A STUDY ON THE IMPACTS OF THE PROPERTY MARKET
AND THE FINANCIAL SECTOR ON
THE THAI ECONOMY

Piamchan Doungmanee

A Dissertation Submitted in Partial

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ABSTRACT

Title of Dissertation	A Study on the Impacts of the Property Market and the Financial Sector on the Thai Economy
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Even though the property and financial sectors do not occupy the highest proportion of the Gross Domestic Product (GDP), the difficulties that emerge from these sectors could lead to the most severe impacts on the entire Thai economy. This study thereby aims to analyse the impacts of the property market and the financial sector on the Thai economy, as well as to evaluate the impacts of government policy—the Thai Kem Keng program—on these sectors. The three models, including the Input-Output model, the Social Accounting Matrix (SAM) model, and the Financial SAM model, are adopted in the analysis to measure such linkages and impacts. The database used in the study is the 2004 SAM and 2004 Financial SAM for Thailand.

The study shows that collateral—a durable asset used to guarantee a loan—is a very important factor that creates a nexus between the property market and the financial sector, especially the commercial banking sector, which this study focused on, and the problems in these sectors, thereby spreading to the entire economy. The construction sector in Thailand has very strong pull effects (backward linkage effects), while the real estate sector shows stronger push effects (forward linkage effects) than pull effects (backward linkage effects). The commercial banking sector also plays a very important role in the Thai economy, as evidenced by its highest direct push effect. The degree of dependency of the property sector on the commercial banking sector is much larger than the reverse. The results of the study imply that crises in the property sector lead to banking crises, and finally economic crises.

In addition, the paper finds that the economic impacts of the construction sector, the real estate sector, and the commercial banking sector that are computed by the Financial SAM model are 25%, 27%, and 20% higher than those computed by the SAM model, respectively, because the Financial SAM includes the induced effects of the financial side. Therefore, without using the Financial SAM, the result could mislead the interpretation of the degree impacts of these sectors on the overall economy.

Currently, the Thai government is implementing the Thai Kem Keng Program, a 3-year 1.56 trillion Baht program, which focuses mainly on spurring the economy. The program allocates 73%, the highest share of all sectors, of its budget to the property industry. The effectiveness of the policy can be reflected in the increase in economic growth and good distribution of household income. The study finds that the average GDP growth, caused by the Thai Kem Keng policy and computed by the Financial SAM model, is 2.8% greater than the that computed by the SAM model. The lowest income group receives the greatest benefits from government investment. The result shows that their income increase computed by the Financial SAM model is 13.5% greater than that from the SAM model. Although the commercial banking sector does not receive direct financial support from the Thai Kem Keng Program, the sector is also benefitted. This depicts the interdependence between the commercial banking sector and other sectors.

It can be concluded that the result processed by the Financial SAM model shows a greater impact than the conventional SAM model. Therefore, without using the Financial SAM model, the result indicates a lower degree of impact of the property and commercial banking sectors on the entire Thai economy. The contribution of this study consists in that fact that using the Financial SAM model will help in the accurate analysis and measurement of the problems that emerge from the linkage between the property and commercial banking sectors, and spread over the entire Thai economy, better than the traditional SAM model.

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ABBREVIATIONS

Abbreviations	Equivalence
BIBF	Bangkok International Banking Facilities
BOT	Bank of Thailand
BTS	Bangkok Mass Transit System
GDP	Gross Domestic Product
CGE	General Equilibrium Model
FCGE	Financial General Equilibrium Model
Financial SAM	Financial Social Accounting Metric
GH Bank	Government Housing Bank
IO	The Input-Output Analysis
NESDB	National Economic and Social Development Board
M&R	Maintenance and Repair
MRT	Mass Rapid Transit
NPL	Non-Performing Loans
NHA	National Housing Authority of Thailand
NSO	National Statistic Office of Thailand
OECD	Organisation for Economic Co-operation and Development
REIC	Real Estate Information Center
ROW	Rest of the World
SAM	Social Accounting Metric
SES	Socio-Economic Survey
SET	Stock Exchange of Thailand
TDRI	Thailand Development Research Institute
TKK	Thai Kem Keng Scheme

UNCTAD	United Nations Conference on Trade and Development
UK	United Kingdom
US	United States of America
UNSNA	United Nation System of National Accounts

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

In general, the property industry and financial sector are significant factors that provide both a positive and negative impact on the entire economy. There is much evidence stating that these sectors encourage economic recession in many countries. For example, the monetary policy of lowering the interest rate was a cause of a boom in the U.S. residential market during the economic recession in 2002-2003 (Hofe, 2007: 70). Investment in a mega project during Thailand's financial crisis in 1997 also stimulated the housing market. There is also a lot of evidence supporting the idea that the problems that occur in the property and financial sectors, especially the banking industry, cause severe impacts on the economy. An example of this occurrence can be seen in the amount of world economic turmoil, for example, the Great Depression of the 1930s (Walter, 2005: 44), the 1973 UK economic recession (Buckle, Buckle and Thompson, 2004: 334; Panagopoulos and Vlamis, 2008: 15), the 1980s Japanese financial crisis (Allen and Gale, 2000: 236, Shiratsuka, 2005: 50), the 1991-1993 Scandinavian banking crisis (Englund, 1999: 80; Allen and Gale, 2000: 237), the 1997 Asian Financial Crisis (Quigley, 1999: 4), the 1998 Latin American financial crisis (Jara, Moreno and Tovar, 2009: 54), and the 2007 U.S. subprime mortgage crisis (Bianco, 2008: 3; Jaffee, 2003: 2).

This dramatic impact on the economy was the inspiration for this research. The study will focus mainly on the linkage between the property market and the financial sector, and their impacts on the Thai economy. The property industry and the financial sector have a high degree of significance for the entire Thai economy. The property industry is ranked in 5th place in the GDP (National Economic and Social Development Board (NESDB), 2010). The industry occupies 5 percent of the national income, decreasing from 11 percent before the 1997 Asian Crisis. In addition, the

sector creates large employment, ranking in 4th place with a proportion of 8 percent of the total employment (National Statistic Office of Thailand (NSO), 2010: 2). The commercial banking sector has a 70 to 80 percent share of the GDP (Bank of Thailand (BOT), 2009). In addition, property loans, the key link between the two sectors, are ranked in 3rd place with a 19 percent share of total commercial bank loans (BOT), 2009). Although these sectors do not occupy the highest share in the GDP, the problems in these sectors create a severe impact on the entire Thai economy, and Thailand faces both negative and positive impacts from these sectors. For example, the 1997 Asian Financial Crisis was caused by an oversupply in the housing market that spilled over into the financial market, leading to economic collapse. In addition, the Thai government sees these sectors as a stimulation for the economy during a recession period and has implemented tax incentive policies (expired in 2010) for the property market to boost the industry. At present, the government has implemented the Thai Kem Keng Scheme and has allocated 73 percent of its budget to the property sector (Ministry of Finance, 2010). Moreover, the BOT has helped in stimulating the economy by decreasing its interest rate policy. The relationship among the property sector, the banking sector, and the entire economy has already been extensively studied. Many studies have addressed the relation of the property sector with the banking sector, for example, a study by Gerlach and Peng, 2003: 1-21, which uses the co-integrating VAR model, and a study by Hofmann (2003:12-56) uses the Error-Correction Models (ECMs). Some studies, on the other hand, indicate that the problems that emerge from the banking sector also lead to problems in the property industry. This is evident in a study by Collyns and Senhadji (2002:1-32) and a study by Mora (2008: 57-87). In addition to the study of the linkage of the property and banking sectors, and its impact on the economy, some literature has also focused on the following impacts: 1) the property sector on the economy as a whole, for example, in the study by Kofoworola and Gheewala (2008: 1222-1247) using the Input-Output model, and the study of Wu and Zhang (2005: 178-230), using the Input-Output model; or 2) the impact of the banking sector on the economy as a whole, for example, the study by Mathinee Subhaswasdikul and Don Nakornthab (2002: 42).

As the existing studies do not provide a complete picture of the relationship between the property and commercial banking sectors, and their impact on the Thai

economy, this paper aims to be a pioneer in an analysis focused on both the property and commercial banking sectors, and their impact on the Thai economy. No literature has ever studied the interaction between the property market and the banks for the entire economy of Thailand by using the SAM model. Moreover, this study uses the financial SAM model, which has never been used in other papers, adopted to analyze both real and financial perspectives. The paper is therefore a pioneer in using the SAM model and the Financial SAM model to analyze such kinds of linkages.

1.2 Research Problems

According to the information mentioned above, there are two interesting research problems in this study.

1) Although the property and banking sectors do not occupy the highest proportion of the GDP, problems have arisen in these sectors resulting in the worst impacts on the entire Thai economy.

2) Many times in the past when Thailand faced an economic recession, the property sector was used as a leading sector in stimulating the economy in order to determine if the property sector was an effective tool in this regard. The effectiveness of the Thai Kem Keng Program 2 is thereby investigated.

1.3 Research Questions

The linkage between the property and commercial banking sectors is the significant factor that contributes to large impacts on the Thai economy. The problems in the property and commercial banking sectors contribute to the difficulty in the Thai economy. There is evidence that many economic downturns in Thailand have been rooted in the problems in these sectors, such as the Thai economic difficulty in 1992 and the economic collapse in 1997.

Presently, the Thai government has implemented Stimulus Plan II, called Thai Kem Keng Scheme 2, to alleviate the economic difficulties that emerged from the 2008 global economic crisis. The Thai Kem Keng Program 2, a 3-year project with a budget of 1.56 trillion Baht—allocates its highest share of 73% to the public works

sector, a subsector of the property sector. The impact of the Thai Kem Keng policy on the Thai economy is evaluated by using two models: the SAM and Financial SAM models.

Because of these events, the following questions emerge.

1. How can the relationship between the property and banking sectors cause the most severe impact on the entire Thai economy, although neither of them has the highest share in the GDP?

2. How effective is the program for both sectors and for the entire economy? And between the SAM and Financial SAM models, which model is more efficient?

1.4 Objectives

The paper has two objectives, as follows:

1. To study the linkages among the property sector, the commercial banking sector, and their impacts on the entire economy by using the Input-Output model, the SAM model, and the Financial SAM model

2. To study the impact of government policy—the Thai Kem Keng Scheme—on the Thai economy by using the SAM and Financial SAM models by comparing the two models

1.5 Methodology

In order to analyze and measure the linkages among the property market, the banking sector, and their impacts on the entire economy, 3 models have been adopted: the Input-Output model, the SAM model, and the Financial SAM model. Although the first two models have been adopted in many existing studies, no previous study has used these two models to analyze the commercial banking sector. In order to fill this gap, this paper employs these two models in analyzing the relationships between the commercial banking sector and the Thai economy and the linkages between the property and the commercial banking sectors, and their impacts on Thai economy. In addition, this study is a pioneer in using Financial SAM because no research has ever applied the Financial SAM model in analyzing both the property and commercial bank

sectors, and their impacts on the Thai economy. The Financial SAM model was extended from the SAM model by integrating the financial components because of the limitation of the SAM, which hinders the integration of the financial components in analyzing such relationships.

In order to study the impacts of the Thai Kem Keng policy, which allocates its major share to the public works sector, the SAM and Financial SAM models were employed. The study also compares of the impacts of the policy on the Thai economy, computed by these two models.

1. Data

The data used in the paper consist of the 2004 Social Accounting Matrix for Thailand (hereafter 2004 SAM) and the 2004 Financial Social Accounting Matrix for Thailand (hereafter 2004 Financial SAM). The details of these data are explained in Chapter 4. The former was constructed by David Roland-Holst (2009) in collecting data from various sources, such as the 2000 Input-Output Table. The latter was constructed by extending the 2004 SAM with the Flow of Funds Table from the Bank of Thailand (BOT) in the same year.

In order to analyze and measure the linkages among the property market, the banking sector, and their impacts on the entire economy, the original 180 sectors of the 2004 SAM Table and the 2004 Financial SAM Table are grouped according to 3 analysis types: aggregate, disaggregate type 1, and disaggregate type 2 into 9 sectors, 10 sectors, and 12 sectors, respectively. Table 1.1 demonstrates the aggregate analysis, that the property sector is the combination of the construction and real estate sectors. The commercial banks sector is separated from the banking service sector, which is sector 6 in the table, as follows.

Table 1.1 Classification of the 9 Industries (Construction and Real Estate are grouped together as the Property Sector-Aggregate Level)

	Sector (Study)	180 Sectors (2004 SAM/FSAM)
1	Agriculture	1-29
2	Light Industry	42-83
3	Heavy Industry	32-41,84-92,95-134

Table 1.1 (Continued)

	Sector (Study)	180 Sectors (2004 SAM/FSAM)
4	Energy	30-31,93-94,135-137
5	Property	138-144,163
6	Commercial Banks	160
7	Other Financial Institutions	160-162
8	Private Service	145-159,164,170-178
9	Public Service	165-169

Source: Adapted from NESDB, 2010

Table 1.2 demonstrates disaggregate level type 1, which consists of 10 sectors, in which the property sector is divided into the construction and real estate sectors, and the commercial banks sector is sector 7 in the table, as follows.

Table 1.2 Classification of the 10 Industries (Property Sector divided into
Construction and Real Estate, according to Disaggregate Level Type 1)

	Sector (Study)	180 Sectors (2004 SAM/FSAM)
1	Agriculture	1-29
2	Light Industry	42-83
3	Heavy Industry	32-41,84-92,95-134
4	Energy	30-31,93-94,135-137
5	Construction	138-144
6	Real Estate	163
7	Commercial Banks	160
8	Other Financial Institutions	160-162
9	Private Service	145-159,164,170-178
10	Public Service	165-169

Source: Adapted from NESDB, 2010.

Table 1.3 demonstrates disaggregate level type 1, which consists of 12 sectors, in which the property sector is divided into the residential building, non-residential building, public works, and the real estate sectors in sector 5 to 6, and the commercial banks sector is sector 9 in the table, as follows.

Table 1.3 Classification of the 12 Industries (Property Sector divided into Residential Building, Non-Residential Building, Public Works, and Real Estate, According to Disaggregate Level Type 2)

	Sector (Study)	180 Sectors (2004 SAM/FSAM)
1	Agriculture	1-29
2	Light Industry	42-83
3	Heavy Industry	32-41,84-92,95-134
4	Energy	30-31,93-94,135-137
5	Residential Building	138
6	Non-Residential Building	139
7	Public Works	140-144
8	Real Estate	163
9	Commercial Banks	160
10	Other Financial Institutions	160-162
11	Private Service	145-159,164,170-178
12	Public Service	165-169

Source: Adapted from NESDB, 2010.

In this study, there were two factors of production (labor and capital) and six economic agents: (i) households, (ii) firms, (iii) government, (iv) commercial banks, (v) the Bank of Thailand (BOT), and (vi) the rest of the world (ROW). The financial components consist of financial institutions: commercial banks, the BOT, and financial assets/liabilities: (i) currencies, (ii) deposits, (iii) government bonds, (iv) loans, (v) capital requirements, (vi) foreign loans, and (vii) other assets and liabilities.

2. Scenario

This study examines the impacts of the Fiscal policy—the Thai Kem Keng Project—a 3-year, 1.56-trillion-baht program, launched by the Thai government to spur the Thai economy. There are 3 scenarios discussed in the study: a base year scenario, policy simulation by using the SAM model, and policy simulation by using the Financial SAM model.

1.6 Scope

The study is analyzed at 3 levels: aggregate, disaggregate type 1, and disaggregate type 2. The study focuses on the property and commercial banking sectors. The property sector is analyzed according to 3 levels into: (i) the combination of the construction and real estate sector in the aggregate analysis, (ii) the property sector divided into the construction and real estate sectors in disaggregate type 1, and (ii) the property sector divided into the residential building, non-residential building, public works, and real estate sectors in disaggregate type 2.

This study focuses mainly on commercial banks because they occupy a major share in the financial market and represent a major funding source for the Thai economy. The commercial banking sector was separated from other types of banking service in the banking service sector (160). According to a NESDB official publication, the commercial banks occupy around a 60 percent share of the total output in the banking service sector (160), while the remaining 40 percent belong to other types of banking service. Therefore, only the commercial banking sector is in sector 160, while the remaining 40 percent is moved to the other financial institutions in sector 161. In this study, the commercial banking sector is sector 6 in Table 1.1, sector 7 in Table 1.2, and sector 9 in Table 1.3.

1.7 Limitations

The study uses the 2004 SAM as a database. The data were collected from various sources, i.e. the Input Output Table in 2000 and the Flow of Funds in 2004. This information was collected during the period of the economic the crisis, so it

unlikely reflects an up-to-date picture of the current economic situation, which has already recovered. In addition, only commercial banks in the financial industry are analysed because they are required to hold reserves at the BOT.

1.8 Organization

The study is organized according to six chapters. Chapter I is the introduction, and Chapter II presents the literature review. Chapter III describes the property sector, the banking sector, and the entire Thai economy. Chapter IV presents the SAM and Financial SAM for the Thai economy. Chapter V discusses the analyses of the Input-Output model, the SAM model, and the Financial SAM model, which are related to the property and banking sectors, including the results of the policy simulation by using the SAM model and the Financial SAM model. Chapter VI provides the conclusion, the policy implications, and suggestions for further study.

1.9 Contribution

The paper investigates the linkages among the property market, the commercial banking sector, and the entire economy by using the Input-Output, SAM, and Financial SAM models. The study includes the discussion of four topics that have not been addressed in prior studies. The first one is the analysis of the commercial banking sector by using the Input-output model, showing the impact of the commercial banking sector on the entire economy. Second, the study also includes the linkage between the commercial banking sector and the property market, and its impact on the entire economy. Next, the Financial SAM model was employed for the first time in this study in order to investigate this linkage. Finally, the conventional SAM model and the Financial SAM model were also used in the analysis of the effectiveness of government policy—the Thai Kem Keng policy—which emphasizes the property sector with the purpose of stimulating the economy. Both models provide different results regarding the impacts of the Thai Kem Keng policy on the economy. The results that were not able to be provided in the SAM model are shown in the Financial SAM model, thus representing the contribution of this study.

The paper will be of great benefit to policy makers, as it will enable them to understand the development of the property market and the factors linking this to the banking sector. The paper will also enhance the policy makers' understanding of the problems between the two sectors, which could spill over into the entire economy. Policy makers will thus be able to set up more effective policies to protect both sectors, thereby preventing a future economic crisis that could emerge from the both the property and commercial banking sectors.

CHAPTER 2

LITERATURE REVIEW

In the past, there were large numbers of economic crises worldwide, such as the Florida speculative building bubble (1926), the UK economic recession (1973), the Scandinavian Crisis (1980-1990), the Japanese asset price bubble (1980s), the Mexican Crisis (1990), the Savings and Loan Crisis (1990), the Asian Financial Crisis (1997), the Latin American Crisis (1999), and the recent U.S. Subprime Mortgage Crisis (2008), which originated from the property and banking sectors and then later spilled over to the entire economy. Very few economic crises occurred because of other causes, i.e. Dutch Tulip Mania (1637), The South Sea bubble (1720), the Mississippi bubble (1720), and the Dot-com bubble (2000). These economic crises were an inspiration for studying the linkages among the property sector, the banking sector, and their impacts on the economy.

There is a large amount of existing literature on the area of economic crisis, including problems in the property and banking sectors. Perusing this literature, this study has found two important issues that will be reviewed in the study: the linkages among the property sector, the banking sector, and their impacts on the entire economy and the factors that were the channel causing these problems.

2.1 Linkages among the Property Sector, the Banking Sector, and Their Impacts on the Entire Economy

In light of the existing literature, the linkages among the property sector, the banking sector, and the entire economy have already been extensively studied. However, there has been no consensus on this issue. Many studies address the notion that the problems in the property sector influence the banking sector. Some studies, however, show that the results are the opposite. Moreover, some literature also focuses

on the impact of (i) the property sector on the economy as a whole or (ii) the impact of the banking sector on the economy as a whole.

Numbers of studies have also suggested that the direction of the relationship is from the property sector to the banking sector. For example, a study by Gerlach and Peng (2003: 1-21) found that the crisis in the Hong Kong property market did create difficulties in the banking sector. The crisis in the property market, however, did not cause a severe impact on the banking sector because of its strict regulations and risk control measures, which were issued during that specific period of time. These regulations and measures limit the fluctuation in the sector using the vector autoregression (VAR) model. Hofmann (2003:12-56) also confirmed that the property market influences the banking sector. He analyzed the patterns of dynamic interaction between bank lending and property prices, based on samples of 20 industrialized countries, by using Error-Correction Models (ECMs). The results showed that the fluctuation in property prices, which stimulated the crisis in the loan banking industry, was the main cause of the economic crisis rather than excessive bank lending. Herring and Wachter (2002; 3) suggested that decreasing property prices will decrease a bank's capital directly by reducing the value of the bank's own property assets, and this will reduce the supply of credit to the property sector. Davis and Zhu (2005: 1-37) examined the area of the determination of commercial property prices and the interaction between those prices and bank lending in 17 developed countries. They found different results based on different factors of each country. Zhang and Sun (2006: 57-74) studied three factors in the real estate sector in China, including economic growth, macroeconomic environment, and institutional establishment, by using an econometric model. Their research states that the problems with real estate sector loans, government guarantees, and a maturity mismatch of bank loans led to a negative impact on the stability of the financial sector.

Some studies, on the other hand, have shown that problems in the banking sector cause problems in the property industry. For example, a study by Collyns and Senhadji (2002:1-32) examines a panel of 8 countries in East Asia and showed that excessive bank lending, especially in the property sector, leads to excessive asset price inflation. Similarly, a study by Mora (2008: 57-87) indicated that bank credit fuels asset prices in Japan. The Japanese government changed its financial regulations,

resulting in manufacturing firms finding new sources of funds that provide lower costs. Therefore, the banks had an excess supply of loans as manufacturing firms did not use bank loans as the main source of funds as before. The banks then heavily increased lending in the real estate sector, thereby resulting in an increase in property prices, and finally Japan property prices bubbled. This excessive lending also has caused numbers of nonperforming loans, and lastly economic turmoil. A study by Liang (2007: 1-45) addresses the relationship between property prices and bank lending in the long run; in addition they evaluate the causality among property prices, bank lending, GDP, and interest rates in China using the autoregressive distributed lag (ARDL) approach and the research found that in the long run, the relationship between the property sector and commercial banks was from income, bank lending, and interest rates to property prices.

There are several researches that have investigated the impact of the property sector on the entire economy. The study by Kofoworola and Gheewala (2008: 1222-1247), for example, using the Input-Output Model to examine the role of the construction sector in other sectors in Thailand, found that the construction sector has strong pull effects and weak push effects. In other words, the construction industry is a major contributor to economic growth. Wu and Zhang (2005: 178-230) focused on the analysis of the Chinese construction sector and how it links to the other sectors. In addition, they calculated the sector's pull and push effects on the entire Chinese economy. The results showed that the pull effect has a much more influence on the economy than the push effect. Furthermore, the results from the Input-Output model showed that the both effects grew steadily during the study period of 10 years.

Several researches have addressed the idea of the impact of the banking sector on the entire economy. A study by Mathinee Subhaswasdikul and Don Nakornthab (2002: 42), for example, found that the cutback in bank lending due to the tightening of the monetary policy during the 1997 Asian Financial Crisis resulted in a decrease in investment and aggregated activities in Thailand.

It can be found that much existing literature focused only on the property side or the commercial banking side, so their studies do not provide a total idea of the linkages of the property and commercial banking sector that cause impacts on the

economy. Therefore, this paper focuses on both the property and commercial banking sector and their impacts on the Thai economy.

Studying the relationships of the sectors and their impact requires various approaches and methodologies, for example, use of the Econometric Model (e.g. Herring and Wachter, 2002: 1-15; Gerlach and Peng, 2003: 1-21; Davis and Zhu, 2005: 1-37; Mora, 2008: 57-87), the Input-Output Model (e.g. Liu and Song, 2004: 487-507; Wu and Zhang, 2005: 905–912; Kofoworola and Gheewala, 2008: 1222-1247), the SAM Model (e.g. TDRI, 2004), and the CGE Model (e.g. TDRI, 2004; Hofe, 2007: 69-91). However, there are some weak points in the models mentioned above. Some studies for example have failed to show the impacts of their linkages on the whole economy because the examinations did not cover the entire sectors. Others did not include financial sides in their researches. Therefore, this study has attempted to correct these weaknesses. The financial SAM model, which has never been used in analyzing this kind of relationship, has been adopted to analyze both the real and financial perspectives. The paper is therefore a pioneer in using the financial SAM model to analyze such kind of linkages. Therefore, 3 models, the Input-Output, SAM, and financial SAM models have been adopted in the study.

2.2 Factors that are a Channel for Causing the Problems

The study has found that the following factors create problems in the property sector, the banking sector, and in the entire economy, leading to a crisis consisting of collateral, bank lending, bank balance sheets, household consumption, pull and push effects, employment, and governments policies.

2.2.1 Collateral

Collateral has been explored as an important factor that links the property sector, commercial banking. Property or a durable asset such as land and buildings is used to guarantee a loan that borrowers promise to pay to lenders in case that they cannot pay their debt, their collateral is going to belong to the lenders. Entrepreneurs use their property or their ongoing projects as collateral to guarantee their credit to acquire financial assistance from banks. It can be implied that property prices

influence bank lending. That is, the fluctuation of collateral affects credit because the value of the collateral decreases when property prices fall, resulting in the reduction of credit available to entrepreneurs. As a result, entrepreneurs find it difficult to obtain loans from banks, resulting in lack of liquidity, and finally they decrease their investments. Firms then abandon their ongoing projects, leading to loan defaults or a number of non-performing loans in the banking sector, resulting in an economic crisis. The above evidence was supported by the study of Kiyotaki and Moore (1997: 212). They stated that collateral creates a crucial nexus between the property and banking sectors with a strong positive relationship. That means that the value of collateral rises when property prices rise, and fall when asset prices fall. They illustrated that some firms that heavily rely on collateral to acquire loans face more severe impacts from an economic downturn than those that rely less on collateral. The firms tend to default when the property prices decrease more than their actual collateral value, meaning that the property has less value and they have less power to obtain more loans; therefore they are unable to borrow more money. Iacoviello (2003: 304-320) studied the relationship between house prices and consumption by using the Euler's equation model. He stated that housing used as a collateral for mortgage loan determines the capacity of household borrowing—the high value of housing leads to a high lending amount from banks, and to high consumption.

2.2.2 Bank Lending

The influx of bank lending leads to a collateral price over-increase that prompts an economic bubble. The credit availability of banks determines property prices. That is, an increase in credit availability results in an expansion in property demand. Because the commercial banks are the main funding sources in the property market, their over-lending, particularly to the property sector, results in an over-inflation in asset prices, and finally, an asset price bubble. Huge non-performing loans result in economic turmoil, as happened with Japan's economic bubble.

2.2.3 Bank Balance Sheets

Besides collateral and bank lending, bank balance sheets are also one of the factors that determines the problems in the banking and property sectors that lead to

crises (Mishkin, 2005: 178). Because banks play a significant role as the prime source of lending in economic development, the problems in the sector makes the country's financial system unstable and results in large impacts on the entire economy.

Generally, bank balance sheets consist of loans secured by collateral properties, which become the bank's assets. A decline in a property price results in a decrease in the value of the collateral. The value of the collateral then becomes less than that of the borrowed money. Therefore, the borrowers are unlikely to pay back their loan, and a moral hazard takes place (Mishkin, 2005: 192). Thus, it increases the nonperforming loans for banks, leading to the deterioration of banks' balance sheets. Moreover, a decline in property prices decreases the banks' capital and reduces the value of the property owned by the banks. These non-performing loans weaken bank assets. This decline leads to a decrease in the net worth of banks.

2.2.4 Household Consumption

Housing is one of the basic needs of human beings and represents the wealth of households because it can be used to guarantee loans. Housing wealth could reflect the consumption of each household, and household consumption directly relates to the prices of properties and houses. A fluctuation in property prices leads to an instability in borrowing capacity and credit (Kiyotaki and More, 1997: 212). As housing is used as collateral to obtain loans from banks, the value of the house determines the households' capacity to borrow. That is, the higher the value of a house, the higher the loan amount, meaning better consumption ability (Iacoviello 2003: 306). If property prices decrease households can acquire a lower amount of loans from banks during recession periods—the liquidity of household consumption thereby decreases. Consumption is postponed, finally leading to economic stagnancy.

Many studies support the positive relationship between housing prices and bank loans. For example, Greef and Haas (2000: 1-23) studied the relationship between housing prices and mortgage lending in the Netherlands. Two models were employed, the housing model and the mortgage-lending model, by using the Error Correction Method (ECM) in the process of estimation. They found that housing prices and mortgage lending are interdependent. Housing prices are influenced by

changes in bank lending. Mortgage lending is also dependent on housing prices, as well as disposable income.

A study by Sierminska and Takhtamanova (2007: 1-38) compared house wealth and financial wealth. The study attempted to find out which factor affected household consumption across age groups in Canada, Italy, and Finland. The results showed that the effect from house wealth is stronger than the effect from financial wealth because housing wealth is a proxy for permanent income, which is an important indicator of household consumption. In addition, the effect from housing wealth is significant in mature households because they have stable lives and ample savings to buy houses.

Oikarinen (2008: 1-32) studied the linkage between housing prices and household credit in Finland by using a vector error-correction model. The results showed that there was a significant two-way interaction between housing prices and housing loans, as well as consumption loans.

It can be said that the household consumption links to property prices and bank lending, which impacts the entire economy. This study investigates the impact of government investment via the public work sector, a subsector of the property sector, in stimulating household consumption in Thailand.

2.2.5 Pull and Push Effects

Because the scope of this study covers the property sector, consisting of the construction and real estate sectors, and the commercial banking sector, the pull and push effects, which represent the linkages of these sectors and their impacts on the entire economy, are considerable. Much existing literature has focused on using the Input-Output model to analyze the pull and push effects in the construction sector, which will be stated in the following.

In order to construct a building, a variety of work and a large amount of material are required in the process of production. This creates huge investment and construction activities in other related businesses. The construction sector consists of two main areas: (1) constructing new buildings, which is related to pull effects, and (2) maintenance and repairing service (M&R), which is related to push effects. The former is important for the developing/newly-developed countries because new

buildings are needed as a workplace for conducting business transactions during the period of creating economic growth, while the latter are required for maintaining or repairing the old buildings in developed countries.

The pull effects, which can be measured by the backward linkage indicator, refer to the extent of the dependent degree of a sector on the entire economy. A high value represents a sector's high dependence on other economic sectors. It can be interpreted that this sector has a high influence on the economy. For example, cement and steel are needed to construct buildings.

The push effects that are measured by the forward linkage indicator show the strength of the sector's economic push. It represents the output of a sector that is distributed to other sectors for use as their input in the production process.

The idea above is supported by a study by Wu and Zhang (2005: 905-912). Their research shows the development trend of the construction sector and its role in the Chinese economy by using Input-Output model. The examination uses a 17-sector version of the four IO Table for years 1992, 1995, 1997, and 2000 to calculate output and input multipliers of the construction sector. The results show that the trend of the pull effect of the construction sector is intently high, indicating that the construction sector is a significant driver in the Chinese economy. The push effect of the construction sector on the whole economy recently increased significantly but is still less than that in industrialized countries, indicating that the M&R services of China, which mainly occur in the service area, are still weak.

Su, Lin and Wang (2003:719-728) examined and analyzed the role of the construction sector in other economic sectors in the Taiwanese economy by using Input-output analysis. They used the data of 12 input-output tables between 1964 and 1999. The study shows that the pull effect of the Taiwanese construction sector was approximately equal to that of the Japanese construction sector, demonstrating that construction is more closely linked to the economy in Taiwan than in other countries such as Italy, the UK, and the U.S.A. The push effect increases significantly over time, indicating that the maintenance and repair service expenditures are increasing in Taiwan.

Song and Liu (2005: 412-425) analyzed and measured the economic performance and sectoral linkages of the construction sector in the 1990s by using the

IO model and the Spearman Rank Correlations test in Australia. The data used in the paper were from the five Australian input-output tables in the 1990s. The property sector was divided into two sub-sectors, the residential and commercial property services. The results showed that the residential property sector is more important than the commercial property sector. The pull effect of the residential property sector decreased, while that of the commercial property sector increased. This happened because in the 1990s, Australia faced an economic downturn, resulting in the decline in housing demand. In addition, the country's push effects of both sectors are moderate.

Kofoworola and Gheewala (2008: 1222-1247) studied the construction sector and its relationships to other sectors in the Thai economy by using three input-output (IO) tables compiled between 1995 and 2000. The pull and push effect of the sector were measured. They found that the pull effect was much larger than the push effect in the Thai construction sector. This implies that the sector was a significant driver in stimulating production for other sectors in the entire economy. The results showed that the sector did not generate much employment in its own sector, but the strong backward linkage effects of the sector provided employment in other sectors in the entire economy.

Rameezdeen, Zainudeen and Ramachandra (2009: 1-14) studied the significance of construction and its relationships with other sectors in Sri Lanka by using the input output model. The data used were from the five input-output tables compiled for Sri Lanka. They found that the construction sector was ranked 8th in terms of backward linkages, with an indicator of 1.80. This high value of backward linkage was due to its high dependence on other sectors for construction inputs. However, the forward linkage indicator was ranked at 35, with an indicator of 1.09. The forward linkages show less significance to other sectors because a major part of construction output caters to the final demand. It demonstrates the insignificance of the maintenance and repair sector in Sri Lanka.

In conclusion, many existing studies reveal that the pull effects of the construction sector are stronger in developing and newly-developed countries than in developed countries, while the values of push effects are low, for example, as seen in the pull effects in Taiwan (Su, Lin and Wang, 2003: 719-728), Thailand (Kofoworola

and Gheewala, 2010: 1227-1240), and Sri Lanka (Rameezdeen, Zainudeen and Ramachandra, 2009: 1-14). This means that the construction sector is the main stimulation for the economy. However, there has been no study of the pull effects of the real estate and commercial banking sectors on the entire Thai economy. Also, no literature has ever studied the push effect of the real estate and commercial banking sectors in Thailand. The study is therefore conducted with the hope of finding relevant information.

2.2.6 Employment

According to the National Statistic Office of Thailand (NSO), 2010: 2), the property sector is ranked in 4th with 8 percent in employment, compared to 16 industries in Thailand. This implies that the property sector is an important sector, which creates a large supply of work for the entire economy. Currently, the Thai government has implemented the Thai Kem Keng Scheme, that mainly invests in various types of the construction, i.e. infrastructure in agriculture and infrastructure in the tourism industry. This is an attempt of the government to help the economy to recover from the negative impacts of the global economic recession. Therefore, it is reasonable to investigate how and the extent to which the Thai Kem Keng scheme impacts employment activities.

Investing in the property sector creates a lot of employment in the country. Due to the linkages in the sector, the investment in the property increases numbers of jobs in both its own and other sectors in the entire economy. A study by Kofoworola and Gheewala (2008: 1239) showed that a boom in the construction sector boosts employment and demand in property-related sectors. Kiyotaki and Moore (1997: 212) have stated that the values of collateral properties could generate large fluctuations in output and asset prices. This is because banks lend more to firms when collateral value increases. The firms therefore increase their investments, leading to higher employment and production in the economy. A study by Kim and Lee (2002: 181) showed the negative impact of investment on the property sector. The over-investment in the property sector because the government subsidy resulted in high economic growth, and finally led to the economic crisis. Hofe (2007: 69-91) studied the impacts of changes in housing variables, i.e. public housing investment in the New York

housing market by using the Computable General Equilibrium (CGE) model. He found that mortgage rate reduction and government investment in public housing have economy-wide impacts by promoting regional economic growth, an increase in regional commodity output, a boost in the labor market, and finally an increase in household income.

2.2.7 Government Policies

Interventions of government policies, i.e. fiscal policy and monetary policy, are important factors in stimulating or distorting the economy. In the past, many nations used the property and the banking sectors to boost their economies during economic crises, i.e. government investment and tax exemptions as in Thailand. On the other hand, there is evidence that these government interventions are as well the cause an economic crisis, i.e. a deregulate financial system as in Japan and Latin America.

Government investment in the property sector is popular among countries to boost the economy when the country is in a recession period. The Thai Kem Keng Scheme is a 3-year project that has already been implemented by the Thai government in an attempt to recover the economy from its recession. Seventy-three percent of the budget flowed into the public work sector, which is a subsector of the property sector. The scheme was analyzed in this study to measure how effective the policy on the Thai economy was. Besides investment in the property sector, tax exemption was also used in Thailand in order to stimulate the Thai economy. Since the 1997 Financial Crisis, the property sector in Thailand has been recovering gradually. The Thai government has issued the reduction of special business taxes, the reduction of transfer fees, and the reduction in mortgage fees to stimulate the economy. These policies were valid until May 2010.

Besides the fiscal policy that consists of government spending and tax exemption, monetary policy is another powerful policy which can be adopted to stimulate or distort the economy. It is proven that effective government policies could prevent the country from facing crisis, as was the case in Hong Kong, (Garlach and Peng, 2005: 479).

