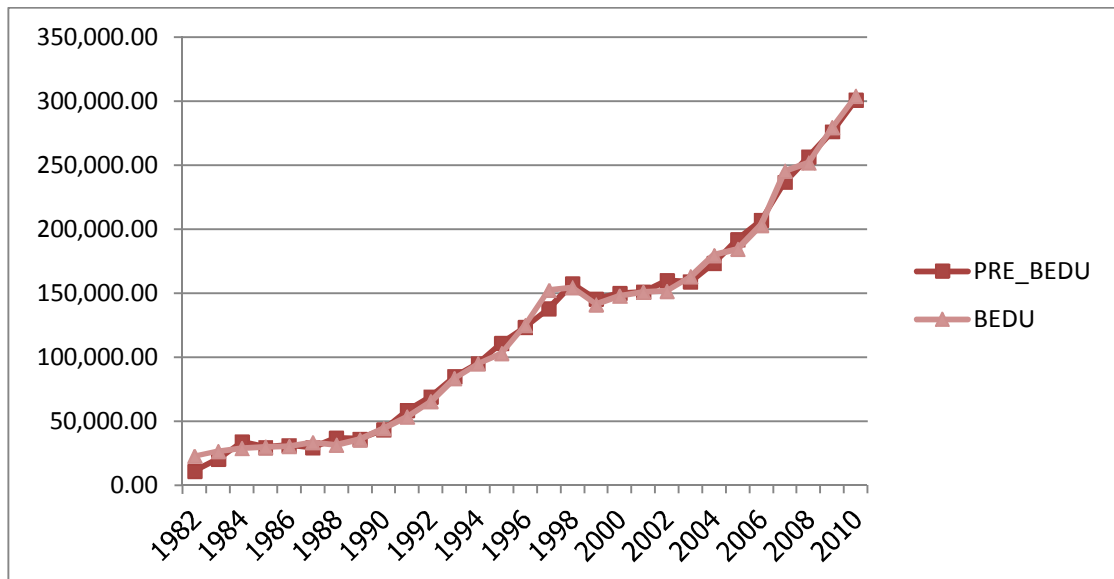
Figure 5.4 The Goodness of Fit of the Basic Education Expenditure

In Figure 5.4, the model fits the observation very well. Two lines, the prediction and the actual lines, are almost plotted at the same points along the timeline from 1982-2010. Moreover, there is no obvious deviation or fluctuation of the prediction from the actual graph. This result indicates that the robustness of this model is high. This is also confirmed by the high value of the adjusted R^2, which is 99 percent. The actual value and the value predicted by the model are almost identical, as seen from the graph. From the estimations and equation above, it can be seen that there are three types of factors determining total educational expenditure. They are economics, decision-making, and political variables, which are discussed below.

5.2.4.1 The Impacts of the Economic-Demographic Variables

This set of variables reflects how economic and demographic factors or environments can determine the level and allocation of basic education expenditure.

The estimated coefficient of IND is positive but it is statistically insignificant. In this case, industrialization shows no significant impact on basic education expenditure, which is similar to the case of total educational expenditure and the capital educational expenditure discussed above. The estimated coefficient of the IFL is also insignificant and hence does not statistically determine the allocation of basic education despite its negative sign.

The estimated coefficient of the UNEM is significant but negative, which goes in line with Wagner's Law, and this case shows similar results as the case of total educational expenditure and the capital educational expenditure discussed above. The Thai government decreases its basic education expenditure as unemployment rises. This case is, however, opposite what is predicted by the Keynesian Counter-Cyclical theory, meaning that the budget allocation of basic education in Thailand is not prepared in a counter-cyclical way.

This implies that basic education expenditure is not a kind of expenditure that is raised to stimulate the economy in the time of a recession. The government decreases this part of the budget in a pro-cyclical way with an increase in unemployment. The Thai government should consider raising the budget on basic education when unemployment rises, as parents may have lower income and still need to spend money on their children's education because those students in a basic education state cannot support themselves financially.

In this estimation, however, there are no demographic or educational variables that have statistical significance. Statistically, basic education expenditure allocation does not take into account these demographic or educational variables. Even though both the number of schools and teachers are positively related to basic education expenditure, they show an insignificant impact. By not being able to incorporate these factors into the allocation, the allocation of basic education may have been less efficient than it should have been, as it cannot meet the needs of the education sector. Additionally, basic education is the largest stage of education in Thailand in many aspects and is considered very important in improving the human capital of the country.

5.2.4.2 The Impacts of the Decision-Making Variables

The estimated coefficient of the Incrementalist variable in basic education expenditure is statistically significant and the sign is positive, which is in

line with the expectation. The impact of this variable, with its very high coefficient value of .929, indicates the relatively great importance of the lagged expenditure. Judging from this result, the government's allocation of resources to basic education has been strongly influenced and determined by the precedent of the previous year's budget allocation.

This pattern is again similar to those of the previous equations in different types of educational expenditure. The movement of basic education, which is the largest stage of education, is very incremental, indicating a muddling-through way of policymaking for this important stage of education. It can be argued that this pattern of allocation may not result efficiently in terms of the demand deemed by personnel and students in the basic education sector.

Its impact is more explicit than any other variable in this estimation, including IND or even the UNEM. Given that the UNEM represents the demand for government resources, it may be inferred that the government also relies on the demands from its citizen as well as the latest budget experience in setting basic education policy. Once again, the Thai government considers relatively little other economic-demographic variables.

5.2.4.3 The Impacts of the Political Variables

As for the political variables, DEF and ELEC have shown statistical insignificance. Statistically, the budget deficit has no significant relationship with basic education expenditure and thus makes no confirmation of the budget maximizing bureaucrat model of the public choice theory. As for the ELEC, its insignificant coefficient implies that the political business cycle theory is not valid in the case of basic education expenditure allocation.

The coefficient estimated of IDT has a statistical significance of more than a 99 percent confidence level. The coefficient estimated, however, is negative and deserves further discussion. As predicted by fiscal illusion theory, there should be a positive relationship between the proportion of indirect tax to total tax and the public expenditure. The government is expected to raise its income in a less visible way to provide higher spending. This less visible income of government normally comes from indirect taxes. Hence, the sign of the coefficient of IDT is expected to be positive.

However, in this circumstance, the relationship of the two variables may be analyzed carefully in a context of educational expenditure. As the focus of this study is only on educational expenditure, and this equation only attempts to estimate the determinants of basic education, a change in the relative amount of indirect tax may not determine this type of expenditure. The increase of indirect taxes may have a greater impact on other types of expenditures, or even the total expenditure of the country.

5.2.5 The Empirical Estimation of the Higher Education Expenditure Equation

From the regression table 5.6, it can be seen that the determinants of the government's higher-education expenditure represent a comprehensive explanation based on their statistical significance, as shown by the F-statistic being significant at more than 95 percent. Additionally, the R^2 adjusted-R^2 value also indicates that the variation in the higher-education expenditure can be explained by this set of independent variables by about 98 percent.

Table 5.6 OLS Estimates of HEDU

Variable	Coefficient	Std. Error	T-stat	Sig.	Collinearity Statistics	
					Tolerance	VIF
IND	.229	3332.611	2.223	.041*	.075	13.331
IFL	-.027	488.684	-.511	.616	.287	3.488
UNEM	-.056	784.478	-1.181	.255	.355	2.819
POP	-.111	.001	-.715	.485	.033	30.466
SCH	.028	2.200	.323	.751	.102	9.782
TEA	.259	.045	2.275	.037*	.061	16.354
HSTU	-.132	.005	-.614	.548	.017	57.945
STR	-.091	794.118	-1.432	.171	.196	5.099

Table 5.6 (Continued)

					Collinearity Statistics	
Variable	**Coefficient**	**Std. Error**	**T-stat**	**Sig.**	**Tolerance**	**VIF**
LEXPCAP	.718	.099	7.582	.000**	.089	11.295
DEF	-.030	.009	-.643	.529	.360	2.780
IDT	-.113	242.310	-2.227	.041*	.307	3.253
ELEC	.019	1517.449	.589	.564	.767	1.303
CONSTANT	4281.936	52252.966	.082	.936		
$R^2 = 0.987$	**Adjusted-R^2 = 0.978**		**F-stat = 103.780****		**Durbin-Watson = 1.785**	

Note: **Significant at 1 %

   *Significant at 5%

The estimated equation for the model is:

$$HEDU = 4281.936 + 0.229IND * -.027IFL - .056UNEM - .111POP + .028SCH$$
$$+ .259TEA * -.132HSTU - .091STR + .718LEXP ** -.030\ DEF$$
$$- .113IDT * +.019ELEC$$

This regression result explains very well regarding the movement of the dependent variables, even though there are only two independent variables used in the regression of this equation. The Durbin-Watson statistic of 1.785 indicates that there is no concern for the problem of autocorrelation. There are three types of factors determining total educational expenditure. They are the economic-demographic and decision-making variables, and the political.

As a matter of multicollinearity, the two independent variables included in this equation can be claimed to be free of a multicollinearity problem, as seen from the high value of Tolerance and the low value of the VIF.
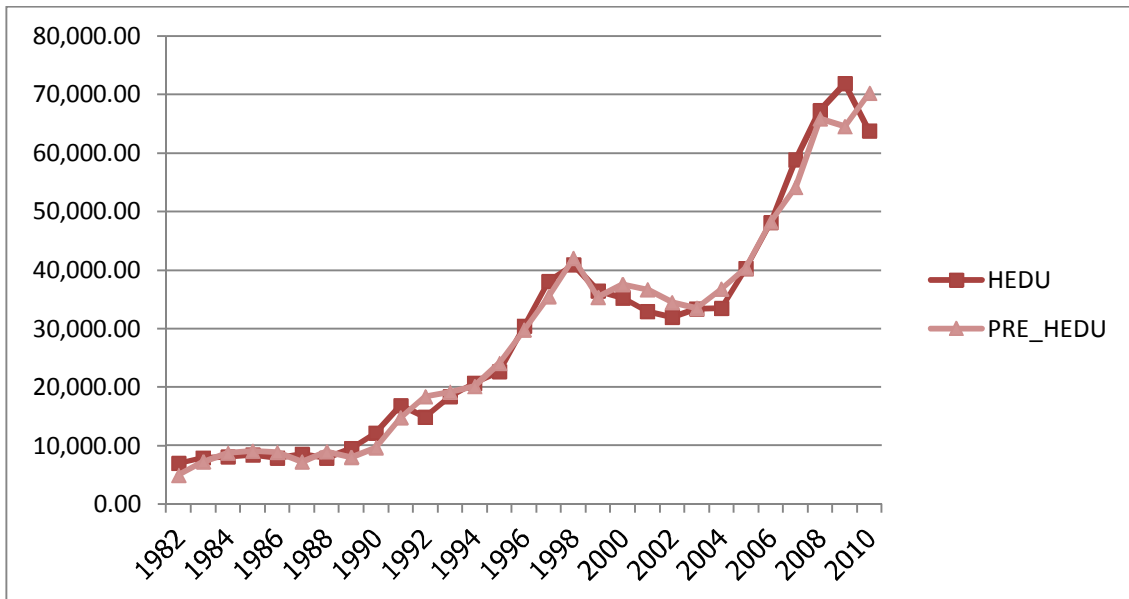
Figure 5.5 The Goodness of Fit of the Higher Education Expenditure

Figure 5.5 indicates that the prediction and the actual lines are almost plotted at the same points along the timeline from 1982-2010 for the higher-education expenditure equation. In this case, the predicted values of this equation are reasonably well-fitted, with the actual value as seen in Figure 4.5. This goes in line with the high adjusted R^2 value of .978. Only a minor deviation appears during 2009-2010, which is similar to the total educational expenditure equation. This is similar to the pattern that appeared in the total educational expenditure.

5.2.5.1 The Impacts of the Economic-Demographic Variables

From the estimation in table 5.6 above, it can be seen that higher-education expenditure is statistically and positively determined by industrialization (IND). A higher percentage of labor in the industrial sector leads to an increase in the expenditure on higher education. The implication from this estimation could come from the fact that the rising demand in industrial sector requires more skilled labor; hence the government has to allocate its budgets more on higher education. This is in line with Wagner's Law, which predicts that the government does respond to an increasing demand in society. The impact of industrialization has the same characteristic as in the case of current educational expenditure.

Inflation (IFL) and unemployment (UNEM) are both negatively but not significantly related to higher-education expenditure. Neither variable has a significant impact on higher-education expenditure. This violates the predictions of both Wagner's Law and the Keynesian Counter-Cyclical theory, which explains that government will stimulate the economy during a recession by spending more. The characteristics of inflation and unemployment are perhaps neglected in the policymaking process, as the Thai government may decide to increase or reduce the budget at this stage by not incorporating these two economic factors.

The demographic and the education variables are all statistically insignificant, implying that they are overlooked by the educational expenditure policy making and hence they do not determine the allocation of higher-education expenditure. This may be reasonable as many education variables are not specific to the higher-education level apart from the number of students in higher education, which is also insignificant in this model.

5.2.5.2 The Impacts of the Decision-Making Variables

The LEXP variable has a very positive and significant impact on higher-education expenditure. This impact is strongly positive, judging from the coefficient value of .718, which is very high. The Incrementalist theory is well confirmed by the evidence from the higher-education expenditure in Thailand.

According to this result, the government's allocation of resources to higher education has been influenced and determined by the precedent of the previous year's budget allocation. This result is similar to other types of educational expenditures in Thailand. Its impact is more obvious than any other lagged variables in other equations, implying that the government budget on higher education does not depend on any other variables. Once again, the Thai government considers relatively little other economic-demographic variables and educational variables, which emphasizes on education indicators.

5.2.5.3 The Impacts of the Political Variables

All of the political variables in the above estimation show statistical insignificance, except IDT. This means that the higher-education expenditure in Thailand is not statistically determined by any political variables

apart from indirect tax. Nevertheless, the coefficient of IDT is negative, indicating an inverse relationship. This shares the same pattern as that of basic education expenditure.

Therefore, it could be argued that public choice theory is invalid when testing higher-education policy in Thailand. This could be because higher education is not the interest of politicians compared to basic education, as higher-education institutions in Thailand are less relevant to both local and national politics compared to basic education institutions, such as primary or secondary schools.

5.2.6 The Empirical Estimation of the Non-Formal Educational Expenditure Equation

The equation explains up to 68 percent of the variation of the non-formal educational expenditure according to the adjusted-R^2 value, and it can explain this movement significantly as seen from the f-stat. The adjusted-R2 value is relatively less than those of any other equations in this study. Nevertheless, the value of .68 can be considered as moderate and it can fairly make a prediction of the movement of the dependent variable. All of the independent variables in this equation are free from the multicollinearity, problem as they exhibit a very high value of Tolerance and a low VIF value.

