

CHAPTER III

METHODOLOGY

The focus of this research is to analyze the policy implications of Thailand's social security regime as a developing nation, to investigate whether or not such a regime would be in the best interest of international trade, and source of growth for a country. The theoretical framework will suggest that the TSSO will act as a tool for capital accumulation, which can be used as investment capital into domestic markets and infrastructures. By setting aside personal savings through the TSSO as a wealth management fund for its members, it will be possible for human development, giving room for innovation and manufacturing capabilities, making Thailand more attractive for international trade and investment. With the current system in place, and economic condition of the country, interviewees will be asked a series of questions to understand their positions, and consideration for resolutions. Then a regression analysis will provide the empirical evidence necessary to prove the growth model presented in this chapter, that has been adopted and adapted from Barro's, in order to show the emphasis on Social Security to growth. This chapter will seek out patterns; investigate both normative and positive data, and data analysis to maintain the credibility of this research, from both an internal and external perspective

3.1. Research Instruments

3.1.1. Interview: Modified Morphological Approach (Internal Analysis)

Primary data will be collected by following similar guidelines to the morphological analysis. First the interviewer must address current problems that are associated with the system, or problems that they would like to address. By employing the knowledge of professionals in the areas of public law, public finance, economics,

political science, and social development will answer questions about regime design implementation and reforms. The interviewees act as counselors to their own specific field of interest (5 categories) and offer probable solutions or opinions to the problems they are able to address.

3.1.2. Quantitative Study: Econometric Formulation (External Analysis)

Secondary data will employ the collection of empirical evidence as economic indicators, and other calculations to set as a basis for a comparative study between Thailand and Singapore. Variables established are adapted from Barro to provide a model towards each country's growth patterns. The theoretical applicability of capital and labor accumulation will provide the evidence towards increased value in productivity at an international scale. First establishing the linkage between savings to the TSSO Budget, this will be used to prove the greater capability of capital accumulation and the need to fund it, followed by the use of the modified Barro model to show the growth potential in comparison to Singapore.

3.2. Procedure of Interviews and Quantitative Analysis

3.2.1. Modified Morphological Analysis

This model will be used to analyze the 5 different functional groups of public law, finance, political science, social development and economics. This will be applied to the problem of social security in Thailand, under the assumption that there is a problem with the operational direction to begin with. Interview questions conducted focus mainly on issues with the Thai scheme, creating a internal benchmark for the country.

In order to use this method, a few requirements must be met: Generalized Method

1. Problems that is non-quantifiable
2. Problems that contain genuine uncertainties

3. Problems that cannot be causally modeled or simulated
4. Problems that require judgmental approach

As part of this research's purpose, is to look at Thai society, and historical background which make up who the Thai people are. This, as previous studies have shown, is what social security regimes should reflect. The types and level of government assistance is reflected upon what the people expect of its elected representatives to give them. If it is a nation of individual workers, striving to make the best out of their lives, social assistance does not have to be extensive. However, a country with laborers who work together for the benefit of the whole, require such welfare befitting their needs.

Original Steps for Analysis:

- I. Describe the problem
- II. Analyze possible solution parameters
- III. Construct morphological box
- IV. Evaluate possible solutions
- V. Apply selected solution

Modified Steps for Analysis:

- I. Identify problems through scholarly literature to create interview questions
- II. Parameters based on answers by interviewees
- III. Construct a morph box that connect problems with answers to create a pattern of solutions
- IV. Evaluate applicability of patterns for solutions
- V. Recommendations for reforms

Now knowing the morphological analysis itself, this section will be used to analyze the policy implications of the current Social Security Office (SSO) of Thailand. There are five areas to be discussed, that serve as functional groups, solving problems in their own fashion. This requires each group to be bias in their own field of expertise. The duty of a morphological analysis is to combine the arguments and solutions of all

functional groups in order to achieve a single viable set of solutions. The original method of a morphological analysis requires extensive capabilities in programming and probability testing, which can yield over 2,000 possible answers to a 4 dimension morph box. Due to stringent capability constraints, a modified version will be applied to the steps of analysis in the form of individual interviews with specified question to gain opinion on each functional area.