On the other hand government interventions, such as financial liberalization, are a prominent factor that can cause an economic crisis (Wilmarth, 2003: 1-3). For example, the economic crises in Japan, Mexico, and Thailand received some impacts from the deregulation in the financial sector. The influx of loans due to financial deregulation resulted in problems in the banking sector that led to the banking crisis and eventually economic collapse (Mora, 2008: 59; Hübler, Menkhoff and Chodechai Suwanaporn, 2008: 393-394).

Because monetary policy, i.e. interest rate policy and reserve requirements, has a significant impact on the supply of bank loans (Kashyap and Stein, 1994: 5), using monetary policy leads to the shift of money supply, resulting in changes in interest rate and spending. When policy makers decide to tighten money, they drain bank reserves. This loss of reserves reduces the supply of deposits that require reserves, which drives up interest rates. The higher cost of capital reduces investment spending by firms and consumers (Bessler, Yang and Leatham, 2005: 2). However, only interest rate policy has been adopted in Thailand to control the economic flunctution.

Regarding bank regulations, BASEL—a set of regulations with the purpose of monitoring and supervising banks to meet international standards—was launched by the BASEL Committee on Banking Supervision. The regulations have been adopted in the financial institutions domestically and internationally. In Thailand, the Thai commercial banks have adopted Basel II, which was implemented by the BOT since 2008, in order to maintain the minimum capital requirements that can protect their solvency and overall economic fragility from unexpected risks (BOT, 2011). The third version, BASEL III, is going be launched in the near future to guard the impacts of the Subprime Mortgage Crisis. A study of Panagopoulos and Vlamis (2008: 16) suggests that Basel II would strengthen the commercial banks, and it reveals that different types of building property result in various chances to default from loans. Investing in industrial buildings and warehouses create higher risks than those of office buildings. Therefore, BASEL II needs to measure the capital requirements that suit each type of property before lending.

2.2.8 Conclusions

Upon reviewing the literature, this study has discovered important similarities as well as differences in previous literature regarding the linkage between the property sector and the commercial banking sector, and its impact on the Thai economy. Furthermore, some areas of significance have been extended.

2.2.8.1 The Similarities

This study has found three areas of results that are similar to those in existing studies as follows.

First, the construction sector has strong pull effects on the economy, similar to many authors, i.e. Kofoworola and Gheewala (2008:1227); Su, Lin and Wang (2003: 724); and Rameezdeen, Zainudeen and Ramachandra (2009: 1-14).

Second, the construction sector has weak push effects, similar to many authors, i.e. Kofoworola and Gheewala (2008:1227) and Song, Liu and Langston(2003: 309).

Next, the real estate sector has stronger push effects than pull effects, as indicated in the work of Yu, Song and Liu (2005:10).

Finally, the study also reveals that the industrial sector has a high important role, side by side, with the construction sector by alternatively ranking number one or two among all related sectors. Such results are similar to those in the work of Pietroforte and Gregori (2003:325).

2.2.8.2 The Differences

The study has found some differences from existing papers. According to the study, high employment is a result of the investment of the Thai Kem Keng Program in the property sector. In contrast, a study of Kofoworola and Gheewala (2008: 1222-1247) shows that there is not much increase in employment from direct investment when there was an investment in Thailand's construction sector; rather, the employment increase was from the indirect impacts from employment.

In addition, the study has segregated the property sector into subsectors according to 3 types of analysis that can show each subsector's dominant features, unlike the study of TDRI (2004) and Kofoworola and Gheewala, (2008: 1227-1240), who have studied mainly the construction sector, and the study of Su, Lin and Wang (2003: 719–728), who have studied merely the real estate sector, and the study of

Song, Liu and Langston, (2003: 579-589), who have studied the construction and real estate sectors.

2.2.8.3 The Extensions

Besides the similarities and the differences mentioned earlier, the study has extended three points.

First, the construction sector, under the property industry, has been disaggregated into non-residential building, residential building, and public works, with the purpose of achieving better results. The analysis used is called disaggregated analysis Type 2. Few studies have analyzed this sector in such detail.

Second, because there is no previous study on the impacts of commercial banks on the Thai economy and the sectoral linkage between the property sector and commercial banks by using the Input-Output analysis, this study has extended these analyses.

Last, this study has also extended the SAM model to the Financial SAM model because of the limitations of the SAM, which hinder the integration of the financial perspective in analyzing the linkages between the property industry and the commercial bank sector on the entire economy.

CHAPTER 3

THE PROPERTY SECTOR, THE FINANCIAL SECTOR, AND
THEIR IMPACTS ON THE ENTIRE ECONOMY
OF THAILAND

In Thailand, the property industry, and the financial institutions, especially commercial banks, are closely related. The problems between these sectors cause severe impacts on the overall economy. In order to have a vivid picture of these sectors and their problems, this chapter presents the role of the property market and commercial banks in Thailand. The relationship between the property sector and the commercial banking sector, and their impact on the entire economy, is also presented. Finally government policies on these sectors are illustrated.

3.1 The Role of the Property Sector in Thailand

The high importance of the property market to the overall Thai economy can be recognized by its high proportion of Gross Domestic Product (GDP) and its employment creation. Moreover, the supply of property is an important indicator that can point out the situation of the property industry.

3.1.1 Property Sector and Gross Domestic Product (GDP)

The impact of the property sector on the GDP illustrates its importance to the entire economy. Its high value indicates the considerable contribution to the economy as a whole. Figure 3.1 shows the values of the property sector to GDP in comparison with other sectors, from 1985 to 2009. In the late 1980s, the government under Prime Minister Chatchai (1988-1991) promoted Indo-China investment under the policy of turning the battle field into a market place (Pasuk Phongpaichit and Baker, 1998: 50) and issued a housing development policy. Moreover, the government also encouraged

commercial banks to provide loans to the property sector, and promoted property demand by allowing interest payments on mortgaged loans to be deducted as an expense for calculating personal income tax. Such governmental policies led to the prosperity of the economy, with high growth in the property market. At that time, Thailand was recognized as one of the high economic growth countries and one with a high GDP growth rate in Asia.

From 1985 to 1990, the value of the property sector showed a rapidly increasing trend, from 86,929 million Baht in 1985 to 204,492 million Baht in 1990, a 135% increase. This extraordinary growth led to the overvalue of properties during the boom period, arising from speculation. In 1990, the Persian War led the world economy into a recession period. The property market in Thailand received severe impacts from the downturn, which made people lack confidence in buying goods, especially high value property. It also caused oversupply in the property sector and consequently led to the first property collapse in Thailand in 1992.

During the government under Prime Minister Chuan's period (1992-1995), the Thai financial market became deregulated. The Bangkok International Banking Facilities (BIBF), which was established in 1993, led to an influx of foreign loans into the country. Developers could borrow loans domestically and from foreign countries at a low interest rate. That led to a large number of new projects being launched into the market. The value of the property sector reached a peak at around 500,000 million Baht in 1996. These occurrences led to the oversupply in the property market, which in turn paved the way for the second property collapse during the Chawalit government (1996-1997) in 1997. After that the value of the property sector decreased gradually until it recovered in 2009, when the value reached 461,915 million Baht. During that period, the property sector was ranked 5th place in sector value in the GDP, after the transport, agriculture, wholesale and retail trade, and manufacturing sectors.

Million Baht
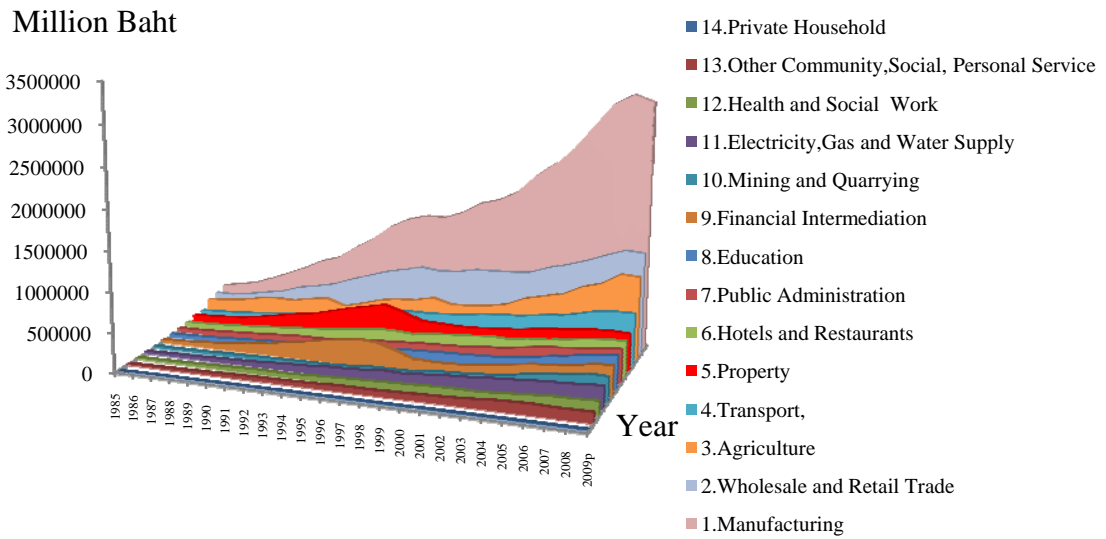
Figure 3.1 The Proportions of the Sectors to GDP (at Current Prices)
Source: Adapted from NESDB, 2010.

Figure 3.2 shows the proportion of all the sectors to the GDP from 1985-2009. Considering the property sector, its proportion to the GDP was at around 8 percent in 1985, and increased gradually to reach the peak of 11 percent during 1993-1996. After that, it decreased steadily from around 9 percent in 1997 to 5 percent in 2009.
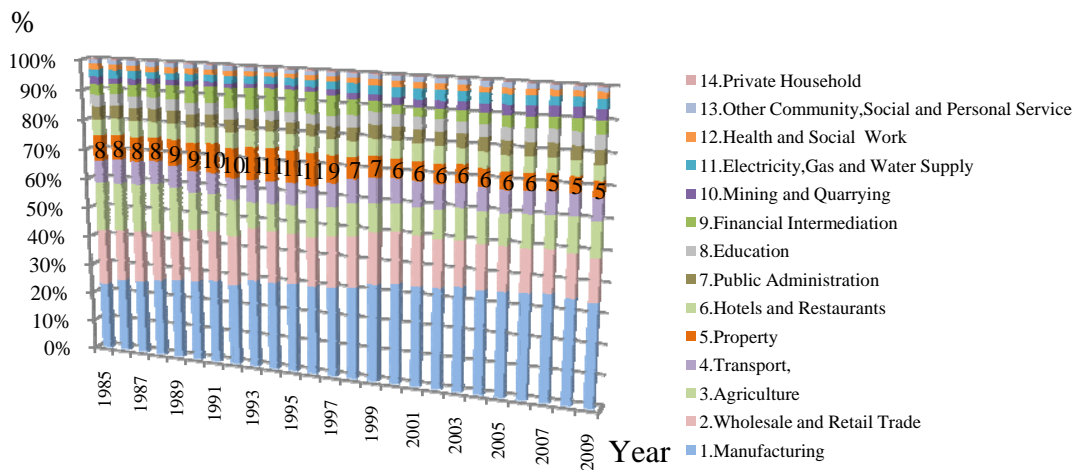
Figure 3.2 The Percentage of the Sectors to GDP (at Current Prices)
Source: Adapted from NESDB, 2010.

Figure 3.3 illustrates the close relationship between the growth rate of the GDP and that of the property sector, as they move in the same direction, Property growth rate, however, was higher than the GDP growth rate during the prosperous period, and the property growth rate was lower than the GDP growth rate during the recession period. In other words, the property sector received more severe impacts than the overall economy. It can be seen that in 1986-1996, property growth was higher than economic growth. For instance, the property's growth rate was at 21 percent, while the economy's growth rate was only at 8 percent in 1993. Regarding economic crisis, the GDP growth was at -1 percent while the property growth was at -14 percent during the period of the Asian economic crisis in 1997. In 1998, the GDP was at -10 percent while property was at -22 percent. To sum up, the degree of difficulties in the property sector was heavier than the difficulties that occurred with the entire economy.
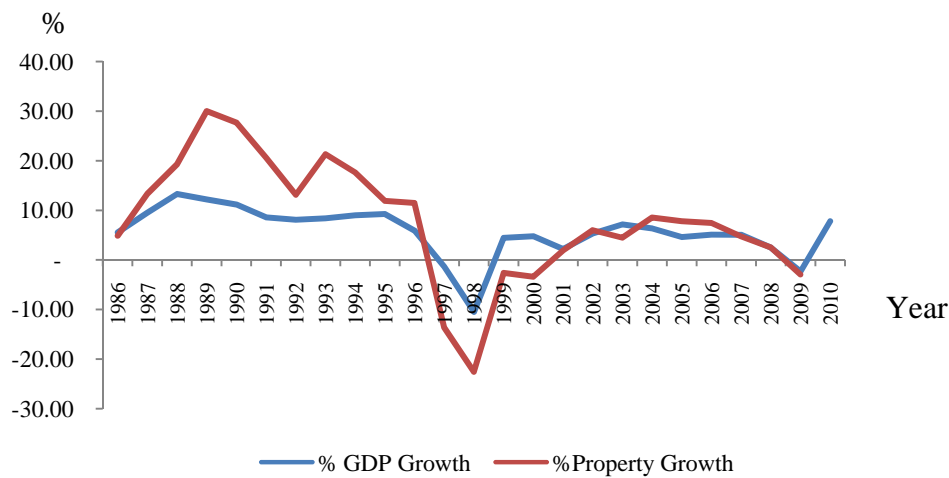
Figure 3.3 Percentage Share of Property Sector and Gross Domestic Product
Source: Adapted from NESDB, 2010.

3.1.2 Employment in the Property Sector

The property sector in Thailand has inter-industry linkages with the overall economy because the sector requires the goods and services from other sectors in its production process and the sector provides its goods and services to other sectors that represent a backward and forward linkage (Kofoworola and Gheewala, 2008: 1227).

These created enormous employment in the economy. In other words, the high backward linkage of the property sector means the property sector highly depends on the output of other sectors for its input in the production process. Constructing a building will be taken as an example; many kinds of material are used, i.e. concrete, steel, and furniture. Moreover, banking services are also required to supply the budget for operating. In addition, the sector's forward linkage shows how it distributes its output to the entire economy. For instance, when a building is constructed, maintenance and repair services are required. All of these relationships lead to huge consumption and investment.

In Thailand, which had a population of approximately 65 million people in 2009, the employed labor force was 37.7 million people (NSO, 2010: 2). Among the 16 industries shown in Figure 3.4, the property sector ranked 4th place, generating 8.1 percent of employment, followed by 14.3 percent from the manufacturing sector, 16.0 percent from the wholesale and retail trade sectors, and 39.0 percent from the agriculture sector. This implies that the property sector is significant in stimulating economic growth because of its huge employment creation.
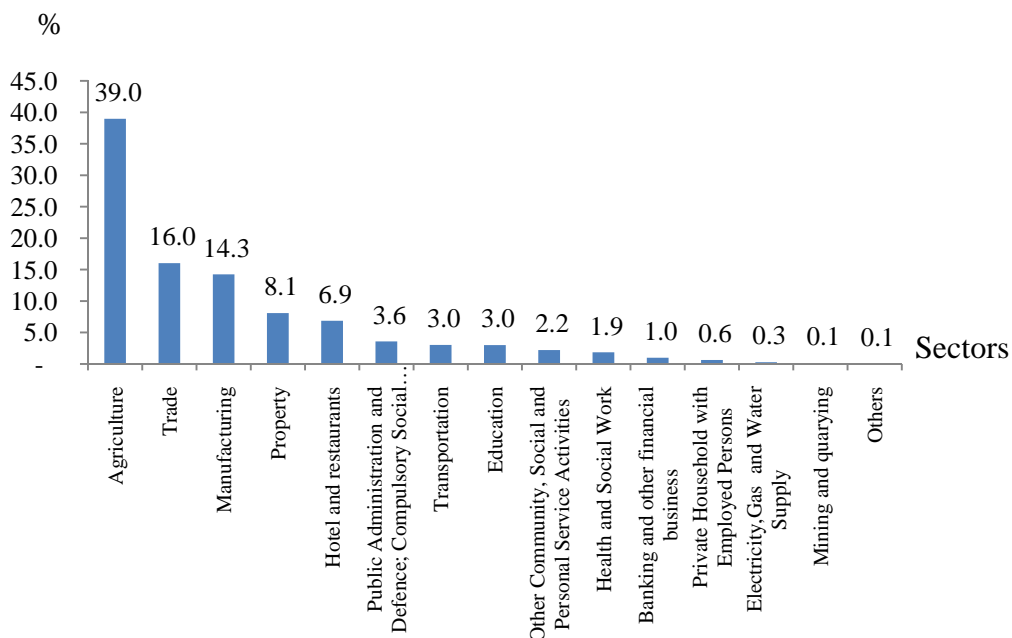
Figure 3.4 Percentages of Employed Persons by Industry in 2009
Source: Adapted from NSO, 2010.

Figure 3.5 shows the trend of the labor force in the property sector. After facing severe impacts from the Asian Financial Crisis in 1997, the employment rate started to increase, from 6.9 percent in 2002 to 7.7 percent in 2004 and to 8.0 percent in 2009 consecutively.
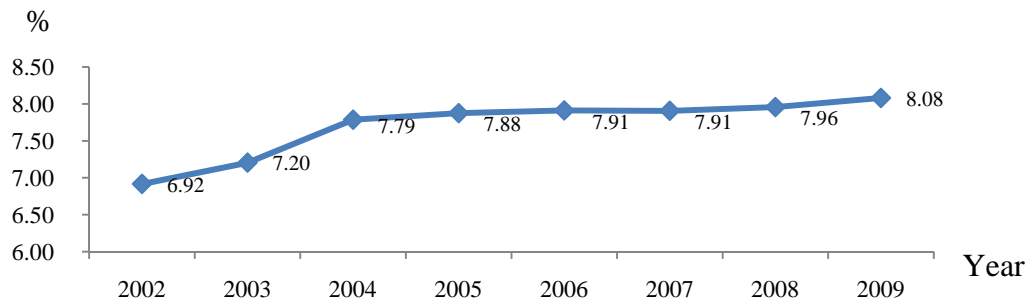
Figure 3.5 Percentages of Employed Persons by Property Industry: 2002- 2009
Source: NSO, 2009.

3.1.3 Supply of Property

The supply of property can indicate the situation of the sector and its impact on the entire economy. For example, the excessive supply in the housing market was the key contributory factor of the 1997 Asian financial crisis (Wong, 2001: 2). At the time of the crisis, the housing supply was larger than the housing demand, which led the housing market to disequilibrium. The housing demand was at around 100,000 units, but the supply of housing, several years before the crisis and within the year of the crisis, was more than 140,000 units per year (Samma Kitsin, 2010: 74). The great excess in supply of the housing market led to the property sector collapsing, finally leading to difficulties in the overall economy. In order to avoid a similar collapse in the property market, the supply of the sector should be considered carefully.

To deal with fluctuations in the property sector, indicators in the property sector are set by the Bank of Thailand in order to monitor the situation of the property market, i.e. housing price index and the land price index (BOT, 2004: 24). Another important indicator is housing starts, which shows the number of housing units that are going to be built; at present, however, there is no record of such data in Thailand. Therefore the land development licenses issued, the construction areas permitted, and

the newly-completed and the registered projects are used to measure the property supply trend in Thailand (Ballobh Kritayanavaj, 2007: 33).

3.1.3.1 Land Development Licenses Nationwide

Land subdivisions are important for starting new construction projects. Figure 3.6 shows the number of land development licenses issued all over the country in years 1990-2000 (blue line) and the number of land development licenses issued in Bangkok and perimeter in years 1990-2009 (red line). In 1990, the property sector was highly developed because of the high economic growth. Under the policy of promoting export-oriented industrialization in the 1970s, the workforce in the industry sector increased. People migrated to live in urban areas. At that time, the Persian War caused a world economic recession that also impacted the Thai economy, resulting in the economic recession. Consequently, the number of land development licenses issued all over the country (blue line) had fallen since 1990, from 160,519 units to 128,513 units in 1993. When the BIBF set up in 1993, it stimulated investment in the property market. The number of land development licenses issued increased to a peak of 167,261 units in 1994. After that the licenses declined continuously until the country faced the financial crisis in 1997 due to the entrepreneurs' liquidity shortage and purchasers' affordability shortage. There were only a few new projects launched in the market during the crisis. The issuance of land development licenses also sharply decreased during the market recession period since the housing market grew during the recession. After year 2000, the number of licenses issued increased slightly, especially in the number of land development licenses issued in Bangkok and perimeter (red line). In short, the investment in the property sector was stable from 1999 to 2009. It is important to note that after year 2000, the land development licenses issued in Bangkok and perimeter (red line) were assumed to be used to study the nationwide trend instead of the number of land development licenses issued all over the country (blue line) due to the lack of nationwide data (blue line).

Units
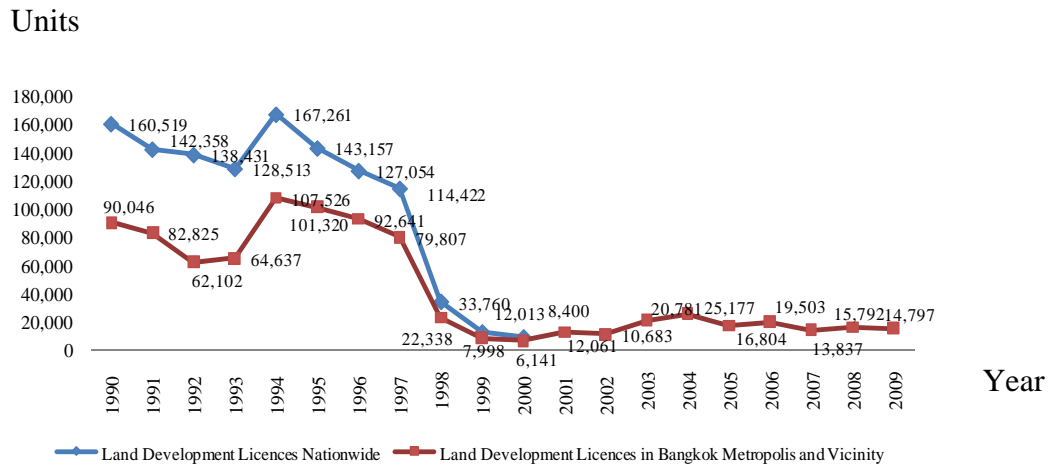
Figure 3.6 Land Development Licenses Nationwide, and Land Development
Licenses in Bangkok Metropolis and Vicinities, 1990-2009

Source: Adapted from BOT, 2010.

3.1.3.2 Construction Areas Permitted in Thailand

From 1990 to 2009, the permitted countrywide area for construction fluctuated according to the volatile economic situation. Figure 3.7 shows the area permitting construction in urban areas across Thailand. During 1990 and 1995, when the country had high economic growth due to the government stimulation, the permitted areas were as high as 38,207 thousand square meters. After that, they sharply decreased to 7,442 thousand square meters in 1998, which equals a 73.3 percent decline. However, they subsequently increased slowly according to the economic recovery, until they reached 22,698 thousand square meters in 2004. Then, they slightly decreased to 16,987 thousand square meters in 2009 due to economic stagnancy, which was caused by the high cost of fuel and construction materials, high inflation rate, and political instability.

Thousand Sq. Meters
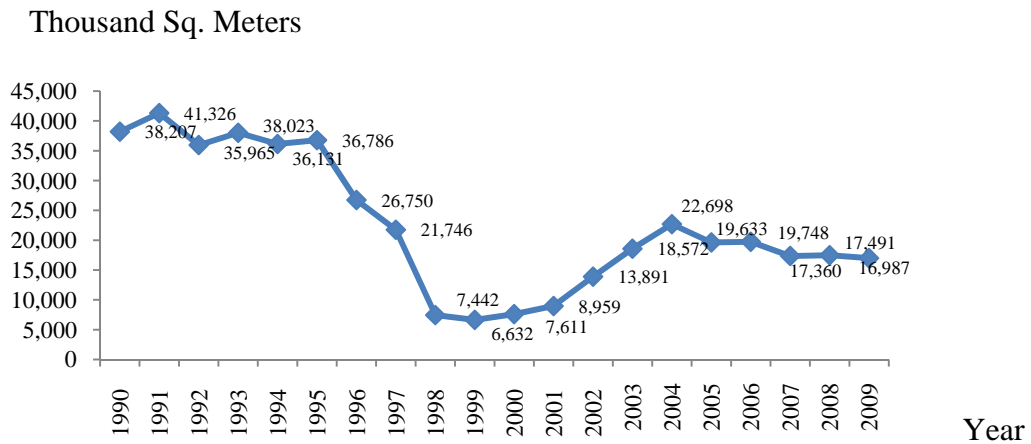
Figure 3.7 Construction Areas Permitted in Municipal Zones Nationwide
Source: adapted from BOT, 2010; Real Estate Information Center (REIC), 2010.

Figure 3.8 shows the proportion of construction building in the property sector. Residential building had the largest share of permitted area with 68 percent, followed by commercial and office building (13 percent), industrial estate and factory (10 percent), and hotel (4 percent), education and health building (1 percent). These clearly show that residential building is the most important in the property sector in Thailand (NSO, 2010).
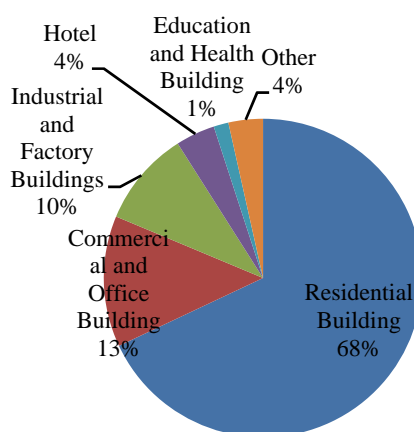
Figure 3.8 Types of Construction Building
Source: NSO, 2010.

3.1.3.3 Newly-Completed and Registered Housing Units in Bangkok and

Vicinity

The new housing supply, including types of completed housing units in the market, are presented in Figures 3.9 to Figure 3.10. Figure 3.9 shows the number of registered houses, which sharply decreased in 1996 and reached the lowest at 32,028 units in 2000 with a difference of 56 percent. In 2010, the property market became more robust, with 104,652 units of new housing when compared to 63,864 units in 1998 and 145,355 units during the financial crisis in 1997. It is important to point out that the supply of new houses in 2010 was considerably high but still lower than that in 1997.
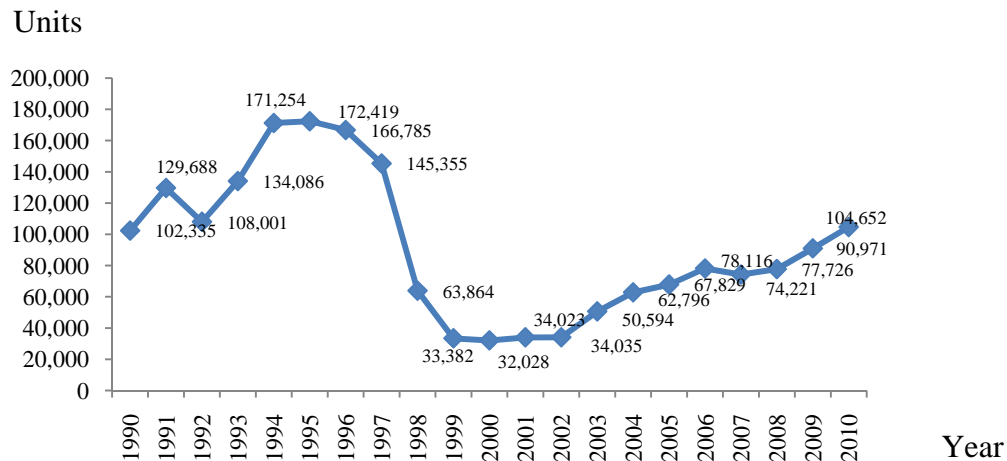
Figure 3.9 Newly-Completed and Registered Housing Units in Bangkok and

Perimeter, 1990-2010

Source: BOT, 2010; REIC, 2010.

Figure 3.10 shows 4 types of residential buildings: detached houses, semi-detached houses, townhouses, and condominiums. Among these types of housing, condominiums, especially those that were close to the Bangkok Mass Transit System (BTS) and Mass Rapid Transit (MRT), had the highest growth of supply and demand. The main reason was because living habits changed from extended family living in a detached house to nuclear family living in a condominium. In addition, the massive transportation made it convenient for this group to go to their workplace in the central business district (CBD).
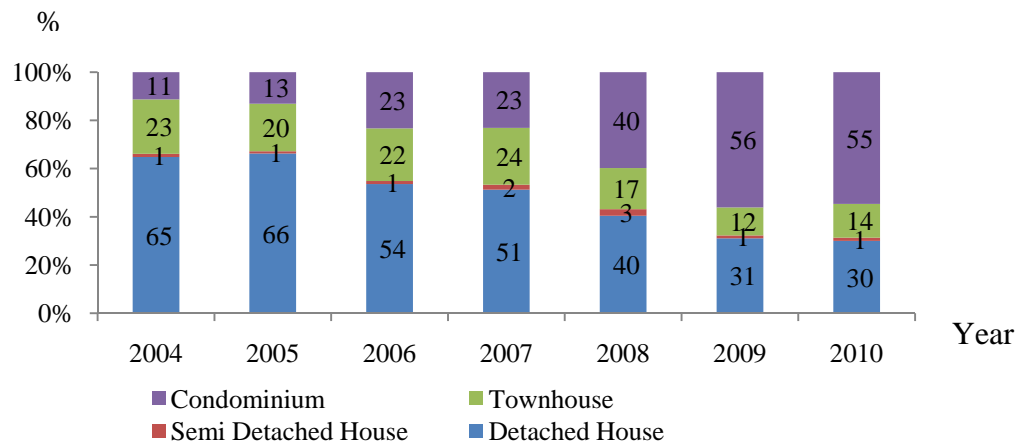
Figure 3.10 Type of Newly-Completed and Registered Housing Units, 2004-2010
Source: REIC, 2010.

3.2 The Role of the Banking Sector in Thailand

Commercial banks play a significant role in the Thai economy. The bank loan system is also the most popular funding method in many countries, i.e. the United States, Germany, Japan, and developing countries (Mishkin, 2005: 172). Because of their uncomplicated accessibility, borrowers can use their assets as collateral to guarantee loans. The importance of the banking sector to the Thai economy can be seen clearly in the three following indicators, namely: the commercial bank shares in the financial market, the ratio of commercial bank loans to GDP, and non-performing loans (NPLs).

3.2.1 Commercial Bank Shares

The importance of commercial banks to the Thai economy can be seen clearly in the bank shares in the financial market (Mathinee Subhaswasdikul and Don Nakornthab, 2002: 4). Among three main sources of funds for entrepreneurs and individuals in Thai financial market, which are bank loans, the stock market, and issuing bonds, bank loans occupy the major share. In addition, commercial bank loans take the major share at around 77 percent (BOT, 2007: 72) of total financial institutions in Thailand, which are commercial banks, special banks, and non-banks.

Since the past (1993), bank loans and the stock market were the two main sources of funds in Thailand. On the other hand, the bond market is unpopular in the country, even though it emerged in the Thai market beginning in 1945. Bank loans have played a more important role in the Thai market. As BIBF was established, it brought a number of foreign loans into the Thai market. As a result, there was an abundance of low-interest rate loans in the market while stocks were not interesting to investors. At the same time, the bond market grew slightly. In short, funding by bank loan was the most popular method during 1997 in comparison with funding by stocks and bonds.

Due to the high amount of bank loans and serious problems that took place, the amount of increasing NPLs influenced the whole economy and eventually caused the economic crisis. Figure 3.11, which is cited in the Thai Bond Dealer Center, shows the financial sources in the Thai market: bank loans, stocks, and bonds. After the economic crisis in 1997, bank loans decreased continuously from 6,000 billion Baht to 4,200 billion Baht from 1998 to 2001. Since then, the number of bank loans increased gradually, from 5,500 billion Baht in 2002 to 7,800 billion Baht in 2009. This demonstrates that the number of investments increased because investors increased investing so they increased borrowing from banks to run their projects during the economic boom. Simultaneously, stocks and bonds enhanced their roles in the financial market. Stocks have regained their important role, and bonds have become popular. These additions have created an improved atmosphere of investment in the financial market. In other words, bank loans have always shared the major part among sources of funds.

Billion Baht
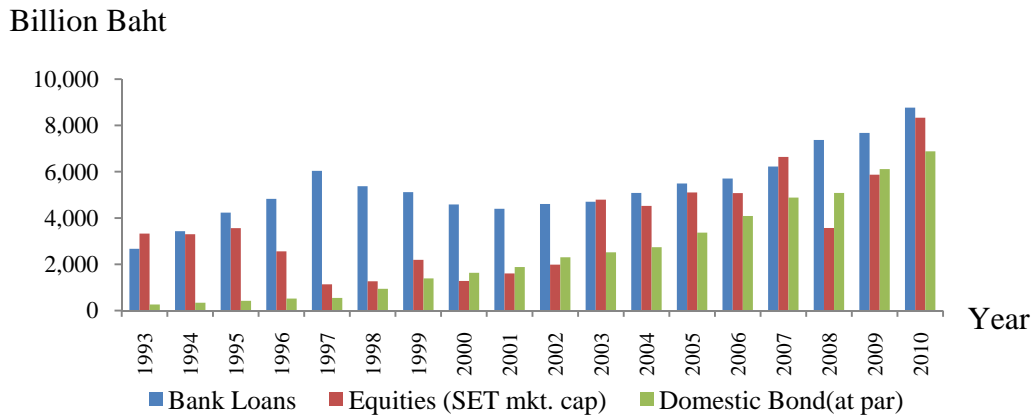
Figure 3.11 Financial Market in Thailand

Source: Thai Bond Dealer Center, 2001, 2005, 2010.

Figure 3.12 depicts the percentage change among the three types of funding: bank loans, stocks, and bonds. The percentage change in bank loans slightly declined from 73 percent in 1997 to 37 percent in 2010. That of stocks increased from around 15 percent in 1997 to 35 percent in 2010 percent. Additionally, that of bonds increased from 7 in 1997 to 29 percent in 2010.
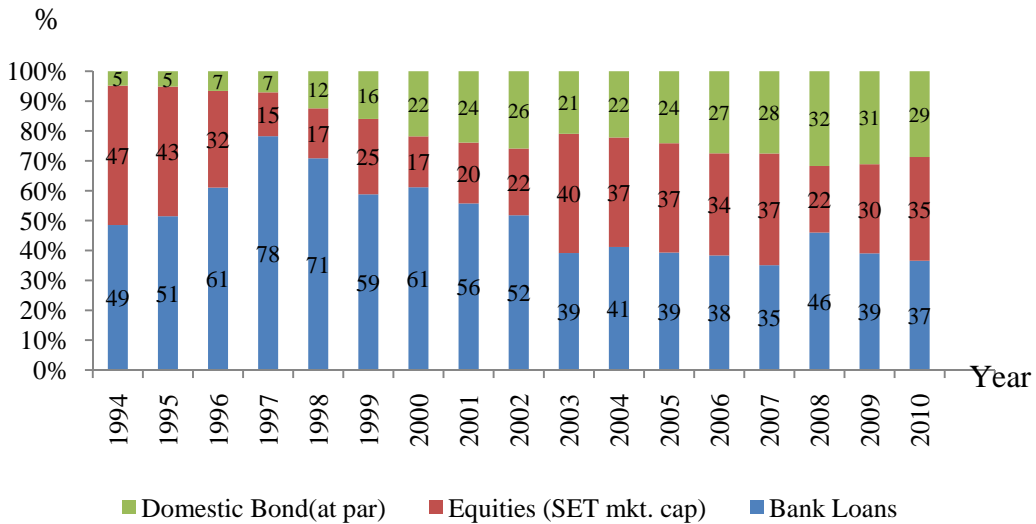
Figure 3.12 Proportion of Financial Market in Thailand

Source: Thai Bond Dealer Center, 2001, 2005, 2010.

3.2.2 Commercial Bank Loans

The bank loan to GDP ratio is an indicator for measuring the importance of the banking sector to the entire economy (Mathinee Subhaswasdikul and Don Nakornthab, 2002: 4). In addition, the relationship between the property market and commercial banks that impact that overall economy can be analysed via property credit and the number of new housing loans.