Table 5.7 OLS Estimates of NEDU

Variable	Coefficient	Std. Error	T-stat	Sig.	Collinearity Statistics	
					Tolerance	VIF
IND	-.003	309.046	-.019	.985	.263	3.802
IFL	.040	57.831	.364	.719	.617	1.620
UNEM	-.074	116.547	-.597	.557	.485	2.064
POP	.063	.000	.303	.765	.170	5.900
LEXPN	.829	.137	5.833	.000**	.367	2.723

Table 5.7 (Continued)

| Variable | Coefficient | Std. Error | T-stat | Sig. | Collinearity Statistics | |
					Tolerance	VIF
DEF	.050	.001	.490	.629	.701	1.426
IDT	-.028	31.480	-.242	.811	.549	1.821
ELEC	.132	248.093	1.424	.170	.866	1.155
CONSTANT	173.267	4302.721	.040	.968		

$R^2 = 0.852$ Adjusted-$R^2 = 0.793$ F-stat = 14.372**   Durbin-Watson = 1.463

Note: **Significant 1%

*Significant at 5%

The estimated equation for the model is:

$$NEDU = 173.267 - 0.03IND + .040IFL - .074\,UNEM + .063POP$$
$$+.829LEXP \ast\ast + .051\,DEF - .101IDT + .029ELEC$$

In Figure 5.6, the goodness of fit is somewhat less than any other equations in this study. The adjusted R^2 value of this equation is, among other equations, also the lowest value of .793. The prediction of this model is relatively less accurate compared to other equations and may need further adjustment. This could be because the non-formal educational expenditure has a very small share in total educational expenditure and the model may fail to provide a good prediction. Hence, the prediction of this equation does deviate and fluctuates from the actual data.
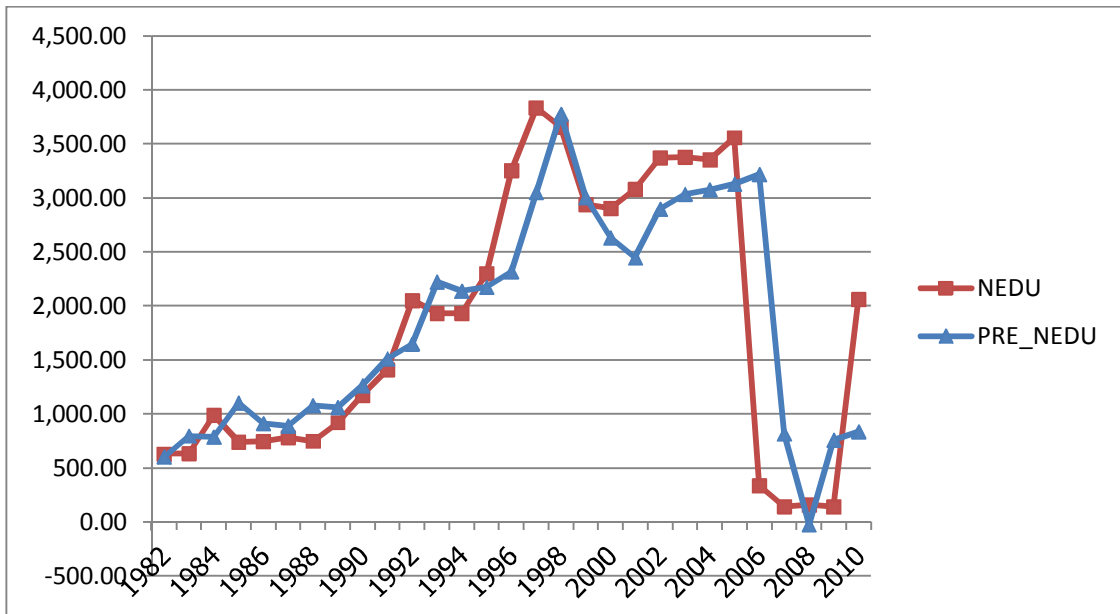
Figure 5.6 The Goodness of Fit of the Non-Formal Educational Expenditure

From the estimation, it is obvious that there is only one variable that is significant: the decision-making variable. Even though many variables that are included in the equation have a positive coefficient, and they are free from the multicollinearity problem, they have no significant relationship with non-formal educational expenditure.

5.2.6.1 The Impacts of the Economic-Demographic Variable

All of the economic-demographic variables in the above estimation have demonstrated that they have no significant impacts on the dependent variable, which is non-formal educational expenditure, despite their positive coefficients. Non-formal educational expenditure allocation is not determined at all by any economic or demographic factors.

Precisely, one cannot take into account Wagner's Law or the Keynesian Counter-Cyclical theory in the budget allocation for this type of educational expenditure. This may be because non-formal educational expenditure shares a very little amount of the total educational expenditure and perhaps the Thai government does not pay sufficient attention to this margin of educational expenditure policy, as reflected in the non-responsive character of this type of expenditure.

5.2.6.2 The Impacts of the Decision-Making Variable

The incremental or the lagged expenditure variable reflects whether the decision-makers in the government base their decisions on the previous year's budget. In other words, if the budget is allocated based on the previous year, it can be inferred that this is an Incrementalist decision. The incremental variable is the only variable in the non-formal educational expenditure equation that shows a significant impact on the dependent variable.

In the above equation, it is evident that the lagged expenditure variable (LEXPN) has illustrated that its coefficient has a significant and positive impact on the allocation of non-formal educational expenditure. The magnitude of this variable is relatively high, with the value of .829, which is very large.

The allocation of this type of budget is strongly and solely determined by the previous year's budget allocation. This reflects the strong incremental style and characteristic of budget allocation of this type of educational expenditure. In this case, it shares this same characteristic with every type and stage of education in Thailand, except capital educational expenditure.

The implication of the impact of this variable lies in the fact that the Thai government neglects other factors, including economic-demographic, institutional, and political variables when making decisions on non-formal educational expenditure.

This highly significant impact of the incremental variable can also imply that the allocation of this kind of budget is not responsive to the true demand of the society. In particular, by being a small margin of the total expenditure, none of the factors has a strong or significant impact on it, and it moves only in an incremental fashion.

5.2.6.3 The Impacts of the Political Variable

In the above estimation, it is obvious that all of the political variables included in the regression are insignificant. The rationale behind this could be the same as that of the economic-demographic variables. That is, non-formal educational expenditure has a relatively small share compared to other stages of education and it is considered as a small sector in the total educational expenditure.

5.3 Discussion and Comparisons Among the Six Empirical Estimations

Having discussed the estimations of each equation at the macro-level, time series analysis, a summary of the determinants of educational expenditures from the above six equations should also be made in order to simply illustrate the practical results of the analysis in this chapter. Each equation is explained by a somewhat different set of explanatory variables, even though there are some common variables associated with most of the equations.

Table 5.8 presents a summary of the variables affecting educational expenditures in Thailand for different types and at the different stages of education as predicted by the MAPD framework and the time-series regression analysis at the macro level. It should be noted here that times-series data all of the dependent variables in this macro-level analysis, are taken back to the year 1982. For our understanding, each educational expenditure type and stage is therefore discussed in terms of its policy determinants.

From the data illustrated in table 5.8, a comparison of the similarities and differences of the determinants among different types of educational expenditure can be discussed for a deeper understanding. This can serve as an explanation that is beneficial both in terms of theoretical application and policy notification for policymakers.

Table 5.8 Summary of the Determinants of Educational Expenditures at the Macro-
Level

Expenditures	Determinants	Signs
Total Expenditure	Industrialization	+
	Inflation	-
	Number of teachers	+
	Lagged expenditure	+
	Indirect tax	-
Current Expenditure	Number of teachers	+
	Lagged expenditure	+
	Indirect tax	-
Capital Expenditure	Lagged expenditure	+
	Indirect tax	-
Basic Education Expenditure	Unemployment rate	-
	Lagged expenditure	+
	Indirect tax	-
Higher Education Expenditure	Industrialization	+
	Number of teachers	-
	Lagged expenditure	+
	Indirect tax	-
Non-formal Education Expenditure	Lagged expenditure	+

First of all, the incremental variable is obviously the most prominent variable among others. It has positive and significant impacts on the allocation of every type of educational expenditure and at every stage of expenditure. This implies that policy makers in Thailand base their decisions on educational expenditure allocation mainly from the previous year's budget allocation. Obviously, the pattern of educational expenditure in Thailand over time is indeed incremental but it has some structural or institutional shifts, as discussed in the previous chapter and as seen from some sharp increases.

Secondly, economic variables also affect the allocation of several kinds of educational expenditure. Industrialization is the determinant of total and higher-education expenditures. These two kinds of educational expenditures are positively determined by the size of the industrial sector of the economy, as predicted by Wagner's Law. It seems that educational expenditure policy moderately responds to changes in economic condition, particularly higher-education expenditure.

It can be argued that policy makers allocate more budgets to total and higher-education expenditures as the economy grows as a result of industrialization. This could be due to the fact total educational expenditure is relatively large and this is in line with the expansion of the economy. For higher education, as industrialization occurs, it requires more skilled labor, which is trained by the higher-education system.

Inflation also affects total educational expenditure, but it is incorporated with negative signs, implying that inflation decreases this kind of educational expenditure. It could be the case that as the average price level increases, total educational expenditure decreases, or the case when educational expenditure increase in less proportion over time compared to increases in price levels.

Unemployment is another economic variable that could be considered as a puzzle and that has an impact on educational expenditure, particularly basic education expenditure. Clearly, unemployment has a significant and negative impact at this stage of educational expenditure. The implication is that as unemployment increases, basic education expenditure decreases. This supports the claim of Wagner's Law, which predicts that government adjusts its expenditure to match the demand of the society, but this is a puzzle as it contradicts the Keynesian Counter-Cyclical theory.

Thirdly, the demographic and educational variable, the number of teachers, is the only variable among others that has significant effects on the allocation of educational expenditures, especially on total and current educational expenditures. This indicates the response to an increase in the salary of teachers as the number of teachers increases. Interestingly, other demographic variables are neglected in all types of educational expenditures. This may be because of the fact that policy makers place relatively less emphasis on the allocation of expenditure by looking at the educational indicators and neglect the demand arising from the demographic factors.

As for the political variable, only indirect tax was found to have a significant impact on educational expenditures. Particularly, it has a negative impact on every type of educational expenditure, except non-formal education. This is, however, opposite the fiscal illusion theory, which predicts that government expenditure increases with the proportion of indirect taxes. The argument could be that an increase in indirect tax may be used to finance other types of government expenditure, not educational expenditures. On the other hand, it could be because the direct tax, which is the denominator of this variable, has increased and this leads to higher expenditure on education. An increase in educational expenditure could come from direct tax, not from indirect tax. Nonetheless, this variable has nothing much to do with the need of the education sector.

Noticeably, total, current, and higher-education expenditures are affected by the largest number of independent variables, while capital and non-formal education is affected by only two and one, although different, variables respectively. The effect of each set of determinants on each particular type and stage of educational expenditure in Thailand is somewhat complex and noteworthy. The results obtained in this part of the study helps to clarify the macro view of educational expenditure policy making in Thailand. Also looking at the micro view can provide a better and more thorough understanding of the policy perspective of educational expenditure in Thailand.

CHAPTER 6

FURTHER INVESTIGATIONS OF THE DETERMINANTS OF EDUCATIONAL EXPENDITURE

With regards to the limitation of the time-series regression analysis, it can only provide a picture from a macro point of view over time. A further investigation of the micro-level analysis is employed to provide a deeper understanding and more dimensions for policy analysis. The analysis of this chapter, therefore, aims to use the panel data, which are a cross-section and time-series in nature, based on the provincial-level data, to clarify the determinants of educational expenditure in Thailand as another dimension to analyze public expenditure on education.

With some limitations on the data at the provincial level, some variables were removed from the abovementioned equations at the national level, as they were not available. Nevertheless, some new variables were added to the provincial distribution regression equations. Moreover, this micro-level analysis of educational expenditure only focuses on total education and basic education expenditure, which only takes into account the so-called expenditure for education development and expansion of opportunity in education, such as new equipment, gadgets, and buildings.

The basic education expenditure in this study does not include the subsidy expenses per head, as they are equal for every student and for all of the current expenses. It only focuses on the expenditure for education development and opportunity expansion. Other parts of basic education expenditure were not available from the Bureau of Budget and they are separated across country, and it may require a larger size of research to collect all of them.

The basic education expenditure was also modified into several types to test for the determinants, such as the ratio of the number of schools, teachers, and students, in order to provide a relative term of analysis. The higher and non-formal educations were not included due to their availability and they do not exist in many provinces.

Therefore, five equations are estimated in this chapter. The first equation is based on the total education, which includes basic education expenditure for education development and the expansion of educational opportunity, together with the higher-education expenditure of 76 provinces. The second equation comes from the basic education expenditure for educational development and the expansion of education opportunity alone. The third, fourth, and fifth equations reflect the average basic education expenditure per school, teacher, and per student. The data cover the period from 2007 to 2010 for 76 provinces.

Table 6.1 Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
GPP	304	124607.3	154799.1	29609	1052575
POP	304	834971.4	724472.6	180787	5716248
SIZE	304	6698.241	4664.423	416.707	20493.96
IFL	300	1.608667	1.552016	-3.5	10.9
UNEM	301	1.295847	.6690474	.1	3.8
IND	300	42551.09	78936.75	857	503095
SCH	244	539.9877	2410.38	65	37847
TEA	232	5300.733	5289.015	879	57968
STU	237	94484.95	57919.18	2393	290451
IDT	243	3.04e+09	8.70e+09	516.6	6.94e+10
POVERTY	227	8.681145	9.79106	0	65.16
TEDU	303	5.92e+08	9.80e+08	0	6.06e+09
BEDU	303	1.64e+08	1.44e+08	0	5.98e+08
BEDU_SCH	244	545551.2	622982.6	0	3683073
BEDU_TEA	232	42954.56	48370.2	0	305839.5
BEDU_STU	237	2435.655	6168.175	0	90852.14
LTEDU	303	6.36e+08	9.47e+08	4171000	5.99e+09
LEXPB	303	2.22e+08	1.51e+08	2721000	8.94e+08
LEXPB_SCH	244	739140.5	607612.2	445.2136	3966386
LEXPB_TEA	232	55997.39	43003.95	2156.779	267390.9
LEXPB_STU	237	3082.931	3164.912	108.5542	37971.66
pvcode	304	316.4079	187.8728	101	706

Table 6.1 presents a summary of the empirical results of the thesis, which are interpreted carefully so that we can compare and contrast the results with the previous chapter.

The further investigation in this chapter also tests the same kind of statistics as previously tested in the above chapter, which is the multiple regression analysis. This is to test for the predictability of the independent variables and to see whether they determine educational expenditure significantly. The same techniques are applied to the following estimations. Nevertheless, these estimations are a panel-data analysis not a time-series analysis, as in the previous chapter. The results of the following estimations can reaffirm the robustness of the estimation and the analysis of this paper. Further, the discussions and implications from the estimations can provide understanding of the movement of the educational expenditure pattern in Thailand in the latest year.