3.2.2. Econometric Analysis: Modeling for Comparative Study

Within a regional (Southeast Asia) aspect of Thailand, it is decided that another country be chosen for a comparative study. First of all it needed to be a country with a mature enough social security system that has proven effective and provides universal coverage. Singapore was the most viable choice due to its history on education, development policy, and overall economic stance in the area. Although both countries differ in geographic and population size, that is not the purpose of this section. It is to monitor numerous variables that are to be later stated, to see the effects of economic policy and share of human concentration the country spends on. This section will employ variables originally used by Barro, whose study was to prove the linkages between education and economic growth, to monitor certain indicators of Thailand and Singapore. Some adaptation of the variables originally used, are required due to the attainability and accessibility of information.

With this model in mind, its applications on a developing nation should have positive results, according to a theoretical framework. Its requirements are an emphasis on the accumulation of human capabilities in order to achieve growth. According to the Solow growth model, short-term implications suggest that capital accumulations will only increase growth until it reaches a point of diminishing returns on capital, when the economy is no longer able to produce beyond that point. However in order to achieve long-run growth, concentration on human development to become more productive yields a higher and extended growth rates. But one cannot go with out the other as capital is required for investment, and labor to drive the production possibility of the country. As a

developing country, with 80% of the workforce deemed as undeveloped, unorganized, and structurally insignificant to the responsibilities of government, extensive reform and expansion of the current Thai regime should improve growth rates, develop the nation, and improve productivity on an international scale.

Model Outline: Steps of Analysis

1. Capital Accumulation (CA) is required where total Savings (derived from $Y = C + S + T$) will be used as a proxy for CA
2. The TSSO by definition is an institution for wealth redistribution and retirement fund, therefore it can be deemed as a function of capital accumulation. The TSSO Budget for the last 20 years, where prior to 1992 it had a different objective, nonetheless have been combined from the former to the latter into the TSSO, will be used to find a positive correlation between Savings and the Social Security Budget.
 - i. Correlation between Savings and Social Security Budget, it also has to have a positive connection to Total Gross Domestic Product. If there is a link, then the label of formal and informal labor should be dropped, which will increase CA capabilities.
3. After the above is established, the modified Barro's growth model, where $Dy = \text{Total GDP Percentage Change}$ has to be linked to CA, where variables used will include
 - i. GDP – Per Capita (GDP / Cap)
 - ii. Total Government Expenditures (Ttl GDP)
 - iii. International Openness (Intl Opn)
 - iv. Inflation Rate (Infl Rate)
 - v. Net Barter Terms of Trade (Nt Brt)
 - vi. Social Security and Welfare Budget (SSWB)
 - vii. Public Education Expenditures (Edu Exp)
 - viii. Public Health Expenditures (Hlth Exp)
 - ix. Other Government Expenditures (OtrExp)
 - x. National Social Development - Thailand (NSD)

- xi. National Development – Singapore (ND)
4. The modified Barro's growth model will also be used against Singapore to compare its numbers with Thailand

$$Dy = F(y, y^*)$$

Dy = Growth of Total GDP

Y = Inputs of Production

Y* = Effects of Government Policy

3.3. Selection of Functional Groups and Explanatory Variables

As part of the morphological analysis, it requires “functional groups” which are a combination of expertise in various fields, who are given a set of problems, and from their own view, how to solve those problems. This of course creates a number of possible solutions, some overlapping, while others may not have anything to do with each other. This method also requires a probability program to help analyze the various problems and solutions at the same time, to gain a solution that meets most of the functional group's solutions. For this study, however it is not possible to achieve such methods.

Therefore a modified version, based on interviews that are presented with current problems and concerns, provided by scholarly works, are set as the guidelines for the basis of this study in what it hopes to achieve. The main focus is on human development through the use of social security within a country.

Due to the nature of Barro's study, and the extent of his research, the use of his econometric model, and the variables required, this dissertation is unable to fully employ such a procedure. The paper “Education and economic growth” has two sets of independent variables, where one side is quantifiable, while the rest require a unquantifiable numeric method, which is the analysis of government policy. Empirical data can be easily collected and converted for analysis; however the latter requires

sources of information that is deemed unattainable because of available access to information, and financial constraints.

In this case a modified version has to be introduced, which follows the guidelines set out by Barro, but more concentrated on the actions of current government spending towards Thailand and Singapore's output capabilities. All of which are still monitored by the level of GDP – per capita.