In figure 3.13, the ratio of commercial bank loans to GDP slightly increased from 60.6 percent in 1990 and continuously increased to a peak of 128 percent in 1997, the crisis year. After that, it started to decrease continuously to reach 93.6 percent in 2001, and remained rather stable, from 70 percent to 80 percent since then.
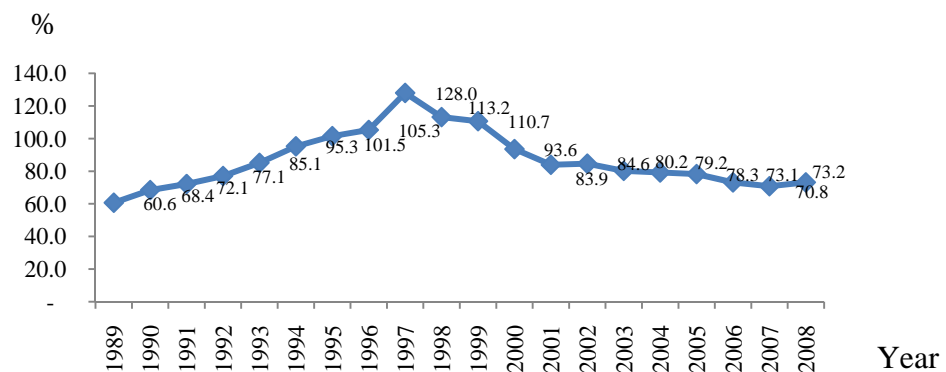
Figure 3.13 Commercial Bank Credits to GDP Ratio, 1989-2008
Source: Adapted from BOT, 2009.

3.2.2.1 Property Credit

Property credit is a prominent factor that connects the property sector to the banking sector. A high value of property credit shows the high interdependence between these two sectors. Problems with property credit can have a significant impact on total loans and banks' balance sheet, consequently affecting the Thailand economy. This part of the study focuses on property loans in two areas: the ratio of the property loans to GDP and the ratio of the property loans to total private loans.

Figure 3.14 shows the ratio of the property loans to GDP. Property loans were at 12.1 percent in 1990 and reached a peak at 20.1 percent in 1998. The increase was mainly because of various positive factors, namely: high demand in the housing

market from the economic growth, the establishment of BIBF, and the stimulating governmental policies for the property sector. When the Thai economic growth reached a peak and collapsed, the loans continued to decrease until they reached their lowest at 11.7 percent in 2001. Because of the difficulties in the property sector, commercial banks were strict on issuing loans to investors. This leads to adverse selection problems where risky investors, who tend to default, would like to borrow more than potential borrowers. Consequently, banks provided strict regulations on issuing loans; then the number of total loan decreased. After that, the property credit increased slightly as a result of the economic recovery, and the government implemented some measures, e.g. a reduction in transfer fees and special business taxes in order to stimulate investment and growth in the market. Accordingly, loans increased steadily to 14.8 percent in 2009.
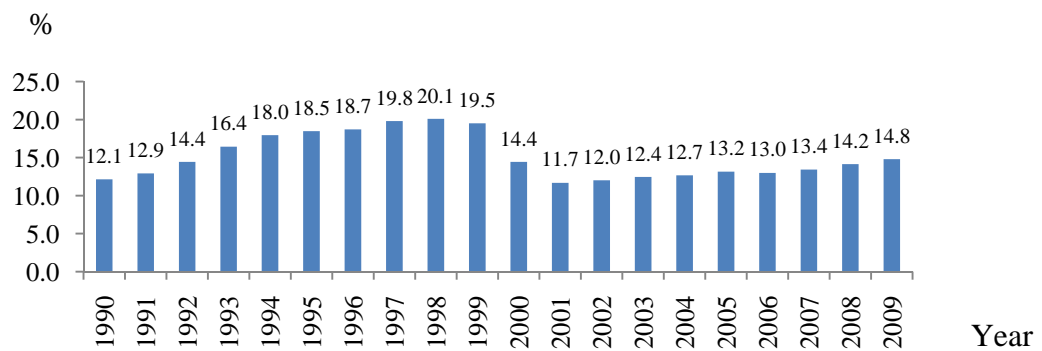
Figure 3.14 The Ratio of the Property Sector's Outstanding Credit to GDP
Source: BOT, 2010.

The property sector relies mainly on the commercial banking sector for its loans. Figure 3.15 shows that from 1989 to 2003, the percent share in the property market was 18.9 until the peak of 22.6 in 1996, the crises period and after the crisis, when the percent share in property the market decreased to around 17.7 percent in 2003. It can be seen that property loans were the third lending sector of commercial banks at 17.7 percent. Wholesale and retail trading loans were at second place at 19.3 percent, while manufacturing loans were at first place with 26.3 percent. In spite the fact that the property sector was only the third major sector in terms of commercial

bank lending, it had the greatest impact on the entire economy, as happened during the Asian financial crisis in 1997.

%
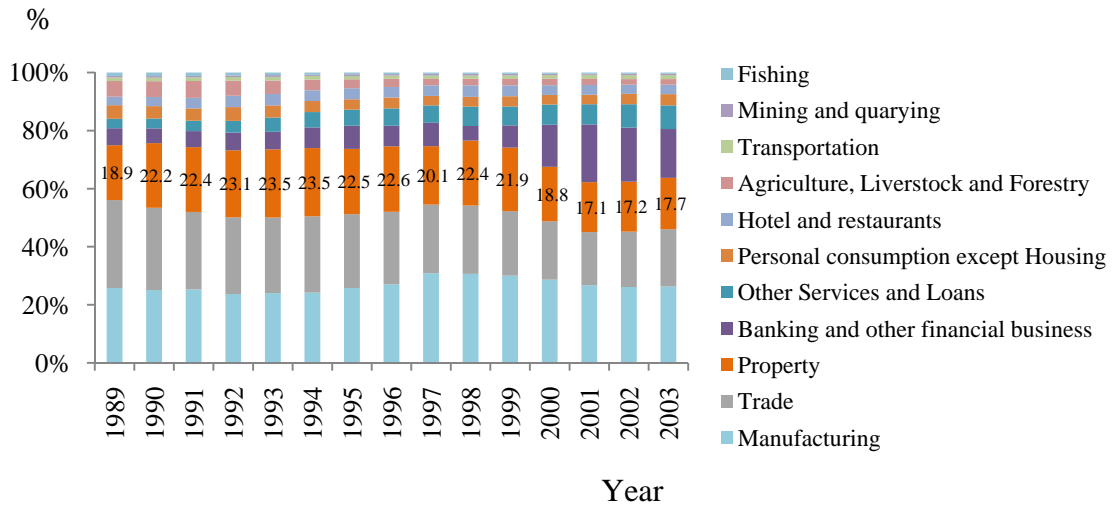
Figure 3.15 Commercial Bank Credits Classified According to Types of Business
Source: Adapted from BOT, 2004.

3.2.2.2 The Number of New Housing Loans

Figure 3.16 shows the proportion between two groups of borrowers in the housing market. They consist of entrepreneurs that borrow to run high-cost projects, and households that borrow for purchasing their houses. In short, it shows the proportion of real estate loans to mortgage loans. From 1990 to 1996, the housing market played a highly important role in Thailand. Real estate loan reached 65 percent and the rest were comprised of mortgage loans in 1990. The real estate loans slightly decreased a few years later and started to increase again in 2000. This illustrates that the entrepreneur depends much more on real estate loans than the household depends on mortgage loans. Furthermore, households also can use their own savings to buy properties. After the years of crisis (1997-1999), the percentage share still increased because of the ongoing projects and loan contracts already signed. It reached a peak of 57 percent in 1999. Consequently, entrepreneurs incredibly suffered from borrowing from banks to run their projects before the crisis period. With this experience of suffering, they depended less on bank lending and relied more on their own savings then borrowing from banks only for the remainder. It can be seen that the entrepreneurs' borrowing slightly decreased to 28 percent in 2009. On the other hand,

before the crisis, households used to exploit their own savings for building houses. They depended less on bank loans than did entrepreneurs. After the crisis, these patterns changed. Bank loans became the major funding source of building houses for households, which made home loans increase from 35 percent in 1990 to 72 percent in 2009.
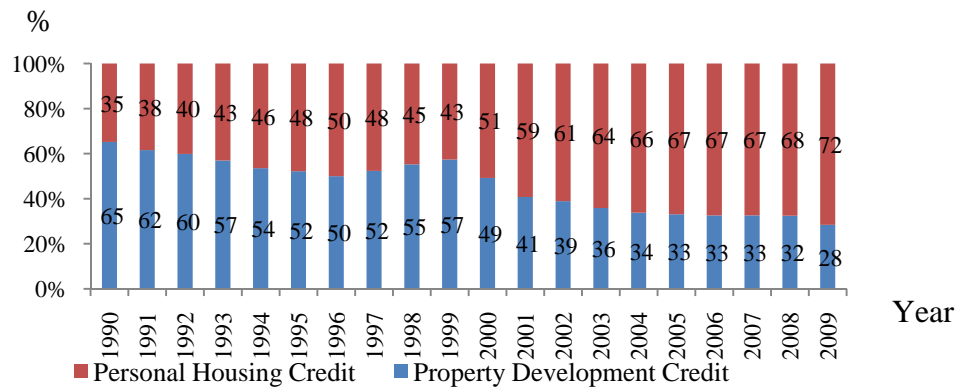
Figure 3.16 New Housing Loans
Source: Adapted from BOT, 2010.

3.2.3 Non-Performing Loans (NPLs)

A non-performing loan (NPLs) is a loan that is in default or close to being in default. Loans become non-performing after being in default for 3 months (BOT). NPLs represent problems in the sectors and finally lead to economic problems. Figure 3.17 shows that the number of the outstanding non-performing loans (NPLs) in the property sector sharply declined from approximately 1,240,000 million Baht in 1999 to 379,461 million Baht in 2009 with a 70 percent decrease. Non-performing loans in the property sector were at around 16 percent of total approved credits, which was the second highest after manufacturing NPLs.

Million Baht
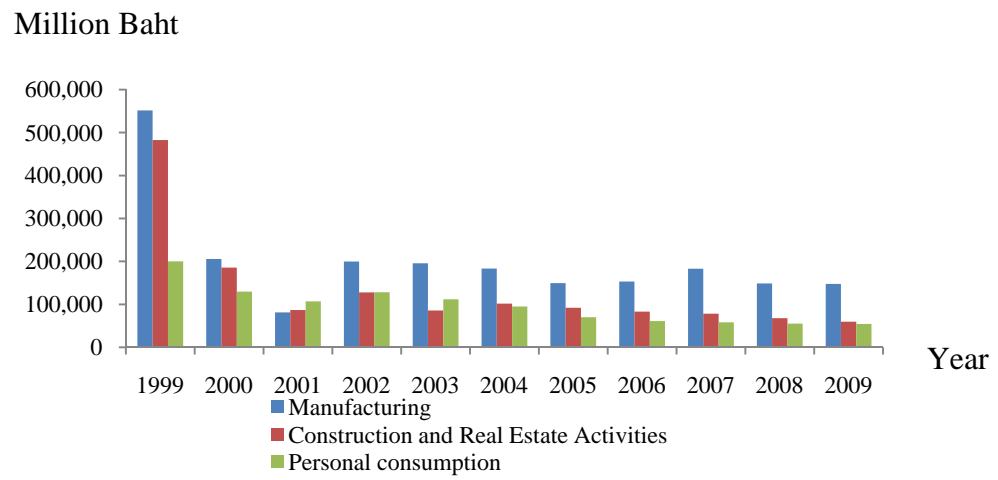
Figure 3.17 The Number of Non-Performing Loans (NPLs)

Source: Adapted from BOT, 2010.

3.3 The Linkages among the Property Sector, the Commercial Banking Sector, and the Entire Economy in Thailand

The property sector and the commercial banking sector have been generally accepted as significant drivers for Thai economic development. These two specific sectors have an impact on the entire economy because of the linkage between them. This paper mainly focuses on the linkage between the property market, commercial banks, and their impact on the overall Thai economy, in which collateral is the most important factor that relates these sectors (Kiyotaki and Moore, 1997: 212; Iacoviello, 2003: 304-320).

There is no conclusion as to whether the property sector or commercial banking sector was the origin of the economic meltdown. Some studies have suggested that the meltdown was mainly derived from the property sector to the banking sector, for example, in the work of Herring and Wachter (2002: 3), Davis and Zhu (2004: 1-45), and Zhang and Sun (2006: 57-74). They found that a property price decrease originates from an oversupply of property, leading to the problem. Figure 3.18 shows that intensive construction or oversupply causes an economic crisis, especially during a boom period. The decline in collateral prices reduces firms' net worth. Therefore, developers are unable to borrow more funds for running their projects. Consequently, the developers may have a liquidity problem. They will be directly forced to lower their investments, which causes less revenue and as a result the firms' net worth falls. For that reason, credit constraint reduces firms' investment. This situation will reoccur in the following year when the low value of property prices lead to low amounts of loans provided by banks. This low amount of money leads to fewer investments and less profit. These knock-on effects are clearly stated in Kiyotaki and Moore's paper (1997: 213). The strong interaction between the banking sectors' lending limitations and the decrease in asset prices meant that the low value of collateral resulted in a low number of loans provided by commercial banks and this caused the property sector crisis and also influenced the entire economy (Kiyotaki and Moore, 1997: 211). Entrepreneurs stopped their projects, defaulted on their loans, and this caused the increase of NPLs in the banking sector and eventually ended with an economic crunch.
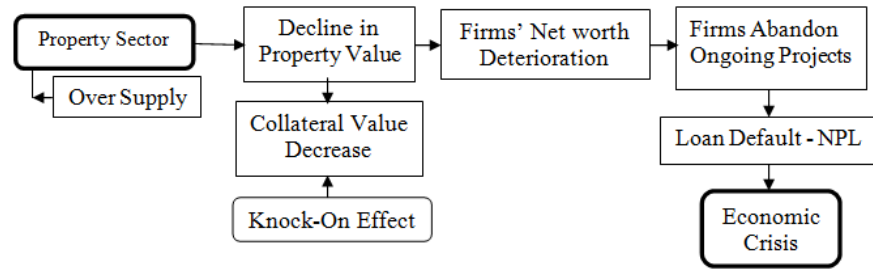
Figure 3.18 The Relationship between the Property Sector and the Overall Economy

Recent literature shows the impact of the banking sector on the property sector, and finally the economy, for example, in the work of Collyns and Senhadji, 2002:1-32; Liang and Cao, 2007: 63-75; and Mora, 2008: 57-87. The origin of the economic crunch mainly derived from the weak balance sheet of commercial banks as a result of the decrease in property prices (Bernanke and Gertler, 1999: 20). Figure 3.19 implies that the problem that originated in the banking sector could influence the property sector and finally led to the economic crisis. Assuming that banks have only basic transactions, their balance sheets consist of reserves and loans on the asset side, as well as deposits and bank capital on the liability side. A decrease in property prices leads to collateral price decreases, resulting in a decrease in banks' assets due to the fact that collateral assets are used to guarantee loans.

According to the law of double entry accounting, low collateral prices lead to a decrease in bank capital. In order to stabilize balance sheets, banks have to decrease the supply of loans in order to maintain liquidity, since banks cannot reduce their minimum reserves because they have to comply with regulatory requirements. This situation leads to a credit crunch (Bessler, Leatham and Juan, 2005: 5). In addition, the excess demand on getting loans leads to interest rate increases. Then, the increased interest rates enhance the investment capital significantly. Consequently, most rational investors limit their borrowing at this stage, while irrational borrowers still borrow money from banks (Stigliz and Weiss, 1981: 393). Due to asymmetric information or incomplete information of borrowers, the problem of adverse selection occurs. Banks have poor ability to differentiate good borrowers from bad borrowers, and banks with poor ability are thereby unlikely to give loans (Mishkin, 2005: 189). The concern also

increases risk in their portfolios (Stigliz and Weiss, 1981: 409). Therefore, banks curtail their supply of loans. Such an issue results in lower economic activity and consequently leads to economic crisis. In conclusion, a banking crisis, which can be characterized by a drop in the supply of credit, affects entrepreneurs that need liquidity and impacts the economy.
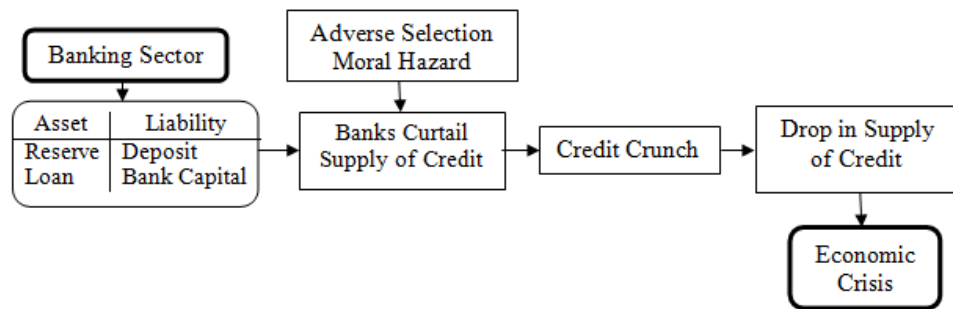
Figure 3.19 The Relationship between the Commercial Banking Sector and the Overall Economy

In conclusion, collateral assets connect property and commercial banking sectors and make these two sectors depend greatly on each other. This can be seen clearly, for example, when developers run their construction projects. Construction projects require a high budget. Most developers, with limited self-funding, borrow 30-50 percent of the land price. They also borrow 80 percent of the project cost, and the remaining 20 percent of the projects is self-funded (TDRI, 2004: 52).

Figure 3.20 shows the linkages among the property sector, the commercial banking sector, and the overall economy. In order to borrow money from banks, developers use their on-going projects as collateral assets. These collateral assets then become the assets of the banks. During an economic recession period, market uncertainties occur with low consuming confidence, especially regarding durable goods such as high-price properties. Low demand for properties, intensive construction, and oversupply during a boom period result in a decrease in property price. Banks' balance sheets also deteriorate due to the collateral devaluation. This deterioration in the banks' balance sheets then results in a decline in the banks' capital; thus lending sources and amounts are limited. Next, banks decrease their loan supply

to the market. Consequently, firms' net worth deteriorates. In short, firms have low borrowing ability because of the low collateral values (Mishkin, 2005: 190). The firms finally default their loans and become NPLs, which causes an economic crisis.
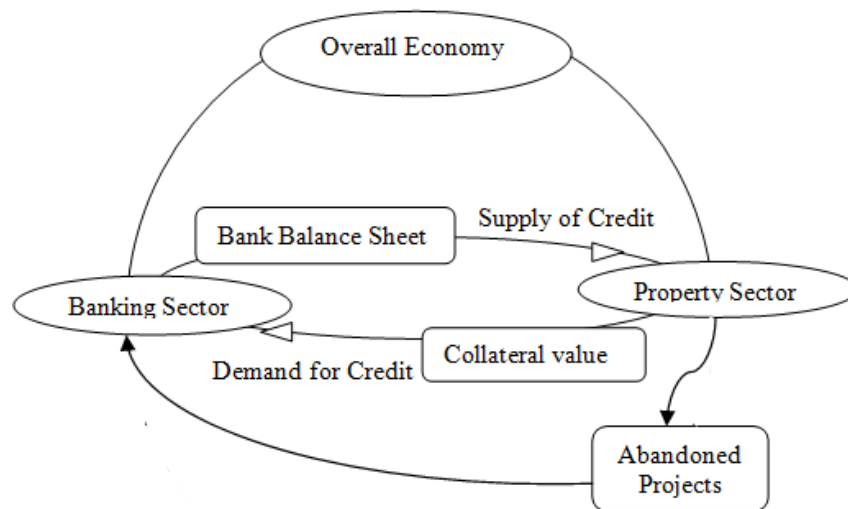
Figure 3.20 Linkages among the Property Sector, the Commercial Banking Sector, and the Overall Economy

3.4 The Government Policies on the Property and the Commercial Banking Sector

It is widely accepted that the property and financial sectors are a stimulation to the economy because they exert large impacts on the entire economy; for example, they generate massive investment, employment, and consumption. There were many times when Thailand issued both fiscal policy via government investments and tax reductions, and monetary policies via the reduction of the one-day repurchase rate, with the purpose of stimulating economic recession. This study therefore investigates the magnitude of these policies on the sectors. Therefore, Thai Kem Keng—a government investment—is simulated in order to find the extent to which the policy actually impacts the Thai economy. The following section shows how government policies relate to the property and banking sectors, and their impact on the Thai economy.

3.4.1 Government Investment

Since the 1997 Asian Economic Crisis, the Thai government has launched various measures and policies to boost the economy, including tax reduction and investment in mega projects. In 2009, the government has launched Stimulus Plan II or the Thai Kem Keng Program—a 3-year project with a value of 1.56-billion Baht. This project intends to invest in the main areas of the seven sectors, including infrastructure development, farm irrigation and water supply, increasing income and quality of life for the south, education, tourism, developing creative economy, and healthcare. The program focuses on infrastructure investment via the public works sector.

Figure 3.21 shows how the fiscal policy of the Thai Kem Keng Program affects the linkages. The policy stimulates the investment in public works and results in an increase in property prices, higher employment in other sectors, and more economic output. This policy also leads to more investments in the property sector, resulting in a collateral value increase and strengthening bank balance sheets. Those activities enable the banks to provide loans to the market and later spur the entire economy.
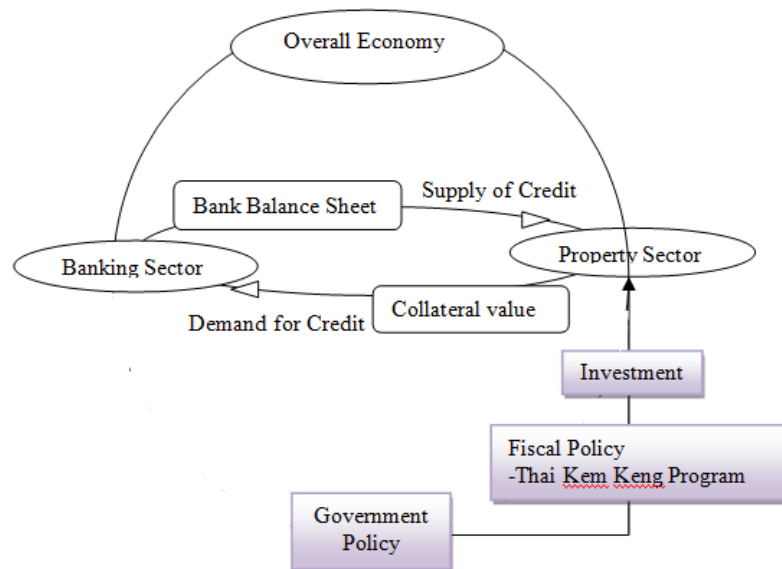
Figure 3.21 The Impact of the Thai Kem Keng Program on the Linkages among the Property Sector, the Commercial Banking Sector, and the Entire Economy

3.4.2 Tax Policies

From the 1997 Financial Crisis until June 2010, the Thai government resorted to the implementation of tax incentives on the property market in order to stimulate the economy. Figure 3.22 shows the tax incentive consisting of a reduction in transfer fees, from 2 percent to 0.1 percent, a reduction in mortgage fees, from 1 percent to 0.1 percent, and a reduction in special business taxes, from 3 percent to 0.1 percent. These incentives encourage entrepreneurs to invest more and also encourage home buyers to purchase housing. This led to economic prosperity due to the high demand for credit.
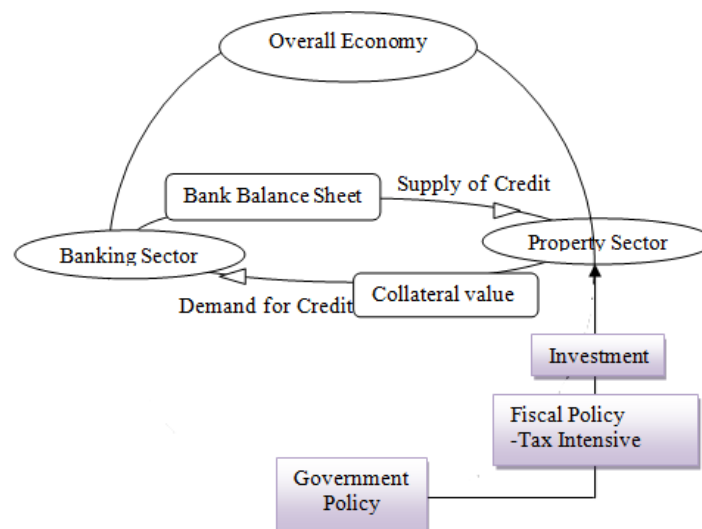
Figure 3.22 The Impacts of Tax Policy on the Linkages among the Property Sector, the Commercial Banking Sector, and the Entire Economy

3.4.3 Interest Rate Policy

In addition to the implementation of the fiscal policy, the government has also used the monetary policy instrument, including lowering interest rates policy, to stimulate the economy. Since the end of 2008, Thailand has been using a somewhat loose monetary policy. The BOT gradually lowered the one-day repurchase rate several times from 3.75 percent to the lowest rate in the past five years at 1.25 percent

(Bangkok Post, Jan 14, 2010: B2), with the intention of stimulating and increasing investment.

Figure 3.23 shows that a decrease in the interest rate policy leads to a decline in banks' interest rate, for both loans and savings. During an economic recession period, the BOT decreases its interest rate policy, which results in a decrease in the loan interest rate. Entrepreneurs thereby have lower investment costs. They finally need more loans for more investments, resulting in economic growth. Although a decrease in interest rates helps stimulate the economy, it also leads to inflation. Therefore, in order to control inflation, when there were signs of economic recovery in the world and the region, the BOT raised its interest rate policy several times. At present (April, 2011), the rate has reached 2.75 percent (The Nation, 2011). In addition, some foreign countries use this policy to stimulate their economies; for example, during the U.S. economic slowdown in 2002-2003, the Federal Reserve stimulated the housing market by lowering the federal fund rate. This stimulation leads to a large decrease in the mortgage rate, an increase in housing sales and prices, and encourages building construction and finally economic recovery (Hofe, 2007: 70).
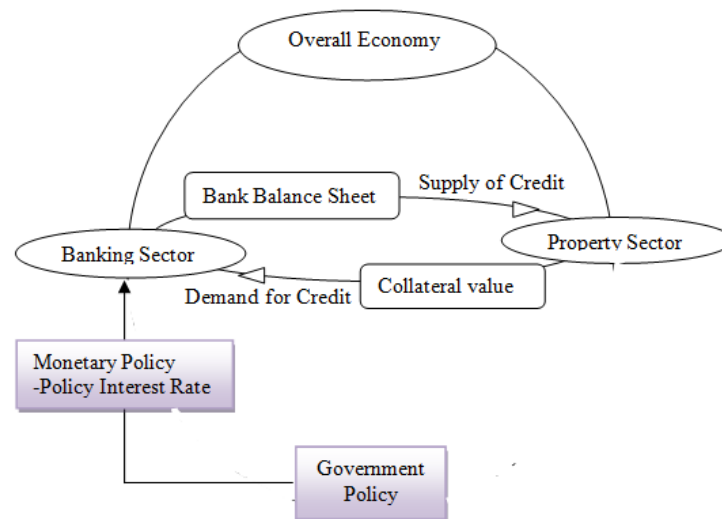
Figure 3.23 The Impacts of Policy Interest Rate on the Linkages among the Property Sector, the Commercial Banking Sector, and the Entire Economy

CHAPTER 4

THE SOCIAL ACCOUNTING MATRIX AND THE FINANCIAL ACCOUNTING MATRIX FOR THAILAND

In order to understand the linkages between the property and commercial banking sector, and their impacts on the Thai economy, the Social Accounting Matrix model (SAM) and the Financial Social Accounting Matrix model (Financial SAM) are employed in the present study. In addition, the 2004 SAM Table and the 2004 Financial SAM Table were newly-constructed with the purpose of analyzing the characteristics of the Thai economic structure and to be used as a database in the SAM model and the Financial SAM model.

This chapter describes the SAM model in Section 4.1. Section 4.2 describes the Financial SAM model. Section 4.3 shows the details of the 2004 SAM and the 2004 Financial SAM for Thailand. The last section, section 4.4, presents the structural characteristics of the Thai economy analyzed based on the 2004 SAM and the 2004 Financial SAM table.

4.1 The 2004 Social Accounting Matrix for Thailand

For decades, the SAM model has been a popular tool for economic analysis in various areas, such as economic growth, income distribution, and fiscal policy (Roland-Holst, Sancho, 1995: 361). It is the result of extending the classic Leontief input-output models, which focus on inter-industry relationships by including various types of institutions representing consumption linkages (Breisinger, Thomas and Thurlow, 2009: 17). The SAM contains complete information on different institutional accounts, that is, income and expenditure flows in activities and commodities. This means that the circular flow of income from an institution becomes another

expenditure of an institution. The circular flow of the transaction is illustrated in Figure 4.1.
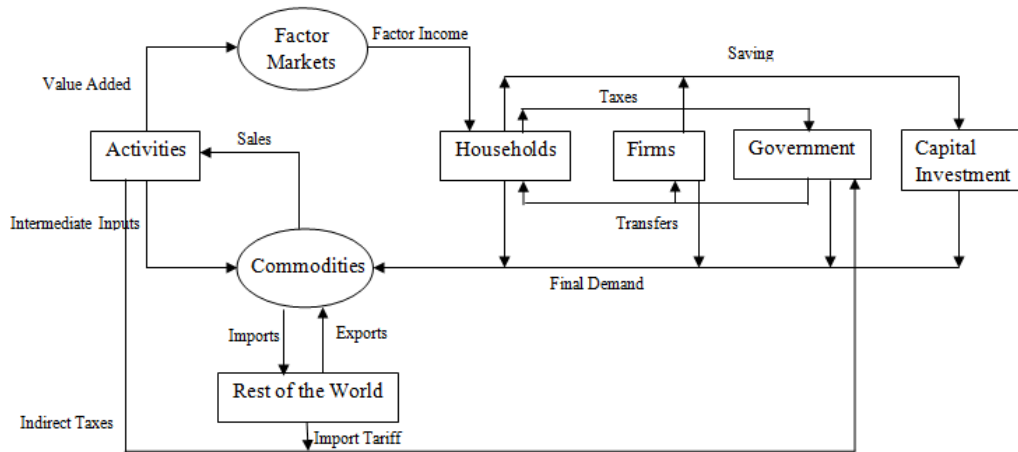
Figure 4.1 Circular Income Flow

Source: Chung-I Li, 2002: 2.

The SAM is a square matrix in which its rows illustrate deliveries of commodities or sources of income, and the columns are the usage of commodities or expenses. The total of rows and columns must be equal according to the double-entry accounting principle. (Round, 2003: 14-1). The general element of the social accounting matrix is as follows:

t_{ij} , i =1,2,3…………n, and j=1,2,3…..…..n

t_{ij} is each sector in the SAM matrix, i is the row of each sector that represents income, and j is expenditure column of each sector that represents expenditure.

This means that the expenditure of sector j constitutes a receipt for sector i.

Generally, there are 6 mains accounts: activities, commodities, factors of production, institutions, aggregated capital accounts, and the Rest of the World (ROW). The activity and commodity accounts are separated because an activity can produce more than one type of commodity, and a commodity can be produced by more than one activity (Breisinger, Thomas and Thurlow, 2009: 2). Moreover, the concept of the SAM is based on the assumption that prices are fixed. Therefore,

changes in demand result in changes in output, not prices. It implies that the resources are unconstrained, which leads to an increase in demand that matches the supply, resulting in an economic equilibrium.

The 2004 SAM Table that was used as a database in this study was constructed by Roland-Holst (2009). The method begins with collecting data from various sources, such as the 2000 Input-Output Table established by the Office of the National Economic and Social Development Board (NESDB), the 2004 National Accounts published by NESDB, the 2004 Trade Data estimated by the United Nations Conference on Trade and Development (UNCTAD), and the Household Survey Data from the SES National Representative Household Survey. The 2004 SAM exhibits different accounts from the general SAM. Some main accounts in the 2004, i.e. government account, are separated into sub-accounts, such as taxes. The 2004 SAM consists of 13 accounts: activities, commodities, import tariffs, labor, capital, households, enterprises, government, indirect taxes, transfer taxes, direct taxes, capital accounts, and the ROW.

Table 4.1 shows the structure of the 2004 SAM explains the meanings of each cell entry. The following is an example of the explanation of a household's cell in row and column entries. The household row shows household income. That is, households receive incomes since they own their labor force, which is a factor of production. They receive profit from their assets as capital income and operating surplus from the enterprise. They also receive transfer payments from their governments, including social security services and pensions. In addition, they receive income when any family members work abroad in terms of remittance from abroad that is recorded in the ROW's entry. The household column shows that households purchase commodities for consumption, for paying import tariffs for imported products, paying interest payments, transferring money to the government, and paying taxes to the government. The difference of incomes and expenditures in households becomes the households' savings. In addition, households send money to their family living abroad. This transaction is recorded in the 2004 SAM, referring to money transferred from household to the ROW. Table 4.2 illustrates the data used in the study.

Table 4.1 The Structure of 2004 Social Accounting Matrix for Thailand

	Activities	Commodities	Tariff	Labor	Capital	Households	Enterprises	Government	Indirect Taxes	Transfer Taxes	Direct Taxes	Capital Acct.	ROW	Total
Activities		Sales (Domestic Supply)												Total Domestic Production
Commodities	Intermediate Inputs					HH Consumption		Government Consumption				Investment Expenditure	Exports	Total Market Supply
Import		Import Tariff				Import Tariff		Import Tariff				Import Tariff		Import Tariffs
Labor	Value-Added													Factor Income
Capital	Value-Added													Factor Income
Households				Labor Income	Capital Income		Operating Surplus	Government Transfers					Remittances from Abroad	Household Income
Enterprises					Operating Surplus	Interest payment		Government Transfers						Enterprises Income
Government					Factor Paym. Govt.	HH Transfer to Govt.	Ent. Transfer to Govt.		Indirect Taxes	Import Tariffs	Direct Taxes		Foreign Grants	Government Income
Indirect Taxes	Indirect Taxes	Sales Taxes												Indirect Taxes
Transfer Taxes			Import Tariffs											Transfer Taxes
Direct Taxes						Income Taxes	Corporate Taxes							Direct Taxes
Capital Acct.						HH Savings	Enterprise Savings	Government Savings						Total Savings
ROW			Import c.i.f		Factor Paym. Abroad	HH to ROW		Interest Paym. to ROW				Net Investment Abroad		Payments to ROW
Total	Gross Output	Domestic Absorption	Import Tariff	Value-Added	Value-Added	Households Expenditure	Enterprise Expenditure	Government Expenditure	Indirect Taxes	Transfer Taxes	Direct Taxes	Investment	Foreign Exchange Earning	

Source: Modified from Roland-Holst, 2009.

Table 4.2 The 2004 Thailand Social Accounting Matrix for Thailand

(Unit: Billion Baht)

	Activities	Commodities	Tariff	Labor	Capital	Households	Enterprises	Government	Indirect Taxes	Transfer Taxes	Direct Taxes	Capital Acct.	ROW	Total
Activities		17,249												17,249
Commodities	11,484					2,916		636				1,024	3,887	19,946
Import		2,698				390		0				435		3,522
Labor	1,786													1,786
Capital	2,647													2,647
Households				1,786	1,573		376	85					68	3,887
Enterprises					760	27		51						838
Government					80	33	7		1331	302	434		55	2,241
Indirect Taxes	1,331													1,331
Transfer Taxes			302											302
Direct Taxes						118	316							434
Capital Acct.						389	139	1,198						1,725
ROW			3,220	235	14			272				267		4,009
Total	17,249	19,946	3,522	1,786	2,647	3,887	838	2,241	1,331	302	434	1,725	4,009	59,917

Source: Modified from Roland-Holst, 2009.

4.2 The 2004 Financial Social Accounting Matrix for Thailand

Besides the SAM, the Financial SAM was also used in order to carry out the detailed analysis of financial part of the present study, which represents another significant section of the study. The Financial SAM is a SAM-based model, which incorporates financial sectors and the flow of funds into the matrix. The Financial SAM captures the structure of financial markets, consisting of financial instruments, i.e. currencies, bonds, loans, and financial agents, i.e. commercial banks and the central bank.

Unlike the general SAM, which has only one aggregate capital account, the capital account is disaggregated by each institution in the Financial SAM. It can be said that the Financial SAM is different from the SAM in that the Financial SAM provides more details on the capital account, which show the savings behavior of each institution. The Financial SAM also includes the banking system, consisting of commercial banks and the Central Bank, which play the major role in financial transactions. In other words, the Financial SAM shows not only transactions of real activities but also financial transactions, which have been separated into each institution, as seen in Figure 4.2.
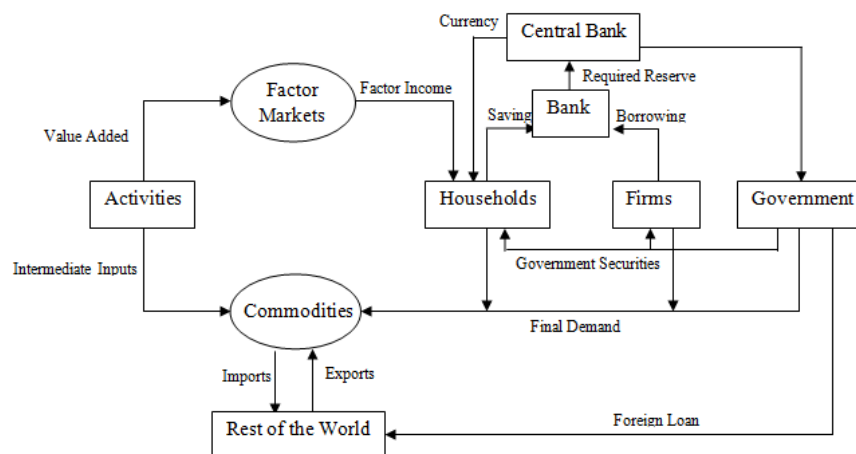
Figure 4.2 Circular Income Flow with Financial Transactions

Source: Adapted from Chung-I Li, 2002.