6.1 Empirical Estimations of the Provincial Distribution Data

As the empirical results of the equations used to analyze educational expenditure at the national level have already been presented in the previous chapter, attention now moves in this chapter to the empirical results of the remaining equations using data from the provincial distribution, which are panel data in nature. The five dependent variables include total expenditure, basic education expenditure, basic education expenditure per school, per teacher, and per student, whereas the independent variables are as shown in chapter 3. The panel data multiple regression with random effects is employed here.

The problem of multicollinearity is still taken into account in this chapter as in the previous chapter. After the test for multicollinearity, it was found that no variable in the provincial level exhibited a high value of VIF or a very low value of Tolerance and therefore no variable was removed from the regression equations. In other words, all of the independent variables are free from multicollinearity and are all included in the models.

The regression equations then become as follows:

$$PTEDU = \delta 1 + \gamma_1\,GPP + \gamma_2\,POP + \gamma_3\,SIZE + \gamma_4 IFL + \gamma_5 UNEM + \gamma_6 IND$$
$$+\, \gamma_7 IDT + \gamma_8 POV + \gamma_9\,LTEDU + e \qquad\qquad (7)$$

$$PBEDU = \delta 2 + \gamma_{10}\,GPP + \gamma_{11}\,POP + \gamma_{12} SIZE + \gamma_{13} IFL + \gamma_{14} UNEM$$
$$+\, \gamma_{15} IND + \gamma_{16} SCH + \gamma_{17} TEA + \gamma_{18}\,STU + \gamma_{19}\,IDT + \gamma_{20} POV$$
$$+\, \gamma_{21}\,LEXPB + e \qquad\qquad (8)$$

$$PBSCH = \delta 3 + \gamma_{22}\,GPP + \gamma_{23}\,POP + \gamma_{24}\,SIZE + \gamma_{25} IFL + \gamma_{26} UNEM$$
$$+\, \gamma_{27} IND + \gamma_{28} SCH + \gamma_{29} TEA + \gamma_{30}\,STU + \gamma_{31} IDT + \gamma_{32} POV$$
$$+\, \gamma_{33}\,LBSCH + e \qquad\qquad (9)$$

$$PBTEA = \delta 4 + \gamma_{34}\,GPP + \gamma_{35}\,POP + \gamma_{36}\,SIZE + \gamma_{37} IFL + \gamma_{38} UNEM$$
$$+\, \gamma_{39} IND + \gamma_{40} SCH + \gamma_{41} TEA + \gamma_{42}\,STU + \gamma_{43} IDT + \gamma_{44} POV$$
$$+\, \gamma_{45} LBTEA + e \qquad\qquad (10)$$

$$PBSTU = \delta 5 + \gamma_{46}\,GPP + \gamma_{47}\,POP + \gamma_{48} SIZE + \gamma_{49} IFL + \gamma_{50} UNEM$$
$$+\, \gamma_{51} IND + \gamma_{52} SCH + \gamma_{53} TEA + \gamma_{54} STU + \gamma_{55}\,IDT + \gamma_{56}\,POV$$
$$+\, \gamma_{57} LBSTU + e \qquad\qquad (11)$$

The empirical results of all five equations presented in table 6.2 can serve as provision of an analysis of the determinants of educational expenditure in Thailand considering the provincial distribution data. This innovative way of analyzing public expenditure adds meaningful implications for the literature in this field as well as for policy implications for future development of Thailand.

Table 6.2 below illustrates the estimations of the five empirical regression equations of the provincial distribution. The overall estimation can well explain the allocation of educational expenditures across the provinces in Thailand.

Table 6.2 OLS Estimations of Educational Expenditure Policy Determinants of
Provincial Distribution

Variable	(7) PTEDU	(8) PBEDU	(9) PBSCH	(10) PBTEA	(11) PBSTU
GPP	-.097**	-.064	-.243*	-.081	-.148
	(-2.71)	(-.066)	(-2.19)	(-.73)	(-1.40)
POP	-.013	.321*	.175	.038	.022
	(-.39)	(2.15)	(1.03)	(1.23)	(.14)
SIZE	.043	.113	-.130	-.084	-.112
	(1.38)	(1.45)	(1.46)	(-.94)	(-1.32)
IFL	.114**	.527**	.474**	.557**	.509**
	(5.06)	(9.05)	(7.30)	(8.59)	(8.18)
UNEM	.007	.006	-.128*	-.091	-.120
	(.33)	(.11)	(1.336)	(-1.42)	(-1.96)
IND	-.025	-.070	-.056	-.015	-.076
	(.82)	(-.75)	(-.53)	(-.15)	(-.74)
SCH	-	-.153	-1.078**	-.027	.038
		(-.78)	(-4.36)	(-1.2)	(.18)
TEA	-	.001	-.008	-.142	-.016
		(.02)	(-.10)	(-1.60)	(-.20)
STU	-	.512*	.503*	-.102	-.500*
		(2.49)	(2.13)	(-.43)	(-2.11)
IDT	.082*	.027	.147	.057	.042
	(1.97)	(.24)	(1.15)	(.45)	(.34)
POV	-.013	.232**	.152*	.231**	.224*
	(-.52)	(3.58)	(2.05)	(3.04)	(3.14)
LAGGED	.930**	-.542**	-.232**	.109	-.249**
	(33.47)	(-6.47)	(-2.69)	(1.41)	(-3.22)
R^2	.913	.593	.460	.456	.507
Adjusted-R^2	.909	.558	.414	.410	.465
F-stat	211.96**	17.10**	10.02**	5.730**	12.09**

Note: *Significant at 5%, **Significant at 1%

- Numbers in Parentheses are t-stat

Each variable is given with the estimated coefficients and the t-stat in brackets. The important statistics, such as R-square and Adjusted R-square, as well as the F-stat, are also included in table 6.2 below.

6.1.1 Empirical Estimation of the Total Educational Expenditure Equation

From the regression results obtained in table 6.2, they can be considered as a very good explanation of the determinants of total educational expenditure based on their statistical significance, as shown by the F-statistic being significant at more than 95 percent. Additionally, this estimation has a significantly high R^2 adjusted-R^2 value of .913 and .909 respectively, which also indicates that the movement of the total educational expenditure is explained by this set of independent variables by about 90 percent or so.

The estimated equation for the model is:

$$PTEDU = 1.09e08 - .097GPP ** - .013\,POP + .043\,SIZE + .114IFL **$$
$$+ .007UNEM - .025IND + .082IDT * - .013POV + .930LTEDU ** + e$$

From the estimations and equation above, there are four variables that can explain the change in total educational expenditure across provinces. These variables are GPP, IFL, IDT, and LTEDU. They should be carefully interpreted in order to see the impact of each variable. It should be remembered and noted also that the total educational expenditure in the provinces mainly consists of expenditure allocated to universities; some provinces have very small and few universities, and some have no university at all. Therefore, the number of schools, teachers, and students are not included in the model. We focus mainly on economic-demographic and political variables.

First of all, it is obvious that the total educational expenditure is negatively and significantly determined by the income per capita of each province, as seen from the highly significant and positive coefficient of the GPP. In other words, the allocation of the total educational expenditure across provinces goes in a different

direction from the income per capita. The province with a higher income per capita tends to receive less educational expenditure as a whole, and vice versa. Policymakers seem to take into account the income per capita when making educational expenditure decisions. This is in accordance with the Keynesian Counter-Cyclical theory, which predicts a counter-cyclical character of public policy and public expenditure but is contradictory with Wagner's Law.

Another economic variable that shows a highly significant impact from the above estimation is inflation rate. IFL has a positive and highly significant coefficient, implying that inflation leads to higher total educational expenditure. When the price level of each province increases, the government tends to adjust the expenditure with increasing in prices. This is very interesting, as the price level at the provincial level has determination power on educational expenditure. Therefore, it can be said that government increases educational expenditure across provinces at a higher rate than inflation. This somewhat follows Baumol's disease.

Two political variables have demonstrated that they determine the total educational expenditure across provinces. Indirect tax (IDT) has a somewhat positive and significant impact on total educational expenditure, with quite a small magnitude. This estimation reaffirms the robustness of the fiscal illusion theory. The government seems to increase the indirect taxes of the province that are needed in order to have an increase in total educational expenditure

Lastly, the one-year lagged expenditure significantly and positively affects the total educational expenditure. This result confirms the prediction of the Incrementalist theory. The magnitude of the coefficient of LTEDU is really high, with a value of .930. This means that the higher education expenditure almost moves in the same direction as that of the previous year.

The central administration allocates the total educational expenditure for each province by relying on the previous year's expenditure of that province. It should be noted again that the total educational expenditure from the bureau of budget mainly consists of expenditure allocated to universities. It could be the case that the allocation relies heavily on the previous year's budget allocated to higher education institutions.

6.1.2 Empirical Estimation of the Basic Education Expenditure Equation

The regression results obtained above can explain clearly the movement of the basic education expenditures across provinces in Thailand. This can be seen from its statistical significance, shown by the F-statistic being significant at more than 95 percent. Further, this estimation has a very fair value of R^2 of .581, which also indicates that the movement of basic education expenditure is explained by this set of independent variables by almost 60 percent. The precise explanation of the allocation of basic expenditure can, therefore, be expected from the regression analysis.

The estimated equation for the model is:

$$BEDU = 1.09e08 - .064\,GPP + .321\,POP * + .113\,SIZE$$
$$+ .527IFL ** + .006UNEM - .070IND - .153SCH$$
$$+ .001TEA + .512STU * + .027IDT + .232POV **$$
$$- .512LBEDU ** + e$$

According to the estimations and equation above, there are altogether five variables that significantly explain the change in the basic education expenditure across provinces. They are POP, IFL, STU, POV and LBEDU, which are discussed below. This implies that the model estimations have fair significance. Other variables have demonstrated insignificances.

Two economic-demographic variables in the above estimation have illustrated significance in terms of their impact on the basic expenditure on education. Both POP and IFL have a positive and significant impact on the allocation of basic education across provinces in Thailand. Particularly, inflation has demonstrated a high significance at .01 percent. It shares the same pattern as the previous equation.

The estimation implies that basic education development expenditure distributed to provinces increases with the increase in the size of the population and with an increase in inflation rate. The allocation of this type of budget seems to meet the economic-demographic condition. Precisely, the impact of population matches Wagner's Law, which predicts that the government responds to the demand from the society, and the impact of inflation could be explained by Baumol's desease.

Inflation also determines the allocation of basic education development expenditure, which could perhaps mean that the government increases this kind of expenditure as the price level increases. This is also what Wagner's Law attempts to predict.

Clearly, STU has a positive and very significant impact on basic education development expenditure across provinces. That is, the provinces with a larger number of students are allocated more basic education development expenditure. This goes in line with Wagner's Law but not the Keynesian Counter-Cyclical theory. The size of the coefficient of the STU is quite large so it could imply that basic education development expenditure is still allocated by taking into account the size of education variables. This indicates that the number of students does play an extremely crucial role in the allocation of educational expenditure even for development expenditure, such as buildings, constructions, and development.

As for the political variable, POV has demonstrated a highly significant impact on the allocation of basic education development expenditure. The coefficient of POV is positive, meaning that higher poverty within the province, which is the percentage of people living in poverty, tends to increase the basic education development expenditure. This goes in line with the median voter theory, which predicts that the government allocates its budget depending partly on the poor-income group of people.

Of interest is the impact of the lagged variable. The previous year's expenditure has a highly significant but positive influence on the basic education development expenditure, which is opposite to what is predicted by Incrementalist theory. The coefficient of LBEDU is negative and the magnitude is very fair at about .5, indicating that the basic education development expenditure is highly contradicted or oppositely based on the previous year's allocation of expenditure.

The estimation of LBEDU sheds some light on the analysis of educational expenditure policy for provincial distribution. The government might allocate this type of expenditure, not by looking at the previous year's expenditure. Moreover, the negative coefficient could be the case that there is a reverse trend of allocation, which means that the province that receives a small amount of budget from the previous year tends to receive a higher budget during the current year, and hence vice versa.

Other variables are not statistically significant and hence cannot explain the movement of basic education development expenditure.

Especially noteworthy, the allocation of basic education development expenditures across provinces in Thailand is actually and interestingly determined not only by the economic-demographic factors, but also the educational and political variables, and not by the incremental variable. This pattern of determinants indicates a meaningful result. This could be because the basic expenditure in this study covers only the development expenditure, which focuses on education opportunity expansion, and hence it needs to match the demand from the society.

6.1.3 Empirical Estimation of Basic Education Expenditure Per School Equation

The regression results obtained in table 6.2 above moderately explain the movement of capital educational expenditures across provinces in Thailand. This can be seen from their statistical significance, as shown by the F-statistic being significant at more than 95 percent.

Further, it has a quite fair R^2 value of .46, which also indicates that the movement of basic education development expenditure per school is explained by this set of independent variables by almost 50 percent. This is fair in terms of explaining the movement and allocation of this kind of expenditure. Illustrated below is the estimated equation of the basic education expenditure per school model.

The estimated equation for the model is:

$$
\begin{aligned}
BSCH \; = \; & 1159404 - .243\,GPP * + .175\,POP + \;.130\,SIZE \\
& + .474 IFL ** -.128 UNEM * -.056 IND - 1.078 SCH ** \\
& -.008 TEA + .503 STU * -.147 IDT + .152 POV * \\
& -.232 LBEDU ** +e
\end{aligned}
$$

From the estimation above, it can be seen that seven out of twelve variables have significant impacts on the basic education expenditure per school. This indicates a good signal, as many variables incorporated into this model can explain the allocation of this expenditure.

Three economic-demographic variables have illustrated a significant impact, which include GPP, IFL, and UNEM. The GPP, the average income per capita for each province, tends to have a negative and significant impact that determines the basic education expenditure per school. This is contradictory to Wagner's Law. Nevertheless, it is in accordance with the Keynesian Counter-Cyclical theory, which postulates that the government will expand the budget to counter a low level of economic development.

Additionally, this pattern of allocation may also help reduce the gap between the richer and poorer provinces, as more educational expenditure is allocated to the poorer provinces and, if education is perceived to be a poverty killer, it may be able to raise the income of that province in order to narrow down the income gap among provinces.

Inflation also determines the allocation of basic education development expenditure per school, indicating that the government increases this kind of expenditure as the price level increases. This shares the same pattern with absolute basic education development expenditure and is different from the prediction of the Counter-Cyclical theory of Keynes. Its impact also reflects Baumol's disease.

The last economic-demographic variable that has a significant impact is UNEM, the unemployment rate. The UNEM has a significant but negative coefficient, implying that the government allocates less expenditure for basic education development per school when the unemployment rate increases. This is in line with Wagner's Law, as the government spends less when the demand in the economy shrinks. It is, however, opposite the Keynesian Counter-Cyclical theory.