3.3.1. Functional Group Selections

Starting off with the topic of social security, several fields of academic expertise began to present itself. First taking a glance on the side of economics, the concern here is the proper allocation of capital to achieve the optimal level of savings and investments. This presents itself as theory behind what is required of social security and its capabilities as a social institution. Next is political science, which looks at the actual structure and development of policy and structural institution. The concern here is the first of all, the institutions that are already existing in the country, and the effects that will occur when introducing a new policy that needs to be adapted to traditional and political norms of the country. Before structural design can be determined, existing laws need to be analyzed to ensure that such system is feasible within the boundaries of public law. In this area the law of the land has a final say in whether or not such a design is possible or not. When reforming current policy design, constraints will arise in the interpretation of law, either allowing for change or not. Social Development is the study of groups of people within a given set, or in this case a country. Classification is required to understand what the existing groups are and what their needs. Finance has the role of how Thailand's Social Security Office funds its regime. By evenly collecting taxes from government, employer and employee will show what the organization's capabilities and restraints are.

3.3.2. Interviewee Profiles

1. Public Law

Dr. Nantawat Boramanand

“Director of the Ph.D. Program”

Faculty of Law, Chulalongkorn University

Public law deals with laws that govern individual citizens with the state.

Constitutional law identifies specific capabilities of every individual and government entities as to their duties and responsibilities. Designation and legislation of law depends on the language used in it, either being specific or vague. Depending on the nature in the interpretation of law, Thailand legislate bills that are very specific. In the case of social security for Thailand, the law specifically states the organizational structure, power of authority, and membership responsibility and benefits. The social security act is very stringent in terms of allowance for change in future policies. The act however has been a turning point in welfare policy in Thailand, allowing for social security to be part of government responsibility, and not publicized by party politics.

2. Finance

Mr. Wuttichai Tankuranand

“Head of Corporate Finance, Corporate Finance”

True Move Company Limited

As part of the institutional structure of social security being a tool of the government, it needs to be well funded. In the case for Thailand, source of funds comes from three separate parties, all sharing a third of the cost. That is the government, employer, and employee. Government expenditures and taxes fall in the category of public finances. But the concern here is not the ability of the government to collect and spend taxes, but the burden of local firms and the effects that taxes impose on them. There is vast literature on an optimal tax rate, which this research will not go into, but does shine light on how tax rates should be determined. In the case for Thailand, the main concern is to collect taxes that will not diminish a firm’s willingness to invest. A country cannot depend on government expenditures as the main source of growth.

3. Political Science

Asst. Prof. Pisanu Sangiampongs, Ph.D.

“Faculty of Political Science, Chulalongkorn University”

Political science is the study of government, history, and institutional structures that make a country what it is, and how it reacts with other nations. Social security is a policy responsible by the state in order to ensure that its citizens will have the basic necessities to survive in its country's current livelihood. This is where the state provides welfare services such as medical care, public education, public housing, and employee security. Social welfare seen as proper governance and an extension of the state's role into the general public's lives. Opinions on the role of government depend on the structure of government, where in Thailand case is a constitutional monarchy.

4. Social Development

Ms. Thanomsri Kulvachira

“Director of Promotion and Technical Support Office of the Ministry of Social Development and Human Security”

In order to create a large institutional system such as social security, demographics are vital to understanding what is required of the state. Who the policy is designed to help, and if those who need help even exist. Sociologists use such information to determine existing groups within a country, as a means of classification for both social means and/or political. Within a country, labor reports show that, depending on regional location, occupation, age, and education attainment, determines which income group each individual belongs to. Naturally this creates a distorted wealth effect, where some are going to be better off than others. Social security is a socialist ideology, which has not always been accepted due to communist origins. But the facts cannot be denied that such programs are beneficial towards the development and support of those faced with financial, social and medical burdens. Identifying what the problems in society are, that could range from various types of disabilities, homelessness, and abandonment, is the responsibility of the state to look after these persons who do not have the means of supporting themselves.

5. Economics

Ms. Nawaporn Ryangsakul

“Former Secretary General of the Government Pension Fund of Thailand”

With economics, social security is a service provided by the state that a normal working free market economy would not provide on its own. Therefore an incentive needs to be initiated by the government in order to attain such services. This notion already goes beyond the role of government in economic text. This is where social security splits off from the usual micro and macro arguments, and extends itself into welfare and development economics. Relatively new field of analysis in economics, welfare concerns itself with the allocation and distribution of income and efficiency. Development economics applies to Thailand due to its continual status as a developing country, where this field studies the institutional, political, social, and economical aspects of a state to bring about rapid growth.