The schematic of the Financial SAM consists of three main areas: the traditional SAM, capital accounts, and financial accounts. Table 4.3 shows the schematic of the 2004 Financial SAM, which consists of three main areas: area I, area II, and area III. Area I presents the real side of the economy, which resembles the general SAM. Area II shows the savings for each institution. Area III shows the flows of financial assets and liabilities.

Table 4.3 The Schematic of the 2004 Financial SAM

OUTFLOWS/ INFLOWS		Production	Factors of Production	Current Accounts of Institutions	Capital Accounts of Institutions	Financial Flows	Total Incomes
Production	Activities						
	Commodities						
	Import						
Fac. of Prod.	Factors of Production						
Current Accounts of Institutions	Households			AREA I			
	Enterprises						
	Government						
	Indirect Tax						
	Import Tax						
	Direct Tax						
	ROW						
Capital Accounts of Institutions	Households				AREA II	AREA III	
	Enterprises						
	Government						
	Commercial Bank						
	BOT						
	ROW						
Financial Flows	Currency				AREA III		
	Depoisits						
	Government Bond						
	Domestic Bank Loan						
	Foreign Loans						
	Reserve						
	Foreign Reserve						
	Other Asset/ Liability						
	Total Expenditure						

Source: Modified from Wong, Azali and Chin, 2009: 13.

The 2004 Financial SAM table used in this study was extended from the 2004 SAM by including financial transactions. There were 79 accounts consisting of 12 sectors of activities, 12 sectors of commodities, 12 sectors of import tariffs, 2 factors of production, 10 levels of household income groups, the firm, the government, an indirect tax account, an import tax account, a direct tax account, a commercial bank, the BOT, the ROW. In addition, the capital account of institutions consists of the 10 groups of households income group, the firm, commercial banks, and the BOT. In Financial Accounts, there are 8 types of assets and liabilities: currencies, deposits, government bonds, domestic bank loans, foreign loans, required reserves, foreign reserves, and other assets/liabilities (see Appendix A).

4.3 Details of the 2004 SAM and the 2004 Financial SAM for Thailand

4.3.1 The Activity Account

The activity account illustrates the goods and services produced that are used in the production process. The row entry shows the income of the activity account, which is derived from selling goods and services, both domestically and internationally. The expenditures shown in the column represent the purchasing of intermediate commodities, paying wages and salaries to labors, paying interests and rents to capitals, and paying indirect taxes.

In the 2004 SAM, the income of 17,249 billion Baht was from selling goods and services, both domestically and internationally, while the expenditures of 11,484 billion Baht was the expense on wages and salaries (1,786 billion Baht), interests and rents to capitals (2,647 billion Baht), and indirect taxes (1,331 billion Baht).

4.3.2 The Commodity Account

In general, commodities are those goods and services produced by domestic activities. The income from the commodity accounts (row) derives from selling goods and services to the domestic market for use in the production process, for selling commodities to households, for the government for their final consumption, and for investment. The expenses (column) are from buying domestic supplies to produce commodities, including buying imported merchandise to be used in the production process.

In this paper, the commodity accounts purchased locally produced commodities at 17,249 billion Baht and imported goods at 2,300 billion Baht. It paid imported tariffs at 302 billion Baht. The income from the commodity accounts was 19,946 billion Baht, consisting of 11,484 billion Baht from the sale of commodities for use in the production process of other sectors, 2,916 billion Baht from the sale of commodities to households, 636 billion Baht from the sale of commodities to the government, 1,024 billion Baht for investment, and 3,887 billion Baht from exporting to the rest of the world.

4.3.3 Factors of Production

The factors of production or the value added or the GDP at factor cost dictate the primary factors used in the production process, which consist of labor and capital. In the labor account, the row entry illustrates the compensations and salaries given to employees that sell their service to the activities account. The column entry shows the payment, which is distributed among households. In the capital factor account, the row entry depicts the income payments in the form of rents and profits, received by the given account. The column entry indicates the capital factor income divided among firms, government, and the rest of the world.

In the labor account, the row entry shows the income of 1,786 billion Baht that employees received in terms of wage from the activities account; on the other hand, the amount of 1,786 billion Baht becomes the payment of the labor account that is distributed to the household account. In the capital factor account, the row entry depicts the income of 2,647 billion Baht that the capital factor account receives in the form of rents and profits from the activity account. In addition, the column entry shows the expenses of 2,647 billion Baht that the capital factor account distributes among households (1,573 billion Baht), firms (760 billion Baht), the government (80 billion Baht), and the rest of the world (235 billion Baht).

4.3.4 Current Account of Institutions

The institutes in the 2004 SAM have been disaggregated into four institutions: (i) households, (ii) firms, (iii) the Government, including the subsector of indirect tax, transfer tax, and direct tax, and (iv) the ROW. Each institution shows the sources and uses of income.

The income of the households consists of wages and salaries (labor income) and gains from capital (capital income), transfers from firms, the government, and the ROW. Expenditures consist of consumption, income taxes, savings, and the transfers to the ROW. According to the 2004 SAM, household income is comprised of the wages and salaries (1,786 billion Baht) and gains from capital (1,573 billion Baht), the transfers from firms (376 billion Baht), the transfers from the government (85 billion Baht), and transfers from the ROW (68 billion Baht). Expenditures consist of consumption (2,916 billion Baht), income taxes (118 billion Baht), savings (389

billion Baht), and transfers to the rest of the world (14 billion Baht). In the study, the household is separated into 10 levels of income groups in order to analyze the impact of Thai Kem Keng Policy on household income distribution in chapter 5.

Firms receive an operating surplus, an interest payment from households, and transfers from the government, while expenditures arise from the transfers to households, the government, corporate tax payments, and savings. From the total firms' income, 760 billion Baht is from the operating surplus, 27 billion Baht from the transfers from households, and 51 billion Baht from the transfers from the government. The expenditures arise from the transfers to households (376 billion Baht), the transfers to the government (51billion Baht), corporate tax payments (316 billion Baht), and savings (139 billion Baht).

The government obtains revenue from various types of taxation schemes, including indirect taxes (1,331 billion Baht), income taxes 434, and import tariffs (302 billion Baht). The government also receives transfer payments from ROW in term of foreign grants (55 billion Baht). The government's expenditures are government consumption, transfers to households, firms, the rest of the world, and government savings. Six hundred and thirty-six billion Baht for government consumption, 85 billion Baht for transfers to households, 51 billion Baht for transfers to firms, 1,198 billion Baht for government savings, and the interest payment to the ROW of 272 billion Baht.

The incomes for the ROW are import purchases, the remittance remitted to family members living abroad, and interest payments from the government. The ROW expenses are payments from exports and the remittance received from family members living abroad, foreign grants, and foreign savings. The 3,220 billion Baht of domestic imports, 14 billion Baht of household transfers, and 272 billion Baht of the government's interest payment provide income for the ROW. The ROW expenses are 3,887 billion Baht for exports, 68 billion Baht of the remittance received from family members living abroad, and 55 billion Baht to foreign grants, plus 235 billion Baht of foreign savings.

The capital account of institutions in the 2004 Financial SAM was different from the 2004 SAM by including more new institutions of commercial banks and the BOT. Moreover, new components of the financial account consisting of currencies,

deposits, government bonds, domestic bank loans, foreign loans, required reserves, foreign reserves, and other asset/liabilities were added into the matrix.

4.3.5 Aggregates Capital Account (2004 SAM)

In the 2004 Financial SAM, the aggregated capital account represents the savings from the following institutions: 389 billion Baht from households, 139 billion Baht from firms, and 1,138 billion Baht from the government. Simultaneously, the domestic investment of 1,024 billion Baht, the import tariff of 435 billion Baht, and foreign investment of 267 billion Baht in the column entry is equal to the total investment of 1,725 billion Baht. It can be seen that the total savings of 1,725 billion Baht in the row entries equals the total investment of 1,725 billion Baht shown in the column entry.

4.3.6 Disaggregates Capital Account (2004 Financial SAM)

In the Financial SAM, the capital account disaggregated according to institutions and financial instruments. The row refers to the resources available to institutions in the form of savings and financial assets by agents, while the column shows the usage of available resources by institutions regarding the investment in goods and financial liabilities by agents.

In the 2004 Financial SAM, the disaggregated capital account represents the savings from the following institutions: 389 billion Baht from households, 139 billion Baht from firms, and 1,138 billion Baht from the government. This can be seen from the row entry, which has a total investment of 1,725 billion Baht, shown in the column entry. Simultaneously, the combination of 1,024 billion Baht in domestic investment, 435 billion Baht in import tariffs, and 267 billion Baht in foreign investment in the column entry equals a total investment of 1,725 billion Baht.

4.3.7 Financial Account

The study of the financial account shows that the financial liabilities of an institution are the financial asset of other institutions, which need to be balanced. In this study, the financial account consists of 8 financial assets categorized with respect

to institutions, names, currencies, deposits, government bonds, domestic bank loans, foreign loans, required reserves, foreign reserve, and other asset/liabilities.

In this study, the financial account illustrates the financial liabilities and assets of each institution: (i) households, (ii) firms, (iii) the Government, (iv) commercial banks, (v) the Central Bank, and (vi) the ROW. An institution's asset is a liability of the others according to the double-entry bookkeeping accounting rule. The asset refers to the use of funds, while the source of funds is a liability. The study shows only some assets and liabilities of each institution in the balance sheet due to the concerned areas, while other assets and liabilities are left in other asset or liability items. The assets and liabilities of agents are shown as follows.

4.3.7.1 Households

Households hold currencies, bank deposits, government bonds, while the liabilities are loans and savings.

4.3.7.2 Firms

The firm's assets comprise currency, deposits in banks, and the purchase of government bonds, while liabilities or sources of funds are domestic and foreign loans and savings.

4.3.7.3 The Government

The government's assets are comprised of deposits in banks, while the liabilities consist of bond issuing to households, firms, commercial banks, and the BOT, domestic loans, foreign loans, and savings.

4.3.7.4 Commercial Banks

Commercial banks are profit maximization agents. They receive deposits from households, firms, and the government and convert the deposits to credits for borrowers. However, banks are not able to lend all of the cash deposits they received, as some portions of such deposits need to be reserved at the BOT. Commercial bank assets consist of capital requirements, government bonds, private loans, and public loans. The liabilities of banks are deposits and foreign loans.

4.3.7.5 The BOT

The BOT's liabilities are currency issuing to households, firms, and capital requirements from commercial banks. On the assets side, the BOT holds government bonds and foreign reserves.

4.3.7.6 The ROW

ROW assets are loans from commercial banks, firms, and the government, while the liabilities are capital reserves.

Table 4.4 shows the balance sheets of each institution, including assets and liabilities.

Table 4.4 Financial Balance Sheets

(Million Baht)

Households			
Assets		**Liabilities**	
Currency	53,051	Borrowing	172,877
Bank Deposits	142,798	Savings	389,000
Government Bonds	96,062		
Other Financial Assets	269,966		
561,877		**561,877**	

Enterprises			
Assets		**Liabilities**	
Currency	5,634	Bank Loans	315,149
Bank Deposits	88,346	Foreign Loans	63,843
Government Bonds	54,293	Savings	138,900
Other Financial Assets	369,619		
517,892		**517,892**	

Government			
Assets		**Liabilities**	
Bank Deposits	50,508	Securities held by HH	96,062
Other Financial Assets	1,389,368	Securities held by Firms	54,293
		Securities held by Bank	8,734
		Securities held by BOT	16,438
		Bank Loans	6,360
		Foreign Loans	59,989
		Savings	1,198,000
1,439,876		**1,439,876**	

Table 4.4 (Continued)

Commercial Banks

Assets		Liabilities	
Reserves	408,217	HH Deposit	142,798
Government Bonds	8,734	Firms Deposit	88,346
Loans to Households	172,877	Gov. Deposit	50,508
Loans to Firms	315,149	Foreign Loans	37,549
Loans to the government	6,360	Other Financial Liabilities	592,136
	911,337		**911,337**

Bank of Thailand (BOT)

Assets		Liabilities	
Government Bonds	16,438	Currency - HH	53,051
Foreign Reserves	229,927	Currency - Firms	5,634
Other Financial Assets	220,537	Reserves	408,217
	466,902		**466,902**

The Rest of the World

Assets		Liabilities	
Foreign Loans -Commercial Bank	37,549	Foreign Reserves	229,927
Foreign Loans -Firms	63,843		
Foreign Loans -Government	59,989		
Other Financial Assets	68,546		
	229,927		**229,927**

Source: Flow of Funds, 2004; BOT, 2007.

4.4 The Thai Economic Structure

Based on the 2004 SAM and the 2004 Financial SAM for Thailand, the structure of the Thai economy can be illustrated as follows.

4.4.1 The Structure of Production

According to the United Nation System of National Accounts (UNSNA), the Gross Domestic Product (GDP) can be computed by three methods: expenditures, incomes, and production revenues (Pak Tongsom, 2005: 20-22). Table 4.5 shows the GDP according to the expenditure and income methods, which is equal to 6,067

billion Baht. The former is the combination of household consumption, government consumption, investment, and net exports. The latter is comprised of labor compensation, capital income, and government income. For the expenditure method, the exports contribute the major share of 64.1 percent, followed by household consumption expenditures at 48.1 percent and imports at 39.5 percent. The highest share from exports indicates that the Thai economy depends mainly on its export industry. For the income method, the capital income contributes the highest proportion of 43.6 percent, followed by 29.4 percent of wage payments, and 21.9 percent of net production taxes. The high share of capital income indicates that most of the workers in Thailand are self-employed, and their incomes are recorded as capital income.

Table 4.5 Expenditure and Income Approaches of the GDP

(Billion Baht)

GDP	Value	%
Expenditure Approaches		
Exports	3,887	64.1
HH	2,916	48.1
Imports	2,396	39.5
Capital Account	1,024	16.9
Government	636	10.5
GDP	6,067	100.0
Income Approaches		
Capital	2,647	43.6
Labor	1,786	29.4
Indirect Tax	1,331	21.9
Transfer Tax	302	5.0
GDP	6,067	100.0

The value added is the difference between expenditure on the intermediate consumption and the gross output. It is indented for paying for labor services and capital interest and net indirect taxes (Pak Tongsom, 2008: 60). In analyzing the value added, there are 12 sectors in the entire Thai economy, in which the property sector is

separated into the residential building sector, the non-residential building sector, the public work sector, and the real estate sector. In Table 4.6, the highest share of value added goes to heavy industry, which contributes 25.91 percent of the GDP, followed by 19.02 percent of light industry, and 15.50 percent of agriculture. The property and financial sectors, however, occupy the low to lowest share of the GDP.

Table 4.6 Sectoral Shares of Value Added

(Billion Baht)

Production Sectors	Gross Value Added	% share in GDP
Heavy Industry	1,149	25.91
Light Industry	843	19.02
Agriculture	687	15.50
Public Service	547	12.34
Private Service	467	10.54
Energy	352	7.93
Real Estate	168	3.78
Other Financial Institutions	70	1.59
Public Works	66	1.50
Commercial Banks	65	1.47
Non-Residential Building	10	0.22
Residential Building	9	0.21
Total	4,434	100.00

In terms of investment expenditures, as can be seen in Table 4.7, the heavy industry also occupies the highest share. The industry contributes 48.64 percent to the GDP, followed by public work, non-residential building, and residential building sectors with a percentage of 24.33, 10.50, and 7.90, respectively. That means that the property industry has a high share of investment so that these sectors generate a high volume of employment for the society. Therefore, the problems in these sectors provide a high impact on the Thai economy.

Table 4.7 Sectoral Shares in Country's Investment

(Billion Baht)

Production Sectors	Investment	% share in Total INV
Heavy Industry	498	48.64
Public Works	249	24.33
Non-Residential Building	107	10.50
Residential Building	81	7.90
Light Industry	78	7.65
Energy	8	0.74
Real Estate	1	0.12
Agriculture	1	0.12
Commercial Banks	-	-
Other Financial Institutions	-	-
Private Service	-	-
Public Service	-	-
Total	1,024	100.00

As can be seen from Table 4.8, among the goods and services produced by 12 sectors in the whole economy, it was found that the non-residential building and public work sectors were completely consumed domestically (100 percent). This indicates that the impact from the world market does not affect these sectors and vice versa. The residential building of 98.47 and real estate sectors of 86.17 are consumed domestically, while the rest is exported to the world market. The major share of exports, of 38 percent, goes to light industry.

Table 4.8 Sectoral Shares in Domestic and Export Market

(Billion Baht)

Production Sectors	Domestic	Export
Non-Residential Building	100.00	-
Public Works	100.00	-
Commercial Banks	99.55	0.45
Other Financial Institutions	99.49	0.51
Residential Building	98.47	1.53
Agriculture	95.79	4.21
Public Service	90.92	9.08
Real Estate	86.17	13.83
Heavy Industry	79.54	20.46
Energy	75.31	24.69
Private Service	70.44	29.56
Light Industry	61.72	38.28
Total	77.47	22.53

The factors of production consist of wage payments and capital income, as can be seen in Table 4.9. The public service sector (25.72 percent) occupies the biggest share in total wage payment, followed by the heavy industry sector (19.87 percent), while the construction building sector, comprised of residential and non-residential building, occupies the lowest shares with 0.28 percent and 0.21 percent respectively.

Table 4.9 Sectoral Shares in the Factor of Production: Labor Income

(Billion Baht)

Production Sectors	Labor	% of Labor
Public Service	459.43	25.72
Heavy Industry	354.96	19.87
Light Industry	271.28	15.19
Private Service	228.73	12.80
Energy	191.37	10.71

Table 4.9 (Continued)

Production Sectors	Labor	% of Labor
Agriculture	154.34	8.64
Commercial Banks	42.13	2.36
Other Financial Institutions	34.63	1.94
Public Works	22.22	1.24
Real Estate	18.44	1.03
Residential Building	5.08	0.28
Non-Residential Building	3.73	0.21
Total	1,786.33	100.00

As can be seen in the table regarding capital income (Table 4.10), the heavy industry sector also contributes the highest proportion in total capital income (29.98 percent), followed by light industry with 21.61 percent, while the construction sector, which consists of the public work sector, non-residential building, and residential building rated low to the lowest, with 1.67, 0.23 and 0.16 percent of the shares, respectively.

Table 4.10 Sectoral Shares in the Factor of Production: Capital Income

(Billion Baht)

Production Sectors	Capital	% of Capital
Heavy Industry	793.75	29.98
Light Industry	572.21	21.61
Agriculture	532.80	20.13
Private Service	238.38	9.00
Energy	160.30	6.05
Real Estate	149.31	5.64
Public Service	87.52	3.31
Public Works	44.09	1.67

Table 4.10 (Continued)

Production Sectors	Capital	% of Capital
Other Financial Institutions	35.67	1.35
Commercial Banks	22.86	0.86
Non-Residential Building	6.13	0.23
Residential Building	4.36	0.16
Total	2,647.38	100.00

4.4.2 The Sources and Uses of Income

The sources and uses of institution income are as follows.

4.4.2.1 Households

Table 4.11 shows the income sources and uses in households. In 2004, 1,786 billion Baht in labor wages, accounting for 45.96 percent of households' total income, was allocated. The 1,573 billion Baht of capital income reflects 40.46 percent of total income. They also received the transfer of 376 billion Baht (9.67 percent) from firms, the transfer of 85 billion Baht (2.18 percent) from the government, and the transfer of 68 billion Baht (1.74 percent) from the rest of the world. The highest share of the wages from labor indicates that the service sector, in which there are plenty of employees, plays the most significant role as it is the sector that provides an income source for households.

For household expenditure, 2,916 billion Baht (75.03 percent) was the final consumption, 404 billion Baht (10.39 percent) was transferred to the rest of the world, 389 billion Baht (10.01 percent) was saved, 118 billion Baht (3.03 percent) was spent on income taxes, 33 billion Baht (0.85 percent) was transferred to the government, and 27 billion Baht (0.70 percent) was transferred to enterprises. It is evident that households spend most of their income on consumption.

Table 4.11 Sources and Uses of Household Income

(Billion Baht)

Sources and Uses of Income	Value	% share
Income		
Wages of labor	1,786	45.96
Capital income	1,573	40.46
Transfers from firms	376	9.67
Transfers from the government	85	2.18
Transfers from the ROW	68	1.74
Total income	3,887	100.00
Expenditure		
Final consumption expenditure	2,916	75.03
Transfers to the ROW	404	10.39
Savings	389	10.01
Direct tax paid to the government	118	3.03
Transfers to the government	33	0.85
Transfers to firms	27	0.70
Total expenditure	3,887	100.00

As can be seen in Table 4.12, in 2004 only the households at levels 6 – 10 had some savings. This means that their incomes exceeded their expenditures. Therefore, the study assumes that only this household group used their savings in purchasing durable assets, and the rest was borrowed from banks.

Table 4.12 The Savings of Households

(Billion Baht)

Households Level	Savings
HH1	-0.00000012
HH2	-0.00000009
HH3	-0.00000010
HH4	-0.00000009

Table 4.12 (Continued)

Households Level	Savings
HH5	-0.00000007
HH6	0.70414583
HH7	13.36393
HH8	13.96680
HH9	39.93203
HH10	321.00238
Total	388.96929

4.4.2.2 Enterprises

As can be seen in Table 4.13, the major component of income was capital income (90.72 percent), followed by the transfer from households (3.24 percent), and the transfer from the government (6.04 percent). Enterprise expenditure consisted of transfers to households (44.86 percent), corporate taxes (37.74 percent), investment (16.58 percent), and transfers to the government (0.82 percent).

Table 4.13 The Sources and Uses of Income of Firms

(Billion Baht)

Sources and Uses of Income	Value	% share
Income		
Capital income	760	90.72
Transfers from the government	51	6.04
Transfers from households	27	3.24
Total income	838	100.00

Table 4.13 (Continued)

Sources and Uses of Income	Value	% share
Expenditure		
Transfers to households	376	44.86
Corporate taxes	316	37.74
Savings	139	16.58
Transfers to the government	7	0.82
Total expenditure	838	100.00

4.4.2.3 Government

In Table 4.14, government income included indirect taxes on production,, amounting for 1,331 billion Baht (59.38 percent), direct taxes of 434 billion Baht (19.36 percent), a levy of import duties of 302 billion Baht (13.47 percent), and income paid to the government of 80 billion Baht (3.57 percent). The government also received transfers from the ROW, households, and firms, amounting to 2.44 percent, 1.47 percent, and 0.31 percent, respectively, of their total income On the other hand, the government utilized its income on government savings of 1,198 billion Baht (53.44 percent), current consumption of 636 billion Baht (28.36 percent), transfers to households of 85 billion Baht (3.78 percent), transfers to firms of 51 billion Baht (2.26 percent), and 272 billion Baht (12.16 percent) transfers to the ROW.

Table 4.14 The Sources and Uses of the Income of the Government

(Billion Baht)

Sources and Uses of Income	Value	% share
Income		
Indirect taxes on production	1,331	59.38
Direct tax	434	19.36
Import duties	302	13.47
Capital	80	3.57
Transfers from the ROW	55	2.44
Transfers from households	33	1.47

Table 4.14 (Continued)

Sources and Uses of Income	Value	% share
Transfers from the firms	7	0.31
Total income	2,241	100.00
Expenditure		
Savings	1,198	53.44
Final consumption expenditure	636	28.36
Transfers to the ROW	273	12.16
Transfers to households	85	3.78
Transfers to the firms	51	2.26
Total expenditure	2,241	100.00

4.4.2.4 The Rest of the World (ROW)

As can be seen in Table 4.15, the rest of the world received 2,396 billion Baht (59.77 percent) of its total income from imported goods, 702 billion Baht (17.51 percent) from savings, 404 billion Baht (10.07 percent) from the transfers from households, 273 billion Baht (6.80 percent) from the transfers from the government, and 235 billion Baht from capital (5.85 percent). The rest of the world spent 3,887 billion Baht (96.95 percent) on exports, 68 billion Baht (1.69 percent) on transfer to households, and 55 billion Baht (1.36 percent) on transfers to the government.

Table 4.15 The Sources and Uses of Income of the Rest of the World

(Billion Baht)

Sources and Uses of Income	Value	% share
Income		
Imports of goods	2,396	59.77
Savings	702	17.51
Transfers from households	404	10.07
Transfers from the government	273	6.80
Capital	235	5.85
Total income	4,009	100.00

Table 4.15 (Continued)

Sources and Uses of Income	Value	% share
Expenditure		
Exports of goods	3,887	96.95
Transfers to households	68	1.69
Transfers to the government	55	1.36
Total expenditure	4,009	100.00

In conclusion, the study illustrates that the property sector, which consists of non-residential building, residential building, public work, and the real estate sector, provides a high impact on the Thai economy, while the commercial banks do not quite play an important role, as will be described in the structure of Thai economy as follows.

The property sector generates a high volume of employment for the society. According to investment expenditures, the public work segment contributes 24.33 percent of the GDP, followed by the highest share of the heavy industry sector, which occupies as much as 48.64 percent of the GDP. The non-residential building sector contributes 10.50 percent of the GDP.

The property sector relies the most on the Thai market. One hundred percent of output of the public work and non-residential building sectors is consumed domestically, meaning that the low world price of products in these sectors does not have much of an impact.

However, the property sector occupies the low to lowest proportion in production factors, including wage payments and capital income. The residential and non-residential building sectors occupy the second lowest and lowest shares of labor income, at 0.28 and 0.21percent, respectively. The non-residential and residential building sectors occupy the second lowest and the lowest shares of capital income, at 0.23 and 0.16 percent, respectively. It implies the workers in these sectors receive a low income.

In Thai households, income is mainly generated from wages, which equals 45.96 percent of total household income. Most household expenditure is consumption, which

equals 75.03 percent. In households with lower incomes, household levels 1 to 5 had no savings but merely debt.

CHAPTER 5

THE CONTRIBUTION OF THE THAI PROPERTY INDUSTRY
AND COMMERCIAL BANKING SECTOR TO
THE ENTIRE THAI ECONOMY

This chapter analyzes the contribution of the property and commercial banking sectors in connection with the Thai economy by using 3 models: the Input-Output model, the Social Accounting Matrix model (SAM), and the Financial Social Accounting Matrix model (Financial SAM). Section 5.1 describes the characteristics of the property and commercial banking sectors. Section 5.2 illustrates the Input-Output model. Section 5.3 explains the details of the SAM Model, while section 5.4 explains the Financial SAM Model. Lastly, section 5.5 illustrates the impacts of the Thai Kem Keng scheme on the entire economy by using the SAM Model and the Financial SAM Model.

5.1 The Characteristics of the Property Industry and the Commercial Banking Sector

In order to understand the impacts and linkages between the sectors, it is important to study the characteristics of the two sectors. The following section describes their main features.

5.1.1 The Characteristics of the Property Sector
In this study, the property sector is analyzed according to two levels, the aggregate and disaggregate levels. The aggregate level is a combination of the construction and real estate sectors. In disaggregate type 1, the property sector is divided into the construction and real estate sectors. In disaggregate type 2, the property sector includes residential and non-residential buildings, public works, and

the real estate sector. The following paragraph will describe the important features of the construction and real estate sectors, which are included in the property industry.

5.1.1.1 The Construction Sector

There are two categories of work involved in the construction sector: 1) constructing new buildings and 2) maintaining and repairing old buildings (M&R service) (Wu and Zang, 2005: 909). The construction of new buildings involves various activities in related industries. Building materials, including steel and concrete, are needed from heavy industry. Loans are supported by the commercial banking sector. The construction process also includes employment for various jobs. All of these activities are used as the input of the production process. After a certain period of time, old buildings need maintenance and repair service (M&R). A few existing studies reveal that M&R service plays an important role in developed countries, including the U.S. and Denmark, because of the decrease in new construction caused by a insufficient supply and lack of land for new buildings. This can be seen in high push effect values in these countries (Pietroforte and Tullio, 2003: 324).

In the analysis of disaggregate type 2, the construction sector is separated into three sub-sectors: residential buildings, non-residential buildings, and public works. The sector of residential buildings consists of various types of housing, i.e. detached houses, semi-detached houses, and condominiums. The sector of non-residential building refers to buildings used for business purposes, i.e. commercial buildings, office buildings, factories, hotels, and warehouses. This sector also includes the maintenance of these buildings (NESDB, 2010: 18). The sector of non-residential buildings has a significant impact on the economy because this sector includes the constructions of large buildings with high floor areas. The public works sector covers various projects which require a high budget and multi-stage work. The projects thereby have to be financed and constructed by the government. To illustrate, the sector includes the construction of electric plants, irrigation works, highways, streets, roads, bridges, airports, water supply facilities, sewage systems, and communication systems and other facilities, including repair and maintenance (NESDB, 2010: 18). It can be seen that this sector creates various kinds of related work, finally leading to an increase in employment.

5.1.1.2 The Real Estate Sector

The real estate sector covers the activities of real estate agents and brokers (NESDB, 2010: 21). In addition, it deals with various kinds of business, i.e. accountants, appraisers, attorneys, brokers, counselors, government regulators, mortgage brokers, mortgage lenders, salespersons, surveyors, and land title companies. Due to its connections to various kinds of business services, it is highly connected to monetary transactions. That means that it is closely linked to commercial banks.

5.1.2 The Characteristics of the Commercial Banking Sector

The commercial banks, the most important financial institution in Thailand, channel funds from lenders to borrowers. The banks convert deposits to the funds and then transfer them to the business sector in terms of loans. Like other businesses, the objective of the banks is to make a profit. For this reason, the banks tend to borrow in the short term and lend in the long term (Mishkin, 2005: 205). In other words, the banks have a commitment to depositors to return the money within a certain period of time, which tends to be short, i.e. within 1-2 years. The banks, on the other hand, lend money to investors in the longer term, 15-20 years, because they do not own or have control over the money. This causes difficulties for the banks because some investors tend to default when there is an economic recessions. The banks thereby need to manage their risk well. Besides their dependence on loans from other sectors, business services from commercial banks, i.e. check clearing and credit analysis, are important in the production process (Mishkin: 2005: 205).

5.2 Input-Output Analysis

This section analyses the linkage between the property and commercial banking sectors in the context of the Thai economy. The study, using the Input-Output model (IO model), includes their performance in relation to each other and the extent to which such performance affects other sectors. The IO model adopted in this study is a pioneer framework, discovered by Wassily Leontief (1936). Although numbers of existing studies have used the Input-Output model to analyze the performance of the property sector for the entire economy, none of them has focused on the role of the

commercial banking sector and the relationship between the property and commercial banking sectors in the context of the Thai economy. Therefore, besides the backward and forward linkages that are used to analyse the impacts of each sector on the entire economy, this section includes the analysis of the sectoral linkage in order to determine the linkage between these two sectors and its impact on the economy.

The framework adopted in the study has been simplified, as shown in Table 5.1. The row illustrates the intermediate input of each sector that distributes to the particular sectors. The column dictates the intermediate output of each sector used by a particular sector. a_{ij} represents the intermediate input flow from sector i to sector j. The total output of all sectors (Y) comprises total intermediate output (T_i) and final demand (F_i). The final demand is the goods and services that are consumed by households, the government, and used for investment and export. The total input of all sectors (Y') consists of total intermediate input (T_j) and value added (V_j). The value added or factors of production are labour and capital used as inputs in the production processes of the sector.

Table 5.1 Simplified Framework of Input Output Model

		Intermediate Output			Total Intermediate Output		
Industry		Sector j, $j=1..9$	Sector 5 (Property)	Sector 6 (Commercial Bank)		Final Demand	Total Output
Sector i, $i=1..9$		a_{ij}			T_i	F_i	Y
Sector 5 (Property)			a_{55}		T_5	F_5	Y_5
Sector 6 (Commercial Bank)				a_{66}	T_6	F_6	Y_6
Total Intermediate Input		T_j					
Value Added		V_j	V_5	V_6		F=V	
Total Input		Y'	Y'_5	Y'_6			

Source: Modified from Liu and Song, 2000: 491.

The pull effect, the push effect, and the sectoral linkages of the property sector, the commercial banking sector, and the impact on the entire Thai economy are discussed in the following.

5.2.1 The Pull Effect

The pull effect illustrates the relationship and impact of a sector on the entire economy. High pull effect refers to a strong relationship of a sector with the overall economy. In other words, it shows the degree of dependence of a sector on other sectors in the economy. The pull effect can be measured by the direct backward linkage—the technical efficiency indicator—and the total backward linkage indicator—the output multiplier. The direct backward linkage indicators are the proportion of the direct input from other sectors to each sector. In addition, the pull effect indicates the industrialized level of a sector (Pietroforte and Gregori, 2003: 325; Su, Lin and Wang, 2003: 724). A sector with a high degree of direct backward linkage indicators depicts that a sector highly requires material from other sectors to be used in the production process. The total backward linkage indicators indicate the effects of one monetary unit change in the value of the final demand for goods and services of sector j on the total output of all sectors (Su, Lin and Wang, 2003: 723). Unlike the direct backward linkage, the total backward linkages include the indirect impact from investment, which is ignored in the direct linkages (Bekhet and Abdullah, 2010: 115). The direct backward linkage and the total backward linkages indicators are calculated as follows.

Direct Backward Linkages Indicators, $\dfrac{T_j}{Y^{'}}$ (1a)

Total Backward Linkages Indicators, $M_j = \sum (I - A)^{-1}$ (1b)

T_j is the total intermediate input, $Y^{'}$ is the total input, A is the matrix of the technical coefficient.

In order to compute the direct backward linkages and the total backward linkages, the 180 sectors of the 2004 Input-Output Table were used as a database. The table groups the sectors into 3 types, 9 sectors, 10 sectors, and 12 sectors, as discussed in chapter 1, according to 3 analyses: (i) aggregate levels, (ii) disaggregate type 1, and (iii) disaggregate type 2.

Figures 5.1 to 5.3 illustrate the direct backward linkages and the total backward linkages of the 3 analyses: (i) aggregate levels, (ii) disaggregate type 1, and (iii) disaggregate type 2.

(i) Aggregate Levels

All of the 180 sectors in the Input-Output table are grouped into 9 sectors. In this type, the property sector is the combination of the construction and real estate sectors. Figure 5.1 shows that the property sector is ranked at 4th place, among 9 sectors, with the value of 0.51 of the direct backward linkage indicators. In other words, the property sector purchases 51 units used in its production process from other sectors in order to produce 100 units. That means that the property sector depends on other sectors, representing the strong pull effect of the sector on all other sectors in the entire economy. On the other hand, the total backward linkage indicator in the sector is placed at a better rank, third place, with the value of 2.00. It can be interpreted that the economy generates 200 Baht when the property sector produces 100 Baht. The 200 Baht consists of 100 Baht from the direct impacts of the expenditures in the sector and 100 Baht from the indirect effects of production and employment of the sector to other sectors.

The commercial banking sector is ranked at 5th place in both direct and total backward linkages, with the value of 0.36 and 1.66, respectively. It can be dictated that for every 100 units produced by the commercial banking sector, 36 units are purchased from other sectors in order to be used in its production process. In other words, the commercial banking sector depends less on other sectors, referring to the weak pull effect on the remaining sectors in the entire economy. Moreover, the value of the total backward linkage indicators of 1.66 means that the whole economy generates 166 Baht when the commercial banking sector produces 100 Baht. The 166 Baht consists of 100 Baht from the direct impacts of the expenditures in the sector and 66 Baht from the indirect effects.
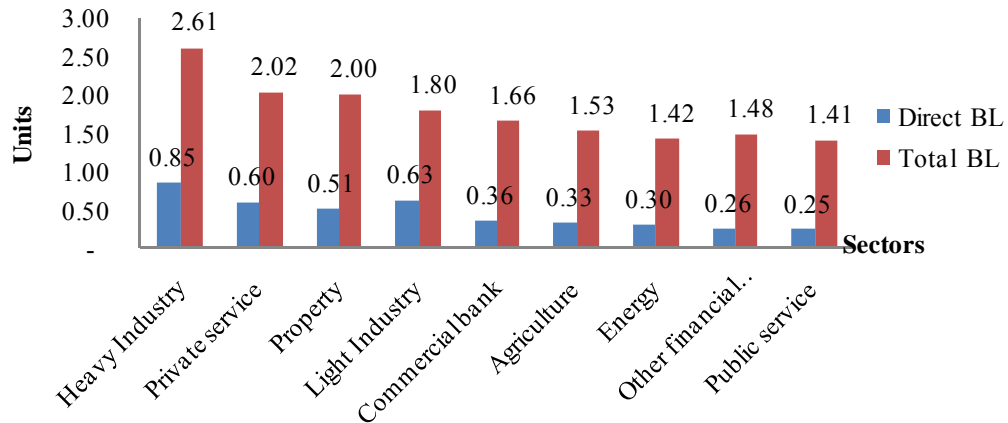
Figure 5.1 Direct and Total Backward Linkages in the Aggregate Analysis

(ii) Disaggregate type 1

Figure 5.2 depicts the direct and total backward linkages of 10 sectors in the analysis of disaggregate type 1. The analysis focuses on the construction, real estate, commercial banking sectors.