Despite the importance of basic education development expenditure, particularly per school on average, the above estimation indicates that this type of expenditure is negatively and significantly affected by the number of schools, as the coefficient of SCH is negative and significant. This could result in non-productive and unequal development outcomes from the expenditure invested in education when considering the number of schools.

Nevertheless, when considering the number of students, the basic education expenditure per school on average is determined positively by the number of students, as the coefficient of STU is positive and significant. That is, as the number of students

increases, the basic education development expenditure per school also tends to increase. This has a similar pattern as in the previous equation on the absolute value of basic education development expenditure.

As for the political variable, poverty highly and significantly determines the allocation of basic education development expenditure. The coefficient of POV is positive, implying that provinces with greater poverty tend to receive higher basic education development expenditure per school. This goes in line with the median voter theory, which predicts that the government allocates its budget depending partly on the poor-income group of people, and this is similar to the estimation in the previous model.

The impact of the lagged variable is worth analyzing. The previous year's expenditure per school has a highly significant but positive influence on the basic education development expenditure per school, which is opposite to the prediction of the Incrementalist theory. The coefficient of the LBSCH is negative and the magnitude is as strong as in the previous equation, indicating that the basic education development expenditure per school slightly contradicts the previous year's expenditure.

The estimation of the LBSCH also points out some crucial implications regarding the analysis of educational expenditure policy for the provincial distribution, particularly as average per school. The government does not allocate this type of expenditure given the previous year's expenditure. Moreover, the negative coefficient could be the case that there is a reverse trend of allocation, which means that the province that receives a small amount of budget from the previous year tends to receive a higher budget for the current year, and hence vice versa.

6.1.4 The Empirical Estimation of the Basic Education Expenditure Per Teacher Equation

The regression results obtained in table 6.2 above can explain reasonably the movement of the basic education expenditures across provinces in Thailand. This can be seen from their statistical significance, as shown by the F-statistic being significant at more than 95 percent. Nevertheless, it has quite a low value of both R^2 adjusted-R^2 value of .512 and .423 respectively, which also indicates that the movement of the

basic education expenditure is explained by this set of independent variables by only 42 percent.

All of the independent variables included in the basic education expenditure equation are free of the multicollinearity problem, as shown by the value of both high Tolerance and low VIF values. In other words, none of the independent variables in this equation has a high correlation among each other.

The estimated equation for the model is:

$$PBTEA = 1159404 - .081\,GPP + .038\,POP - .084\,SIZE$$
$$+ .557IFL** - .091UNEM - .015IND - .027SCH$$
$$- .142TEA - .102STU + .057IDT + .231POV**$$
$$+ .109LBTEA + e$$

According to the estimations and equation above, there are two variables that explain the change in basic education development expenditure per teacher across provinces. In other words, two variables in the model have a significant impact and are expected to determine the allocation of basic education development expenditure per teacher across provinces.

Statistically, inflation (IFL) is expected to be a significant and positive determinant of this type of educational expenditure. The impact of inflation in the above estimation is very similar to other panel-data estimations for the provincial distribution. According to this estimation the government tends to increase its basic education development expenditure per teacher with an increase in inflation.

Another variable that seems to be a determinant from the above estimation is poverty, which is expected to positively and significantly determine the basic education expenditure per teacher. The coefficient of POV is highly significant and positive implies that the government distributes more expenditure per teacher to the provinces with a higher level of poverty.

The coefficients of most of the variables are negative but they are all insignificant. This means that in the contexts of provinces, most of the variables in the model have no influences on the educational expenditure when considering the

average per teacher. This is obviously contradictory to many equations and models illustrated above in this study. Many theories are invalid when applied to the case of basic education expenditure per teacher allocation in Thailand. In terms of policy making, the government did not take into account any of the demographic or educational environments when making educational expenditure policy.

6.1.5 Empirical Estimation of the Basic Education Expenditure Per Student Equation

The regression results obtained in table 6.2 above can clearly explain the movement of the higher education expenditures across provinces in Thailand. This can be seen from their statistical significance, as shown by the F-statistic being significant at more than 95 percent. Further, it has a fair R^2 value of .50, which also indicates that the movement of the basic education development expenditure per student is explained by this set of independent variables by almost 50 percent.

The estimated equation for the model is:

$$
\begin{aligned}
PBSTU = \; & 4709.404 - .148\,GPP + .022\,POP - .112\,SIZE \\
& + .509IFL** - .120UNEM - .076IND + .038SCH \\
& - .016TEA - .500STU* + .042IDT + .224POV** \\
& - .249LBSTU** + e
\end{aligned}
$$

From the regression results above, it seems to be the case that there are four variables determining the allocation of basic education development expenditure, which are inflation rate, number of students, poverty, and lagged variable.

Among the other economic-demographic variables, inflation (IFL) is the only variable that shows a statistical significance and positively determines the basic education development expenditure per student. From this estimation, the provinces that have higher inflation tend to receive a higher allocation of basic education expenditure per student. This variable has the same impact as others in the above estimations.

Especially noteworthy is the impact of STU. The number of students is expected to negatively and significantly determine the basic education development expenditure per student. The allocation of expenditure per student tends to decrease with the increasing number of students. The impact of this variable could lead to an unequal distribution of resources, which as a result widens the income and wealthy gap of people across provinces, as education is perceived as a form of human capital.

As for the impact of poverty, it confirms the theory of the median voter since the coefficient of the POV is positive and significant. That is, basic education development expenditure per student increases when poverty increases. In other words, provinces with higher poverty tend to receive higher expenditure per student. This pattern of allocation seems to improve the distribution of resources.

The one-year lagged expenditure significantly and negatively affects this kind of expenditure. This result contradicts the Incrementalist theory. Nevertheless, it has a similar effect as the estimations of absolute basic educational expenditure and as the per school expenditure. This means that the basic education development expenditure per student moves in the opposite direction to that of the previous year. The central administration allocates expenditure per student for each province by contrasting it with the previous year's expenditure of that province. It may be the case that policymakers would like to improve the allocation of resources for provincial distribution.

Even though the allocation of basic education expenditure per student matches the economic contexts, such as inflation, and the political context, such as poverty, it moves in the opposite direction frin the number of students, which seems to respond insignificantly to the educational context of provinces. This pattern of allocation may lead to unproductive development outcomes and may not be able to solve the problem of disparity among provinces, especially when taking into account the number of students, which is very a very important factor.

6.2 Discussion and Implications from the Provincial Distribution Analysis

From the estimations above, a picture from the micro-level data is clearly seen. It provides us with a lens to zoom into the factors affecting educational

expenditure, taking into account all of the data for provincial distribution. The overview and analysis from this section serves as another dimension, as well as a kind of in-depth discussion. Thus, a better diagnosis can be obtained.

The estimations for each equation can be critically used to compare and contrast with the estimations from the previous section. By doing so, it allows us to see whether the same variables have the same impact both at the macro and micro level. Moreover, the micro-level analysis can be very helpful in providing policy implications that pinpoint the real cause of problems.

6.2.1 The Economic-Demographic and Educational Determinants

Considering the determinants of educational expenditures for provincial distribution in the year of the study, it is obvious that they are partly determined by a set of economic-demographic contexts. The income per capita at the provincial level negatively determines the total educational expenditure and basic education development expenditure per school. This illustrates a good sign for reducing the disparity among provinces, as a higher budget is distributed to poorer provinces. Nevertheless, when taking into account the absolute value of basic education development expenditure, it is determined positively and significantly by the size of the population. This pattern may not lead to much distributional improvement.

Every type of educational expenditures distributed to provinces seems to respond to inflation very significantly and positively. This illustrates a good sign for improving equality, as all types of expenditure distribution for the provinces can match with the rising price level for each province. It also indicates that the local educational expenditure distribution tends to be increased at a higher rate than the increase in the price levels. In addition, it could be a case of Baumol's disease when the expenditure on education, particularly wages and salaries, increase more than productivity, which is often found in the labor-intensive sectors, including the education sector.

As for unemployment, it only affects the basic education expenditure per school but it has a negative impact. This may slightly improve the distribution of educational expenditure when taking into account the average per school. The impact of unemployment is difficult to explain. The explanation for this case could be that as

people have less employment and less income, they tend not to depend on the education system, which is slightly puzzling.

The educational context also affects several types of educational expenditure distributions for the provinces. Surprisingly, the number of schools tends to have a negative impact on basic education development expenditure per school. The impact is highly significant and could worsen the distribution per school.

In terms of theoretical application, the allocation of educational expenditure across provinces in Thailand may be very ambiguous when applied correctly to the public policy theories, such as the system theory or Wagner's law. These economic-demographic theories perhaps can slightly explain the movement of educational expenditure. All other economic-demographic variables produce a result that could not reaffirm the stated theories.

6.2.2 The Decision-Making Determinant

The incremental variable is the variable that seems to play quite significant roles in educational expenditure policy and in the allocation of several types of educational expenditure across provinces. It has a significant impact on almost every type of expenditure and its impact is relatively robust. The lagged expenditure greatly determines the decision of policymakers but in the opposite direction.

It should be noted that at the local level of policy making on educational expenditures, the total expenditure allocation is based almost entirely on the traditional method of public policy making, which is adjusted slightly from the previous year. This of course shares the similar pattern with the allocation of educational expenditure over time, as shown in the previous chapter. The disadvantage of incremantalism is that it may lead to unproductive or inefficiency expenditure allocation because when policymakers rely heavily on the previous year's expenditures, the allocation may not match the context or the needs of society, and hence public problems may not be solved.

Nevertheless, for the absolute basic education development expenditure, per school, and per student expenditure, are expected to be negatively and significantly determined by the previous year's expenditure. This could be because the policy makers attempt to move away from incremental fashion and it may be because the

characteristic of development expenditure is not incremental in nature but rather a kind of investment budget, which may act opposite to the previous year's expenditure, for example, a province that is allocated a small amount of expenditure in the previous year tends to receive higher budget. This case is of interest as it draws only on educational expenditure policy, which can improve the human capital leading to the greater productivity and sustainable development outcomes of the country.

6.2.3 The Political Determinant

The two political variables in the above estimations are indirect tax and the percentage of people living in poverty. Nevertheless, these two variables have shown interesting results. The making of total educational expenditure, which mainly focuses on higher education, across provinces, is determined by the indirect tax, reflecting the prediction of the fiscal illusion theory. In this case, the allocation of educational expenditure may not be able to help or be a part of the solution of the inequality or disparity problem of the Thai society, even at the local level across country, as indirect tax is the burden of the poor group of people.

Poverty tends to have an influence on all types of basic education development expenditure, as shown from the coefficients, which are all positive and significant, implying that provinces with a higher level of poverty tend to receive higher expenditure allocation no matter what it is absolute or is average per school, teacher, and student. This could help improve the distribution of educational resources.

The overall impact of the determinants of educational expenditures is somewhat ambiguous and indeed puzzling. Even though several theories could explain the local distribution of educational expenditure, many variables are still a puzzle that needs to be solved. It is unclear whether the current distribution of educational expenditures across provinces can improve the equality of living. The distributional impact of the variable tested in this chapter has an imprecise direction. Therefore, a more distributional policy on educational expenditure across provinces is needed.

6.3 Comparisons Between the National and the Provincial Estimations

The results shown in the previous chapter regarding the national time-series analysis can be more useful when compared with the results from the provincial analysis using panel data. The results from the local-level analysis can be thought of as both a comparison and confirmation of the soundness of theories, as well as that of this research paper. Having a comparison and discussion could provide and serve as an integrative analysis for developing policy implications and policy recommendations, together with the suggestions for further study.

From the information provided in table 6.3, meaningful analysis can be drawn from the comparisons. It is obvious that the most outstanding variable that has a statistically significant and positive impact on most of the educational expenditures at the national level is the incremental variable, but it is somewhat different in the provincial distribution. This may be due to the fact that the data on basic education collected in this study take into account only the expenditure for development and opportunity expansion.

Other variables are very ambiguous, as they tend to have opposite signs between the estimation at the country level and at the provincial distribution. The allocation of educational expenditures may partly match the needs of the education sector, as seen from the positive and significant coefficients of the few educational variables in several types of educational expenditure both regarding country and provincial distribution.

Table 6.3 Comparisons between the National and the Provincial Estimations

	Variables	
	National	**Provincial**
Total Expenditure	Industrialization (+) Inflation (-) Number of Teachers (+) Lagged Expenditure (+) Indirect Tax (-)	Income per Capita (-) Inflation (+) Indirect Tax (-) Lagged Expenditure (+)
Current Expenditure	Number of Teachers (+) Lagged Expenditure (+) Indirect tax (-)	-
Capital Expenditure	Lagged Expenditure (+) Indirect Tax (-)	-
Basic Education Expenditure	Unemployment Rate (-) Lagged Expenditure (+) Indirect Tax (-)	Population (+) Inflation (+) Number of Students(+) Poverty (+) Lagged Expenditure (-)
Basic Education Expenditure per School	-	Income per Capita (-) Inflation (+) Unemployment (-) Number of Schools (-) Number of Students (+) Poverty (+) Lagged Expenditure (-)

Table 6.3 (Continued)

	Variables	
	National	**Provincial**
Basic Education Expenditure per Teacher	-	Inflation (+) Poverty (+)
Basic Education Expenditure per Student	-	Inflation (+) Number of Students (-) Poverty (+)
Higher Education Expenditure	Industrialization (+) Number of Teachers (-) Lagged Expenditure (+) Indirect Tax (-)	-

From the above comparison, it can also be noted that a number of predictors failed to be incorporated into the policy determinants of educational expenditures in Thailand both over time and for local distribution. This clearly leaves some puzzles to be resolved and explained in the future. This puzzle should be addressed by both scholars in the field of public policy analysis as well as the policymakers in the field of education and public economics.

This research points out clearly that the educational expenditure policy making in Thailand has failed to bring these factors into the allocation of educational expenditure. The reasons that educational expenditures have increased over time have been revealed. Policy determinants may be those that may not lead to efficiency of educational expenditure allocation. As a result, neither the education delivery problems nor the structural problems of Thailand may be solved efficiently. Tremendous efforts are truly required when this kind of structural problem is needed to be solved. Particularly, transparent and profound understanding of such issue is also needed to be addressed.

CHAPTER 7

CONCLUSION AND POLICY RECOMMENDATIONS

This study seeks to clarify two main issues concerning educational expenditure policy in Thailand. First, in the past few decades it is obvious that educational expenditure has been increasing significantly. One should, therefore, be able to explain what causes that sharp increase, particularly in terms of policy determinants. Secondly, there is a concern over the issue of equity in the distribution of resources in education across the country. There must be evidence to show the characteristics of the distribution of educational expenditure across provinces in Thailand.