3.3.3 Questions Presented to Interviewees

At the beginning of each interview, a set of known facts will be presented to the interviewees for them to keep in mind, in order to maintain a certain framework for their answers. Such as:

- Thai workforce population of 35 million (13.6 million formal, 21.8 million informal)
- Low participation rate due to voluntary basis
- Tripartite funding regime (government, employer, and employee)
- Hospitals are contracted to accept social security members
- Workforce population is higher than retirement age population
- Extent of medical care services provided depends duration of membership

Questions:

1. From your perspective what is the definition of social security?
2. What do you think is the role of social security in Thailand?

3. Do you think that government is the best entity to judge what types of welfare should be provided?
4. What advantages and disadvantages do you think come from a government sponsored pension plan?
5. The Thai social security system is funded by a tripartite regime. Do you think social security taxes on firms restrain their ability to operate and expand?
6. Thailand divides its workforce into two categories. If the purpose of social security is to alleviate poverty and financial burden, does this mean Thailand is targeting the wrong group?
7. Do you think public services such as social security is adequate for Thai people?
8. Do you think Thailand as a developing nation should adopt “welfare state” philosophies like those in France and much of Western Europe?
9. Social security requires high government spending, do you think it’s worth it?
10. In order for the state to provide social security, taxes need to be levied. Do you think Thai people currently pay high or low tax rates for state provided services?
11. Do you think social security is a viable tool of the government to drive economic development and growth?

3.3.4. Econometric Analysis

As can be observed from above, this methodology has two steps to be completed. Since this research is about Thailand’s Social Security Office, an analysis of its policies and current practices, interviews were initiated of members in five different fields, all presented with a targeted set of questions. The questions were designed to address certain problems and concerns of past researchers. This will allow for internal insight into institutional policy and structure as viewed by Thais who represent not only different fields of expertise, but both public and private sector frame of references.

The second part of this research is to provide an empirical model intended as an external analysis of Thailand. Because Thailand is a developing country, it is viewed as a necessity for the state to initiate programs that will support the overall wellbeing of its

population. This means high government spending in sectors that are considered to be infantile or promote and support human development. Social security in Thailand is still subsidized and requires large amounts of state consumption in order for it to function. Singapore on the other hand has a regime that is supported by a wealth management fund, separate of governmental operations and budgeting. By observing government spending as a whole, the variables are focused towards social welfare, public health, and education. Budget allocation towards social welfare by comparison, will show the overall effectiveness of the TSSO in the country. The initial econometrics modeling was adopted upon variables used by Barro's study, but adapted due to the attainability of information, which required other variables to take its place. In addition, Total Government Expenditure is broken down into Public Health and Education, Social Security and Welfare Budget, and National Social Development (Thailand) and National Development (Singapore).

Table 1: Adoption and Adaptation of Variables

	Barro's Variables		Modified Variables
1	Per Capita GDP	1	GDP – Per Capita
2	Government Consumption	2	Total Government Expenditure s
3	The Rule of Law	3	Health Expenditures
4	International Openness	4	Education Expenditures
5	Inflation Rate	5	Social Security and Welfare Budget
6	Fertility Rate	6	National Social Development Expenditures
7	Investment Ratio	7	Other Government Expenditures
8	Terms of Trade	8	International Openness
		9	Inflation Rate
		10	Terms of Trade



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3.3.4.1. Econometric Models

Thailand - Model I:

$$\begin{aligned} \% \Delta \text{TotalGDP}_t = & \alpha_0 + \alpha_1 \text{LnGDP/Cap}_t + \alpha_2 \text{LnTtlGovExp}_t + \alpha_3 \text{IntlOpn}_t + \alpha_4 \text{InflRate}_t \\ & + \alpha_5 \text{NtBrt}_t + \varepsilon_t \end{aligned}$$