In this study of direct backward linkages, the construction sector was ranked at 2nd place with the significant share of 0.75, followed by the heavy industry sector with the highest share of 0.85. It can be interpreted that in every 100 units produced by the construction sector, there are 75 units purchased from the remaining sectors to be used in the production process. In other words, the sector requires high amounts of intermediate input from the other sectors, such as concrete, steel, and electricity, to construct buildings, meaning that the sector highly depends on other sectors. The sector also occupies the second highest share of 2.42 in the total backward linkages, meaning that the economy generates 242 Baht when the construction sector produces 100 Baht. The 242 Baht consists of 100 Baht from the direct impacts of the expenditures on the sector and 142 Baht from the indirect effects from production and employment in the sector on other sectors in the economy

The real estate sector has the lowest value of both direct and total backward linkages, 0.12 and 1.20, respectively. This can be explained by the fact that for every 100 units produced by the real estate sector, there are 12 units purchased from other

remaining sectors to be used in the production process. The sector has the lowest total backward linkage indicator value of 1.20, meaning that the entire economy generates 120 Baht when the sector produces 100 Baht. In 120 Baht, 100 Baht is from the direct impacts of the expenditures on the sector, while another 20 Baht is from the indirect effects of production and employment on other sectors. The real estate sector thereby depends less on the output of other sectors in its production process. This is because of its business nature, which is delivering goods and services to consumers.

The commercial banking sector was ranked at 5th place in the direct and total backward linkages, with the same value as they exhibited in the aggregate analysis. The moderate rank of both direct and total backward linkages means that the sector depends neither too much nor too little on other sectors.
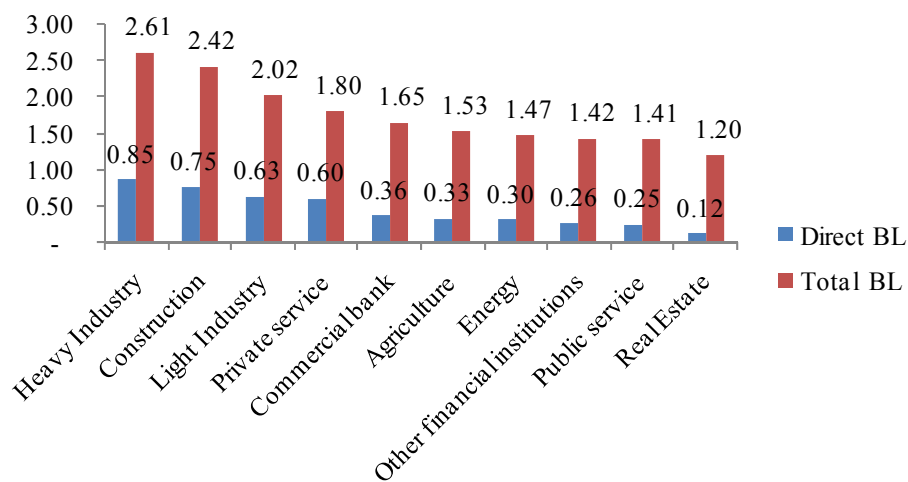
Figure 5.2 The Analysis of Direct and Total Backward Linkages of Disaggregate Type 1

(iii) Disaggregate type 2

Figure 5.3 shows the direct and total backward linkages of 12 sectors in disaggregate analysis Type 2. The analysis focuses on the residential building, non-residential building, real estate, and commercial banking sectors.

The non-residential building sector shows the highest values of both direct and total backward linkages of 0.87 and 2.62, respectively. The value of 0.87 means that

for every 100 units produced by the non-residential building sector, there are 87 units purchased from other sectors for use in its production process. The value of the high total backward linkage indicator of 2.62 shows that the entire economy generates 262 Baht when it produces 100 Baht. Of the 262 Baht, 100 Baht is from the direct impacts of the expenditures on the sector and another 162 Baht is from the indirect effects of production and employment on other sectors in the entire economy.

The public works sector has a significant share of 0.68 and was ranked at 3rd place of the direct backward linkages, followed by the heavy industry sector with the second highest share of 0.85. The value of 0.68 can be interpreted as follows: for every 100 units produced by the public works sector, 68 units are purchased from other sectors for use in its production process. That means that the public works sector requires high amounts of intermediate input from other sectors, such as concrete, steel, and electricity. This makes the sector highly dependent on the others. It also occupies the third highest share of 2.36 in the total backward linkages, meaning that the entire economy generates 236 Baht when the public works sector produces 100 Baht. Of the 236 Baht, 100 Baht is from the direct impacts of the expenditures on the sector and 136 Baht is from the indirect effects of production and employment from the sector on other sectors in the economy.

The residential building sector was ranked at 4th place in both direct and total backward linkages, with the value of 0.83 and 2.33, respectively. The value of 0.83 in the direct backward linkages refers to the fact that for every 100 units produced by the residential building sector, 83 units are purchased from the remaining sectors to be used in its production process. The high value of the total backward linkage indicator at 2.33 shows that whole economy would generate 233 Baht when it produces 100 Baht. Of the 233 Baht, 100 Baht is from the direct impacts of the expenditures in the sector and 133 Baht is from the indirect effects from production and employment on other sectors in the economy.

Similar to disaggregate type 1, the real estate sector was ranked in last place for both direct and total backward linkages, with the value of 0.20 and 1.20, respectively. That means that the real estate sector depends less on other sectors' output in its production process because of its business nature, which deliver goods and services to consumers.

Similar to disaggregate type 1, the commercial banking sector was ranked at moderate ranks for both direct and total backward linkages.
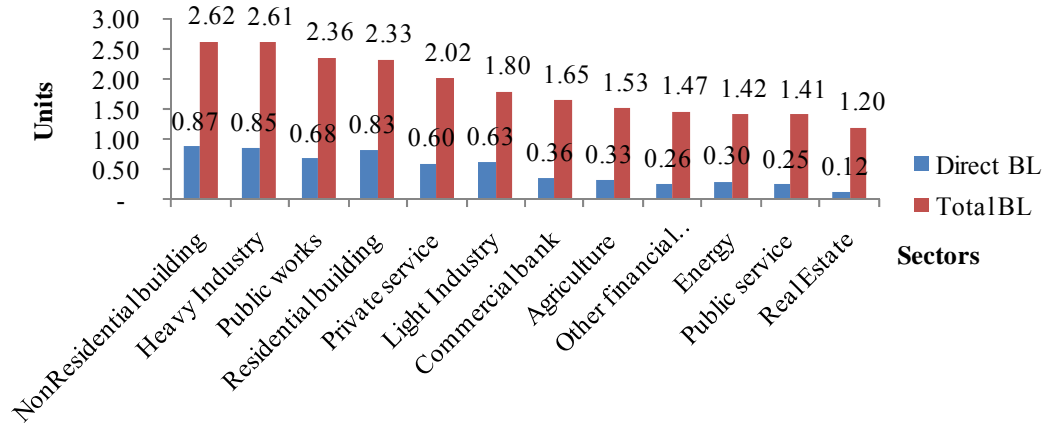
Figure 5.3 The Analysis of Direct and Total Backward Linkages of Disaggregate Type 2

It can be said that the property sector and its subsectors, except the real estate sector, are ranked at a high place in terms of both direct and total backward linkage. That means that the construction sector (including non-residential building, th residential building, and public works) is a key industry in the Thai economy due to its high value of direct and total backward linkage, presenting its strongest pull effects. The real estate sector provides the lowest values in both direct and total backward linkages. This represents the weakest pull effect, since it needs the lowest input from other sectors in its production process because the sector deals with services. The commercial banking sector has moderate pull effects in the Thai economy, as the sector provides services to other sectors, thereby using only small intermediate input from other sectors in doing its business. It can be noted that the total backward linkages show higher values than the direct backward linkages due to the inclusion of both direct and indirect effects.

5.2.2 The Push Effect

The push effects illustrate the importance of a sector to the entire economy. Goods and services derived from the sector are valuable to other sectors, as they become the input in the production process. The maintenance and repair service shows the push effects of a sector (Su, Lin and Wang, 2003: 719). The pull effects can be measured by direct forward linkage indicators and total forward linkage indicators (or input multiplier), as can be seen in the equation below.

Direct Forward Linkages Indicators, $\dfrac{T_i}{Y}$ (2a)

Total Forward Linkages Indicators, $M_i = \sum (I - B)^{-1}$ (2b)

T_i is the total intermediate output, Y is the total output, and B is the matrix of direct-output allocation coefficients.

The direct forward linkage indicators depict the proportion of intermediate output from a sector to the output of other sectors in the economy. The total forward linkage indicators measure unit change, in terms of money, in the value of the primary input available or value added in a sector to those in other sectors (Su, Lin and Wang, 2003: 724).

Figures 5.4 to 5.6 illustrate the direct forward linkages and total forward linkages. The analyses are divided into 3 levels: (i) aggregate level, (ii) disaggregate type 1, and (iii) disaggregate type 2.

(i) Aggregate level

Table 5.4 shows the linkage between the property sector, which consists of the construction and real estate sectors, and the commercial banking sector, in the analysis at the aggregate level. The commercial banking sector occupies the highest share of 0.99 in the direct forward linkages, while the sector has the second highest share, 3.23, in the total forward linkage indicators, following by the heavy industry sector. The highest value of 0.99 in direct forward linkages implies that 99 output units produced by the commercial banking sector are consumed by other sectors. In addition, 3.23 in the total forward linkage indicators means that the economy would generate 323 Baht

if the sector produces 100 Baht. Of the 323 Baht, 100 Baht is from the direct impacts of the expenditures in the sector and another 223 Baht is from the indirect effects.

The property sector, which is a combination of the construction and real estate sectors, was ranked at the lowest place in terms of both direct and total forward linkages, with the value of 0.05 and 1.12, respectively. The value of 0.05 in the direct forward linkages implies that 5 output units produced by the property sector are consumed by other sectors. The one point twelve of the total forward linkage indicators means that the economy would generate 112 Baht when the sector produces 100 Baht. Of the 112 Baht, 100 Baht is from the direct impacts of the expenditures in the sector and another 12 Baht is from the indirect effects.
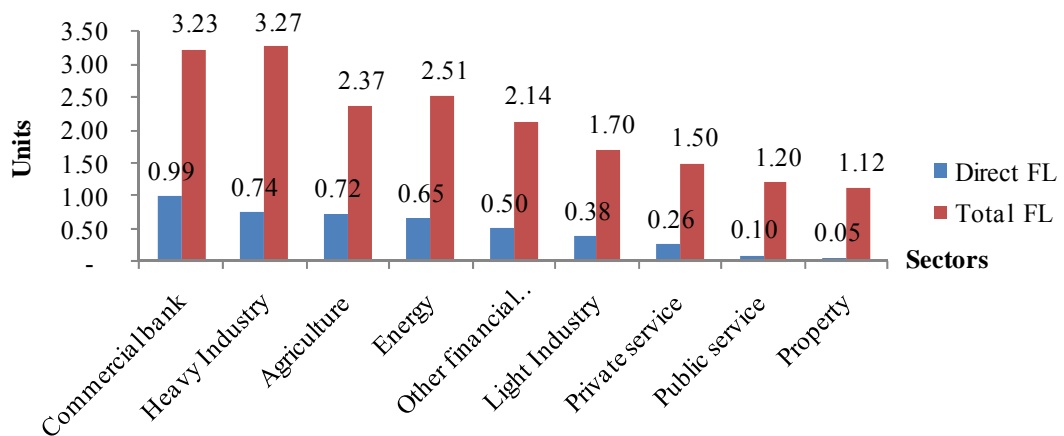
Figure 5.4 Direct and Total Forward Linkages of Aggregate Analysis

(ii) Disaggregate type 1

Figure 5.5 shows the impacts of the property sector, which is divided into construction and real estate sectors, and the commercial banking sector, on the entire Thai economy in disaggregate type 1. Similar to the aggregate analysis, the commercial banking sector shows the highest share in the direct forward linkage, a value of 0.99. It also occupies the second highest share in the total forward linkage indicators, with a value of 3.23.

The real estate sector was ranked at 8th place in both direct forward linkage and total forward linkage, with a value of 0.11 and 1.26, respectively. The value of 0.11 in

the direct forward linkage means that 11 output units or services in the real estate sector are used in its production process in other sectors. The value of 1.26 in the total forward linkage indicators means that the whole economy would generate 126 Baht when the sector produces 100 Baht. Of the 126 Baht, 100 Baht is from the direct impacts of the expenditures on the sector and 26 Baht is from the indirect effects.

The construction sector was ranked in last place in terms of both direct forward linkage and total forward linkage, with the value of 0.02 and 1.05, respectively. The direct forward linkage value of 0.02 means that 2 output units or services of the construction sector are used in the production process of other sectors. The construction sector, with a total forward linkage indicator value of 1.05, means that the whole economy would generate 105 Baht when the sector produces 100 Baht. Of the 105 Baht, 100 Baht is from the direct impacts of the expenditures on the sector, while another 5 Baht is from the indirect effects.
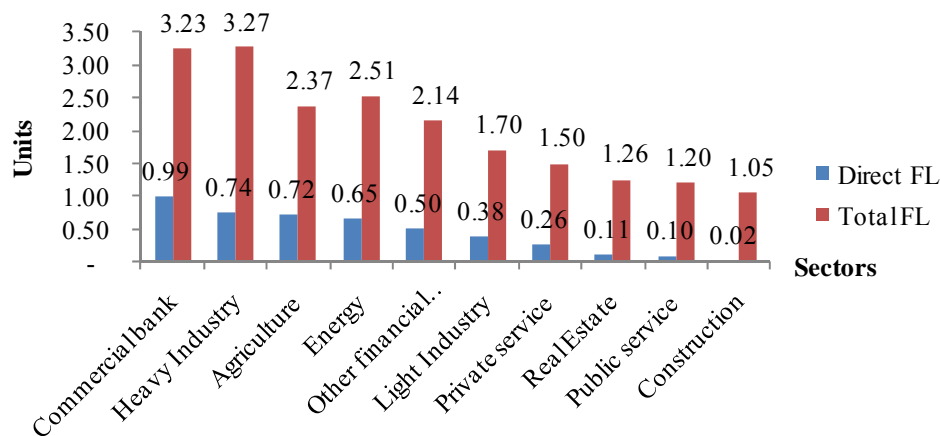
Figure 5.5 Direct and Total Forward Linkages of Disaggregate Type 1 Analysis,

(iii) Disaggregate type 2

Figure 5.6 shows the impacts of the property sector, which is separated into non-residential building, residential building, and public work sectors, and the commercial banking sector, on the whole Thai economy in disaggregate type 2. Similar to the aggregate analysis and disaggregate type 1, the commercial banking

sector shows the highest share in the direct forward linkage indicators, with a value of 0.99. It also occupies the second highest share in the total forward linkage indicators, with the value of 3.23. In addition, the real estate sector has the same outcome as with disaggregate type 1, which was ranked at the eighth rank in terms of both direct and total forward linkage, with the value of 0.11 and 1.26, respectively.

The non-residential building sector was ranked at 10th place in both direct and total forward linkages, with the value of 0.08 and 1.17, respectively. The direct forward linkage value of 0.08 means that 8 of 100 output units or services, of the non-residential building sectors, are used in the production process of other sectors. The results show a very low amount of the output or service of the non-residential building sector that other sectors rely on. The total forward linkage value of 1.17 in the non-residential building sector shows that the whole economy would generate 117 Baht when the sector produces 100 Baht. Of the 117 Baht, 100 Baht is from the direct impacts of the expenditures on the sector and another 17 Baht is from the indirect effects of its production and employment on other sectors in the economy.

The residential building sector was ranked at 11th place in both direct and total forward linkages, with the value of 0.02 and 1.02 respectively. The direct forward linkage value of 0.02 means that 2 of 100 output units or services of the residential building sector are required by other sectors in the production process. That shows insignificance of the outputs or services of the residential building sector for the other sectors. The total forward linkages of 1.02 of non-residential building shows that the whole economy would generate the value of 102 Baht when the sector produces 100 Baht. Of the 102 Baht, 100 Baht is from the direct impacts of the expenditures in the sector and 2 Baht from the indirect effects of its creation of production and employment on other sectors in the overall economy.

The public works sector has the lowest values in terms of both the direct and total forward linkages of 0.001 and 1.00, respectively. The direct forward linkage of 0.001 means that the 0.1 of 100 output units or services of the public works sector is required by another sector in the production process. This shows insignificance of the output or service of the public works sector on other sectors. The total forward linkages value of 1.00 in the public work sector shows that the whole economy would

generate the value of 100 Baht, equal to the direct impacts of the expenditures in the sector, meaning that there is no indirect effect from the sector.

Among the 12 sectors, the non-residential building sector, the residential building sector, and the public work sector are ranked in bottom place.
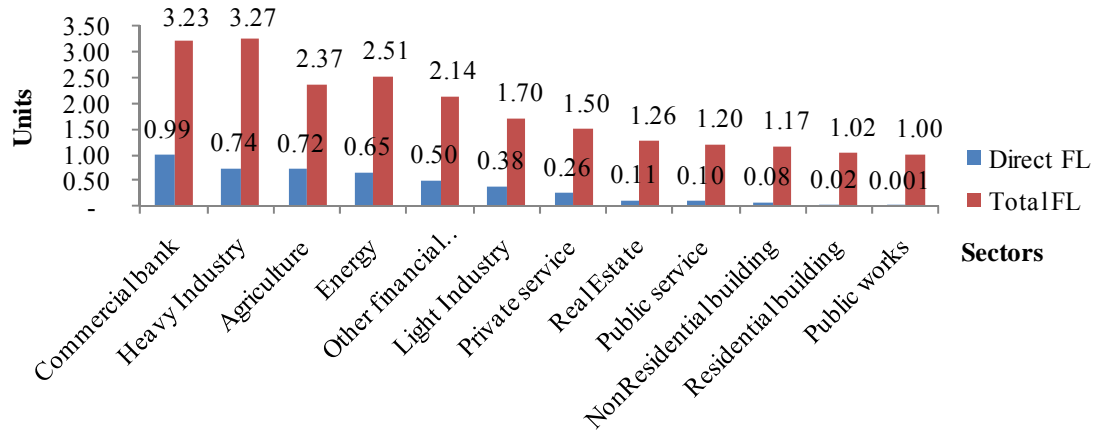
Figure 5.6 Direct and Total Forward Linkages of Disaggregate Type 2 Analysis

In conclusion, from the viewpoint of the push effect, the commercial banking sector plays the most important role in the Thai economy, as is has the highest value of the forward linkage. It can be said that the commercial banking sector plays a vital role in the Thai economy because the sector is the major funding source for the entire economy.

The property sector has the low to lowest values in both direct and total forward linkage indicators, implying that the sector's push effects are weak. That means that other sectors depend less on the property sector. In other words, the maintenance and repair services are insignificant in Thailand. Unlike Thailand, some OECD countries have strong push effects because the economies have reached their maturity. They thereby spend large amounts of money on building maintenance and repair (Song and Liu, 2007: 78).

5.2.3 The Sectoral Linkages between the Property Sector and the
    Commercial Banking Sector and their Impacts on the Thai
    Economy

The sectoral linkage shows an interrelationship between the property and the commercial banking sectors. The direction of the linkages is categorized in two directions: the linkage from the property sector to the commercial banking sector and another is from the commercial banking sector to the property sector. The linkages are measured by direct and total sectoral input linkages. The direct sectoral input linkage (direct input coefficient) is a direct input from sector i to sector j, which indicates direct interdependence between the two sectors (Wu and Zhang, 2005: 912). The total sectoral input linkage is the total input from sector i to sector j. The direct sectoral input linkages and the total input coefficients are calculated as follows.

Direct Sectoral Input Linkage, $\dfrac{a_{ij}}{Y'}$ (3a)

Total Sectoral Input Linkage, $M_{ij} = (I - A)_{ij}^{-1}$ (3b)

5.2.3.1 The Linkage of the Property Sector with the Commercial
        Banking Sector

In order to analyze the importance of the commercial banking sector in relation to the property sector, the dependent degree of the property sector on the banking sector is measured. The study analyses the sectoral linkages according 3 levels: (i) aggregate level, (ii) disaggregate type 1, and (iii) disaggregate type 2 as in Figure 5.7 to 5.9.

(i) Aggregate level

Figure 5.7 shows the sectoral linkages of the property sector with the commercial banking sector in the analysis at the aggregate level. The property sector, in this analysis, is a combination of the construction and real estate sectors. The value of the construction sector that relies on the commercial banking sector is 0.02, meaning that for every 100 Baht expense in the property sector, 2 Baht are spent on the service in the commercial banking sector and another 82 Baht are spent in other sectors.
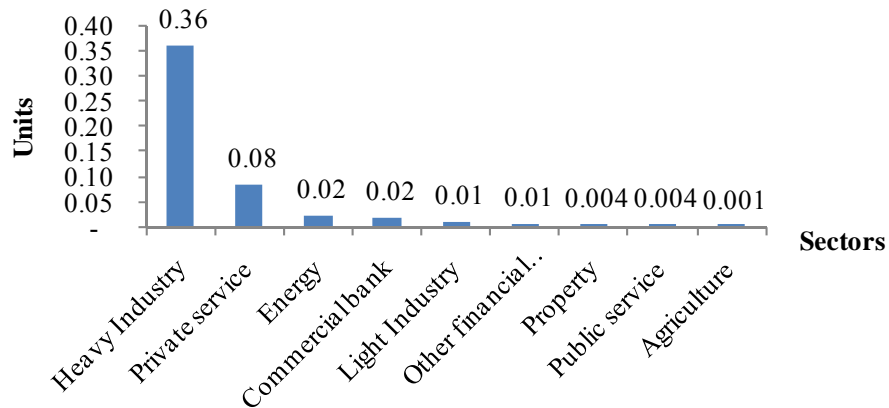
Figure 5.7 The Sectoral Llinkages from the Property Sector with the Commercial Banking Sector in the Analysis at the Aggregated Level.

(ii) Disaggregate type 1

Figure 5.8 shows the sectoral linkages from the property sector to the commercial banking sector in the analysis of disaggregate type 1. The property sector is divided into construction and real estate sectors.

The sectoral linkages of the construction sector with the commercial banking sector are relatively low at 0.01, indicating that the construction industry relies less on the commercial banking sector. The value of 0.01 means that for every 100 Baht expense in the construction sector, there is only 1 Baht spent on the service in the commercial banking sector. The construction sector depends on the commercial banking sector in its transactions, such as loans and business services.
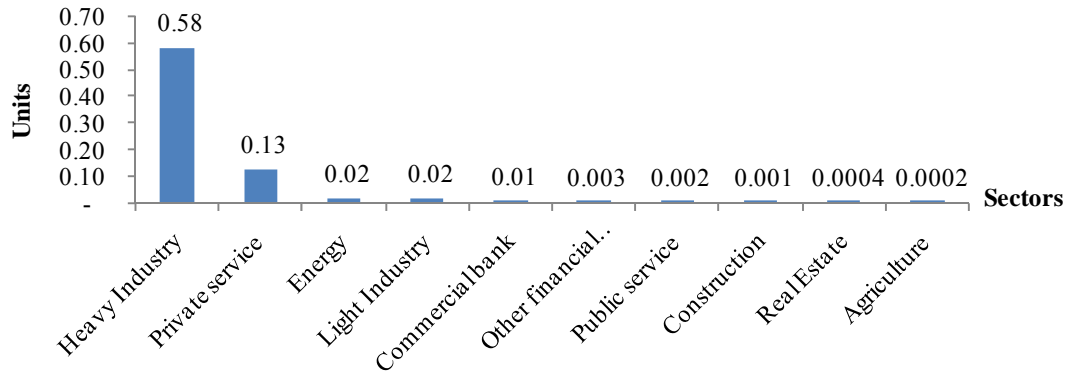
Figure 5.8 The Sectoral Linkages of the Construction Sector with the Commercial
Bank Sector in the Analysis of Disaggregate Type 1

In Figure 5.9, the sectoral linkages of the real estate sector with the
commercial banking sector have the highest value at 0.04, meaning that the real estate
sector relies on the commercial banking sector the most, compared to other sectors in
the economy. The value of 0.04 means that every 100 Baht of direct input (expense) in
the real estate sector results in 4 Baht of expense paid on service in the commercial
banking sector. The real estate sector depends on the commercial banking sector for its
transactions, such as loans and transfers. This is because the real estate sector supplies
various kinds of services such as brokerage services, plant location, and leasing
services, which require high transactions in the commercial banking sector.
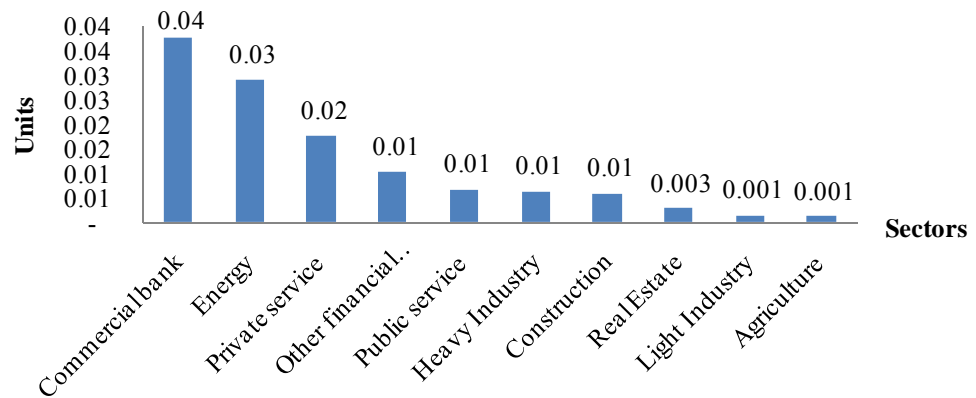
The bar chart shows values for sectors:
Commercial bank 0.04, Energy 0.03, Private service 0.02, Other financial.. 0.01, Public service 0.01, Heavy Industry 0.01, Construction 0.01, Real Estate 0.003, Light Industry 0.001, Agriculture 0.001

Y-axis labeled "Units" (0.01 to 0.04), X-axis labeled "Sectors"

Figure 5.9 The Sectoral Linkages of the Real Estate Sector with the Commercial Banking Sector in the Analysis of Disaggregate Type 1

(iii) Disaggregate type 2.

Figures 5.10 to 5.13 show the sectoral linkages of the property sector with the commercial banking sector in the analysis of disaggregate type 2 level. In this study, the property sector includes the non-residential building sector, the residential building sector, public work, and the real estate sector.

In Figure 5.10, the sectoral linkages of the non-residential building sector with the commercial banking sector have a relatively low value at 0.005. This indicates that the non-residential building sector relies less on the commercial banking sector. The value of 0.005 means that every 100 Baht of expense in the non residential building sector results in 0.5 Baht spent on the services in the commercial banking sector.
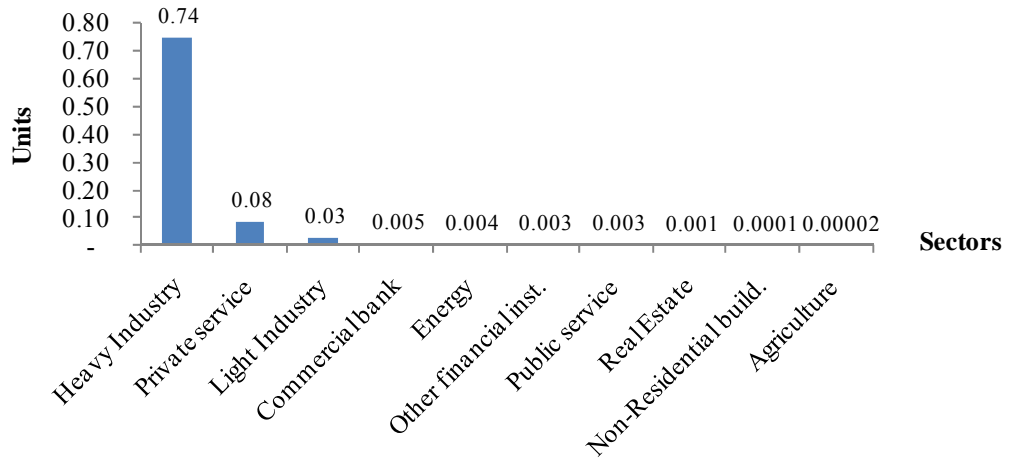
Figure 5.10 The Sectoral Linkages of the Non Residential Building Sector with the Commercial Banking Sector in the Analysis of Disaggregate Type 2

In Figure 5.11, the sectoral linkages of the residential building sector with the commercial banking sector were relatively low at 0.01, indicating that the residential building sector relies less on the commercial banking sector. The value of 0.01 means that 100 Baht of expense in the residential building sector results in 1 baht of expense paid on the service in the commercial banking sector.
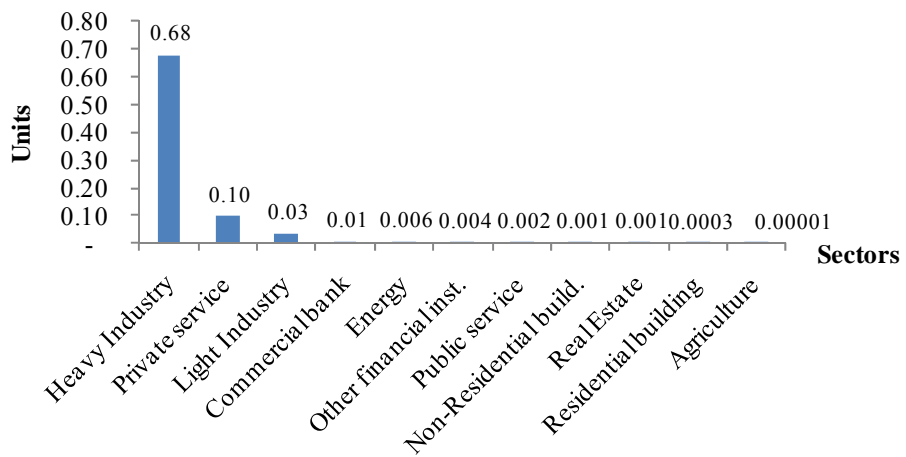
Figure 5.11 The Sectoral Linkages of the Residential Building Sector with the Commercial Banking Sector in the Analysis of Disaggregate Type 2

In Figure 5.12, the sectoral linkages of the public works sector with the commercial banking sector are rather low at 0.01, indicating that the public works sector relies less on the commercial banking sector. The value of 0.01 means the expense of 100 Baht in the public works sector results in 1 Baht of expense on services in the commercial banking sector.
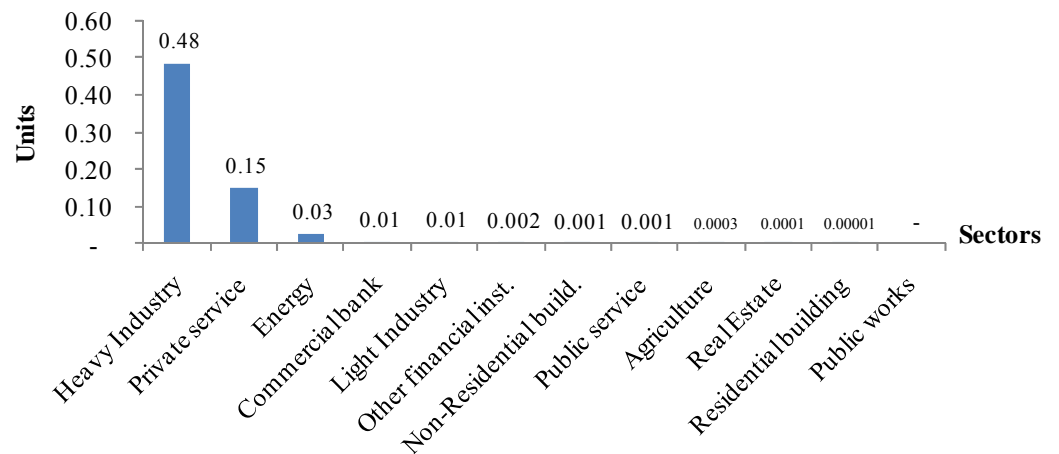
Figure 5.12 The Sectoral Linkages of the Public Works Sector with the Commercial Banking Sector in the Analysis of Disaggregate Type 2

In Figure 5.13, in disaggregate type 2, the sectoral linkages of the real estate sector with the commercial banking sector have the same value as in disaggregate type 1, with the highest value at 0.04. The result shows that the real estate sector relies on the commercial banking sector the most, compared to all other sectors in the economy.
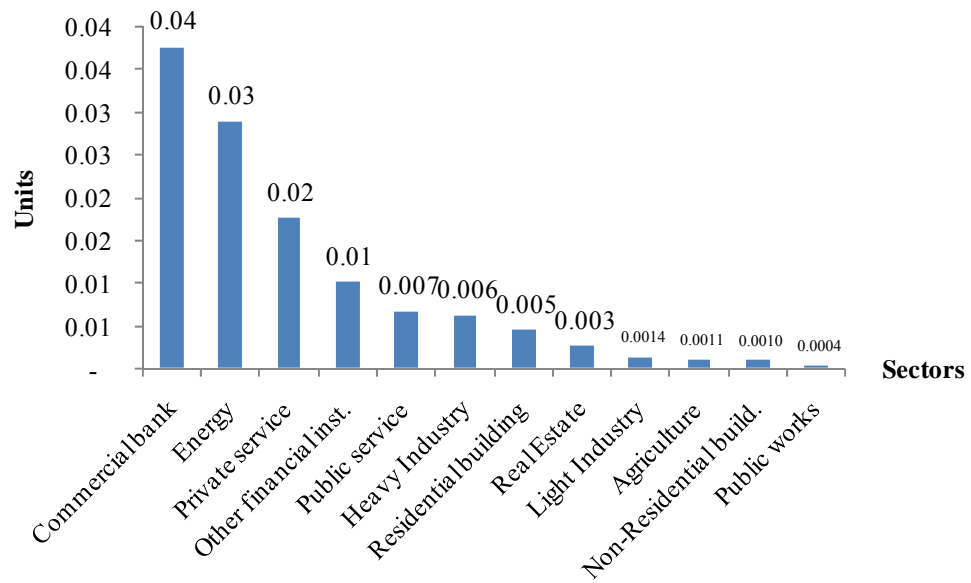
Figure 5.13 The Sectoral Linkages of the Real Estate Sector with the Commercial
Banking Sector in the Analysis of Disaggregate Type 2

In conclusion, among the 4 sub-sectors—the residential building, non-residential building, public works, and real estate sectors, the real estate sector relies on the commercial banking sector much more than the others. The real estate sector has the dependent value of 0.04, followed by the residential building sector, the public works sector, and the non-residential building sector, with a value of 0.01, 0.01, and 0.005, respectively. Therefore, the difficulties in the real estate sector strongly impact the commercial banking sector.

    5.2.3.2 The Linkage of the Commercial Banking Sector with the
        Property Sector

In order to analyze the importance of the property sector to the commercial banking sector, the dependent degree of the commercial banking sector that relies on the property sector, was studied. The study analyses the sectoral linkages at 3 levels: (i) aggregate level, (ii) disaggregate type 1, and (iii) disaggregate type 2, as depicted in Figure 5.14 to 5.16.

    (i) Aggregate level

Table 5.14 shows the sectoral linkages of the commercial banking sector with the property sector. The property sector provides the input value of merely

0.01 to the commercial bank, which is ranked at 2nd place from the bottom. The results shows a very weak dependence of the commercial banking sector on the property sector, indicating that the commercial banking sector much less depends on the property sector in its production process.
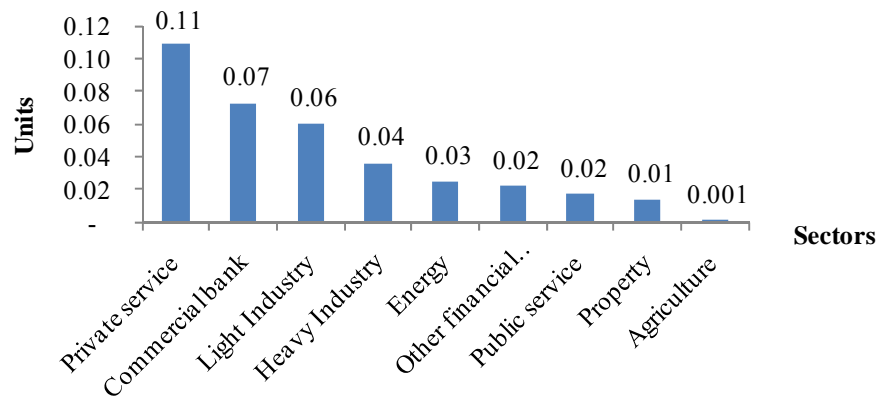
Figure 5.14 The Sectoral Linkages of the Commercial Banking Sector with the Property Sector in the Aggregate Analysis.