In this study, attempts are made to gain insights concerning the actual behaviors of the Thai government's educational expenditure policy, focusing on how it is formulated and what are its determinants both over time and across provinces. In the literature thus far, a study of this kind is truly scarce. Most of the previous studies are either cross-section analyzes or time series analyses, which provide only one angle of the view of educational expenditure. The data dating back to 1982 are applied to determine factors that statistically affect educational expenditure policy, as well as its development, in the case of Thailand.

Exploratory research is the type of research which is evidenced in this study. It considers government expenditure policy as the dependent variable to the extent to which the analysis seeks to explain the behavioral pattern by referring to multidimensional independent variables, including social, economic, demographic, decision-making, institutions, and politics. Given the objectives of this study, therefore, the aim is to answer the following questions.

First, what is the pattern of educational expenditure in Thailand; how has it evolved in relation to the historical events of the period, has its allocation changed over time and how? Second, what factors determine the educational expenditures and

the changes in the allocation and the distribution, and do the proposed variables explain it? Third, what policy implications should be suggested from the empirical evidence found in this study? From reviewing the relevant literature, a number of theories and hypotheses have been chosen to test for their plausibility in explaining Thai educational expenditures.

Given the scarcity of the empirical literature, particularly regarding both time-series and panel data analyzes, the present thesis substantially creates a multidimensional analysis of the policy determinants to fit the context of Thailand for both macro- and micro-level analyzes. This MAPD framework takes into account the perspectives, data, as we as the methodology, with the aim to explain the allocation of Thai educational expenditure. There are three main points that should be summarized regarding the framework of this study.

First, in terms of the perspective mentioned above, explanatory research is the type of research employed here and it aims to analyze the behavior, pattern, development, as well as the factors causing government expenditure in Thailand. Considering the analytical framework and objectives, two types of analysis are incorporated in this study, which are the time series analysis and the panel data analysis. This study aims to analyze, given the data collected, the impact of the hypothesized independent variables in both time series and panel data analyzes. These hypothesized independent variables were derived from a combination of related theories, previous studies, as well as the hypothesis formulated in this study based on the context of Thailand.

Particularly prominent is the fact that this kind of research has never been performed in the case of Thailand's educational expenditure. Even in the international sphere, this kind of multidimensional research has rarely been done, particularly the kind that is based on both time series and panel data of educational expenditure in a specific country.

Second, the selection of the variables in this study covers many dimensions. As for the dependent variables, both types and stages of educational expenditure are included, as well as the total educational expenditure. The choice of independent variables used in explaining the pattern of educational expenditure also varies from those in the literature.

Third, despite the fact that some theories and techniques used to construct the framework and the analyses in this study were derived from the economic discipline, the core of this thesis is a policy-oriented analysis. This approach is based primarily on the ground that any endeavor applied to the more advanced quantitative tools of other fields in order to deliver policy analysis can benefit the thesis in terms of advancing the body of knowledge in this field.

Therefore, the multidimensional analysis for the policy determinants (MAPD) used in this study is based on the adjustment according to the theoretical background, some evidence from previous studies, as well as the context of Thailand in particular. This MAPD framework is used throughout this study for both the analysis at the macro-level, using time-series data, as well as at the micro or provincial distribution level, using panel data.

Having discussed the possibilities of variables that may determine educational expenditures in Thailand, those that are deemed appropriate and theoretically sound were added in the equations for the empirical estimations. At the macro-level, or time-series, analysis, there are altogether six equations. These equations divide total educational expenditure by types, which are current expenditure and capital expenditure, and by stages, which are basic, higher, and non-formal educational expenditures. These equations are extended to include a number of independent variables. The independent variables used in this study comprise four main categories, including economic-demographic, institutional, incremental, and political variables.

The economic-demographic variables include GDP per capita, industrialization (percentage of labor in the industrial sector from total labor), inflation rate, unemployment rate, size of population, number of teachers, number of students, school-age population (percentage of people aged less than 15), enrollment rate, and student-teacher ratio. The institutional variable is a proxy by number of years of compulsory education according to the constitution. The incremental variable is one-year lagged expenditure for each type of expenditure. Political variables include budget deficit, proportion of indirect tax to total tax, the GDP of the non-agricultural sector as a proportion of the GDP, and election cycle as a dummy variable.

At the micro-level, or panel data analysis, five equations are drawn to analyze the pattern of educational expenditure in relation to provincial distribution. These

expenditures cover the total and basic education expenditure distributed to provinces. Further, as the focus of the provincial distribution analysis is on basic education, basic education expenditures are divided according to the number of schools, teachers, and students in order to provide average figures, which can better reflect the allocation of expenditure. Five equations then explain the pattern of total, basic education development, basic education development per school, basic education development per teacher, and basic education development per student expenditures. The independent variables at the micro-level analysis include a number of variables, such as income per capita, population, inflation rate, unemployment rate, size of the province, industrialization, number of schools, students, teachers, poverty, indirect tax, and lagged expenditures.

All of the final equations, with appropriately-assigned independent variables, were regressed using the panel data regression with the random effect technique. Because every equation, both at macro- and micro-level analyzes, has incorporated many independent variables which tend to involve the problem of multicollinearity, the test of correlations among variables is applied, particularly the test for Pearson Correlations. The variables that highly and significantly correlate with each other were removed from the equation. Due to the problem of multicollinearity, equations at both the macro- and micro-level analysis were tested for this problem using Pearson Correlations.

As the macro analysis in chapter five is based on time series analysis, the problem of autocorrelation was taken into account in order to ensure that the estimated coefficients as well as their standard errors were valid. The Durbin Watson statistic is applied to monitor the problem of autocorrelation.

The overall results of the estimation at the macro level can be summarized as follows:

1) The six proposed equations in the macro-level, or time-series, analysis can fit and explain the behavior of educational expenditure allocation reasonably well. All of these equations have F statistics which are statistically significant, and five equations have an adjusted-R^2 value of more than 90 percent, implying the good explanatory power of the equations. Even though the other equations, which is non-formal educational expenditure, has a relatively less value of adjusted-R^2 of about 79

percent, it can still be considered reasonable as for the explanation of the pattern of the movement of the dependent variables.

2) The one-year lagged expenditure has particularly illustrated the most significant role in all types of educational expenditures. This incremental variable has demonstrated significant and positive signs in the coefficients, even though the magnitude differs from one equation to another. The base of the previous year's total educational expenditure appears to have been used by policy makers in allocating educational expenditures. In addition, the incremental variable or the previous year's expenditure also influences the allocation of capital expenditure as well at all stages of education, including basic, higher, and non-formal education. It is worth mentioning here that the magnitude of the incremental variable is highest in the estimation of basic education expenditure with a coefficient value of .929.

To conclude, policy makers base almost every type of educational expenditure allocation on the previous year's expenditure. Both the current and basic education expenditures are most influenced by incremental fashion. This is in accordance with the prediction of Incrementalist theory because the current expenditure is largely spent on wages and salary and should move in an incremental fashion. The explanation could be that there is a fluctuation in the amount of spending on wages and salary due to the change in the number of teachers and educational staff in Thailand during the past 30 years.

3) The economic variables were also found to have statistical influences on the various educational expenditures. Different economic variables, however, have different impacts on different types of educational expenditure. Among others, industrialization has significant impact on total, and higher-education expenditures. These two kinds of educational expenditures are positively determined by the size of the industrial sector of the economy, as predicted by Wagner's Law. In other words, both total and basic education expenditure policy can respond to the higher demand that arises from industrialization.

Inflation is another economic variable that shows a significant impact on educational expenditure. According to the estimations in this study, inflation affects total educational expenditure, but it is incorporated with a negative sign, implying that inflation decreases this kind of educational expenditure. That is, policy makers

decrease the budget allocated to total educational expenditure when the inflation rate goes up.

Unemployment also affects educational expenditure, particularly basic education expenditure. This study finds that unemployment significantly and negatively affects the expenditure allocated to basic education. The implication is that when unemployment increases, policy makers allocate a smaller budget for basic education. This is contradictory to Wagner's Law, which predicts the counter-cyclical behavior of government. In this case, the Thai government does not allocate a larger budget to basic education in response to higher unemployment.

4) The demographic variable has also demonstrated a significant impact on educational expenditure in Thailand. The number of teachers was found to have positive and significant impacts on total, current, and higher-education expenditures. Additionally, this variable is the only demographic and educational variable found to be significant in this study. The implication is that policy makers increase the allocation of the stated educational expenditure as the number of teachers increases. This is according to what Wagner's Law predicts. Nevertheless, all other demographic and education variables are unfortunately and statistically neglected in the educational expenditure policymaking. According to this pattern of allocation, education policymaking seems not to meet the needs of the educational sector.

5) The effect of the political variable was also found in this study. Indirect tax tends to be the only significant variable from all of the political variables included in the MAPD framework. The results show that indirect tax has illustrated a significant and negative impact on educational expenditure. That is, indirect tax tends to decrease the budget allocated to education. Especially noteworthy is the fact that educational expenditure is surprisingly not strongly determined by political factors, as expected and predicted by public choice theory.

With the limitations as well as the inflexibility of the results from the time-series regression analysis, further investigations on the determinants of educational expenditure at the micro or the provincial distribution level are taken into account in order to complement the regression results. This study has examined the determinants of educational expenditure in Thailand for the provincial distribution by particularly looking at the total education expenditure and with the different types of expenditure

at the stage of basic education. This is because basic education is very crucial for the provincial distribution of educational expenditure and is considered as a core of education in Thailand. Other stages of education, for example higher education, normally are clustered in big cities so it is estimating the determinants of the provincial distribution can be ambiguous. The estimation at the micro level can be summarized as follows.

First, economic-demographic variables tend to have a significant impact on the variable type of expenditures. Inflation positively determines every kind of educational expenditure distributed to the provinces. It could be the case that educational expenditure increases at a higher rate than inflation. This could also illustrate that it responds to the change in price level, which acts according to Baumol's disease. The allocation of educational expenditure to the provinces is also based on the income per capita but negatively and particularly for total and basic education per school. Unemployment also negatively determines the basic education per school but has no effect on other types.

Secondly, the education variables have for the most part a positive effect but show little ambiguity. The number of students has a positive and significant impact on both absolute basic education expenditure and per school expenditure. However, it has a negative effect on both basic education development expenditure per teacher and per school. Further, the number of schools is another significant factor that negatively determines the basic expenditure per school but not for other types. It is unclear, therefore, to conclude that this pattern of distribution can equalize the society.

Thirdly, the political variables are also expected to have an impact on the expenditure distributed to provinces. Indirect tax tends to positively determine total educational expenditure and poverty tends to positively determine every type of basic education development expenditure across provinces. It seems to help reduce the inequality and may be good for distributional effect.

The only decision-making variable which tended to have a significant impact on provincial educational expenditure in an ambiguous way was lagged expenditure. This variable has a positive impact on total educational expenditure, which is similar to the results at the national level. Nevertheless, it has negative impact on every type

of basic education expenditure except the expenditure per teacher. This negative impact could help reduce the disparity between the highly-developed provinces that are allocated a small amount of expenditure during the previous year.

7.1 Theoretical Contributions

Although this study is policy-oriented in nature, focusing only on policy determinant analysis and aiming to gain a thorough understanding of the behavior of the Thai government in allocating public expenditure on education, there are some significant theoretical contributions.

The paper has provided some new empirical evidence supporting the existence of a long-run positive correlation between educational expenditures and several key determinants in Thailand. Within a well-established body of research, this paper has made a contribution to policy analysis field of study, with results stemming from a very promising estimation technique, which makes more efficient use of both the time-series and panel data dimension of the dataset. The results obtained in this study clearly provide insightful contributions to the field of policy analysis. The theoretical contributions generated in this study are as follows.

First, the results indicate that the educational expenditure in Thailand is partly determined and guided by the government's perception of the economic situation, particularly GDP per capita unemployment, and inflation, at the time. These findings also shed some light on the framework of Dye—that public policy is not randomly determined but rather a part of the process of social and economic development.

In terms of inflation, nevertheless, the educational expenditure policy over time is conducted in the counter-cyclical fashion presented by Keynes but acts opposite across provinces. Precisely, the government expenditures on education decrease with inflation over time and increase with inflation for each province. These theoretical contributions add to the literature by allowing future research to use more sophisticated models using other types of government policies or public expenditures.

Second, the Incrementalist variable used in this study makes an immense theoretical contribution. The results confirm that the government expenditure on education in Thailand over a 30-year period of time is not exogenously determined but rather heavily guided by the government's previous year's expenditures. This

confirms the significance of the Incrementalist theory, as the incremental variable is obviously a crucial determinant of educational expenditure in Thailand, as shown in several equations in this study. The incremental variable can clearly explain the behavior and pattern of the educational expenditures in Thailand. Further, the influences of the incremental variable can lead to theoretical significance that can be used in future studies. Nevertheless, the estimations are opposite when applying the panel data of the provinces in Thailand. The pattern of allocation across provinces is in contrast with the Incrementalist theory.

Third, this study also proves that a number of theories are invalid in the case of educational expenditure policy in Thailand. The findings, which are different from the previous cross-sectional studies, highlight the importance and some advantages of the time series analysis. To rely on the cross-country estimations alone for a specific country's policy analysis could lead to over extrapolation as well as misinterpretation. The results obtained in this study illustrate that the educational expenditure policy in Thailand is made differently perhaps from the case of many countries.

7.2 Policy Implications

The results obtained from this research provide insightful information for policy implications. These policy implications are based on the analysis and empirical results of this study given the specific socio-economic and political contexts of Thailand.

There are a number of implications that should be noted here, as they can suggest to policy makers how to improve educational expenditure policy in order to respond to the needs of people in the education field. The role of policymakers, in terms of efficiency and effectiveness, can be boosted from the application of the following policy implications.

7.2.1 Increase the Responsiveness of the Allocation of Educational Expenditure and Reduce the Role of the Incrementalist and Institutional Shift

Thai educational expenditure allocation has a strong incremental character, which links the current year expenditure to the base of the previous year's expenditure

with marginal adjustment, and this eradicates the responsiveness to the real needs of the government's budget. From the results obtained in this study, it can be implied that educational expenditure adjustment and allocation assume a very low policy priority. The Thai government is to focus more on society's needs and demographic changes, as this will allow the educational expenditure allocation to be more effective and efficient, hence improve the use of the government's total expenditure.

Certain types of educational expenditure, particularly capital expenditure, should place more emphasis on how it responds to the needs and the demands from socio-economic and educational factors. A more responsive educational expenditure policy could lead to more efficient and effective policies, which will of course result in satisfactory policy output and outcome.

For the local-level expenditure, the local government should have a more active role despite its less significant role in today's budgetary system. The decentralization will allow the local government to have more roles in the future allocation of education educational expenditure. The demand for educational expenditure may vary according to the context of a specific area or provinces. The allocation of educational expenditure, therefore, should focus on the needs of the local citizens.