Singapore – Model I:

$$\begin{aligned} \% \Delta \text{TotalGDP}_t = & \alpha_0 + \alpha_1 \text{LnGDP/Cap}_t + \alpha_2 \text{LnTtlGovExp}_t + \alpha_3 \text{IntlOpn}_t + \alpha_4 \text{InflRate}_t \\ & + \alpha_5 \text{NtBrt}_t + \varepsilon_t \end{aligned}$$

Thailand - Model II:

$$\begin{aligned} \% \Delta \text{TotalGDP}_t = & \alpha_0 + \alpha_1 \text{LnGDP/Cap}_t + \alpha_2 \text{LnHlthExp}_t + \alpha_3 \text{LnHlthOtr}_t + \alpha_4 \text{IntlOpn}_t \\ & + \alpha_5 \text{InflRate}_t + \alpha_6 \text{NtBrt}_t + \varepsilon_t \end{aligned}$$

Singapore – Model II:

$$\begin{aligned} \% \Delta \text{TotalGDP}_t = & \alpha_0 + \alpha_1 \text{LnGDP/Cap}_t + \alpha_2 \text{LnHlthExp}_t + \alpha_3 \text{LnHlthOtr}_t + \alpha_4 \text{IntlOpn}_t \\ & + \alpha_5 \text{InflRate}_t + \alpha_6 \text{NtBrt}_t + \varepsilon_t \end{aligned}$$

Thailand - Model III:

$$\begin{aligned} \% \Delta \text{TotalGDP}_t = & \alpha_0 + \alpha_1 \text{LnGDP/Cap}_t + \alpha_2 \text{LnEduExp}_t + \alpha_3 \text{LnEdOtr}_t + \alpha_4 \text{IntlOpn}_t \\ & + \alpha_5 \text{InflRate}_t + \alpha_6 \text{NtBrt}_t + \varepsilon_t \end{aligned}$$

Singapore – Model III:

$$\begin{aligned} \% \Delta \text{TotalGDP}_t = & \alpha_0 + \alpha_1 \text{LnGDP/Cap}_t + \alpha_2 \text{LnEduExp}_t + \alpha_3 \text{LnEdOtr}_t + \alpha_4 \text{IntlOpn}_t \\ & + \alpha_5 \text{InflRate}_t + \alpha_6 \text{NtBrt}_t + \varepsilon_t \end{aligned}$$

Thailand – Model IV:

$$\begin{aligned} \% \Delta \text{TotalGDP}_t = & \alpha_0 + \alpha_1 \text{LnGDP/Cap}_t + \alpha_2 \text{LnSSWB}_t + \alpha_3 \text{LnSWOtr}_t + \alpha_4 \text{IntlOpn}_t \\ & + \alpha_5 \text{InflRate}_t + \alpha_6 \text{NtBrt}_t + \varepsilon_t \end{aligned}$$

Singapore – Model IV:

$$\begin{aligned} \% \Delta \text{TotalGDP}_t = & \alpha_0 + \alpha_1 \text{LnGDP/Cap}_t + \alpha_2 \text{LnNtnlDevl}_t + \alpha_3 \text{LnNDOtr}_t + \alpha_4 \text{IntlOpn}_t \\ & + \alpha_5 \text{InflRate}_t + \alpha_6 \text{NtBrt}_t + \varepsilon_t \end{aligned}$$

Thailand – Model V:

$$\begin{aligned} \% \Delta \text{TotalGDP}_t = & \alpha_0 + \alpha_1 \text{LnGDP/Cap}_t + \alpha_2 \text{LnNSD}_t + \alpha_3 \text{LnNSDOtr}_t + \alpha_4 \text{IntlOpn}_t \\ & + \alpha_5 \text{InflRate}_t + \alpha_6 \text{NtBrt}_t + \varepsilon_t \end{aligned}$$

Singapore – Model V:

$$\begin{aligned} \% \Delta \text{TotalGDP}_t = & \alpha_0 + \alpha_1 \text{LnGDP/Cap}_t + \alpha_2 \text{LnHlthExp}_t + \alpha_3 \text{LnEduExp}_t \\ & + \alpha_4 \text{LnNtnlDevl}_t + \alpha_5 \text{LnOtrExp}_t + \alpha_6 \text{IntlOpn}_t + \alpha_7 \text{InflRate}_t \\ & + \alpha_8 \text{NtBrt}_t + \varepsilon_t \end{aligned}$$