(ii) Disaggregate type 1

Figure 5.15 shows the sectoral linkages of the commercial banking sector with the property sector, which is classified into the construction and real estate sectors. The commercial banking sector inadequately depends on either the real estate or construction sectors, with the dependent degree of 0.01 and 0.005, respectively. It can be implied that for every 100 units produced by the real estate sector, merely 1 unit is provided to the commercial banking sector. Also, for every 100 units produced in the construction sector, only 0.5 units are provided to the commercial banking sector. The results show the very weak dependence of the commercial banking sector on the construction and real estate sectors.
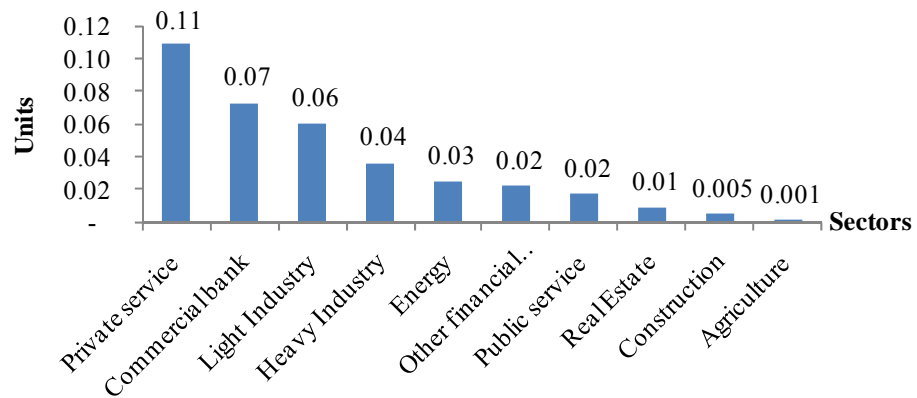
Figure 5.15 The Sectoral Linkages of the Commercial Banking Sector with the
Property Sector in the Analysis of Disaggregate Type 1

(iii) Disaggregate type 2

Figure 5.16 shows the sectoral linkages of the commercial banking sector with the property sector. The property sector is divided into 4 sub-sectors: the non-residential building sector, the residential building sector, and the public works and real estate sectors.

The real estate sector provides the input of merely 0.01 to the commercial banking sector, indicating a very weak dependent level of the commercial banking sector in relation to the real estate sector. It can be implied that for every 100 units produced by the real estate sector, only 1 unit is provided to the commercial banking sector as the input. Moreover, the commercial banking sector relies on the non-residential building sector with the value of 0.005 units, meaning that for every 100 units produced by the non-residential building, only 0.5 units are provided to the commercial banking sector as its input. The results show that the commercial banking sector has a much weaker dependency on the public works sector with the degree of 0.00001 units in its production process. It can be interpreted that for every 100 units produced by the public works sector merely 0.001 units are provided to the commercial banking sector as the input. There is no dependence of the commercial banking sector on residential building.
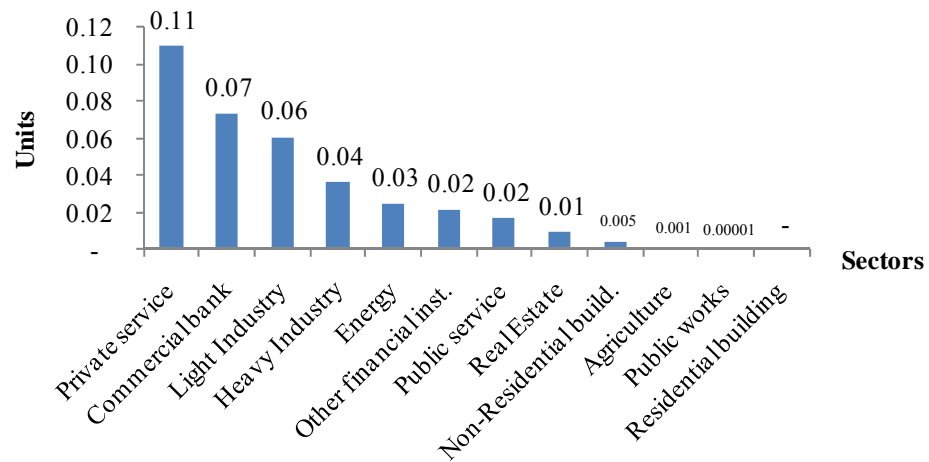
Figure 5.16 The Sectoral Linkages of the Commercial Banking Sector with the Property Sector in the Analysis of Disaggregate Type 2

5.2.3.3 Conclusion

Thailand has strong pull effects, as can be seen from the high values of its direct backward linkages and the total backward linkages. This implies the interdependence between the property sector and other sectors. The sector requires high amounts of intermediate input from other sectors, especially heavy industry, in its production process. However, the sector has weak push effects, meaning that the output from the sector cannot create much productivity in the economy. This result is supported by a study of Kofoworola and Gheewala (2008, 1227-1240). The study shows that the Thai construction sector has strong pull effects. Compared to the construction sector, the real estate sector has lower pull effects but higher push effects. It is significant to emphasize that the output of the real estate sector is distributed to other sectors in the entire economy. The study evidences that the property sector, especially the real estate sub-sector, relies significantly on the commercial banking sector.

In addition, the linkage of the property sector, both construction and real estate sectors, to the commercial banking sector is much larger than the reverse. In other words, the property sector (the non-residential building sector, the residential building sector, and public works) especially the real estate sector, depends on the services of the commercial banking sector a lot more than the reverse due to the

characteristics of businesses that require large funding sources. This conclusion is similar to many researches, which state that crises in property sectors lead to problems in banking sectors, and finally to economic crises.

5.3 The 2004 Social Accounting Matrix Analysis

5.3.1 Concept of the 2004 SAM Model

This part of the present study analyses and measures the roles of the property industry and commercial banking sector in the Thai economy by using the SAM model, which is an extension of the Input-Output model (IO model). The 2004 SAM model is more comprehensive than the 2004 Input-Output model, as it includes households (consists of 10 income groups), firms, the government, and the rest of the world (ROW). Therefore, the 2004 SAM model shows the linkages among institutions and the sectors of production. Furthermore, the SAM multipliers or "accounting multipliers" also indicate the direct, indirect, and induced effects (Round, 2007:14-7). The SAM multipliers computed from the 2004 SAM model indicate the direct, indirect, and induced effects of the property sector and commercial banking sector.

5.3.1.1 Model Specification

As mentioned earlier, the SAM model illustrates the relationship between the production sectors and institutions. Therefore, all typical seven accounts, including activity, commodity, the production factors, households, the government, capital, and the ROW need to be divided into endogenous and exogenous accounts. The endogenous account consists of activities, commodities, the production factors, and households while the exogenous account is the sum of the other accounts (Round, 2003: 14-5). It can be seen that the SAM model is used to analyze the effects of expenditures of exogenous accounts on endogenous accounts within the economic system.

In this study, the simplified framework of the 2004 SAM model, which is similar to that of Waheed and Ezaki (2006), is shown in Table 5.2.

Table 5.2 Simplified Framework of Social Accounting Matrix Model

	Endogenous Accounts			Exogenous Accounts	
	Activities	**Commodities**	**Factors**	**Institutions**	**Sum of other accounts**	**Total**
Activities	0	T_{12}	0	0	f_1	y_1
Commodities	T_{21}	0	0	T_{24}	f_2	y_2
Factors	T_{31}	0	0	0	f_3	y_3
Institutions	0	0	T_{43}	T_{44}	f_4	y_4
Sum of other accounts	l_1	l_2	l_3	l_4	t	y
Total	y_1'	y_2'	y_3'	y_4'	y'	

Source: Waheed and Ezaki, 2006: 8.

The flow of each entity is explained in Table 5.2, the activities account produce the goods and service, called as an intermediate demand (T_{21}), that is used by other sectors in the production process. Combining goods and services (T_{21}), which are domestically produced, with the factors of production (T_{31}), which consist of labor and capital, yield gross output (y_1'). In the production process, the materials consist of goods and services (domestic and foreign produced). The components are represented by T_{12} (domestic supply) plus l_2 (import tariff, or it can be called leakages, used for buying foreign products as production material). These become the total supply (y_2') in the column that equals the total demand (y_2) in the row. At the same time, the total demand (y_2) is the combination of intermediate demand (T_{21}) and final demand (T_{24}), which is household consumption, government consumption, investment, and exports. T_{31} is the factor of production, called value added, which consist of wages paid to labor and profit paid to owners of funds or assets and which are distributed among institutions as their incomes (T_{43}). Finally, institutions, such as households, buy commodity goods for their consumption (T_{24}). T_{44} is the transfers among the institution accounts. All l_n represent the leakage in the economy. All f_n represent the injection to the economy.

In this paper, the endogenous part of the transaction matrix in Table 5.2 is converted to a corresponding matrix as follows:

$$\begin{bmatrix} y_1 \\ y_2 \\ y_3 \\ y_4 \end{bmatrix} = \begin{bmatrix} 0 & A_{12} & 0 & 0 \\ A_{21} & 0 & 0 & A_{24} \\ A_{31} & 0 & 0 & 0 \\ 0 & 0 & A_{43} & A_{44} \end{bmatrix} \begin{bmatrix} y_1 \\ y_2 \\ y_3 \\ y_4 \end{bmatrix} + \begin{bmatrix} f_1 \\ f_2 \\ f_3 \\ f_4 \end{bmatrix}$$

The matrix form is

$$y_n = A_n y_n + F_n$$

(1)

where F_n is the exogenous variable and y_n is the endogenous account. The equation (1) was rearranged to be equation (2) as follows.

$$y_n = (I - A_n)^{-1} F_n$$

(2)

The above equation means that the endogenous income y_n was derived from multiplying the injection or exogenous changes (denoted by F_n) by the SAM multiplier $(1-A_n)^{-1}$. Here $(1-A_n)^{-1}$ is the SAM multipliers or the accounting multipliers, I is the Identity Matrix, and a_{ij} the technical coefficient (i.e. input or intermediate shares in production).

5.3.1.2 Types of SAM Multipliers and Their Effects

The SAM model was used to calculated the SAM multipliers, which illustrate the multiplier effects from the production and consumption linkages. It is different from the IO model, which shows only the production linkages. There are three types of multipliers in the SAM model: the output multiplier (calculated from production), the GDP multiplier (calculated from value added or factor incomes), and the income multiplier (calculated from household incomes) (Breisinger, Thomas, and Thurlow, 2009: 14). All of these multipliers show total effects that consist of direct and indirect effects (Breisinger, Thomas, and Thurlow, 2009: 15). The direct effect shows the first round contributions of a sector on the overall economy. It is used to estimate the direct impact of external shocks. The indirect effect represents inter-

industry transactions. This occurs because the sector induces production in other sectors.

5.3.2 The Property Industry, Commercial Banks, and Other Sectors in the Whole Economy-Social Accounting Matrix (SAM) Multiplier

There are three methods of analyzing the linkages between the property and commercial banking sectors, and the impacts on the Thai economy: (i) aggregate level, (ii) disaggregate level type 1, and (iii) disaggregate level type 2. The SAM multipliers and their effects, according to the analysis, can be expressed as follows:

(i) Aggregate level

Table 5.3 expresses the results of the SAM multipliers on 9 specific sectors at the aggregate level. The property sector is a combination of the construction and the real estate sector. The SAM multipliers of the 9 sectors show that the effects on the country's economic growth can be represented by the output multiplier, and household income distribution can be represented by the income multiplier.

1. Economic growth

The country's growth can be illustrated according to the output multiplier. In Table 5.3, the results show that the commercial banking sector has the second highest amount at 3.00, followed by the heavy industry, which shows the highest amount of 3.22. The value of 3.00 in the commercial banking sectors means that an increase of 100 Baht in the banking sector generates 300 Baht in overall economic expansion. Additionally, the employee compensation will be increased by 60 Baht and the gross operating surplus by 54 Baht

The results indicate that the property sector is ranked at 5th place with the amount of 2.83. This means that an increase of 100 Baht in the property sector from external shocks (i.e. government spending) contributes 283 Baht to overall economic output expansion. In addition, the employee compensation increases by 23 Baht, the gross operating surplus by 56 Baht, and household income increases by 57 Baht. In Table 5.4, the output multiplier of 2.83 in the property sector is the total effect of the property sector that combines direct effect (1.00), indirect effect (1.00), and induced effect (0.83). In other words, if the government spends 100 Baht in the property sector, it will generate the expansion of the country's output of 283 Baht, which is derived

from direct spending of 100 Baht, indirect effect of 100 Baht from the property sector that creates other sectors' expansion, and the induced effect of 83 Baht.

2. Household income distribution

The sectors that create household income can be illustrated by income multiplier. Among the 9 sectors, the commercial banking sector generates the third highest income multiplier of 0.93. This means that working in the banking sector generates 93 Baht of income for households. On the other hand, the property sector generates 58 Baht income for households.

The household income distribution, which is illustrated by output multiplier, will be investigated. Among the 10 household group levels (HH) of all 9 sectors, the 1st household income group (HH1) shares the highest output multiplier of 2.41, but the 10th household income group with the highest income has the lowest output multiplier of 1.82. That means that the lowest income group gets the most benefit from the external shock, such as government spending.

Table 5.3 Results of the SAM model—Classification of the 9 Industries (Construction and Real Estate equals the Property Sector at the Aggregate Level)

Sector	Agriculture	Light Industry	Heavy Industry	Energy	Property	Commercial Banks	Other Financial Institutions	Private Service	Public Service
Agriculture	1.16	0.30	0.09	0.06	0.10	0.16	0.15	0.17	0.18
Light Industry	0.37	1.32	0.18	0.14	0.23	0.40	0.36	0.37	0.41
Heavy Industry	0.63	0.59	2.59	0.25	1.10	0.63	0.59	0.71	0.78
Energy	0.19	0.16	0.14	1.35	0.14	0.19	0.17	0.26	0.19
Property	0.04	0.03	0.02	0.02	0.93	0.06	0.06	0.03	0.05
Commercial Banks	0.02	0.02	0.02	0.02	0.03	1.09	0.04	0.02	0.02
Other Financial Institutions	0.02	0.02	0.01	0.01	0.02	0.04	1.03	0.02	0.02
Private Service	0.23	0.19	0.15	0.15	0.25	0.38	0.35	1.24	0.32
Public Service	0.03	0.03	0.02	0.02	0.02	0.05	0.07	0.03	0.98
Output Multipliers	**2.70**	**2.65**	**3.22**	**2.02**	**2.83**	**3.00**	**2.82**	**2.86**	**2.95**
Labor	0.33	0.27	0.20	0.25	0.24	0.60	0.54	0.31	0.79
Capital	0.81	0.54	0.38	0.27	0.57	0.54	0.65	0.44	0.46
GDP or Value Added Multiplie	**1.14**	**0.81**	**0.58**	**0.52**	**0.81**	**1.15**	**1.19**	**0.76**	**1.25**
HH1	0.03	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02
HH2	0.02	0.02	0.01	0.01	0.02	0.02	0.03	0.02	0.03
HH3	0.03	0.02	0.01	0.01	0.02	0.03	0.03	0.02	0.04
HH4	0.03	0.02	0.02	0.02	0.02	0.04	0.04	0.02	0.04
HH5	0.04	0.03	0.02	0.02	0.03	0.05	0.05	0.03	0.05
HH6	0.05	0.03	0.02	0.02	0.03	0.06	0.06	0.03	0.07
HH7	0.06	0.04	0.03	0.03	0.04	0.07	0.07	0.04	0.08
HH8	0.08	0.06	0.04	0.04	0.06	0.10	0.10	0.06	0.12
HH9	0.11	0.08	0.06	0.06	0.08	0.15	0.14	0.09	0.18
HH10	0.36	0.26	0.19	0.17	0.26	0.39	0.39	0.25	0.43
Income Multipliers	**0.81**	**0.59**	**0.42**	**0.41**	**0.58**	**0.93**	**0.93**	**0.58**	**1.06**

Table 5.3 (Continued)

Sector	HH1	HH2	HH3	HH4	HH5	HH6	HH7	HH8	HH9	HH10
Agriculture	0.31	0.31	0.30	0.30	0.29	0.28	0.25	0.24	0.22	0.15
Light Industry	0.67	0.66	0.64	0.64	0.62	0.61	0.56	0.55	0.52	0.33
Heavy Industry	0.82	0.81	0.80	0.81	0.79	0.79	0.75	0.74	0.70	0.59
Energy	0.19	0.19	0.20	0.20	0.20	0.20	0.20	0.20	0.19	0.17
Property	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.07	0.05
Commercial Banks	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01
Other Financial Institutions	0.02	0.02	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03
Private Service	0.27	0.27	0.28	0.29	0.30	0.33	0.35	0.38	0.35	0.46
Public Service	0.05	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.03
Output multipliers	**2.41**	**2.40**	**2.41**	**2.41**	**2.38**	**2.38**	**2.28**	**2.27**	**2.13**	**1.83**

Table 5.4 Total, Direct, Indirect, and Induced Effects of the 9 Industries (Construction and Real Estate equals the Property Sector at the Aggregate Level)

Rank	Aggregate -9 Sectors	Total Effect	Direct	Indirect	Induced
1	Heavy Industry	3.22	1.00	1.61	0.61
2	**Commercial Banks**	**3.00**	**1.00**	**0.66**	**1.34**
3	Public Service	2.95	1.00	0.41	1.54
4	Private Service	2.86	1.00	1.02	0.83
5	**Property**	**2.83**	**1.00**	**1.00**	**0.83**
6	Other Financial Institutions	2.82	1.00	0.48	1.34
7	Agriculture	2.70	1.00	0.53	1.17
8	Light Industry	2.65	1.00	0.80	0.85
9	Energy	2.02	1.00	0.42	0.59

(ii) Disaggregate Level Type 1

Table 5.5 expresses the results of the SAM multipliers of 10 sectors in disaggregate level type 1. In this analysis, the property sector is separated into construction and real estate sectors. The SAM multipliers illustrate the effects of the 10 sectors on the country's economic growth and household income distribution.

1. Economic growth

In Table 5.5, the results show that the heavy industry sector is ranked in 1st place with the highest SAM multiplier amount of 3.21, with the construction sector with a SAM multiplier of 3.13 following. The commercial banking sector is ranked in 3rd place with the amount of 2.96, while the real estate sector is merely ranked in second place from the bottom. The construction sector's SAM multiplier of 3.13 means that the increase of 100 Baht in the construction sector from external shocks (i.e. government spending) contributes an overall economic output expansion of 313 Baht. In addition, it increases employee compensation by 24 Baht, and gross operating surplus by 43 Baht. It can be interpreted that the construction sector shows a very strong impact on the overall economy, but the real estate sector does not. In Table 5.6, the output multiplier of 3.13 in the construction sector is the total effect of the construction sector, which combines direct effect (1.00), indirect effect (1.42), and induced effect (0.70). It means that an increase of 100 Baht in the construction sector from government spending generates the country's output expansion of 313 Baht,

which is separated into 100 Baht from direct spending, 142 Baht from indirect effect (the property sector creates other sectors' expansion), and 70 Baht from the induced effect.

2. Households income distribution

The sectors that create household income are illustrated by income multiplier. Among the 10 sectors, the commercial banking sector generated the second highest income multiplier at 0.93, which means that the commercial banking sector generates income for households at 93 Baht. On the other hand, the construction sector and the real estate sector generate household income at 73 Baht and 50 Baht, respectively.

Household income distribution is illustrated by the multiplier output. Among the 10 household groups of all 10 sectors, household income group level 1 has the highest output multiplier of 2.36, but the 10th household group with the highest income has the lowest output multiplier of 1.79. That means that the lowest income group gets the most benefit from external shocks such as government spending.

Table 5.5 Results of the SAM model—Classification of the 10 Industries (Property Sector divided into Construction and Real Estate according to Disaggregate level Type 1)

Sector	Agriculture	Light Industry	Heavy Industry	Energy	Construction	Real Estate	Commercial Banks	Other Financial Institutions	Private Service	Public Service
Agriculture	1.16	0.30	0.09	0.06	0.10	0.11	0.16	0.15	0.17	0.18
Light Industry	0.37	1.32	0.18	0.14	0.22	0.24	0.40	0.36	0.37	0.41
Heavy Industry	0.60	0.57	2.58	0.23	1.46	0.36	0.59	0.55	0.68	0.74
Energy	0.19	0.16	0.14	1.35	0.15	0.14	0.19	0.17	0.26	0.19
Construction	0.002	0.002	0.001	0.001	0.854	0.006	0.006	0.005	0.002	0.003
Real Estate	0.04	0.03	0.02	0.02	0.03	1.04	0.06	0.06	0.03	0.05
Commercial Banks	0.02	0.02	0.02	0.02	0.02	0.05	1.09	0.04	0.02	0.02
Other Financial Institutions	0.02	0.02	0.01	0.01	0.02	0.03	0.04	1.03	0.02	0.02
Private Service	0.23	0.19	0.15	0.15	0.27	0.22	0.38	0.35	1.24	0.31
Public Service	0.03	0.03	0.02	0.02	0.02	0.03	0.05	0.07	0.03	0.98
Output Multipliers	**2.67**	**2.63**	**3.21**	**2.00**	**3.13**	**2.22**	**2.96**	**2.79**	**2.84**	**2.92**
Labor	0.33	0.27	0.20	0.25	0.24	0.23	0.60	0.54	0.31	0.79
Capital	0.82	0.55	0.39	0.27	0.43	0.85	0.56	0.66	0.45	0.47
Value Added Multipliers	**1.15**	**0.82**	**0.58**	**0.52**	**0.68**	**1.08**	**1.16**	**1.21**	**0.77**	**1.26**
HH1	0.03	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02
HH2	0.02	0.02	0.01	0.01	0.01	0.02	0.02	0.03	0.02	0.03
HH3	0.03	0.02	0.01	0.01	0.02	0.03	0.03	0.03	0.02	0.04
HH4	0.03	0.02	0.02	0.02	0.02	0.03	0.04	0.04	0.02	0.05
HH5	0.04	0.03	0.02	0.02	0.02	0.04	0.05	0.05	0.03	0.05
HH6	0.05	0.03	0.02	0.02	0.03	0.04	0.06	0.06	0.03	0.07
HH7	0.06	0.04	0.03	0.03	0.04	0.05	0.07	0.07	0.04	0.08
HH8	0.08	0.06	0.04	0.04	0.05	0.07	0.10	0.10	0.06	0.12
HH9	0.11	0.08	0.06	0.06	0.07	0.09	0.15	0.14	0.09	0.18
HH10	0.36	0.26	0.19	0.17	0.22	0.33	0.39	0.40	0.25	0.44
Income Multipliers	**0.82**	**0.59**	**0.43**	**0.41**	**0.50**	**0.73**	**0.93**	**0.94**	**0.58**	**1.07**

Table 5.5 (Continued)

Sector	HH1	HH2	HH3	HH4	HH5	HH6	HH7	HH8	HH9	HH10
Agriculture	0.31	0.31	0.31	0.30	0.29	0.28	0.25	0.24	0.22	0.15
Light Industry	0.67	0.66	0.64	0.64	0.62	0.61	0.57	0.55	0.52	0.33
Heavy Industry	0.76	0.75	0.74	0.75	0.74	0.73	0.69	0.68	0.64	0.55
Energy	0.19	0.19	0.20	0.19	0.20	0.20	0.20	0.20	0.19	0.17
Construction	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002
Real Estate	0.08	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.06
Commercial Banks	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Other Financial Institutions	0.02	0.02	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03
Private Service	0.26	0.26	0.28	0.29	0.30	0.33	0.34	0.37	0.35	0.46
Public Service	0.05	0.06	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.03
Output Multipliers	**2.36**	**2.35**	**2.36**	**2.36**	**2.33**	**2.33**	**2.23**	**2.22**	**2.08**	**1.79**

Table 5.6 Total, Direct, Indirect, and Induced Effect of the 10 Industries (Property Sector divided into Construction and Real Estate according to Disaggregate level Type 1)

Rank	Disaggregate -10 Sectors	Total Effect	Direct	Indirect	Induced
1	Heavy Industry	3.21	1.00	1.61	0.60
2	**Construction**	**3.13**	**1.00**	**1.42**	**0.70**
3	**Commercial Banks**	**2.96**	**1.00**	**0.65**	**1.31**
4	Public Service	2.92	1.00	0.41	1.51
5	Private Service	2.84	1.00	1.02	0.82
6	Other Financial Institutions	2.79	1.00	0.47	1.32
7	Agriculture	2.67	1.00	0.53	1.15
8	Light Industry	2.63	1.00	0.80	0.84
9	**Real Estate**	**2.22**	**1.00**	**0.20**	**1.02**
10	Energy	2.00	1.00	0.42	0.58

(iii) Disaggregate level type 2

Tables 5.7 to 5.8 express the results of the 12-sector SAM multiplier disaggregate type 2 analysis. The property sector is separated into the non-residential building, residential building, public works, and real estate sectors. The SAM multipliers show the effect on the country's growth and household income distribution.

1. Economic growth

In Table 5.7, among the 12 sectors of the study, non-residential building shows the highest amount of SAM multiplier at 3.21, followed by the heavy industry with 3.20. The public works sector is ranked at 3rd place with the value of 3.16. The real estate sector is merely ranked at second place from the bottom. It is clear that the non-residential building sector plays the most important role in the entire economy. Its share of 3.21 means that the increase of 100 Baht from external shocks (i.e. government spending) contributes to the overall economic output expansion of 321 Baht. In other words, the expense of 100 Baht in the sector creates the direct, indirect, and induced effects of 321 Baht on the overall economy. In addition, it increases the compensation of employees by 20 Baht, and a gross operating surplus by 36 Baht.

Similar to the non-residential building sector, the public works sector was ranked at 3rd place with the output multiplier of 3.16. This means that government

spending of 100 Baht on the sector leads to an output increase of 315 Baht in the sector. A hundred Baht of government spending on the sector will increase its output by 315 Baht, heavy industry activity by 134 Baht, public works itself by 89 Baht, private service by 31 Baht and light industry by 23 Baht, the compensation of employees by 27 Baht, and gross operating surplus by 49 Baht.

The commercial banking multiplier was equal to 2.96, and was ranked in 4th place, meaning that the whole economy would generate 296 Baht if the sector produces 100 Baht. A hundred Baht of government spending on the sector will increase its output by 106 Baht, heavy industry activity by 59 Baht, light industry by 40 Baht, private service by 38 Baht and compensation for employees by 60 Baht, and gross operating surplus by 56 Baht.

It can be seen that the non-residential building sector provides the highest growth for the economy with a number 1 rank in the output multiplier.

According to Table 5.8, the output multiplier of 3.21 in the non-residential building sector is the total effect of the non-residential building sector, which combines direct (1.00), indirect (1.62), and induced effects (0.59). This means that the increase of 100 Baht in the sector from government spending generates the country's output expansion of 321 Baht, which is separated into 100 Baht from direct spending, 162 Baht from the indirect effect, and 59 Baht from the induced effect. At the same time, it can be noticed that the commercial banking sector has a high total effect and induced effect. This means that commercial banking sector creates considerably high income. On the other hand, the indirect effect is rather low, meaning that the sector uses inter-industry intermediate input in small amounts. Because the sector is related to services, the input in the production process is low, which is represented by the small indirect effect.

2. Household income distribution

Similar to disaggregate type 1, the sectors that create household income are illustrated by the income multiplier. It can be seen that among the 12 sectors, the commercial banking sector generated the third highest income multiplier of 0.93, which means that the sector generates income for households at 93 Baht. On the other hand, the non-residential building and public works sectors generated household incomes at 56 Baht and 41 Baht, respectively.

The household income distribution is illustrated by the output multiplier. Among the 12 household groups of all 12 sectors, the household income group level 1 shared the highest output multiplier of 2.36, but the 10th household group with the highest income had the lowest output multiplier of 1.79. That means that the lowest income group receives the most benefit from external shocks.

Table 5.7 Results of the SAM model—Classification of the 12 Industries (Property Sector Divided into Residential Building, Non-Residential Building, Public Works, and Real Estate -According to Disaggregate Level Type 2)

Sector	Agriculture	Light Industry	Heavy Industry	Energy	Residential Building	Non-Residential Building	Public Works	Real Estate	Commercial Banks	Other Financial Institutions	Private Service	Public Service
Agriculture	1.16	0.30	0.09	0.06	0.09	0.09	0.11	0.11	0.16	0.15	0.17	0.18
Light Industry	0.37	1.32	0.18	0.14	0.20	0.20	0.23	0.24	0.40	0.36	0.37	0.41
Heavy Industry	0.60	0.57	2.58	0.23	1.46	1.68	1.35	0.36	0.59	0.55	0.68	0.74
Energy	0.19	0.16	0.14	1.35	0.12	0.12	0.16	0.14	0.19	0.17	0.26	0.19
Residential Building	0.0006	0.0004	0.0003	0.0003	0.7623	0.0003	0.0004	0.0040	0.0007	0.0007	0.0004	0.0010
Non-Residential Building	0.001	0.001	0.001	0.001	0.001	0.824	0.002	0.002	0.005	0.004	0.002	0.002
Public Works	0.00004	0.00004	0.00003	0.00006	0.00003	0.00003	0.89692	0.00036	0.00005	0.00004	0.00006	0.00004
Real Estate	0.04	0.03	0.02	0.02	0.02	0.02	0.03	1.04	0.06	0.06	0.03	0.05
Commercial Banks	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.05	1.09	0.04	0.02	0.02
Other Financial Institutions	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.03	0.04	1.03	0.02	0.02
Private Service	0.23	0.19	0.15	0.15	0.21	0.21	0.31	0.22	0.38	0.35	1.24	0.31
Public Service	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.03	0.05	0.07	0.03	0.98
Output Multipliers	**2.67**	**2.63**	**3.21**	**2.00**	**2.92**	**3.21**	**3.16**	**2.22**	**2.96**	**2.79**	**2.84**	**2.92**
Labor	0.33	0.27	0.20	0.25	0.22	0.20	0.27	0.23	0.60	0.54	0.31	0.79
Capital	0.82	0.55	0.39	0.27	0.34	0.36	0.50	0.85	0.56	0.66	0.45	0.47
Value Added Multipliers	**1.15**	**0.82**	**0.58**	**0.52**	**0.56**	**0.57**	**0.77**	**1.07**	**1.16**	**1.20**	**0.77**	**1.26**
HH1	0.03	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02
HH2	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.02	0.03
HH3	0.03	0.02	0.01	0.01	0.01	0.01	0.02	0.03	0.03	0.03	0.02	0.04
HH4	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.04	0.04	0.02	0.05
HH5	0.04	0.03	0.02	0.02	0.02	0.02	0.03	0.04	0.05	0.05	0.03	0.05
HH6	0.05	0.03	0.02	0.02	0.02	0.02	0.03	0.04	0.06	0.06	0.03	0.07
HH7	0.06	0.04	0.03	0.03	0.03	0.03	0.04	0.05	0.07	0.07	0.04	0.08
HH8	0.08	0.06	0.04	0.04	0.04	0.04	0.06	0.07	0.10	0.10	0.06	0.12
HH9	0.11	0.08	0.06	0.06	0.06	0.06	0.08	0.09	0.15	0.14	0.09	0.18
HH10	0.36	0.26	0.19	0.17	0.18	0.18	0.25	0.33	0.39	0.40	0.25	0.44
Income Multipliers	**0.82**	**0.59**	**0.43**	**0.41**	**0.42**	**0.42**	**0.57**	**0.73**	**0.93**	**0.94**	**0.58**	**1.07**

Table 5.7 (Continued)

Sector	HH1	HH2	HH3	HH4	HH5	HH6	HH7	HH8	HH9	HH10
Agriculture	0.31	0.31	0.31	0.30	0.29	0.28	0.25	0.24	0.22	0.15
Light Industry	0.67	0.66	0.64	0.64	0.62	0.61	0.57	0.55	0.52	0.33
Heavy Industry	0.76	0.75	0.74	0.75	0.74	0.73	0.69	0.68	0.64	0.55
Energy	0.19	0.19	0.20	0.19	0.20	0.20	0.20	0.20	0.19	0.17
Residential Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-Residential Building	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Public Works	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Real Estate	0.08	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.06
Commercial Banks	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Other Financial Institutions	0.02	0.02	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03
Private Service	0.26	0.26	0.28	0.29	0.30	0.33	0.34	0.37	0.35	0.46
Public Service	0.05	0.06	0.05	0.05	0.06	0.05	0.05	0.05	0.05	0.03
Output Multipliers	**2.36**	**2.35**	**2.36**	**2.36**	**2.33**	**2.33**	**2.23**	**2.22**	**2.08**	**1.79**

Table 5.8 Total, Direct, Indirect, and Induced Effects of the 12 Industries (Property
Sector divided into Residential Building, Non-Residential Building, Public
Works, and Real Estate According to Disaggregate level Type 2)

Rank	Disaggregate - 12 Sectors	Total Effect	Direct	Indirect	Induced
1	**Non-Residential Building**	**3.21**	**1.00**	**1.62**	**0.59**
2	Heavy Industry	3.21	1.00	1.61	0.60
3	**Public Works**	**3.16**	**1.00**	**1.36**	**0.80**
4	**Commercial Banks**	**2.96**	**1.00**	**0.65**	**1.31**
5	Public Service	2.92	1.00	0.41	1.51
6	**Residential Building**	**2.92**	**1.00**	**1.33**	**0.59**
7	Private Service	2.84	1.00	1.02	0.82
8	Other Financial Institutions	2.79	1.00	0.47	1.32
9	Agriculture	2.67	1.00	0.53	1.15
10	Light Industry	2.63	1.00	0.80	0.84
11	**Real Estate**	**2.22**	**1.00**	**0.20**	**1.02**
12	Energy	2.00	1.00	0.42	0.58

In summary, analyzing the property sector with the disaggregate analysis shows the very strong impacts of the sector on the entire Thai economy. The results revealed that the non-residential building sector was the most important to the entire economy. The reason that the non-residential building sector generates high employment is because it covers a wide range of buildings with numerous floor areas. Moreover, the residential building and commercial banking sectors also play important roles in the economy. Although the real estate sector has a low multiplier compared to that of the construction sector, it has the strong relationship with the commercial banking sector which has a high multiplier due to its numerous transactions.

According to the existing researches, which have studied the Thai construction sector, it is useful to analyze the details of the residential, non-residential, public works, and the real estate sectors. Hence this study shows the significant results from these sectors. In addition, the analysis of the impact of government policies via the property sector is also advantageous. Based on the results of the SAM model, the public investment in public works sector shows its large expansion in the whole economy. Therefore, it is interesting to examine the impacts of Thai Kem Keng, which focuses on public works, on the Thai economy.

5.4 The 2004 Financial Social Accounting Matrix Analysis

The Financial SAM model was adopted in this study to analyze the linkages among the property industry, the commercial banking sector, and the impacts on the Thai economy. The data used were based on the 2004 Financial SAM Table for Thailand, which was discussed in chapter 4. This part explains two main points of the Financial FSAM. The first is the characteristics of the Financial SAM, which consist of some important features of the model, the differences between the Financial SAM and the SAM, and the advantages and disadvantage of the Financial SAM. The second is the conceptual framework and model specification of the two methodologies. that of Emini and Fofack (2004) and Waheed and Ezaki (2006), that apply to the study.

5.4.1 Characteristics of Financial SAM

The importance of the Financial SAM, the differences between the Financial SAM and SAM, and the advantages and disadvantage of the Financial SAM are explained as the follows.

5.4.1.1 The Importance of the Financial SAM

Although there are many studies that have applied the SAM model in studying the area of the property sector and its impacts on the entire economy, no literature has provided an analysis of the linkages between the property sector and the banking sector, and their impacts on the entire economy. This is because the traditional SAM model only intends to study the real side, not the financial side. For this reason, this study has included the financial part in the analysis with the application of the Financial SAM. The Financial SAM model includes the financial components, referring to financial instruments, i.e. currencies, bonds, loans, and financial agents, i.e. the commercial banks and the Central Bank. It has enabled the completion of a clear examination of the commercial banking sectors' connection to the property sector in terms of the way in which it influences the economy.

5.4.1.2 The Differences between the Financial SAM and SAM

Typically, the Financial SAM includes a part of the integral SAM data, with the purpose of connecting the real and financial sectors. There are three main areas added to the Financial SAM matrices. First, the Financial SAM includes

financial agents and instruments. Second, the capital account is disaggregated according to each agent. Lastly, the Financial SAM includes financial assets and liability accounts.