This study recommends that the Thai government employ the mixed-scanning approach, which focuses on both the macro and micro view. A macroeconomic context should be taken into account when allocating educational expenditure at the national level, particularly into different types and stages of education. As for provincial distribution, a micro-type analysis is needed to serve the needs of particular groups of people and students in each area or each province.

7.2.2 Establish the Independent Office for Budget Responsibility (OBR) as a Fiscal Watchdog

A newly-established organization is needed to respond to the making of fiscal policy. This organization should be an independent organization, which acts like a watchdog to analyze, monitor, and evaluate fiscal policy, particularly public expenditure allocation. The objective of this fiscal watchdog should be to ensure fiscal retrenchment when needed. Further, the allocation of the budget should also be

carried out efficiently and directly to the needy groups. There can be sub-units within this organization, which can be structured by function, region, or by category of expenditure, i.e. economic, social, defense, etc.

In terms of educational expenditure, this new office should play a role in finding the areas that still need more budget and also the right kind of budget. At the national level, the right type of educational expenditure should be allocated more budgets and the transparency issue should also be taken into account by this new organization. As for provincial distribution, the allocation of educational expenditure should create equality in terms of the distribution across provinces.

Additionally, this new organization should monitor and be able to give recommendations to adjust the budget; particularly, any areas that receive too much education budget should be retrenched. By creating such an agency, the allocation of public expenditure, including education, will be more efficient and effective.

The work of this newly-established institution can be linked with the Ombudsman to provide some channels for the claims from people regarding education service provision that could result in unequal treatment or even unfairness or corruption in educational expenditure policy making. Therefore, the responsibility for allocating public expenditure, including educational expenditure, is indeed vital for both the improvement of government service delivery and for the development of the socio-economic and political performance of a country.

7.2.3 Increase the Role of Participation in the Process of Educational Expenditure Allocation

Public participation should be given relatively more consideration, as it can lead to more efficient and effective public expenditure allocation. Particularly in the field of education, a number of representatives should be selected or elected to represent the true needs of the education sector. This election or selection should well represent education experts from each stage of education, as well as those that have experience with the Thai education system.

This group of representatives is to provide information as well as feedback from the demands of people in each area. Participation can also be obtained from students. Some of the representatives should be from students so that their voice can

be raised and the real demand of students can be paid attention to. Apart from students, teachers should also be emphasized as teachers can reflect the obstacles they face when working and also the type of budget they require to perform better.

In addition, each school should set up a committee, which may be comprised of parents and teachers. This committee should be given sufficient power to appoint school directors. Further, the committee should also be able to make decisions on important issues, such as compensations or the provision of resources from outside the university.

The degree of participation can be enhanced by using technology. Appropriate technology should be provided for an easier way of participating. For example, representatives should be able to use the internet as one of the channels to provide feedback and reflect the obstacles and demand for an appropriate budget.

The participatory basis is supposed to yield benefits and to provide more effectiveness policy to the needy, as the involvement and participation help relate their feedback and demands to policymakers. The increase in the level of participation through the process of educational expenditure policy is therefore highly recommended according to the preliminary results of this study.

7.2.4 Improve the Criteria for Educational Expenditure Allocation

In the past, educational expenditure allocations were not divided by the type of school, such as schools for the gifted or art schools or science schools. Different kinds of schools should be treated differently and the need for public expenditure may be different. Also, when looking at the criteria with which to analyze educational expenditure, almost all of the data available always take into account only the typical types of expenditure, such as wages, salaries, buildings, equipment. In order to arrive at a better analysis, educational expenditure should be allocated by taking into account the teaching method, especially the method of teaching Thai students how to think, which is in fact very crucial in terms of the impact of education policy and expenditure.

It is arguable that the criteria of educational expenditure allocation in the past may only look simple and come from the old way of budget making, focusing only on materials. If the allocation of educational expenditure can incorporate more

qualitative measures, such as attitude making or focusing not only in terms of knowledge and skill provision, then the educational expenditure can perhaps solve the problems of inequality among society even more.

7.3 Suggestions for Further Studies

Some suggestions for further research or studies should be discussed here. In the future, particularly future research on Thai fiscal policy, may focus on a more specific type of expenditure, as it can provide an in-depth analysis and can shape good policy recommendations that meet the needs of that particular type of policy. In other words, a micro level analysis of public expenditure is required along with a macro-level analysis.

In the context of Thailand's education policy making, the issues surrounding the impact of educational expenditure are also worth studying. In line with the importance of the determinants of educational expenditures, policymakers should also take into account their impact. Particularly interesting are the issues of the efficiency and equity of education policy after expenditures have been allocated.

Further research would benefit the policy analysis arena if it can incorporate the new projects that are to be implemented in the near future, such as the One Tablet Per Child project, which requires a substantial amount of budget; the outcome of this project still seems to be ambiguous. This further analysis could create further understanding in the distribution of educational expenditures across the region as well as whether this kind of analysis is truly determined by the economic-demographic need.

Another project that is worth analyzing regarding the determinants of educational expenditure is the unofficial tuition fee for new students entering schools, which is to be made official. This kind of fee was claimed to be "under the desk" before the current government had the idea to make it official. The analysis of educational expenditures could also be done in another dimension, which concerns the impact of expenditures. The distributional impact, for example, would be very beneficial for policy makers as well as the constituents that receive services from the government.

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APPENDICES

Appendix A: Educational Expenditures in Thailand

Table A1 Educational Expenditures by Stages and Types, 1982-2010

	TEDU	BEDU	HEDU	NEDU	ECAP	ECUR
2010	402,891.50	303,965.30	63,830.50	2,060.10	36,354.00	366,537.50
2009	419,233.20	279,583.20	71,892.90	138.80	46,457.30	351,405.80
2008	363,164.20	251,785.80	67,266.80	157.40	46,068.50	317,095.70
2007	356,946.30	245,580.50	58,827.50	143.80	46,503.20	310,443.10
2006	294,954.90	203,246.20	48,152.30	334.20	24,375.60	270,579.30
2005	262,938.30	184,454.90	40,308.30	3,558.70	37,761.50	225,176.80
2004	251,233.60	179,721.10	33,480.40	3,352.30	29,382.20	221,851.40
2003	235,092.10	163,016.10	33,423.50	3,380.20	22,164.20	212,927.90
2002	222,940.40	151,728.80	32,008.30	3,372.90	15,667.60	207,272.80
2001	221,649.20	150,943.70	32,929.50	3,080.00	19,602.90	202,046.30
2000	221,051.10	147,907.20	35,289.10	2,903.20	24,530.90	196,520.20
1999	208,614.10	141,224.30	36,471.90	2,940.40	28,186.70	180,427.40
1998	226,609.80	154,364.70	40,926.90	3,656.20	43,422.30	183,968.00
1997	215,161.90	152,304.50	38,092.00	3,835.70	67,643.10	147,518.80
1996	170,057.80	124,992.70	30,461.10	3,254.90	34,928.10	135,129.70
1995	135,137.60	103,234.40	22,685.00	2,301.10	27,750.50	109,523.00
1994	122,552.50	95,078.20	20,724.20	1,933.20	23,598.50	98,954.00
1993	108,518.60	83,527.20	18,401.10	1,932.20	18,539.80	89,978.80
1992	85,473.40	65,547.10	14,854.30	2,048.50	17,164.40	69,201.10
1991	73,979.90	53,653.60	16,874.20	1,409.80	12,236.60	61,743.30
1990	59,572.90	44,528.70	12,221.00	1,173.20	8,501.20	51,071.70
1989	47,550.70	35,839.40	9,543.50	920.70	6,623.50	40,927.20
1988	41,214.20	31,609.80	7,921.00	748.80	5,808.10	35,406.10
1987	43,840.30	33,442.40	8,557.60	781.60	5,730.60	38,109.70
1986	39,978.40	30,389.20	7,950.10	746.00	6,104.80	33,873.60
1985	40,290.80	30,174.50	8,447.30	740.10	6,703.00	33,587.80
1984	38,670.60	28,878.00	8,131.30	986.30	7,044.70	31,625.90
1983	37,212.50	26,572.60	7,961.30	633.00	7,533.50	29,679.00
1982	32,630.30	22,851.20	6,993.10	629.20	6,779.80	21,152.70

Table A2 Educational Expenditures across Provinces, 2007-2010

Province	Year	TEDU	BEDU	BEDU_SCH	BEDU_TEA	BEDU_STU
0101 KHON KAEN	2010	3,386,811,400`	160,944,400	143,061.69	15,897.31	738.99
0101 KHON KAEN	2009	3,356,424,300	53,598,600	48,113.64	4,129.32	235.19
0101 KHON KAEN	2008	3,859,096,314	499,436,464	564,973.38	116,391.63	4,012.44
0101 KHON KAEN	2007	3,482,105,440	348,756,240			
0102 UDON THANI	2010	283,655,300	29,265,500			
0102 UDON THANI	2009	400,148,000	58,318,300	67,498.03	4,764.18	254.76
0102 UDON THANI	2008	729,351,206	444,717,106	507,667.93	38,347.60	2,042.78
0102 UDON THANI	2007	534,472,360	293,275,460	328,048.61	25,378.63	1,236.37
0103 LOEI	2010	227,733,800	13,685,300			
0103 LOEI	2009	334,573,700	42,501,000	88,914.23	8,259.04	496.68
0103 LOEI	2008	551,372,241	326,011,541	682,032.51	63,352.42	3,809.88
0103 LOEI	2007	458,164,190	260,409,890	541,392.70	50,457.25	2,921.52
0104 NONG KHAI	2010	15,136,000	15,136,000			
0104 NONG KHAI	2009	46,614,000	36,464,000	67,651.21	6,107.87	263.85
0104 NONG KHAI	2008	361,352,984	359,193,384	666,407.02	56,556.98	2,564.18
0104 NONG KHAI	2007	267,967,620	264,543,620	492,632.44	40,995.45	1,846.46
0105 MUKDAHAN	2010	18,620,400	7,120,400	25,798.55	2,216.81	128.61
0105 MUKDAHAN	2009	18,110,000	7,362,000	26,673.91		130.12
0105 MUKDAHAN	2008	221,132,404	215,758,404	781,733.35	63,890.55	3,778.21
0105 MUKDAHAN	2007	223,079,030	219,907,530	796,766.41	64,319.25	3,735.03
0106 NAKHON PHANOM	2010	435,176,900	53,152,000			
0106 NAKHON PHANOM	2009	459,443,000	43,615,000	87,404.81	7,128.96	384.17
0106 NAKHON PHANOM	2008	729,206,565	262,569,865	407,717.18	28,866.52	1,489.06
0106 NAKHON PHANOM	2007	590,280,640	239,060,940	479,080.04	39,625.55	2,033.61
0107 SAKON NAKHON	2010	259,308,900	39,960,800	62,050.93	4,373.04	220.94
0107 SAKON NAKHON	2009	385,351,700	41,106,800		4,568.95	239.75
0107 SAKON NAKHON	2008	708,856,480	327,521,110	527,409.19	39,337.15	2,375.29
0107 SAKON NAKHON	2007	573,901,710	266,451,110	398,282.68	30,097.27	1,477.08
0108 KALASIN	2010	139,290,200	62,736,400			
0108 KALASIN	2009	237,882,300	30,768,200	49,546.22	3,707.46	228.97
0108 KALASIN	2008	592,134,415	355,414,805			
0108 KALASIN	2007	368,184,910	263,981,210	415,064.80	31,244.08	1,767.39
0109 NAKHON RATCHASIMA	2010	2,002,443,000	263,904,400			
0109 NAKHON RATCHASIMA	2009	2,284,285,500	84,998,800	245,661.27	14,367.61	743.90
0109 NAKHON RATCHASIMA	2008	2,110,633,205	597,625,825			

Table A2 (Continued)

Province	Year	TEDU	BEDU	BEDU_SCH	BEDU_TEA	BEDU_STU
0109 NAKHON RATCHASIMA	2007	1,741,268,570	348,041,370			
0110 CHAIYAPHUM	2010	161,525,700	92,443,000	127,331.96	13,762.54	793.56
0110 CHAIYAPHUM	2009	217,675,400	40,555,400	52,669.35	4,785.86	270.80
0110 CHAIYAPHUM	2008	526,588,646	400,251,946	519,807.72	48,568.37	2,603.15
0110 CHAIYAPHUM	2007	351,978,270	268,663,270	343,120.40	30,866.64	1,677.52
0111 YASOTHON	2010	39,776,000	39,776,000	97,490.20	8,281.49	547.23
0111 YASOTHON	2009	39,944,200	24,804,200	60,645.97	5,084.91	330.78
0111 YASOTHON	2008	308,135,995	302,535,995	734,310.67	63,772.34	3,795.98
0111 YASOTHON	2007	258,775,920	252,355,420	612,513.16	53,161.03	3,123.48
0112 UBON RATCHATHANI	2010	804,936,600	41,332,800			
0112 UBON RATCHATHANI	2009	1,089,138,200	73,124,000	63,975.50	5,242.99	285.57
0112 UBON RATCHATHANI	2008	1,382,784,182	507,843,482	443,144.40	37,884.63	1,944.36
0112 UBON RATCHATHANI	2007	1,146,331,080	331,454,880	284,266.62	24,184.96	1,141.17
0113 ROI ET	2010	153,809,800	19,088,400	22,273.51	1,741.32	106.17
0113 ROI ET	2009	388,318,100	58,579,400	68,274.36	4,953.02	302.02
0113 ROI ET	2008	620,411,364	417,630,064	484,489.63	36,401.12	2,052.72
0113 ROI ET	2007	426,547,400	278,129,700	322,656.26	24,322.67	1,380.25
0114 BURI RAM	2010	350,507,900	121,280,600			
0114 BURI RAM	2009	300,099,300	52,398,600	57,771.33	5,300.82	
0114 BURI RAM	2008	685,794,457	494,947,657	544,496.87	40,736.43	1,918.46
0114 BURI RAM	2007	486,754,350	305,396,050			
0115 SURIN	2010	256,824,700	19,360,000			
0115 SURIN	2009	365,465,600	55,084,600	65,733.41	5,079.26	238.95
0115 SURIN	2008	757,101,335	445,420,345	530,894.33	40,849.26	1,884.54
0115 SURIN	2007	579,948,270	281,721,570	334,984.03	25,993.87	1,167.06
0116 MAHA SARAKHAM	2010	983,780,800	29,493,800	48,429.89	3,929.36	229.72
0116 MAHA SARAKHAM	2009	1,244,668,900	30,084,000	49,318.03	4,038.12	241.56
0116 MAHA SARAKHAM	2008	1,509,298,243	324,155,543	531,402.53	42,646.43	2,541.32
0116 MAHA SARAKHAM	2007	1,333,296,970	247,332,770	392,591.70	30,716.94	1,746.02
0117 SI SA KET	2010	208,057,000	23,232,000	25,957.54	1,559.72	111.15
0117 SI SA KET	2009	245,650,700	52,004,400	55,858.65	4,358.40	241.66
0117 SI SA KET	2008	597,832,575	449,674,975	479,397.63	37,166.29	2,077.05
0117 SI SA KET	2007	407,269,450	299,436,250		24,320.68	1,286.46
0118 NONG BUA LAM PHU	2010	12,672,000	12,672,000			
0118 NONG BUA LAM PHU	2009	17,280,000	16,680,000	49,058.82	4,238.88	215.17