Thailand – Model VI:

$$\begin{aligned} \% \Delta \text{TotalGDP}_t = & \alpha_0 + \alpha_1 \text{LnGDP/Cap}_t + \alpha_2 \text{LnHlthExp}_t + \alpha_3 \text{LnEduExp}_t + \alpha_4 \text{LnSSWB}_t \\ & + \alpha_5 \text{LnNSD}_t + \alpha_6 \text{LnOtrExp}_t + \alpha_7 \text{IntlOpn}_t + \alpha_8 \text{InflRate}_t + \alpha_9 \text{NtBrt}_t + \varepsilon_t \end{aligned}$$

3.3.4.2 Explanations for Independent Variables

- GDP – Per Capita
 - Can be used as a proxy to measure the standard of living, and worker productivity
 - per capita however has been proven to show that the higher the level the more of a negative impact it has on growth
 - if people have higher wages, firms have gain lesser profits, and incentive for operations
- Total Government Expenditure
 - Governments, especially in developing nations have the tendency to have high spending due to fiscal policies that require it to constantly intervene in markets because financial and economic infrastructures are not yet mature enough sustain itself

- High spending can lead to a certain amount of growth, whether or not sustainable depends on market conditions of the time
- International Openness
 - Ratio of imports plus exports to GDP
 - This variable will be used to analyze government policy towards trade, whether or not, compared to GDP, if there are barriers to trade that hinders imports and exports
- Inflation Rate
 - This shows the growth of money and its effects on growth
 - Due to the size of the economy and overall functions of government policy, will show an optimal rate of inflation that will either hinder or cause growth
- Net Barter (Terms of Trade)
 - The price of export versus the price of import will show the value of goods entering and exiting the country, which can also show the level of produced goods, where volume is held constant
 - This variable can show improvements in factors of employment or productivity of the labor force over time, however it has been debatable over its ability to monitor social welfare
- Public Health Expenditure
 - The amount of government expenditures allocated towards public health would show the level of medical spending towards the population over a 20 year time period
 - This variable also includes medical and technological research expenditures, which can reflect advances in knowledge and capabilities
- Public Education Expenditure
 - Government consumption of public education, reflects upon the technical capabilities of the population in terms of production and livelihood
 - High spending on this variable does not necessarily mean greater quality of graduates
- Social Security and Welfare Budget

- The TSSO only came into effect after 1991, and with a 20 year time frame for analysis, the first 6 years shows expenditures for the Workmen's Compensation Fund (WCF), which was used for Labor Protection Laws, where in 1992 onward the WCF was included with a social security fund creating the TSSO
- This variable is used to show the financial capabilities of the funds itself on growth
- National Social Development - Thailand
 - This variable consist of two types of expenditures
 - 1986-1991: Community Service; Other Social Services
 - 1992-2006: Housing and Community Amneity Affairs and Services; Religious and Recreational Affairs and Services
 - The two time frames stated above reflects the change in the “Budget in Brief: Thailand” method of categorization
 - National Social Development was used to combine development initiatives that are a permanent expenditure of the Thai government’s budget
- National Development – Singapore
 - Singapore has, what it calls the Ministry of National Development
 - This ministry is responsible for the creation and development of community infrastructure, technological and social assistance for the advancement of its people and Singapore as a whole
- Other Expenditures
 - This variable is used to describe all other government expenditures that were not categorized in the individual expenditure variables
 - It can be referred to as a non-contributory variable, that is not part of output growth of an economy affected by the amount consumed by government operations
 - Since each model represents a specific expenditure variable, total government expenditure less the expenditure variable is the result of each model’s “other expenditures” then converted into natural log

- However it may be wrong because other expenditures such as communications and transportation add to the economic wholeness of a country, and its ability to increase international trade, but it is also beyond the scope of this study, where expenditures that directly affect human development were used to reflect government policy

3.3.4.3 Data Sources and Descriptions

In this paper annual data collected are available from 1986 to 2006 for Thailand. For Singapore, annual data only ranges from 1990 to 2006 due to collectable information. The variables used, values, and sources are presented in the table below.