To begin with, the Financial SAM includes financial agents, which are commercial banks and the Central Bank, and financial instruments, which are currencies, deposits, government bonds, domestic bank loans, foreign loans, capital reserves, foreign capital reserves, and other asset/liabilities.

Next, the Financial SAM disaggregates the capital account according to each agent. The capital accounts are shown in each agent's balance sheet. The capital accounts in the SAM model, on the other hand, are included in the savings of all institutions. Therefore, it cannot be analyzed for each institution.

Lastly, the Financial SAM is different from the SAM, in that the Financial SAM includes financial assets/financial liabilities accounts, and shows the changes in the assets and liabilities of each agent. The row shows the changes in the financial assets (currencies, deposits, capital reserves, foreign capital reserves, and other financial assets). The column shows the changes in financial liabilities of each agent (domestic bank loans, foreign loans, and other financial liabilities). These two matrices must be balanced according to the double-entry accounting rule.

5.4.1.3 Advantages and Disadvantages of the Financial SAM

The following section describes the advantages and disadvantages of the Financial SAM.

The advantages of the Financial SAM are follows:

1. The model solves the limitation of the traditional SAM, which is able to analyze only the real sector by including the financial sector. It integrates all markets, including the goods market, the labor market, and the money market, into the analysis. Therefore, the Financial SAM model is able to generate all market analyses, in general equilibrium analyses, leading to much more reliable results. A more accurate outcome leads to better economic policies.

2. The results processed by the Financial SAM are greater than those computed by the traditional SAM because the Financial SAM includes the effects from the linkage between the real and financial components, which affects the entire economy.

3. The Financial SAM can be used in various perspectives and areas, which are related to financial transactions, such as capital inflows, taxes, and public debts (Seng, Azali and Chin, 2004: 3). The Financial SAM is used as the database for Financial General Equilibrium Model (FCGE).

The problem of the Financial SAM model is that it can overestimate the results. The study shows that there is an oversupply of products in the market, while the supply is actually insufficient in the real world.

5.4.2 The Financial Social Accounting Matrix Model (Financial SAM)

In the analysis with Financial SAM model adopted, there are two methods that are applied in the study. The first one was created by Emini and Fofack (2004) and another was created by Waheed and Ezaki (2006). The concepts of the two methods are different. Emini and Fofack's (2004) model is similar to the traditional SAM, in which the exogenous shock affects endogenous income, while Waheed and Ezaki's (2006) model focuses on the impact of savings and investment in each economic agent, which affects the entire economy. The differences in analysis concepts are reflected in their allocation of exogenous and endogenous accounts. Emini and Fofack's endogenous accounts consist of activities, commodities, factors of production, and current accounts, while the government, the rest of the world, and the related accounts are assigned to be exogenous accounts. On the other hand, Waheed and Ezaki's model assigns endogenous accounts to include capital accounts and the flow of financial assets, while the remainders are combined to be exogenous accounts.

5.4.3 Conceptual Framework and Model Specification

5.4.3.1 Emini and Fofack's Framework

Emini and Fofack's framework (2004: 22) is similar to that of the traditional SAM model, where the matrix consists of the endogenous income $y_n^{(r,f)}$, equals the average expenditure propensities $A_n^{(r,f)}$ plus the external shock or the injection from exogenous accounts into the endogenous accounts $F_n^{(r,f)}$.

$$y_n^{(r,f)} = A_n^{(r,f)} * y_n^{(r,f)} + F_n^{(r,f)} \qquad (1)$$

The equation (1) can be rewritten as

$$y_n^{(r,f)} = \left(I - A_n^{(r,f)}\right)^{-1} * F_n^{(r,f)}$$

$$y_n^{(r,f)} = M_a^{(r,f)} * F_n^{(r,f)}$$

$y_n^{(r,f)}$ is the endogenous income, $A_n^{(r,f)}$ is the average expenditure propensities, $F_n^{(r,f)}$ is the external shock, r is real side, f is financial side, and $M^{(r,f)}$ is the financial SAM.

In the study, in order to calculate using the Financial SAM model, the 2004 Financial SAM Table that was used as a database was separated into endogenous and exogenous accounts. The endogenous accounts consist of activities, commodities, factors of production, and current accounts of households. The exogenous account consists of current accounts, capital account, and financial assets/financial liabilities of the government account, i.e. government bonds, foreign loans, and foreign capital reserves, including taxes/tariffs and the ROW. The Financial SAM multipliers, which are computed from by the Financial SAM model, illustrate the impacts caused by a one-unit increase in investment in each production activity.

Table 5.9 shows the results of the Financial SAM model where the property sector is divided into the residential building, non-residential building, public works, and real estate sectors. In Table 5.9, among the 12 sectors, the non-residential sector has the second highest multiplier value of 4.02, followed by the industrial sector with a value of 4.03. it can be explained that a unit increase in investment in the non-residential sector induces an increase in production by 4.02 units in the whole economy (2.14 units are in the heavy industrial sector, and 1.0 unit is in its own sector). It also generates 0.39 units in return on capital, 0.22 units in compensation for labor, and 0.50 units in household income. On the financial side, it induces household savings by 0.06 units, and various financial flows by 0.09 units (0.028 units are in deposits, and 0.019 units in loans).

The public works sector has the third highest multiplier amount of 3.91. This means that a unit increase in an investment in the public works sector induces an increase in production by 3.91 units in the whole economy (1.77 units are in the heavy industrial sector and 1.02 in its own sector). It also generates 0.53 units in return on

capital, 0.30 units in compensation for labor, and 0.68 units in household income. On the financial side, they induce household savings by 0.08 units and various financial flows by 0.12 units (0.038 units are in deposits and 0.025 units in loans).

The residential building sector has the fourth highest multiplier value of 3.73. This means that a unit increase of investment in the residential sector induces an increase in production by 3.73 units in the whole economy (1.87 units are in the heavy industrial sector and 1.00 in its own sector). It also generates 0.37 units in return on capital, 0.24 units in compensation for labor, and 0.50 units in household income. On the financial side, they induce household savings by 0.06 units, and various financial flows by 0.08 units (0.027 units are in deposits, and 0.018 units in loans).

The real estate sector is ranked at second place from the bottom with a multiplier value of 2.84. That is, a unit increase of investment in the sector would yield an increase of production by 2.84 units in the entire economy (1.05 units are in its own sector and 0.66 in heavy industry). It also generates 0.92 units in return on capital, 0.26 units in compensation for labor, and 0.91 units in household income. Regarding the financial aspect, it creates household savings by 0.11 units, and various financial flows by 0.16 units (0.052 units are in deposits and 0.035 units in loans).

The commercial banking sector is ranked at 6th place with Financial SAM multipliers of 3.58 units. To clarify, a unit increase in investment in the sector leads to an increase in production by 3.58 units in the whole economy (1.07 units are in its own sector and 0.89 in heavy industry). It also generates 0.61 units in return on capital, 0.63 units in compensation for labor, and 1.06 units in household income. On the financial side, it brings about 0.12 units in household savings and 0.18 units in various financial flows (0.057 units are deposits and 0.038 units are loans).

Table 5.9 Results of the Financial SAM model—Classification of the 12 Industries (Property Sector Divided into Residential Building, Non-Residential Building, Public Works, and Real Estate Sectors) according to Emini and Fofack's Framework

Sector	Agriculture	Light Industry	Heavy Industry	Energy	Residential Building	Non-Residential Building	Public Works	Real Estate	Commercial Banks	Other Financial Institutions	Private Service	Public Service
Agriculture	1.26	0.34	0.11	0.08	0.11	0.11	0.13	0.15	0.19	0.19	0.20	0.21
Light Industry	0.51	1.62	0.25	0.20	0.27	0.28	0.33	0.37	0.54	0.51	0.49	0.55
Heavy Industry	0.95	0.84	3.23	0.37	1.87	2.14	1.77	0.66	0.89	0.87	0.96	1.07
Energy	0.23	0.18	0.16	1.40	0.13	0.14	0.19	0.17	0.21	0.20	0.29	0.21
Residential Building	0.001	0.001	0.001	0.000	1.001	0.001	0.001	0.005	0.001	0.001	0.001	0.001
Non-Residential Building	0.002	0.002	0.001	0.001	0.002	1.001	0.002	0.002	0.006	0.005	0.002	0.002
Public Works	0.03	0.02	0.01	0.01	0.01	0.01	1.02	0.03	0.02	0.02	0.02	0.02
Real Estate	0.05	0.04	0.03	0.02	0.03	0.03	0.04	1.05	0.06	0.07	0.04	0.06
Commercial Banks	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.04	1.07	0.04	0.02	0.02
Other Financial Institutions	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.04	0.07	1.05	0.03	0.03
Private Service	0.31	0.24	0.18	0.18	0.25	0.25	0.37	0.29	0.45	0.43	1.35	0.37
Public Service	0.04	0.03	0.02	0.02	0.02	0.02	0.03	0.04	0.06	0.08	0.04	1.05
Output Multipliers	**3.43**	**3.36**	**4.03**	**2.30**	**3.73**	**4.02**	**3.91**	**2.84**	**3.58**	**3.46**	**3.43**	**3.60**
Labor	0.36	0.30	0.22	0.26	0.24	0.22	0.30	0.26	0.63	0.59	0.34	0.82
Capital	0.89	0.59	0.42	0.30	0.37	0.39	0.54	0.92	0.61	0.70	0.49	0.52
Factor of Production	**1.26**	**0.89**	**0.63**	**0.56**	**0.60**	**0.61**	**0.83**	**1.18**	**1.24**	**1.28**	**0.83**	**1.34**

Table 5.9 (Continued)

Item	Agriculture	Light Industry	Heavy Industry	Energy	Residential Building	Non-Residential Building	Public Works	Real Estate	Commercial Banks	Other Financial Institutions	Private Service	Public Service
Current Accounts												
HH1	0.029	0.020	0.014	0.012	0.013	0.014	0.019	0.029	0.025	0.027	0.018	0.025
HH2	0.028	0.020	0.014	0.013	0.014	0.014	0.019	0.026	0.028	0.029	0.019	0.031
HH3	0.035	0.025	0.018	0.016	0.017	0.017	0.023	0.032	0.036	0.037	0.023	0.040
HH4	0.042	0.030	0.021	0.020	0.021	0.021	0.028	0.038	0.045	0.045	0.029	0.050
HH5	0.049	0.036	0.025	0.024	0.025	0.025	0.034	0.045	0.054	0.054	0.034	0.060
HH6	0.057	0.042	0.030	0.029	0.029	0.029	0.040	0.051	0.065	0.065	0.041	0.074
HH7	0.076	0.055	0.039	0.037	0.038	0.038	0.052	0.069	0.083	0.084	0.053	0.094
HH8	0.101	0.073	0.053	0.050	0.052	0.052	0.070	0.091	0.114	0.114	0.071	0.130
HH9	0.141	0.104	0.075	0.074	0.074	0.074	0.100	0.123	0.169	0.168	0.103	0.198
HH10	0.439	0.311	0.223	0.200	0.214	0.216	0.293	0.409	0.445	0.457	0.293	0.485
Households	**1.00**	**0.71**	**0.51**	**0.47**	**0.50**	**0.50**	**0.68**	**0.91**	**1.06**	**1.08**	**0.68**	**1.19**

Table 5.9 (Continued)

Item	Agriculture	Light Industry	Heavy Industry	Energy	Residential Building	Non-Residential Building	Public Works	Real Estate	Commercial Banks	Other Financial Institutions	Private Service	Public Service
Capital Accounts												
HH1	0.0004	0.0003	0.0002	0.0002	0.0002	0.0002	0.0003	0.0004	0.0004	0.0004	0.0003	0.0004
HH2	0.0005	0.0003	0.0002	0.0002	0.0002	0.0002	0.0003	0.0004	0.0005	0.0005	0.0003	0.0005
HH3	0.0005	0.0004	0.0003	0.0002	0.0003	0.0003	0.0004	0.0005	0.0006	0.0006	0.0004	0.0006
HH4	0.0007	0.0005	0.0003	0.0003	0.0003	0.0003	0.0005	0.0006	0.0007	0.0007	0.0005	0.0008
HH5	0.0010	0.0007	0.0005	0.0005	0.0005	0.0005	0.0007	0.0010	0.0010	0.0011	0.0007	0.0011
HH6	0.0012	0.0009	0.0006	0.0006	0.0006	0.0006	0.0008	0.0011	0.0013	0.0013	0.0008	0.0014
HH7	0.0050	0.0036	0.0026	0.0024	0.0025	0.0025	0.0034	0.0046	0.0054	0.0055	0.0035	0.0060
HH8	0.0058	0.0042	0.0030	0.0028	0.0029	0.0029	0.0040	0.0053	0.0063	0.0064	0.0040	0.0070
HH9	0.0126	0.0092	0.0066	0.0064	0.0065	0.0065	0.0088	0.0112	0.0146	0.0146	0.0091	0.0168
HH10	0.0900	0.0639	0.0457	0.0410	0.0438	0.0444	0.0602	0.0839	0.0912	0.0938	0.0600	0.0996
Households	**0.12**	**0.08**	**0.06**	**0.05**	**0.06**	**0.06**	**0.08**	**0.11**	**0.12**	**0.12**	**0.08**	**0.13**
Commercial Bank s	**0.07**	**0.05**	**0.03**	**0.03**	**0.03**	**0.03**	**0.05**	**0.06**	**0.07**	**0.07**	**0.05**	**0.08**
BOT	**0.05**	**0.04**	**0.03**	**0.02**	**0.02**	**0.02**	**0.03**	**0.05**	**0.05**	**0.05**	**0.03**	**0.06**
Financial Accounts												
Currencies	0.019	0.014	0.010	0.009	0.009	0.010	0.013	0.018	0.020	0.020	0.013	0.022
Deposits	0.056	0.040	0.029	0.026	0.027	0.028	0.038	0.052	0.057	0.059	0.038	0.062
Bank Loans	0.038	0.027	0.019	0.017	0.018	0.019	0.025	0.035	0.038	0.039	0.025	0.041
Required Reserve	0.031	0.022	0.016	0.014	0.015	0.015	0.021	0.029	0.031	0.032	0.021	0.034
Other Asset/Liabilities.	0.029	0.021	0.015	0.013	0.014	0.014	0.019	0.027	0.029	0.030	0.019	0.031
Total Financial Accounts	**0.17**	**0.12**	**0.09**	**0.08**	**0.08**	**0.09**	**0.12**	**0.16**	**0.18**	**0.18**	**0.12**	**0.19**

Table 5.10 shows the compared results of the SAM and Financial SAM models; it was found that by using the Financial SAM model, the percent increase in the output multipliers that represent the economic expansion are higher than those calculated from the SAM model. They are 27.9%, 25.3 %, 24.0%, 27.8%, and 20.7% for the residential building, non-residential building, public works, real estate, and commercial banking sectors respectively. In addition, computing using the Financial SAM, the percent increase in the factors of production that are compensation for labor and return on capital are greater than those of the SAM. They are 8.1%, 8.4%, 8.4%, 9.9%, and 6.9% for the residential building, non-residential building, public works, real estate, and the commercial banking sectors, respectively. This is because the Financial SAM includes the induced effects of the financial side, thereby reflecting the real picture of the entire Thai economy.

Table 5.10 Comparing the SAM and the Financial SAM Results

Sector	SAM					Financial SAM					% Change				
	Non-Residential Building	Public Works	Residential Building	Real Estate	Commercial Banks	Non-Residential Building	Public Works	Residential Building	Real Estate	Commercial Banks	Non-Residential Building	Public Works	Residential Building	Real Estate	Commercial Banks
Agriculture	0.09	0.11	0.09	0.11	0.16	0.11	0.13	0.11	0.15	0.19					
Light Industry	0.20	0.23	0.20	0.24	0.40	0.28	0.33	0.27	0.37	0.54					
Heavy Industry	1.68	1.35	1.46	0.36	0.59	2.14	1.77	1.87	0.66	0.89					
Energy	0.12	0.16	0.12	0.14	0.19	0.14	0.19	0.13	0.17	0.21					
Residential Building	0.000	0.000	0.762	0.004	0.001	0.001	0.001	1.001	0.005	0.001					
Non-Residential Building	0.82	0.00	0.00	0.00	0.01	1.00	0.00	0.00	0.00	0.01					
Public Works	0.000	0.897	0.000	0.000	0.000	0.012	1.017	0.012	0.026	0.023					
Real Estate	0.02	0.03	0.02	1.04	0.06	0.03	0.04	0.03	1.05	0.06					
Commercial Banks	0.02	0.02	0.02	0.05	1.09	0.01	0.02	0.01	0.04	1.07					
Other Financial Institutions	0.02	0.02	0.02	0.03	0.04	0.02	0.02	0.02	0.04	0.07					
Private Service	0.21	0.31	0.21	0.22	0.38	0.25	0.37	0.25	0.29	0.45					
Public Service	0.02	0.02	0.02	0.03	0.05	0.02	0.03	0.02	0.04	0.06					
Output Multipliers	**3.21**	**3.16**	**2.92**	**2.22**	**2.96**	**4.02**	**3.91**	**3.73**	**2.84**	**3.58**	**25.3**	**24.0**	**27.9**	**27.8**	**20.7**
Labor	0.20	0.27	0.22	0.23	0.60	0.22	0.30	0.24	0.26	0.63					
Capital	0.36	0.50	0.34	0.85	0.56	0.39	0.54	0.37	0.92	0.61					
Factors of Production	**0.57**	**0.77**	**0.56**	**1.07**	**1.16**	**0.61**	**0.83**	**0.60**	**1.18**	**1.24**	**8.4**	**8.4**	**8.1**	**9.9**	**6.9**

Besides Emini and Fofack's framework, Waheed and Ezaki's framework was used to analyze the relationships between the property sector and the commercial banking sector, and its impact on the entire economy in this study. As mentioned earlier, Waheed and Ezaki's (2006) model focuses on the analysis of savings and investment because they are prominent factors in stimulating economic growth. For example, in building construction, firms require funding resources in their production process and their savings is used for investment. However, the firms' savings is not enough; they also have to be financed by the commercial banks, which are the major funding sources. Therefore, the analysis of these factors are included in the study to investigate which sectors, agents, and financial assets provide large impacts on the economy.

5.5.3.2 Waheed and Ezaki's Conceptual Framework

In Waheed and Ezaki's framework, which focuses on coporate savings and investment, the account in the 2004 Financial SAM Table is separated into the endogenous accounts and exogenous accounts. The endogenous accounts consist of capital accounts and the flow of financial assets and liabilities accounts, while the exogenous accounts consist of the current account and the remaining accounts of each economic agent. The framework of the Financial SAM, based on Waheed and Ezaki's framework, can be seen in Table 5.11. T21 is the matrix for the financial assets. T12 is the matrix for the financial liabilities of the institutions, S is the vector of savings, k is the vector of physical investment by institution, Z is the total resource available, and z′ is the total resource use of the institutions.

Table 5.11 Simplified framework of the financial social accounting model based on Waheed and Ezaki's framework

		Endogenous	**Accounts**	**Exogenous**	**Accounts**	**Total**
		Capital Account	Flow of Funds Account	Current Account	Some of Other Accounts	
Endo Acct.	Capital Account	0	T_{12}	S_1	0	Z_1
	Flow of Funds Account	T_{21}	D	0	0	Z_2
Exo Acct.	Current Account	0	0	S_3	t_1	Z_3
	Sum of Other Accounts	k'	0	S_4	t_2	Z_4
Total		Z_1'	Z_2'	Z_3'	Z_4'	

Source: Waheed and Ezaki (2006: 13)

Under Waheed and Ezaki's framework, there are two impact analyses: savings impacts and investment impacts.

1. Analyses of Savings Impacts

In order to analyze the impacts of the savings of the economic agents, the transaction matrix of this study is written as (1). This matrix can be transformed into the matrices of the average expenditure propensities of M and N.

$$\begin{bmatrix} Z_1 \\ Z_2 \end{bmatrix} = \begin{bmatrix} 0 & N \\ M & D \end{bmatrix} \begin{bmatrix} z_1 \\ z_2 \end{bmatrix} + \begin{bmatrix} s_1 \\ 0 \end{bmatrix}, \tag{1}$$

where Z is the total resource available, and M and N are the matrices of average expenditure propensities.

To attain the effects of the exogenous changes in savings on the endogenous accounts, the transaction matrix can be rearranged as follows:

$$Z = Fz + S \tag{2}$$

$$Z = (I - F)^{-1} S$$
$$Z = Ms \tag{3}$$

Here, F is the matrix of flow of fund ratios, and M is the matrix of the financial SAM.

Table 5.12 shows the Financial SAM results based on the savings impacts analyses. Each economic agent has a different impact from the changes in its savings. The Financial SAM multipliers of this type are interpreted in terms of the following: a one-unit increase in the savings of an economic agent raises the available agents resources and also those of other agents. Among the economic agents, the commercial banking sector receives the largest increase of 1.56 units from its one-unit increase in savings, compared to the value of 1.36 of the BOT and 1.23 of households. The highest figure of 1.56 units of the commercial banking sector indicates that a one-unit rise in the savings of the sector increases its resources on hand by 1.56 units. In addition, a unit increase in commercial bank savings increases the resources available to firms by 0.97 units, and to the BOT by 0.78 units. In addition, a one-unit increase in

the savings of the commercial banking sector increases its financial assets, as evidenced from the value of bank loans that receive the highest increase of 0.87 units, following by bank capital reserves of 0.71 units.

A one-unit increase in the household savings raises their resources available by 1.23 units, the commercial bank sector by 0.97 units, and enterprise by 0.72 units. Considering household financial assets, a one-unit increase in household savings increases their deposits by 0.68 units and bonds by 0.45 units.

The results suggest that commercial banks receive the largest benefit from an increase of savings in the entire Thai economy. The sharp increase in the commercial bank savings affects funding resource availability in the economy.

Table 5.12 The Financial SAM Results Based on the Savings Analysis Using Waheed and Ezaki's Framework

Item	Household	Enterprise	Commercial Banks	Bank of Thailand	Government	ROW
Agents						
Household	1.23	0.05	0.35	0.21	0.07	0.17
Enterprise	0.72	1.16	0.97	0.92	0.25	0.86
Commercial Banks	0.97	0.18	1.56	0.69	0.24	0.61
Bank of Thailand	0.67	0.10	0.78	1.36	0.12	0.31
Government	0.54	0.08	0.28	0.33	1.05	0.40
ROW	0.33	0.05	0.39	0.67	0.06	1.15
Assets						
Currency	0.23	0.01	0.07	0.04	0.01	0.03
Deposits	0.68	0.11	0.26	0.19	0.11	0.17
Bank Loans	0.54	0.10	0.87	0.38	0.13	0.34
Reserves	0.44	0.08	0.71	0.31	0.11	0.28
Other financial Assets	0.57	0.16	0.61	0.97	0.29	0.63
Bonds	0.45	0.07	0.17	0.15	0.04	0.10
Foerign Loans	0.23	0.03	0.27	0.47	0.04	0.81
Foerign Reserves	0.33	0.05	0.39	0.67	0.06	0.15

2. Analyses of Investment Impacts

In order to measure the impacts of the changes in the investment on the resource requirements of each economic agent, the transaction matrix in equation (1) is changed to (4):

$$\begin{bmatrix} z_1' & z_2' \end{bmatrix} = \begin{bmatrix} z_1' & z_2^1 \end{bmatrix} \begin{bmatrix} 0 & Q \\ P & D \end{bmatrix} + \begin{bmatrix} k' & 0 \end{bmatrix} \qquad (4)$$

where P and Q are the sub-matrices for the flow of the fund ratio, which are different from the sub-matrices in the investigation of the impacts of the changes in savings. These matrices are the results of the division of endogenous accounts by its row total.

Equation 4 can be rewritten as follows:

$$z' = z'U + k'$$

$$z' = k'(I - U)^{-1} = k'M_k$$

Here, M is the matrix of the Financial SAM and U is the matrix of the flow of fund ratios.

Regarding the impacts of investment, the Financial SAM multipliers indicate that a one-unit increase in the physical asset investment of an economic agent raises the agents' required resources and also those of other agents. Table 5.13 shows the Financial SAM multiplier in the change of investment. According to the economic agents, the commercial banking sector also shares the largest increase of 2.31 units from its one-unit investment increase, compared to the value of 2.10 of the BOT and 1.51 of the firm. The highest figure of 2.31 of the commercial banking sector means that a one-unit rise in investment in the physical assets of the commercial banking sector raises its resource requirement by 2.31 units (one unit is the direct resource requirement and 1.31 units is the indirect resource requirement). This one-unit investment also increases the resource requirement of the BOT by 1.17, the government by 0.74, the firm by 0.59, households by 0.55, and the ROW by 0.40.

Table 5.13 The Financial SAM Results Based on the Investment Analysis Using Waheed and Ezaki's Framework

Item	Household	Enterprise	Commercial Banks	Bank of Thailand	Government	ROW	Currency	Deposit	Bank Loans	Reserves	Other financial Assets	Bonds	Foerign Loans	Foerign Reserves
Households	1.22	0.25	0.84	0.53	0.33	0.17	0.07	0.26	0.37	0.47	0.90	0.04	0.06	0.17
Enterprise	0.43	1.51	1.53	1.19	0.70	0.41	0.15	0.48	0.49	1.04	1.94	0.08	0.17	0.41
Commercial Banks	0.55	0.59	2.31	1.17	0.74	0.40	0.15	0.73	0.29	1.02	1.93	0.08	0.16	0.40
Bank of Thailand	0.63	0.56	2.13	2.10	0.69	0.37	0.26	0.67	0.30	1.84	1.81	0.08	0.15	0.37
Government	0.13	0.10	0.23	0.19	1.08	0.09	0.02	0.07	0.06	0.17	0.23	0.12	0.06	0.09
ROW	0.63	0.56	2.13	2.10	0.69	1.37	0.26	0.67	0.30	1.84	1.81	0.08	0.15	1.37

5.5 Policy Simulation – The Thai Kem Keng Scheme

Generally, the property sector is the main driver in stimulating the economy. This relationship between the property sector and government spending merits investigation. In Thailand, the Thai government, several times, has used the property sector as the leading sector in stimulating the economy during a recession. In year 1992, Thailand faced the first collapse of the property sector, leading to the economic crunch in that period, and finally the second economic collapse in 1997. Currently, under the Thai Kem Keng Scheme or the Stimulus Plan 2 Program, the government has allocated 73 percent of the program's budget to the public works sector, which consists of various construction projects, i.e. agricultural infrastructure, transportation and logistics infrastructure, and tourism infrastructure, with the purpose of recovering from the negative impacts of the global economic recession. This study studies whether the implementation of the policy in this sector is effective for the whole economy. For this reason, this paper has examined government investment via the Thai Kem Keng Program by adopting the SAM and Financial SAM models.

This section evaluates the impacts of the Thai Kem Keng Scheme on the entire Thai economy by using the SAM and FSAM models. The analysis is divided into three parts. The first part presents the details of the Thai Kem Keng Scheme. The second part shows the scenarios and the effectiveness of the policy using the SAM. The last part discusses the scenarios and the effectiveness of the policy using the Financial SAM model

5.5.1 The Thai Kem Keng Scheme

During a recession period, the government is the major agent that has ability to stimulate the economy via government investments, while the private sector shrinks its investments. In Thailand, the Stimulus Plan was launched because of the world economic crisis in 2008, with the purpose of preventing the Thai economy from experiencing a global economic recession. The Thai government has launched Stimulus Plan I and now Stimulus Plan II is in process.

Stimulus Plan II—a three years plan with a budget of 1.56 trillion Baht activated between 2010 and 2012—has the goal of stimulating the country's economy

by increasing the country's economic growth. The plan provides opportunities to the private sector to invest in public projects, to boost employment, and to allocate basic infrastructure services to the suburbs of Bangkok and rural areas of the nation (Ministry of Finance, 2010).

The seven objectives of the policy are as follows:

1. To stabilize food and energy by increasing efficiency in agricultural and industrial sectors

2. To improve the basic public services in the economy, society, and environment in order to enhance the competitiveness and quality of life of the citizens

3. To intensify and create potential cash inflow to the tourism industry

4. To create income from the creative economy

5. To improve the quality of education

6. To rearrange the quality of public welfare

7. To increase employment activities and income, leading to better quality of life

Table 5.14 shows the percentages, in detail, of the 7 areas of the Thai Kem Keng Scheme 2. The Infrastructure Development Sector has the major share of 1.14 trillion Baht (73 percent), followed by the farm irrigation and water supply sectors with a value of 230,645 million Baht (14.7 percent), and increasing income and quality of life for the South with a value of 100,000 million Baht (6.4 percent). The remaining amount has been allocated to education, tourism, developing creative economy, and healthcare, which has the lowest share.

The detailed analyses of the 7 areas are as follows.

1. The infrastructure development sector has the major share of 73 percent, that is, 1.14 billion Baht of the budget, and covers the construction in its 9 sub-areas: transportation and logistics, energy and alternative energy, telecommunication networks, tourism, education, public health, social welfare, science and technology, and natural resources and environment.

1.1 The transportation and logistics sector occupies the major share of 43 percent and deals with the construction and improvement of basic infrastructure, i.e. railway, mass transit, and airports.

1.2 The energy and alternative energy sector has the share of 14%. It refers to the stabilization of energy and the development of energy and alternative energy by constructing new electrical plants and developing wind turbines for electricity production.

1.3 The telecommunication network sector (1.8 percent) works on leveling up its high-speed networks, such as Broadband IP and 3G, to support the related business sector and to impart knowledge to the public.

1.4 The infrastructure for tourism sector has a share of 9.6 percent, and intends to extend the water pipeline system, electricity system, and transit system in tourist locations.

1.5 The infrastructure for education sector occupies the share of 8.3 percent, and has the purpose of improving the quality of existing schools, their facilities, and the entire information system in order to modernize them as the education centers in the region and the learning centers in all of the community areas.

1.6 The infrastructure for healthcare sector includes the objectives of improving rural hospitals to be contemporary by investing in modern equipment and developing special centers for chronic diseases. This would allow people be able to access standard services. Its share is 5.7 percent.

1.7 The infrastructure for public welfare and safety sector, with a share of 1%, focuses on the improvement of police stations and the housing units of the police and soldiers across the country.

1.8 The infrastructure for science and technology, with a share of only 0.8%, researches and develops the production of forms of alternative energy that suit the country to reduce costs and strengthen the energy security of the country, and invests in basic infrastructure for adjusting production and service that help support the innovation of products to enhance the competitive ability of important industrial sectors.

1.9 The infrastructure for natural resources and environment sector, with the share of only 0.8%, promotes the growth of plants and forest areas to maintain these natural resources, to alleviate negative green house effects, and to set up databases for natural resources and the environment across the country.

2. The farm irrigation and water supply sector, which has been given the allocation of 230.0 million Baht or 14.7 percent of the budget, upgrades the efficiency of water allocation system, small scale water resource development for agriculture, industrial consumption, and agricultural production. The water resource management covers the improvement and rehabilitation of water resources, the development of the water resources in rainfall areas, the protection and alleviation of floods, and the development of agricultural production and product standards through the development of various sorts of seeds.

3. Increasing income and quality of life

In the attempt to solve the problems that occur in the 5 border provinces in the South, the government has included a budget for this in the plan to increase the income and the quality of the lives of the people. This will help local people have quality of life by increasing basic services for them in terms of housing, water supply, and jobs.

4. Modernizing the whole educational system in 4 areas: learning approaches in the community areas, the standard of education in every school, basic education, and the quality of teachers, to make the country the center of education in the region. This will enable Thai people to receive standard and quality education.

5. Tourism projects improve and promote the industry's image, as well as encourage new investment in tourist spots and rehabilitation of ancient buildings.

6. Developing the potentials of creative economy includes cultural heritage, art and cultural performance, craftsmanship, creative product, the media and software industry, and design and R&D.

7. The healthcare sector concentrates on enhancing its system by producing and training more personnel, i.e. doctors, nurses, and physical therapists, to serve in new hospitals and medical centers. Furthermore, it conducts researches and develops medical technologies to endorse the medical centers to turn them into the hubs in the region.

Table 5.14 The Thai Kem Keng Policy's Budget for 7 Areas

Sectors	2010	2011	2012	2010-12	%
1.Infrastructure Development	355.7	365.1	419.2	1140.0	72.8
1.1 Transportation and Logistics	179.7	227.9	268.5	676.1	43.1
1.2 Energy	86.3	52.1	74.2	212.6	13.6
1.3 Telecommunications System	15.9	8.4	3.8	28.1	1.8
1.4 Tourism	1.8	4.7	3.6	10.1	0.6
1.5 Education	24.2	28.5	30.4	83.1	5.3
1.6 Public Health	31.1	31.1	27.3	89.5	5.7
1.7 Public Welfare	2.7	6.6	5.7	15.0	1.0
1.8 Science and Technology	4	3.9	3.9	11.8	0.8
1.9 Natural Resources and Environment	9.6	1.6	1.2	12.4	0.8
2. Farm irrigation and water supply	70.1	77.2	83.4	230.7	14.7
3. Increasing income and quality of life	30.0	35.0	35.0	100.0	6.4
4. Education	19.1	19.8	21.3	60.2	3.8
5. Tourism	5.8	7.8	6.6	20.2	1.3
6. Developing creative Economy	4.4	1.8	0.5	6.7	0.4
7. Healthcare	1.1	3.9	4.2	9.2	0.6
Total	**486.2**	**510.6**	**570.2**	**1,567.0**	**100.0**

Source: Ministry of Finance, 2010.

In conducting the policy simulation, four sectors in this study, the agricultural sector, the public works sector, the private service sector, and the public service sector, match those in the program. The 7 sectors were thereby rearranged according to 4 categories: the farm irrigation of the government under the agricultural sector, the infrastructure under the public works sector, tourism, and developing creative economy under the private service sector, and education, healthcare, and increasing income and quality of lives for the south under the public service sector. The regrouping of the 7 sectors into 4 sectors and the budgets allocated among them are seen in the following table, Table 5.15.

Table 5.15 Budget Allocation from 2010-2012

(Billion Baht)

Sector	2010	2011	2012	2010-12
Agriculture	70.1	77.2	83.4	230.6
Public Works	355.7	365.1	419.2	1,140.0
Private Service	10.2	9.6	7.1	26.9
Public Service	50.2	58.7	60.5	169.4
Total	**486.2**	**510.6**	**570.2**	**1,566.9**

5.5.2 The Link of the Thai Kem Keng Program 2 to the SAM and Financial SAM Model

Under the SAM and Financial SAM model, government investment is represented as the final demand. Figure 5.17 shows the link of Thai Kem Keng policy to the SAM and Financial SAM model. The government budget injected into the economic system is represented as F_n and $F_n^{(r,f)}$ in the equation. The government injection results in economic growth and household income distribution.

SAM Model	$y_n = (I - A_n)^{-1} F_n$
FSAM Model	$y_n^{(r,f)} = \left(I - A_n^{(r,f)}\right)^{-1} * F_n^{(r,f)}$

Multipliers $(I-A_n)^{-1}$	Final demand (F_n) -Thai Kem Keng Plan

Economic Growth
Households Income Distribution
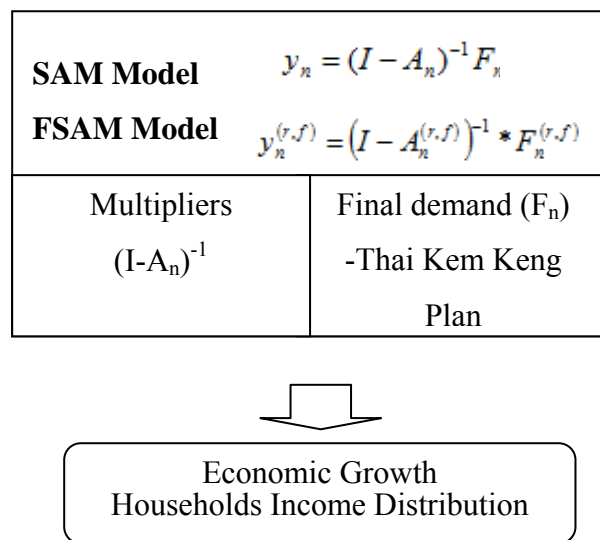
Figure 5.17 The Relationship among the Thai Kem Keng Program and the SAM, and the Financial SAM Model

5.5.3 Scenarios and Results

The study consists of three scenarios**:** the base line scenario**,** the government investment of the Thai Kem Keng Scheme according to the SAM model, and the government investment of the Thai Kem Keng Scheme according to the Financial SAM model.

5.5.3.1 The Baseline Scenario

Under the base line scenario, the 2004 SAM was is used as database in calculating the country's economic expansion and income distribution. Table 5.16 indicates the baseline scenario of year 2004. The value of the total domestic product is 17,248 million Baht, the factor income is 4,433.71 million Baht, and the total household income is 3,887.02 million Baht. The public works sector is focused because the government investment of the Thai Kem Keng Program is mainly via this sector. The value of the public works sector is 224.03 million Baht, approximately 0.3% of the total domestic product. This implies that the public works sector, a sub-sector of the property sector, does not demonstrate significant importance to the Thai economy. However, the sector has been accepted by the government to be a leading sector in stimulating the economy.