Table A2 (Continued)

Province	Year	TEDU	BEDU	BEDU_SCH	BEDU_TEA	BEDU_STU
0118 NONG BUA LAM PHU	2008	297,838,251	296,600,251	872,353.68	75,374.90	3,720.71
0118 NONG BUA LAM PHU	2007	234,291,820	232,540,320	681,936.42	59,095.38	2,854.03
0119 AM NAT CHAREON	2010	30,517,400	30,517,400	108,602.85	9,885.78	530.79
0119 AM NAT CHAREON	2009	36,626,200	36,626,200	130,342.35	12,382.08	618.08
0119 AM NAT CHAREON	2008	283,939,978	283,709,978	1,006,063.75	89,160.90	4,648.32
0119 AM NAT CHAREON	2007	237,982,950	235,511,450	835,146.99	76,989.69	3,674.13
0201 CHIANG MAI	2010	6,062,354,200	132,050,200			
0201 CHIANG MAI	2009	5,961,254,400	87,291,900	105,552.48		487.88
0201 CHIANG MAI	2008	5,897,777,280	528,026,080	609,729.88	59,637.01	2,805.92
0201 CHIANG MAI	2007	5,306,781,284	402,143,284	464,368.69	45,368.15	2,157.51
0202 LAMPANG	2010	260,956,200	37,706,800			
0202 LAMPANG	2009	378,257,500	51,730,400			
0202 LAMPANG	2008	652,420,765	327,657,965	754,972.27	67,156.79	4,070.23
0202 LAMPANG	2007	499,883,920	256,427,420	588,136.28	49,312.97	3,018.43
0203 UTTARADIT	2010	243,388,500	0.00	0.00	0.00	0.00
0203 UTTARADIT	2009	371,010,300	7,389,900	27,886.42	2,199.38	136.55
0203 UTTARADIT	2008	593,504,306	251,315,806	815,960.41	68,646.76	4,567.22
0203 UTTARADIT	2007	560,933,970	237,253,670	1,180,366.52		5,829.47
0204 MAE HONG SON	2010	20,885,300	4,885,300	14,985.58	2,642.13	111.56
0204 MAE HONG SON	2009	45,171,000	40,171,000	122,847.09	19,847.33	907.76
0204 MAE HONG SON	2008	367,560,605	365,444,605	1,094,145.52	184,381.74	8,247.27
0204 MAE HONG SON	2007	293,452,350	288,261,350	840,412.10	142,845.07	6,011.08
0205 CHIANG RAI	2010	879,718,100	141,890,000	229,595.47	21,391.53	984.68
0205 CHIANG RAI	2009	1,030,273,500	47,893,200	74,716.38	6,012.20	314.87
0205 CHIANG RAI	2008	1,270,330,436	396,387,436			
0205 CHIANG RAI	2007	1,006,575,900	300,895,000	458,681.40	37,710.87	1,854.97
0206 PHRAE	2010	11,494,000	7,744,000	26,795.85	2,267.64	
0206 PHRAE	2009	30,358,200	17,158,200	59,370.93	5,024.36	345.58
0206 PHRAE	2008	294,063,502	287,420,202			
0206 PHRAE	2007	268,948,090	254,130,290	873,299.97	70,986.11	4,604.06
0207 LAMPHUN	2010	34,000,400	21,200,400	81,227.59	6,989.91	505.90
0207 LAMPHUN	2009	22,456,000	17,456,000	65,624.06	6,747.58	401.51
0207 LAMPHUN	2008	273,142,094	268,832,894	936,699.98	305,839.47	5,934.24
0207 LAMPHUN	2007	239,775,620	235,036,620	813,275.50	86,157.12	4,853.32
0208 NAN	2010	44,080,400	44,080,400	116,614.81	10,301.57	871.55
0208 NAN	2009	48,974,400	39,154,400	99,883.67	9,150.36	603.08

Table A2 (Continued)

Province	Year	TEDU	BEDU	BEDU_SCH	BEDU_TEA	BEDU_STU
0208 NAN	2008	334,152,504	326,020,704	823,284.61	73,494.30	4,883.40
0208 NAN	2007	303,726,290	279,664,490	697,417.68	64,128.52	3,957.44
0209 PHAYAO	2010	311,610,700	44,610,400	154,361.25	12,874.57	833.11
0209 PHAYAO	2009	543,880,300	29,424,600	101,815.22	10,063.13	516.99
0209 PHAYAO	2008	891,595,545	287,153,445	993,610.54	86,361.94	4,934.67
0209 PHAYAO	2007	670,452,830	239,772,730	832,544.20	67,125.62	3,936.64
0210 NAKHON SAWAN	2010	301,459,400	61,248,000	110,158.27	10,565.46	610.87
0210 NAKHON SAWAN	2009	315,987,300	27,811,000	47,785.22	4,172.07	204.30
0210 NAKHON SAWAN	2008	628,654,120	349,086,720	597,751.23	52,180.38	3,085.55
0210 NAKHON SAWAN	2007	521,953,230	267,384,530	455,510.27	37,538.19	
0211 PHITSANULOK	2010	1,850,346,600	13,024,000	26,471.54	1,952.33	118.40
0211 PHITSANULOK	2009	1,763,566,400	30,738,000	64,037.50	15,579.32	978.48
0211 PHITSANULOK	2008	1,989,832,452	398,662,052		61,702.84	3,713.49
0211 PHITSANULOK	2007	1,754,433,650	305,836,350	625,432.21	64,754.68	2,749.93
0212 KAM PHAENG PHET	2010	317,235,800	89,408,000			
0212 KAM PHAENG PHET	2009	333,784,000	24,806,600	57,158.06	4,697.33	251.02
0212 KAM PHAENG PHET	2008	562,597,009	296,038,009	678,986.26	56,078.43	2,995.64
0212 KAM PHAENG PHET	2007	456,280,840	232,763,740	531,424.06	43,482.86	2,312.31
0213 UTHAI THANI	2010	8,053,300	8,053,300	31,335.80	3,277.70	179.05
0213 UTHAI THANI	2009	10,486,000	8,036,000	31,390.63	3,001.87	176.16
0213 UTHAI THANI	2008	248,799,085	244,999,085	957,027.68	93,905.36	5,348.16
0213 UTHAI THANI	2007	224,697,120	219,701,120	848,266.87	78,436.67	4,728.42
0214 SUKOTHAI	2010	15,216,400	15,216,400	45,694.89	3,395.76	229.85
0214 SUKOTHAI	2009	17,489,000	15,639,000	45,462.21	3,508.86	211.60
0214 SUKOTHAI	2008	282,511,432	280,766,432	795,372.33	63,207.21	3,678.18
0214 SUKOTHAI	2007	236,582,010	232,006,710	644,463.08	60,512.97	2,917.41
0215 TAK	2010	47,433,800	18,383,800	74,730.89	5,810.30	257.54
0215 TAK	2009	47,270,800	19,233,000	78,182.93	6,443.22	238.21
0215 TAK	2008	329,887,333	313,757,333	1,225,614.58	97,409.91	3,949.56
0215 TAK	2007	306,272,420	270,933,020	1,092,471.85	85,765.44	3,354.96
0216 PHICHIT	2010	52,448,000	52,448,000	153,806.45	18,098.00	997.95
0216 PHICHIT	2009	88,043,400	24,744,400	68,734.44	6,379.07	382.40
0216 PHICHIT	2008	308,809,917	302,563,717	514,564.14		
0216 PHICHIT	2007	244,311,880	243,413,380	410,477.88		1,970.05
0217 PHETCHABUN	2010	232,165,000	16,578,300	29,394.15		482.69

Table A2 (Continued)

Province	Year	TEDU	BEDU	BEDU_SCH	BEDU_TEA	BEDU_STU
0217 PHETCHABUN	2009	284,538,800	28,902,600	50,178.13		123.86
0217 PHETCHABUN	2008	623,168,164	369,333,664			
0217 PHETCHABUN	2007	447,776,260	280,560,160			
0301 PHUKET	2010	156,153,100	2,464,000			
0301 PHUKET	2009	307,859,600	5,169,000	79,523.08		150.90
0301 PHUKET	2008	527,719,195	257,815,095	3,683,072.79	215,384.37	7,526.57
0301 PHUKET	2007	446,704,260	217,409,160	3,344,756.31	181,628.37	90,852.14
0302 SURAT THANI	2010	267,623,000	25,653,300			
0302 SURAT THANI	2009	325,191,000	46,856,000			
0302 SURAT THANI	2008	631,225,066	363,788,366			
0302 SURAT THANI	2007	491,155,140	267,300,940			
0303 RANONG	2010	0.00	0.00	0.00	0.00	0.00
0303 RANONG	2009	5,471,200	4,471,200	47,065.26	3,932.45	168.12
0303 RANONG	2008	236,749,560	235,549,560	2,453,641.25	206,803.83	8,663.41
0303 RANONG	2007	221,788,190	218,992,690	2,281,173.85	174,496.17	8,090.46
0304 PHANGNGA	2010	10,438,000	6,688,000			
0304 PHANGNGA	2009	12,976,000	10,676,000	61,710.98	5,438.61	290.81
0304 PHANGNGA	2008	257,683,355	254,822,055	1,439,672.63	122,510.60	6,841.04
0304 PHANGNGA	2007	232,991,230	227,113,730	1,283,128.42	105,880.53	5,896.61
0305 KRABI	2010	48,296,700	32,296,700			
0305 KRABI	2009	23,395,000	16,945,000	68,882.11		264.74
0305 KRABI	2008	317,685,752	315,138,252			
0305 KRABI	2007	251,535,030	245,264,030			
0306 CHUMPHON	2010	44,240,400	28,240,400	102,692.36	7,946.09	397.63
0306 CHUMPHON	2009	18,938,000	11,588,000	42,138.18	3,177.41	160.46
0306 CHUMPHON	2008	307,543,106	294,080,006	1,069,381.84	77,798.94	4,011.35
0306 CHUMPHON	2007	295,077,900	250,394,200	900,698.56	66,576.50	3,314.72
0307 NAKHON SI THAMMARAT	2010	1,073,303,300	112,890,400	140,761.10	11,848.28	596.64
0307 NAKHON SI THAMMARAT	2009	1,140,804,500	56,774,200	70,178.24	4,976.70	303.12
0307 NAKHON SI THAMMARAT	2008	1,379,377,591	477,641,491			
0307 NAKHON SI THAMMARAT	2007	1,258,674,020	315,672,220	386,853.21	25,898.12	1,610.23
0308 SONGKHLA	2010	4,555,161,500	29,123,800			
0308 SONGKHLA	2009	5,396,537,900	103,827,200		13,019.08	793.56
0308 SONGKHLA	2008	5,994,749,359	533,509,359	1,031,933.00	182,085.11	3,558.34
0308 SONGKHLA	2007	4,541,137,330	277,759,940	532,107.16		1,852.57
0309 SATUN	2010	12,147,400	12,147,400	69,413.71	5,469.34	281.28
0309 SATUN	2009	27,644,780	26,344,780	150,541.60	11,360.41	572.55
0309 SATUN	2008	364,920,678	362,520,678			
0309 SATUN	2007	229,389,770	224,441,070	1,268,028.64	96,658.51	

Table A2 (Continued)

Province	Year	TEDU	BEDU	BEDU_SCH	BEDU_TEA	BEDU_STU
0310 YALA	2010	238,335,000	25,523,400	113,437.33	8,993.45	390.39
0310 YALA	2009	352,615,580	35,873,780	159,439.02	11,689.08	491.31
0310 YALA	2008	769,163,274	501,862,974	2,220,632.63		
0310 YALA	2007	501,635,550	240,791,950			
0311 TRANG	2010	92,644,400	32,403,600	112,123.18	7,371.16	395.06
0311 TRANG	2009	248,156,200	21,614,200	70,175.97	5,262.77	259.68
0311 TRANG	2008	481,335,168	286,552,168	918,436.44	66,764.25	3,364.79
0311 TRANG	2007	427,160,120	235,779,210	755,702.60	56,191.42	2,708.18
0312 NARATHIWAT	2010	557,795,300	42,996,400	118,774.59	8,298.86	412.30
0312 NARATHIWAT	2009	533,833,680	51,781,780	144,238.94	9,835.10	505.23
0312 NARATHIWAT	2008	968,930,419	588,584,819	1,634,957.83	115,228.04	5,642.27
0312 NARATHIWAT	2007	453,735,210	265,034,710	736,207.53	5,946.08	2,533.77
0313 PHATTHALUNG	2010	26,400,000	26,400,000	97,777.78	6,185.57	402.30
0313 PHATTHALUNG	2009	266,905,500	9,903,000	36,542.44	2,277.60	146.43
0313 PHATTHALUNG	2008	269,791,843	262,285,543	953,765.61	61,253.05	3,676.56
0313 PHATTHALUNG	2007	529,369,210	229,051,010	829,894.96	50,340.88	3,064.97
0314 PATTANI	2010	90,278,400	32,915,400	102,540.19	8,439.85	433.41
0314 PATTANI	2009	103,842,280	55,561,780	164,871.75	10,609.47	627.74
0314 PATTANI	2008	719,031,928	543,415,728	1,612,509.58	108,966.46	6,026.10
0314 PATTANI	2007	494,700,060	245,429,060	728,276.14	44,213.49	2,659.47
0401 CHON BURI	2010	1,513,528,600	62,304,000			
0401 CHON BURI	2009	1,454,641,200	21,650,200	70,065.37	4,118.36	162.91
0401 CHON BURI	2008	1,749,218,650	306,024,650	971,506.83	57,404.74	2,344.98
0401 CHON BURI	2007	1,464,326,950	251,772,350	796,747.94	45,372.56	1,853.42
0402 CHACHOENGSAO	2010	231,344,300	33,770,000			
0402 CHACHOENGSAO	2009	306,008,000	31,531,400		6,824.98	343.68
0402 CHACHOENGSAO	2008	527,953,264	314,398,664			
0402 CHACHOENGSAO	2007	416,179,740	248,321,140	728,214.49	53,563.66	2,746.03
0403 RAYONG	2010	33,789,400	17,789,400	81,602.75	5,552.25	187.68
0403 RAYONG	2009	22,771,000	14,121,000	62,482.30	3,324.15	149.08
0403 RAYONG	2008	346,397,975	341,539,275	1,511,235.73	97,276.92	3,625.68
0403 RAYONG	2007	248,343,760	243,196,260	1,026,144.56	96,775.27	2,677.31
0404 TRAT	2010	19,712,000	19,712,000	151,630.77	16,690.94	595.82
0404 TRAT	2009	6,334,000	5,914,000	45,844.96		178.66
0404 TRAT	2008	245,105,870	241,962,870	1,875,681.16	157,939.21	7,266.15
0404 TRAT	2007	222,977,180	221,461,180	1,703,547.54	128,606.96	6,545.13
0405 CHANTHABURI	2010	240,932,700	28,313,000	144,454.08		