Table 2: Description and Sources of Variables

Variables	Definition	Unit	Sources
GDP/Cap	Gross Domestic Product Per Capita	Nominal Value	CEIC Database
TtlGovExp	Total Government Expenditure	Nominal Value	BBT
IntlOpn	International Openness - Ratio of Export plus Imports to GDP	Index	UN Database
InflRate	Inflation Rate - Percentage Change of Consumer Price Index	Index	CEIC Database
NtBrt	Net Barter - Export vs. Import Prices Volume Held Constant	Index	World Perspective
HlthExp	Public Health Expenditures	Nominal Value	BBT
EduExp	Public Education Expenditures	Nominal Value	BBT
SSWB	Social Security and Welfare Budget	Nominal Value	BBT
NSD	National Social Development - Thailand	Nominal Value	BBT
ND	National Development - Singapore	Nominal Value	CEIC Database
OtrExp	Other Expenditures – Government Consumption	Nominal Value	Author's Calculations

Some of these variables need to be transformed because the literature requires Per Capita values, which need to be reflected upon all expenditure variables to reflect consumption on the entire population, respective annually. Because International Openness, Inflation Rate, and Net Barter are calculated in the form of rates, the rest of the

data for expenditures need to be converted using Natural Log to make the data sets more manageable with running a regression analysis. Therefore the necessary transformations are required:

$$\text{LN}(\text{TtlGovExp}/\text{PopMn}) = (\text{Total Government Expenditure} / \text{Total Population})$$

$$\text{LN}(\text{HlthExp}/\text{PopMn}) = (\text{Public Health Expenditure} / \text{Total Population})$$

$$\text{LN}(\text{EduExp}/\text{PopMn}) = (\text{Public Education Expenditure} / \text{Total Population})$$

$$\text{LN}(\text{SSWB}/\text{PopMn}) = (\text{Social Security and Welfare Budget} / \text{Total Population})$$

$$\text{LN}(\text{NSD}/\text{PopMn}) = (\text{National Social Development} / \text{Total Population})$$

$$\text{LN}(\text{ND}/\text{PopMn}) = (\text{National Development} / \text{Total Population})$$

$$\text{LN}(\text{OtrExp}/\text{PopMn}) = (\text{Other State Expenditures} / \text{Total Population})$$

$\text{LN}(\text{OtrExp}/\text{PopMn})$ is further calculated to reflect each expenditure variable that is minus total government expenditure, which can be found in Appendix C. Now that everything is read to be included in the model, all variables are summed up in the table below.

Table 3: Definition and Sources of Variables

Variables	Definition	Sources
LnGDP/Cap	Gross Domestic Product Per Capita	CEIC Database
LnTtlGovExp	Natural Log of Total Government Expenditure per person	Author's Calculations
IntlOpn	International Openness - Ratio of Export plus Imports to GDP	UN Database
InflRate	Inflation Rate - Percentage Change of Consumer Price Index	CEIC Database
NtBrt	Net Barter - Export vs. Import Prices Volume Held Constant	World Perspective
LnHlthExp	Natural Log of Public Health Expenditures per person	Author's Calculations
LnEduExp	Natural Log of Public Education Expenditures per person	Author's Calculations
LnSSWB	Natural Log of Social Security and Welfare Budget	Author's Calculations
LnNSD	Natural Log of National Social Development per person - Thailand	Author's Calculations
LnND	Natural Log of National Development per person - Singapore	Author's Calculations
LnOtrExp	Natural Log of Other Expenditures per person	Author's Calculations

3.4. Relationships of Internal and External Studies

The growth model designed by Barro, and then modified by myself only explains specific variables of economic indicators in Thailand and Singapore. By only proving the theoretical and mathematical side of the regression analysis, it does not address policy implications, or regime design on the country. Level and coverage of Social Security depends on social and economical development of the country and its people. Some require extensive programs, while others require only minimal. The morphological analysis is used to study this part, to determine, at current levels, whether or not the Thailand Social Security Office is an adequate institution to support capital and human accumulation presented by the theoretical side of this study by asking the biased opinions of those interviewed in their own fields of expertise. Combination of those thoughts will show if the TSSO is where it should be, or the need for change in order to reflect the growth model studied from Lucas and Barro.

The morph topics reflect questions that are asked of the interviewees, where from their answers, the analysis would show whether or not, for Thailand, does Social Security leads toward growth. The econometric model, which is used on both Thailand and Singapore with similar as possible variables, is to first show that government policies such as Social Security will lead to growth. This also depends on the extent of government expenditures, and the dependency of the country's growth on it.