Table A2 (Continued)

Province	Year	TEDU	BEDU	BEDU_SCH	BEDU_TEA	BEDU_STU
0405 CHANTHABURI	2009	314,838,800	26,911,000	121,769.23	8,529.64	425.56
0405 CHANTHABURI	2008	535,702,945	273,486,345	1,237,494.77	87,208.66	4,287.90
0405 CHANTHABURI	2007	499,102,480	239,069,880	1,076,891.35	75,014.08	3,702.84
0406 NAKHON NAYOK	2010	57,376,000	57,376,000	387,675.68	28,645.03	1,699.38
0406 NAKHON NAYOK	2009	8,805,000	7,505,000	50,709.46	4,061.15	217.23
0406 NAKHON NAYOK	2008	231,960,135	229,640,135	1,530,934.23	114,078.56	6,547.30
0406 NAKHON NAYOK	2007	220,002,110	213,464,610	1,423,097.40	115,137.33	5,995.52
0407 PRACHINBURI	2010	18,304,000	18,304,000	71,221.79	6,726.94	366.21
0407 PRACHINBURI	2009	11,115,000	9,865,000	68,986.01	5,332.43	307.69
0407 PRACHINBURI	2008	282,945,121	279,215,121	1,041,847.47	93,885.38	
0407 PRACHINBURI	2007	228,981,860	224,855,760	814,694.78	70,642.71	3,761.89
0408 SA KAEO	2010	18,014,000	11,264,000	38,312.93	3,233.07	148.64
0408 SA KAEO	2009	16,695,800	13,204,000			
0408 SA KAEO	2008	280,946,514	273,912,714	934,855.68	74,493.53	3,574.16
0408 SA KAEO	2007	237,113,550	229,445,050	1,480,290.65	130,292.48	5,460.25
0501 RATCHABURI	2010	165,348,900	16,049,000	46,250.72	3,666.67	201.78
0501 RATCHABURI	2009	259,336,900	44,743,400	122,249.73	8,646.07	466.22
0501 RATCHABURI	2008	454,839,461	269,953,861	737,578.86	52,807.88	2,812.90
0501 RATCHABURI	2007	429,266,270	232,617,370			
0502 KANCHANABURI	2010	244,257,700	72,110,300	158,136.62	13,245.83	627.62
0502 KANCHANABURI	2009	282,404,700	50,736,000	110,535.95	9,572.83	421.13
0502 KANCHANABURI	2008	565,216,656	365,038,756	797,027.85	71,759.14	3,079.14
0502 KANCHANABURI	2007	471,197,610	285,754,110	621,204.59	51,832.78	2,397.91
0503 PHACHUAP KHIRI KHAN	2010	103,732,000	76,032,000	323,540.43		
0503 PHACHUAP KHIRI KHAN	2009	110,523,000	10,002,000	42,202.53		173.76
0503 PHACHUAP KHIRI KHAN	2008	407,303,468	255,984,608			
0503 PHACHUAP KHIRI KHAN	2007	313,662,660	225,014,260	865,439.46	60,357.90	4,045.49
0504 PHETCHABURI	2010	271,000,400	12,854,300	53,116.94	5,181.10	327.22
0504 PHETCHABURI	2009	302,150,300	16,924,000	66,368.63	5,241.25	688.00
0504 PHETCHABURI	2008	535,436,688	275,653,388			
0504 PHETCHABURI	2007	470,804,420	239,056,420			
0505 SUPHAN BURI	2010	30,976,000	30,976,000			
0505 SUPHAN BURI	2009	22,109,000	19,559,000	43,854.26	3,426.59	179.43

Table A2 (Continued)

Province	Year	TEDU	BEDU	BEDU_SCH	BEDU_TEA	BEDU_STU
0505 SUPHAN BURI	2008	322,345,173	310,370,773	691,248.94		
0505 SUPHAN BURI	2007	296,663,980	279,401,280	1,757,240.75	122,169.34	
0506 SAMUT SONGKHRAM	2010	3,750,000	0.00	0.00	0.00	0.00
0506 SAMUT SONGKHRAM	2009	4,171,000	2,721,000	32,011.76	2,086.66	126.83
0506 SAMUT SONGKHRAM	2008	215,488,420	213,715,220	2,514,296.71	165,031.06	9,931.47
0506 SAMUT SONGKHRAM	2007	211,782,330	209,212,330	2,461,321.53	155,779.84	9,588.54
0601 SARABURI	2010	25,232,400	9,232,400	243.94	3,446.21	153.36
0601 SARABURI	2009	23,900,000	16,850,000	57,508.53	4,518.64	221.09
0601 SARABURI	2008	271,197,613	265,725,613	903,828.62	69,616.35	3,452.15
0601 SARABURI	2007	234,274,520	230,988,020	785,673.54	61,270.03	2,938.59
0602 SINGBURI	2010	2,191,800	2,191,800	16,235.56	1,162.14	84.59
0602 SINGBURI	2009	17,245,000	6,157,000	45,272.06	3,451.23	234.26
0602 SINGBURI	2008	221,674,826	218,442,926	1,594,473.91	112,890.40	8,203.20
0602 SINGBURI	2007	214,906,110	209,659,110	1,530,358.47	113,883.28	7,666.34
0603 CHAI NAT	2010	14,499,000	14,499,000	72,134.33	6,370.39	382.77
0603 CHAI NAT	2009	17,082,000	16,782,000	83,492.54	6,975.06	439.46
0603 CHAI NAT	2008	272,601,414	268,551,414		107,549.63	7,127.35
0603 CHAI NAT	2007	240,471,550	237,332,550	1,174,913.61	93,733.23	5,959.39
0604 ANG THONG	2010	11,500,000	0.00	0.00	0.00	0.00
0604 ANG THONG	2009	13,718,000	8,918,000	53,083.33	4,184.89	247.36
0604 ANG THONG	2008	234,593,156	230,017,256	1,369,150.33	112,753.56	6,334.30
0604 ANG THONG	2007	212,679,130	211,434,130	1,258,536.49	97,705.24	5,790.49
0605 LOP BURI	2010	251,753,100	20,164,400	53,915.51	4,212.33	247.36
0605 LOP BURI	2009	321,798,100	27,164,400	72,438.40	5,674.62	333.23
0605 LOP BURI	2008	568,752,820	330,747,520	881,993.39	67,143.22	4,045.20
0605 LOP BURI	2007	501,884,210	272,810,910	717,923.45	55,157.89	3,249.37
0606 PHRA NAKHON SRI AYUTHAYA	2010	787,570,600	44,000,000			
0606 PHRA NAKHON SRI AYUTHAYA	2009	930,073,600	19,802,000	50,774.36	3,973.91	203.61
0606 PHRA NAKHON SRI AYUTHAYA	2008	1,069,867,402	282,560,102	694,250.86	50,529.35	2,249.59
0606 PHRA NAKHON SRI AYUTHAYA	2007	864,155,910	235,096,410	550,577.07	46,124.47	1,871.71
0701 BANGKOK METROPOLIS	2010	1,150,983,700	125,167,600			
0701 BANGKOK METROPOLIS	2009	365,557,800	147,775,600			
0701 BANGKOK METROPOLIS	2008	263,452,700	121,790,800			

Table A2 (Continued)

Province	Year	TEDU	BEDU	BEDU_SCH	BEDU_TEA	BEDU_STU
0701 BANGKOK METROPOLIS	2007					
0702 SAMUT PRAKAN	2010	3,520,000	3,520,000	43,456.79	3,134.46	70.45
0702 SAMUT PRAKAN	2009	10,602,000	9,252,000	106,344.83	3,478.20	131.97
0702 SAMUT PRAKAN	2008	278,903,999	276,738,999	1,647,255.95	67,928.08	2,330.04
0702 SAMUT PRAKAN	2007	241,908,850	239,425,850	1,425,153.87	58,410.80	2,003.50
0703 PATHUM THANI	2010	1,124,645,300	33,678,000			
0703 PATHUM THANI	2009	1,371,420,700	27,849,400			
0703 PATHUM THANI	2008	1,569,563,908	266,668,808			
0703 PATHUM THANI	2007	1,403,606,110	226,169,110	1,153,924.03	59,801.46	2,123.81
0704 SAMUT SAKHON	2010	10,056,000	1,056,000	9,182.61	508.92	11.19
0704 SAMUT SAKHON	2009	13,984,000	10,246,000	89,095.65		
0704 SAMUT SAKHON	2008	236,225,886	223,857,886	1,946,590.31	3,861.75	
0704 SAMUT SAKHON	2007	219,374,130	214,134,130	1,814,696.02		3,571.28
0705 NAKHON PATHOM	2010	528,666,100	48,656,400			
0705 NAKHON PATHOM	2009	569,367,300	35,953,400	127,043.82	7,347.93	320.67
0705 NAKHON PATHOM	2008	767,607,205	274,627,005	956,888.52	56,788.05	2,407.61
0705 NAKHON PATHOM	2007	780,301,130	249,826,130	870,474.32	48,794.17	2,144.41
0706 NONTHABURI	2010	22,528,000	22,528,000	214,552.38	6,108.46	362.42
0706 NONTHABURI	2009	9,097,200	7,954,200	67,408.47	2,477.17	92.85
0706 NONTHABURI	2008	291,853,474	273,953,574	2,245,521.10	83,701.06	3,060.69
0706 NONTHABURI	2007	271,843,360	259,477,660	1,631,934.97	70,760.20	2,620.85

Appendix B: Independent Variables

Table B1 Economic-Demographic

Year	GCAP	IND	IFL	UNEM	ENR	SAP	STR
2010	143,655.10	2.27	3.30				
2009	129,875.10	2.24	-0.90	1.173037348046	81.782483063849	16.9	20.195630298315
2008	131,717.80	2.28	5.50	1.175922596952	83.108679534567	17.0	20.071479239136
2007	124,377.10	2.21	2.30	1.175963862309	83.334676035868	17.1	20.365110887126
2006	114,803.50	2.29	4.70	1.220325926569	84.693993747769	17.3	22.161567432802
2005	103,671.00	2.53	4.50	1.345996210908	82.842864310644	17.4	22.159794170307
2004	96,053.70	2.34	2.70	1.513038973635	81.639951408763	17.6	22.399426588200
2003	88,688.00	2.19	1.80	1.539764263422	75.748718852642	18.6	22.346598601709
2002	82,975.20	2.12	0.70	1.799999952316	75.964582599521	18.7	22.021105663012
2001	79,571.60	1.81	1.60	2.598882506618	74.948579339337	18.8	21.446850692756
2000	77,860.10	1.53	1.60	2.388842207416	74.121851609583	19.0	21.403674982784
1999	72,980.60	1.41	0.30	2.964140771700	72.571832283757	19.2	21.220852295099
1998	72,979.20	1.57	8.00	3.404355474820	61.245125939019	22.6	21.014619501766
1997	76,057.40	1.56	5.60	0.872862087790	61.063748735319	22.7	21.268225643603
1996	75,145.50	1.52	5.90	1.070894112080	57.851652928797	22.8	20.420874326581
1995	69,325.60	1.49	5.70		55.850192156520	22.9	20.182335098761
1994	60,864.70	1.31	5.00	1.346593164852	54.347486421899	23.0	20.113097717109
1993	53,771.60	1.06	3.40	1.500000151730	53.051140135351	23.2	19.853036349734
1992	48,311.30	0.98	4.10	1.399999976158	51.022256123765	23.3	20.333022789042
1991	43,655.10	0.99	5.70	2.700000217441	47.958870898655	23.3	19.296287743003
1990	38,613.00		5.90	2.209301193717	46.583409547417	23.4	19.095093110033
1989	33,204.00	0.77	5.30	1.387763739588	45.511343464516	23.7	18.913173237456
1988	28,256.00	0.74	3.90	3.040124036514	45.535454632006	23.5	19.036619106843
1987	23,911.00	0.80	2.40	5.773804699805	45.914225087391	23.4	19.167635387092
1986	21,157.00	0.77	1.90	3.500000000000	46.221483268825	23.2	19.117076441344
1985	20,141.00	0.72	2.40	3.700000148804	41.788189931722	25.0	18.849838013738
1984	19,287.00	0.72	0.80	4.779409015100	42.075851055228	24.7	14.884084232687
1983	18,404.00	1.31	3.70	2.900000000000	42.094079109000	24.4	19.131037408953
1982	17,012.00	0.92	5.10	2.532343699630	39.792502957363	25.8	18.481555527938

Table B2 Political Variables

Year	CON	DEF	IDT	GNA	ELEC
2010	9		67.72	4,214.70	0
2009	9		69.98	3,872.70	0
2008	9	-446,457.9	70.16	3,979.60	0
2007	9	-78,054.6	70.31	3,889.20	0
2006	9	-143,442.7	71.70	3,689.00	1
2005	9	-59,826.5	73.71	3,510.10	0
2004	9	-31,957.0	77.24	3,333.70	0
2003	9	-14,991.2	78.91	3,105.10	0
2002	9	-19,720.6	75.68	2,914.80	0
2001	9	-170,271.8	76.11	2,753.50	1
2000	9	-135,693.7	73.43	2,698.40	0
1999	9	-120,392.0	80.03	2,582.80	0
1998	6	-130,259.2	60.89	2,467.00	0
1997	6	-120,636.4	69.18	2,785.70	0
1996	6	-66,119.8	71.31	2,826.50	1
1995	6	72,931.2	74.39	2,665.10	1
1994	6	89,585.2	76.05	2,389.60	0
1993	6	40,663.6	73.30	2,181.80	0
1992	6	30,858.7	74.32	1,986.30	1
1991	6	52,339.2	73.78	1,829.10	0
1990	6	104,172.0	77.81	1,681.70	0
1989	6	79,397.3	78.06	1,473.30	0
1988	6	41,603.6	76.11	1,307.40	0
1987	6	5,381.9	78.58	1,148.50	1
1986	6	-31,768.6	75.69	1,028.90	0
1985	6	-48,505.2	74.90	963.90	0
1984	6	-51,931.4	75.68	920.80	0
1983	6	-38,570.4	75.91	868.10	0
1982	6	-33,933.5	78.93	820.60	0

BIOGRAPHY

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