Table 5.16 The Baseline Scenario, Year 2004

Sector	Base Case
Agriculture	1,024.57
Light Industry	2,896.60
Heavy Industry	8,434.76
Energy	1,459.58
Residential Building	65.49
Non-Residential Building	96.99
Public Works	224.03
Real Estate	240.54
Commercial Banks	87.25
Other Financial Institutions	136.11
Private Service	1,849.03
Public Service	733.60
Labor	1,786.33
Capital	2,647.38
HH1	98.80
HH2	107.21
HH3	137.46
HH4	165.41
HH5	197.72
HH6	234.04
HH7	303.26
HH8	411.25
HH9	591.10
HH10	1,640.74
Total Domestic Production	**17,248.54**
Total Household Income	**3,887.02**

Since the Thai government encourages the economy by implementing the Thai Kem Keng policy, which focuses on the public works sector as the main driver in economic expansion, this study uses economic growth and income distribution to present the effectiveness of the policy. The increase of economic growth represents the practicability of the policy, and the increase of income level represents the well-being of households.

By using the SAM and Financial SAM models, the Thai Kem Keng scheme is simulated as follows:

5.5.3.2 The Thai Kem Keng Scheme Scenario According to the SAM
Model

In order to determine the economic expansion from the Thai Kem Keng scheme, the SAM model's results, which were calculated in the previous chapter, were multiplied with the funds allocated to the four sectors, as depicted in Table 5.20. Economic growth and income distribution were measured for analyzing the effectiveness of the policy, as follows:

1. The Impacts of the Policy on the Country's Economic Growth

Table 5.17, with the government investment of the Thai Kem Keng scheme, the country's GDP increased from 17,248.5 million Baht in the base year to 22,564.4 million Baht, which is equal to 30.6 percent, after 3 years. The Thai economic growth has increased from 17,248.5 million Baht in the base year to 18,887.3 million Baht in the first year, 18,965.3 million Baht in the second year, and 19,171.5 million Baht in the last year, which is equal to 19.7, 20.5, and 23.2 percent, respectively.

Table 5.17, according to the policy, the public works sector had the largest benefit after 3 years; that is, an increase of 508.9 percent from the base year. The reason that the public works sector exhibited the largest benefit from the policy is because the sector itself received the highest budget injection of 73 percent from the government. In addition, the sector with the greatest SAM multiplier of 3.21, which was calculated in the previous part of the present study, reveals the large impacts on other sectors and the overall Thai economy. Due to the fact that the public works sector, a sub-sector under the property industry, cover various type of construction, i.e. urban infrastructure, highways, roads, ports, railways, airports, power systems,

irrigation, they require large amounts of budget. These activities enrich the healthy growth of the economy through their linkages.

Even though the Thai Kem Keng program has not provided any direct financial support to the commercial banking sector, the commercial banking industry has also grown by 31.4 percent from the indirect and induced effects from other sectors, which are supported by the program. This depicts the interdependence between the commercial banking sector and other sectors.

Table 5.17 The Total 3 Year Results of the Impacts of the Thai Kem Keng Scheme on Economic Growth Using the SAM model—Classification of the 12 Industries (Property Sector Divided into Residential Building, Non-Residential Building, Public Works, and Real Estate Sectors)

Sector	Base Case	Total (Year 1-3)				
		Direct Effect	Indirect Effect	Total Effect	Total Increasing	% Total Increasing
Agriculture	1,024.6	230.6	228.9	459.5	1,484.1	44.8
Light Industry	2,896.6	-	473.3	473.3	3,369.9	16.3
Heavy Industry	8,434.8	-	2,016.7	2,016.7	10,451.4	23.9
Energy	1,459.6	-	297.6	297.6	1,757.1	20.4
Residential Building	65.5	-	0.8	0.8	66.3	1.3
Non-Residential Building	97.0	-	2.7	2.7	99.7	2.8
Public Works	224.0	1,140.0	0.1	1,140.1	1,364.1	508.9
Real Estate	240.5	-	58.8	58.8	299.3	24.4
Comercial Banks	87.2	-	27.4	27.4	114.6	31.4
Other Financial Institutions	136.1	-	39.5	39.5	175.6	29.0
Private Service	1,849.0	26.7	520.8	547.5	2,396.6	29.6
Public Service	733.6	169.4	44.8	214.2	947.8	29.2
Total Domestic Production	17,248.5	1,566.7	3,711.2	5,277.9	22,526.4	30.6

2. The Impacts of the Policy on Household Income Distribution

The impacts of the Thai Kem Keng policy on household income distribution show the effectiveness of the policy. The increase of income in each group represents the better household's living standard. In the study, the household accounts were separated into ten decile groups according to their income levels. The first decile represents the first 10 percent of the lowest income to the tenth with the highest

income. The income allocation to the ten household income levels after the government's budget injection via the Thai Kem Keng scheme is shown in Table 5.18. Over the 3 years, the lowest household income group, the first decile, had the highest income increase of 31.8 percent on average among the 10 household groups. This was followed by the highest income group, the tenth decile, with an average income increase of 29.9 percent. Next, the second decile had an average income increase of 29.2 percent. This implies that the lowest income household had the highest benefit from the government's spending. In other words, it represents an inequality of income distribution, which finally leads to an increase in the country's welfare. At the same time, the richest income group also had the highest benefit due to this group having good business opportunities when the economy was prosperous because of the policy.

Table 5.18 The Total 3-Year Results of the Impacts of the Thai Kem Keng Scheme the Household Income Distribution among 10 levels Using the SAM Model

	Base Case	Total (Year 1-3)				% Total
		Direct Effect	Indirect Effect	Total Effect	Total Increasing	Increasing
HH1	98.8	-	31.4	31.4	130.2	31.8
HH2	107.2	-	31.3	31.3	138.5	29.2
HH3	137.5	-	39.1	39.1	176.6	28.5
HH4	165.4	-	47.4	47.4	212.9	28.7
HH5	197.7	-	56.4	56.4	254.1	28.5
HH6	234.0	-	66.2	66.2	300.3	28.3
HH7	303.3	-	86.3	86.3	389.6	28.5
HH8	411.2	-	116.5	116.5	527.8	28.3
HH9	591.1	-	167.0	167.0	758.1	28.3
HH10	1,640.7	-	490.6	490.6	2,131.3	29.9
Total	3,887.0	-	1,132.3	1,132.3	5,019.3	29.0

5.5.3.3 The Thai Kem Keng Scheme Scenario According to the Financial SAM Model

Similar to the approach using the SAM in studying the impact of government policy via the Thai Kem Keng Scheme, the Financial SAM model, which was calculated in the previous chapter, was employed. Economic growth and income distribution using the Financial SAM model are analysed as follows:

1. The Impacts of The Policy on the Country's Economic Growth

According to table 5.19, with the government investment—the Thai Kem Keng Scheme, the country's GDP has increased from 17,248.5 million Baht in the base year to 23,002.0 million Baht, which is equal to a 33.4 percent increase after 3 years. The Thai economic growth increased from 17,248.5 million Baht in the base year to 19,034.4 million Baht in the first year, 19,120.5 million Baht in the second year, and 19,344.2 million Baht in the last year, which is equal to 10.4, 10.9, and 12.1 percent, respectively.

Similar to the SAM's results, the public works sector had the largest benefit of a 521.9 percent increase from the base year. This is because the largest share of injection and the greatest Financial SAM Multiplier of 3.91, which was calculated in the previous part of the study, revealed the large impacts on the other sectors and on the entire economy.

In addition, the commercial banking sector received a large benefit from the program, with a 34.3 percent increase. Consequently, the growth of the banking sector was ranked in the third place, after public works and the agricultural sector. This depicts the large impacts of the policy on the commercial banking sector and the inter-relationships between sectors.

Table 5.19 The Total 3-Year Results of the Impacts of the Thai Kem Keng Scheme
on the Economic Growth Using the Financial SAM model—
Classification of the 12 Industries (Property Sector Divided into
Residential Building, Non-Residential Building, Public Works, and Real
Estate Sectors)

Sector	Base Case	Total (Year 1-3)				
		Direct Effect	Indirect Effect	Total Effect	Total Increasing	% Total Increasing
Agriculture	1,024.6	230.6	262.1	492.8	1,517.4	48.1
Light Industry	2,896.6	-	550.3	550.3	3,446.9	19.0
Heavy Industry	8,434.8	-	2,232.9	2,232.9	10,667.7	26.5
Energy	1,459.6	-	331.0	331.0	1,790.5	22.7
Residential Building	65.5	-	1.0	1.0	66.5	1.6
Non-Residential Building	97.0	-	2.9	2.9	99.9	3.0
Public Works	224.0	1,140.0	29.2	1,169.2	1,393.2	521.9
Real Estate	240.5	-	69.1	69.1	309.7	28.7
Comercial Banks	87.2	-	29.9	29.9	117.2	34.3
Other Financial Institutions	136.1	-	44.6	44.6	180.8	32.8
Private Service	1,849.0	26.7	581.9	608.8	2,457.9	32.9
Public Service	733.6	169.4	51.4	220.8	954.4	30.1
Total Domestic Production	17,248.5	1,566.7	4,186.4	5,753.4	23,002.0	33.4

2. The Impacts of the Policy on Household Income Distribution

According to Table 5.20, the lowest income household group, the first
decile, had the highest income increase among the 10 household levels, with an
average income increase of 36.1 percent over the three-year period. This was followed
by the highest income group, the tenth decile, with an average income increase of 35.1
percent. Furthermore, the second decile's income increased by 34.2 percent. Again,
this shows that the lowest income households receive the highest benefit, which
represents an inequality of income distribution that finally leads to an increase in the
country's welfare.

Table 5.20 The Total 3-Year Results of the Impacts of the Thai Kem Keng Scheme
on the Household Income Distribution among 10 levels Using the
Financial SAM Model

	Base Case	Total (Year 1-3)				
		Direct Effect	Indirect Effect	Total Effect	Total Increasing	% Total Increasing
HH1	98.8	-	-	35.6	134.4	36.1
HH2	107.2	-	-	36.7	143.9	34.2
HH3	137.5	-	-	46.1	183.6	33.5
HH4	165.4	-	-	56.0	221.4	33.9
HH5	197.7	-	-	66.9	264.6	33.8
HH6	234.0	-	-	79.0	313.0	33.7
HH7	303.3	-	-	102.9	406.2	33.9
HH8	411.2	-	-	139.1	550.3	33.8
HH9	591.1	-	-	199.9	791.0	33.8
HH10	1,640.7	-	-	576.6	2,217.3	35.1
Total Household Income	3,887.0	-	-	1,339	5,226	34.4

Table 5.21 compares the results of the SAM and Financial SAM models
on the Thai Kem Keng policy over the three-year period. The Thai economy has an
average GDP growth at 33.4% using the Financial SAM model and 30.6 % by using
the SAM model. Therefore, using the Financial SAM is 2.8% higher than using the
SAM. In addition, Table 5.22 compares the results of the income distribution of the
lowest income households by using the SAM and Financial SAM. The lowest income
households experienced a 36.1% income increase from the policy, computed by using
the Financial SAM model, and 31.8% by using SAM model. Therefore, using the
Financial SAM is 4.3% higher than using the SAM. It can be concluded that using the
Financial SAM model demonstrates a larger policy impact on the overall economy.

Table 5.21 Comparing the Total 3-Year Results of the Impacts of the Thai Kem Keng Scheme on Economic Growth between the SAM and Financial SAM Models—Classification of the 12 Industries (Property Sector Divided into Residential Building, Non-Residential Building, Public Works, and Real Estate Sectors)

Sector	Base Case	Direct Effect Total (Year 1-3)	Difference of Financial SAM and SAM				SAM				FSAM			
			Indirect Effect	Total Effect	Total Increasing	% Total Increasing	Indirect Effect	Total Effect	Total Increasing	% Total Increasing	Indirect Effect	Total Effect	Total Increasing	% Total Increasing
Agriculture	1,024.6	230.6	33.2	33.3	33.3	3.3	228.9	459.5	1,484.1	44.8	262.1	492.8	1,517.4	48.1
Light Industry	2,896.6	-	77.0	77.0	77.0	2.7	473.3	473.3	3,369.9	16.3	550.3	550.3	3,446.9	19.0
Heavy Industry	8,434.8	-	216.3	216.3	216.3	2.6	2,016.7	2,016.7	10,451.4	23.9	2,232.9	2,232.9	10,667.7	26.5
Energy	1,459.6	-	33.4	33.4	33.4	2.3	297.6	297.6	1,757.1	20.4	331.0	331.0	1,790.5	22.7
Residential Building	65.5	-	0.2	0.2	0.2	0.3	0.8	0.8	66.3	1.3	1.0	1.0	66.5	1.6
Non-Residential Building	97.0	-	0.2	0.2	0.2	0.2	2.7	2.7	99.7	2.8	2.9	2.9	99.9	3.0
Public Works	224.0	1,140.0	29.1	29.1	29.1	13.0	0.1	1,140.1	1,364.1	508.9	29.2	1,169.2	1,393.2	521.9
Real Estate	240.5	-	10.4	10.4	10.4	4.3	58.8	58.8	299.3	24.4	69.1	69.1	309.7	28.7
Comercial Banks	87.2	-	2.6	2.6	2.6	3.0	27.4	27.4	114.6	31.4	29.9	29.9	117.2	34.3
Other Financial Institutions	136.1	-	5.2	5.2	5.2	3.8	39.5	39.5	175.6	29.0	44.6	44.6	180.8	32.8
Private Service	1,849.0	26.7	61.1	61.3	61.3	3.3	520.8	547.5	2,396.6	29.6	581.9	608.8	2,457.9	32.9
Public Service	733.6	169.4	6.6	6.6	6.6	0.9	44.8	214.2	947.8	29.2	51.4	220.8	954.4	30.1
Total Domestic Production	17,248.5	1,566.7	475.2	475.5	475.5	2.8	3,711.2	5,277.9	22,526.4	30.6	4,186.4	5,753.4	23,002.0	33.4

Table 5.22 Comparing the Total 3-Year Results of the Impacts of the Thai Kem Keng Scheme on the Income Distribution among the 10 Levels between the SAM and Financial SAM Models

	Base Case	Direct Effect (Year 1-3)	Difference of Financial SAM and SAM				Direct Effect	SAM (Year 1-3)				Direct Effect	Fianncial SAM (Year 1-3)			
			Indirect Effect	Total Effect	Total Increasing	% Total Increasing		Indirect Effect	Total Effect	Total Increasing	% Total Increasing		Indirect Effect	Total Effect	Total Increasing	% Total Increasing
HH1	98.8	-	4.2	4.2	4.2	4.2	-	31.4	31.4	130.2	31.8	-	35.6	35.6	134.4	36.1
HH2	107.2	-	5.4	5.4	5.4	5.1	-	31.3	31.3	138.5	29.2	-	36.7	36.7	143.9	34.2
HH3	137.5	-	7.0	7.0	7.0	5.1	-	39.1	39.1	176.6	28.5	-	46.1	46.1	183.6	33.5
HH4	165.4	-	8.6	8.6	8.6	5.2	-	47.4	47.4	212.9	28.7	-	56.0	56.0	221.4	33.9
HH5	197.7	-	10.5	10.5	10.5	5.3	-	56.4	56.4	254.1	28.5	-	66.9	66.9	264.6	33.8
HH6	234.0	-	12.7	12.7	12.7	5.4	-	66.2	66.2	300.3	28.3	-	79.0	79.0	313.0	33.7
HH7	303.3	-	16.6	16.6	16.6	5.5	-	86.3	86.3	389.6	28.5	-	102.9	102.9	406.2	33.9
HH8	411.2	-	22.6	22.6	22.6	5.5	-	116.5	116.5	527.8	28.3	-	139.1	139.1	550.3	33.8
HH9	591.1	-	32.9	32.9	32.9	5.6	-	167.0	167.0	758.1	28.3	-	199.9	199.9	791.0	33.8
HH10	1,640.7	-	86.0	86.0	86.0	5.2	-	490.6	490.6	2,131.3	29.9	-	576.6	576.6	2,217.3	35.1
Total	3,887.0	-	206.4	206.4	206.4	5.3	-	1,132.3	1,132.3	5,019.3	29.0	-	1,339	1,339	5,226	34.4

In conclusion, the results of implementing the Thai Kem Keng scheme, in which 73 percent was injected into public works, show the positive impact on the Thai economy in terms of both economic growth and income distribution. There were large expansions of the country's economy and income distribution, in which the lowest income group received the largest benefit, which indicates the effectiveness of the policy. It is important to note that the Financial SAM's results are higher than those of the SAM because the Financial SAM includes the impacts from the financial sector.

CHAPTER 6

CONCLUSIONS AND POLICY IMPLICATIONS

This chapter presents the conclusion of the study, the policy implications, and suggestions for further study.

6.1 Conclusions

The paper analyses the impacts of the property and commercial banking sectors on the entire Thai economy at three levels: (i) aggregate levels, where the property sector is a combination of the construction and real estate sectors, (ii) disaggregate type 1, where the property sector is divided into the construction and real estate sectors, and (iii) disaggregate type 2, the property sector that consists of the residential building, non-residential building, public works, and real estate sectors by using three models: the Input-Output model, the SAM model, and the Financial SAM model. In addition, by using the SAM and Financial SAM models, the Thai Kem Keng Policy was measured in order to investigate its impacts on the Thai economy, which represents the effectiveness of the policy via its impact on economic growth and income distribution. The mentioned issues are concluded as follows.

6.1.1 The Impacts of the Property Sector on the Thai Economy

The construction sector, a sub-sector of the property industry, shows the second highest importance on the entire Thai economy regarding disaggregate analysis of type 1. However, when segregating the construction sector into the sub-sectors of the residential building sector, the non-residential building sector, and the public works sector in disaggregate analysis type 2, the non-residential building sector appears to be the most important for the entire Thai economy. That being said, the smaller the analysis of the property industry, the more important the property industry

is seen be to the entire Thai economy. This result implies that analyzing each component individually shows the more rigid dominant features of each sub-sector.

Although the construction and real estate sectors are sub-sectors of the property sector, it was worth separating the analysis of the property sector into the construction and real estate sectors because of their unique characteristics. The construction sector covers (i) the construction of new buildings and (ii) maintenance and repair services (M&R), while the real estate sector includes the area of business service related to M&R service in the construction sector. The real estate sector deals with various businesses, i.e. accountants, appraisers, mortgage lenders. Because of the difference between two sectors, the separation between the construction sector and the real estate sector in analyzing the property sector plays a highly significant role in the entire economy.

6.1.1.1 The Construction Sector

The construction sector had the second strongest pull effect but the weakest push effect. That means that the sector heavily relies on other sectors for its input in the production process, while the construction sector's output did not influence other sectors. In other words, in the production process of constructing a building, various kinds of building material are required from various related sectors, such as concrete and steel from the heavy industry sector, and loans from the commercial banking sector. The output of the construction sector, such as the buildings, which need maintenance and repaired service, does not appear to play an important role in the Thai economy. Such an outcome is opposite that in some developed countries, where the push effect is stronger than the pull effect. In other words, maintenance expenses increase in developed countries where the economic is mature (Su and Lin, 2003:725). That being said, the Thai construction sector has not reached its full capacity yet, meaning it still has room for additional investment.

The results from both the SAM model and the Financial SAM model show that the construction sector provides very the high impact on the Thai economy. With the disaggregate level type 2, where the construction sector was separated into the residential building sector, the non-residential building sector, and public works, it was found that the non-residential building sector was ranked in the first place in

creating economic expansion, followed by the heavy industry sector and the public works sector.

The result of the impact of the construction sector from the Financial SAM model shows the same results as it with the SAM model, in which the construction sector shows the second highest value. This implies that the government investment in the construction sector results in a great increase in production, which leads to the economic expansion of the entire economy. It is worth pointing out that the value of 3.90 of the Financial SAM model is higher than the value of 3.12 of the SAM model, 25 percent higher. This implies that by using the Financial SAM model, the impact of the construction on the Thai economy is larger than the result from the SAM model because the Financial SAM model includes the effects from financial components, leading to a more accurate analysis. It can be said that using only the SAM model misleads economic performance.

6.1.1.2 The Real Estate Sector

The real estate sector had higher push effects than the pull effects, meaning that the proportion of final demand of the real estate sector was larger than its intermediate demand, meaning the output of the real estate sector was more required by other sectors than the output of other sectors was required by the real estate sector (Yu, Song and Liu, 2005:8). This is because the real estate sector provides various services required by other sectors. In addition, the low value of the pull effects of the real estate sector represent the low technology level of the sector, meaning that the real estate sector requires low amounts of material in its production process to produce goods because most outputs from the real estate sector are service. Therefore, the ability of the real estate sector to pull the rest of the economy is weaker than the ability of the construction sector because the real estate involves business services (Yu, Song and Liu, 2005:10).

In the analysis of the impacts of the real estate sector on the Thai economy using the SAM and Financial SAM models, it shows that the real estate sector was placed at second rank from the bottom in both the SAM model and Financial SAM model. However, the values of 2.84 from the Financial SAM model were higher than 2.22 from the SAM model, 27 percent greater. This implies that the results computed using the Financial SAM model show that the impact of the real

estate sector on the Thai economy is greater than the results computed using the SAM model because the impacts of the financial components in the Financial SAM model are active, leading to a more accurate analysis.

6.1.2 The Impacts of the Commercial Bank Sector on the Thai Economy

In business, entrepreneurs need bank loans because of their own limited capital funds; that is, their savings. Therefore, the commercial banking sector is important to firms because they provide loans and business transactions. In the analysis of the impacts of the commercial banking sector by using the Input-Output model, the commercial banks show the strongest push effects—forward linkage—among all sectors, meaning that the commercial banking sector shows an important role in the economy, as other sectors depend greatly on commercial banking services. As mentioned earlier, commercial banks are a primary funding source in Thailand. Logically, every difficulty in this commercial banking sector impacts the others.

In the analysis of the impacts of the commercial banking sector using the SAM model, the commercial banking sector was ranked at third place, followed by the heavy industry and the construction sector. In addition, the results from the Financial SAM model show a difference, in which the commercial banking sector was ranked in fourth place. However, the value of 3.57 of the Financial SAM was higher than 2.96 in the SAM model, 20 percent higher. This implies that by using the Financial SAM model, the impact of the commercial banking sector on Thai economy was larger than the results from the SAM model. In addition, the Financial SAM model under Waheed and Ezaki's framework, which focuses on savings and investment analysis, shows that savings and investment by the commercial banking sector greatly influence the economy as a whole.

6.1.3 The Linkages between the Property Sector and the Commercial
Banking Sector, and Their Impacts on the Thai Economy

Considering the sectoral linkages among the construction, real estate, and commercial banking sectors, the construction and real estate sectors rely on the services of commercial banks more than the reverse. The direction of the linkage therefore flows from the property sector to the commercial banking sector. The real

estate industry has a higher degree of dependency on commercial banks than the construction sector does.

From these findings, it can be seen that there are some degrees of linkages between the property sector and the commercial banking sector. That is, when a problem occurs in the property sector, it impacts the commercial banking sector, and finally leads to economic crisis. In addition, when some difficulties take place in the construction and real estate sectors, the pull effect for the construction and push effect for the real estate sectors together, with a strong inter-sectoral link between them, cause the worst impact on the entire economy.

6.1.4 The Impacts of the Thai Kem Keng Policy on the Thai Economy

This study measured the effectiveness of the Thai Kem Keng Scheme, a 3-year government investment project, with a total budget of 1.56 trillion Baht, in the Program. The major share of 73 percent was invested in the public works sector by using the SAM and Financial SAM model. The effectiveness of Thai Kem Keng Scheme can be assessed in 2 main aspects: (i) economic growth and (ii) income distribution among households.

For economic growth, based on the simulation of the Thai Kem Keng policy by using the SAM, the Thai economy had an average GDP increase of 9.5% in 2010, 10.0% in 2011, and 11.1% in 2012. For the three-year period, the policy provided total growth of 30.6 for the whole economy, in which the public works had the greatest increase growth rate of 508.9%, the first rank, and the commercial banking sector, had an increase in growth rate of 31.4%, the third rank. The policy simulation shows a considerable increase in the growth of each year. Similar to the SAM model, the results from using the Financial SAM model shows the average GDP growth of 10.4% in 2010, 10.9% in 2011, and 12.1 % in 2012. For the three-year period, the policy provides a total growth of 33.4% for the whole economy, 2.8% higher than with the SAM. The policy simulation shows a considerable increase in the growth of each year. Considering public works, which received the major share of the government budget, it had the greatest increase growth increase of 521.9%, the first rank. The commercial banks, the third rank, had an increase of 34.3%, 2.9% higher than with the SAM.

It is worth pointing out that the results from the Financial SAM provide greater value than those of SAM model, meaning that Financial SAM demonstrates large impacts on the Thai economy. It can be interpreted that the property industry provides high expansion for the whole economy because the sector creates large amounts of employment within the sectors and in related businesses. In addition, the commercial banking sector does not get direct financial support from government investment from the Thai Kem Keng Program; however the sector has gained an increase from indirect and induced effects from other sectors, which were supported by the program. This depicts the interdependence between the commercial bank sector and other sectors.

In addition, the effectiveness of the policy can be reflected from the good distribution of household income. The increase of income level represents the well being of household. The SAM and Financial SAM results show that the lowest income group receives the greatest benefits, but the Financial SAM results are 13.5 percent greater than the those computed by the SAM model. That means that the policy helps to reduce poverty by generating income opportunities for the poorest households. Finally, the country's social welfare increases.

6.2 Policy Implications

This part of the study presents some recommendations that will benefit policy makers, based on the results of the study. The findings will help policy makers in several ways, including creating plans for infrastructure projects, setting up policies and regulations to encourage and support the private sector, and setting up housing policies for the poor.

Because the Thai construction sector has not yet reached its maturity, as can be seen from its very strong pull effect, there is large room for policy makers to propose new and efficient policies in order to boost government investment, specifically in the construction industry. In addition, the study of the Ministry of Finance (MOF) reveals that Thailand has less investment in infrastructure compared to other countries. As a result, the country becomes less competitive in the international market (MOF, 2008:4). Therefore, government spending in the construction industry will help with the country's economic expansion.

The government should create a good atmosphere for investment, such as providing regulations to encourage more investment in the private sector. In a recession period, when private sector reduces its investment due to lack of confidence, the government should be a leader in investment to maintain the expansion of the economy and to create confidence in the overall economy. At the same time, the government should support and encourage the private sector to invest more in the property industry. In addition, commercial banks have imperfect and asymmetric information on screening good borrower from bad ones; therefore, during a recession period, the commercial banks should implement strong risk management that can handle uncertain risks by distinguishing good entrepreneurs from bad ones.

The government should create the policies regarding subsidies for the poor. Some studies have indicated that government subsidies for the households do not help to create any welfare for the country compared to subsidies for developers (Jin and Zeng, 2007: 143). Such subsidies for the poor would strengthen the economic situation of the country in the long term because the subsidies for the poor could help prevent social problems, leading to a better quality of life. In Thailand, the government has played a major role in taking care of the poor by providing low-cost housing through the National Housing Authority of Thailand (NHA), such as with Baan Munkong, Baan Auer Torn, and BOI Housing. However, the inefficiency of the management and high market competition with the private sector has led to the projects not being very useful for the poor. The government also has provided mortgages at low interest rates under the supervision of the Government Housing Bank (GH Bank). Yet the lowest income group still cannot access any commercial or state-owned banks, so the poorest are getting less support from the government. Therefore, setting policies to cover the lowest income group to secure houses would benefit the whole country, as housing is a basic need. This will improve the quality of life of the poor and finally improve the social welfare of the country.

The property industry is a prominent source of employment, as it involves various jobs in many sectors and skills at every level of workers, including unskilled, semi-skilled, and skilled labor. For this reason, the jobs offered in the industry become an opportunity for the poor, thereby reducing the level of poverty. These workers, who receive minimum wages, mostly come from households with the lowest income.

These unskilled labor thereby benefit the most from the government's investment. Therefore, investment in the property industry results in the country's economic expansion, the sustainable growth of the country, and finally economic stability.

6.3 Suggestions for Further Studies

In this research, the Input-Output model, the SAM, and the Financial SAM model were adopted to study the linkages among the property sector, the commercial banking sector, and the economy as a whole. There are, however, certain limitations in using the model for the given purpose. The Financial Computable General Equilibrium (FCGE) model is recommended for future studies.

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APPENDICES

APPENDIX A

The 2004 Financial SAM for Thailand

Table A The 2004 Financial SAM for Thailand

	ITEM	NO.	AAGR 1	ALIGHID 2	AHEVID 3	AENER 4	ARESBLD 5	ANONRES 6	APUBLWK 7	AESTAT 8	ACOMBNK 9	AOTHFIN 10	APRIVS 11	APUBLS 12
Activities	AAGR	1												
	ALIGHID	2												
	AHEVID	3												
	AENER	4												
	ARESBLD	5												
	ANONRES	6												
	APUBLWK	7												
	AESTAT	8												
	ACOMBNK	9												
	AOTHFIN	10												
	APRIVS	11												
	APUBLS	12												
Commodities	CAGR	13	79.67	539.65	74.89	0.00	0.00	0.00	0.07	0.26	0.09	0.06	79.13	9.66
	CLIGHID	14	86.11	799.02	111.02	1.28	2.25	2.82	1.35	0.34	5.30	4.96	264.14	36.36
	CHEVID	15	87.06	270.41	6,655.96	16.68	44.26	72.10	108.45	1.51	3.17	4.17	259.48	78.51
	CENER	16	56.33	104.28	204.12	369.09	0.38	0.40	5.78	6.95	2.19	2.79	208.83	20.09
	CRESBLD	17	0.01	0.07	0.10	0.00	0.02	-	0.00	1.09	-	-	0.02	0.22
	CNONRES	18	0.78	1.40	2.20	0.57	0.06	0.01	0.19	0.24	0.41	0.49	1.92	0.65
	CPUBLWK	19	0.00	0.03	0.05	0.05	-	-	-	0.09	0.00	0.00	0.05	0.00
	CESTAT	20	0.90	5.95	8.79	0.76	0.06	0.07	0.03	0.65	0.81	1.70	6.55	1.07
	CCOMBNK	21	7.77	14.91	21.59	9.52	0.33	0.39	1.08	6.79	4.78	3.70	12.60	3.24
	COTHFIN	22	5.40	17.09	23.58	7.58	0.40	0.46	0.74	4.70	3.49	2.86	13.77	2.52
	CPRIVS	23	6.06	47.35	89.84	36.30	6.37	8.21	33.74	4.24	9.58	12.72	242.45	18.76
	CPUBLS	24	6.35	21.73	12.26	2.43	0.14	0.32	0.17	1.63	1.47	4.89	19.37	9.09
Import	MAGR	25												
	MLIGHID	26												
	MHEVID	27												
	MENER	28												
	MRESBLD	29												
	MNONRES	30												
	MPUBLWK	31												
	MESTAT	32												
	MCOMBNK	33												
	MOTHFIN	34												
	MPRIVS	35												
	MPUBLS	36												
Factor of Production	LOB	37	154.34	271.28	354.96	191.37	5.08	3.73	22.22	18.44	31.60	45.17	228.73	459.43
	CAP	38	532.80	572.21	793.75	160.30	4.36	6.13	44.09	149.31	17.14	41.38	238.38	87.52
Curr. Acc. of Agents	HH1	39												
	HH2	40												
	HH3	41												
	HH4	42												
	HH5	43												
	HH6	44												
	HH7	45												
	HH8	46												
	HH9	47												
	HH10	48												
	ENT	49												
	COMBNK	50												
	BOT	51												
Cap. Acc. of Agents	HH1	52												
	HH2	53												
	HH3	54												
	HH4	55												
	HH5	56												
	HH6	57												
	HH7	58												
	HH8	59												
	HH9	60												
	HH10	61												
	ENT	62												
	COMBNK	63												
	BOT	64												
Change in Ass./Lia.	CUR	65												
	DEP	66												
	LOAN	67												
	R	68												
	OTH ASSET	69												
Curr. Acc. of Agents	GOVT	70												
	INDTAX	71	1.00	231.22	81.65	663.65	1.78	2.35	6.09	44.31	7.23	11.21	273.58	6.48
	IMPTAX	72												
	DIRTAX	73												
	ROW	74												
Cap. Acc. of Agents	GOVT	75												
	ROW	76												
Change in Ass./Lia.	BOND	77												
	FL	78												
	FR	79												
	Total	80	1,024.57	2,896.60	8,434.76	1,459.58	65.49	96.99	224.03	240.54	87.25	136.11	1,849.03	733.60

Table A (Continued)

	ITEM	NO.	CAGR 13	CLIGHID 14	CHEVID 15	CENER 16	CRESBLD 17	CNONRES 18	CPUBLWK 19	CESTAT 20	CCOMBNK 21	COTHFIN 22	CPRIVS 23	CPUBLS 24
							ENDOGENOUS ACCOUNTS							
							COMMODITIES							
Activities	AAGR	1	1,024.57											
	ALIGHID	2		2,896.60										
	AHEVID	3			8,434.76									
	AENER	4				1,459.58								
	ARESBLD	5					65.49							
	ANONRES	6						96.99						
	APUBLWK	7							224.03					
	AESTAT	8								240.54				
	ACOMBNK	9									87.25			
	AOTHFIN	10										136.11		
	APRIVS	11											1,849.03	
	APUBLS	12												733.60
Commodities	CAGR	13												
	CLIGHID	14												
	CHEVID	15												
	CENER	16												
	CRESBLD	17												
	CNONRES	18												
	CPUBLWK	19												
	CESTAT	20												
	CCOMBNK	21												
	COTHFIN	22												
	CPRIVS	23												
	CPUBLS	24												
Import	MAGR	25	4.30	60.59	90.04	2.98	-	-	-	-	-	-	4.24	0.27
	MLIGHID	26	0.04	205.46	111.90	0.17	2.86	1.95	0.03		0.30	0.20	31.57	1.72
	MHEVID	27	52.29	282.94	1,426.63	27.50	17.60	18.94	25.60	0.13	0.35	0.33	57.03	48.91
	MENER	28	2.35	1.14	169.59	10.75	0.01	0.01	0.13	0.03	0.02	0.04	31.06	0.23
	MRESBLD	29												
	MNONRES	30												
	MPUBLWK	31												
	MESTAT	32												
	MCOMBNK	33												0.81
	MOTHFIN	34												0.54
	MPRIVS	35				0.005							2.14	
	MPUBLS	36												1.87
Factor of Production LOB		37												
CAP		38												
Curr. Acc. of Agents	HH1	39												
	HH2	40												
	HH3	41												
	HH4	42												
	HH5	43												
	HH6	44												
	HH7	45												
	HH8	46												
	HH9	47												
	HH10	48												
	ENT	49												
	COMBNK	50												
	BOT	51												
Cap. Acc. of Agents	HH1	52												
	HH2	53												
	HH3	54												
	HH4	55												
	HH5	56												
	HH6	57												
	HH7	58												
	HH8	59												
	HH9	60												
	HH10	61												
	ENT	62												
	COMBNK	63												
	BOT	64												
Change in Ass./Lia.	CUR	65												
	DEP	66												
	LOAN	67												
	R	68												
	OTH ASSET	69												
Curr. Acc. of Agents	GOVT	70												
	INDTAX	71												
	IMPTAX	72												
	DIRTAX	73												
	ROW	74												
Cap. Acc. of Agents GOVT		75												
ROW		76												
Change in Ass./Lia. BOND		77												
FL		78												
FR		79												
	Total	80	1,083.55	3,446.74	10,232.91	1,500.98	85.96	117.89	249.78	240.70	87.91	136.67	1,975.08	787.97

EXOGENOUS ACCOUNTS

Table A (Continued)

	ITEM	NO.	ENDOGENOUS ACCOUNTS IMPORTS MAGR 25	MLIGHID 26	MHEVID 27	MENER 28	MRESBLD 29	MNONRES 30	MPUBLWK 31	MESTAT 32	MCOMBNK 33	MOTHFIN 34	MPRIVS 35	MPUBLS 36
Activities	AAGR	1												
	ALIGHID	2												
	AHEVID	3												
	AENER	4												
	ARESBLD	5												
	ANONRES	6												
	APUBLWK	7												
	AESTAT	8												
	ACOMBNK	9												
	AOTHFIN	10												
	APRIVS	11												
	APUBLS	12												
Commodities	CAGR	13												
	CLIGHID	14												
	CHEVID	15												
	CENER	16												
	CRESBLD	17												
	CNONRES	18												
	CPUBLWK	19												
	CESTAT	20												
	CCOMBNK	21												
	COTHFIN	22												
	CPRIVS	23												
	CPUBLS	24												
Import	MAGR	25												
	MLIGHID	26												
	MHEVID	27												
	MENER	28												
	MRESBLD	29												
	MNONRES	30												
	MPUBLWK	31												
	MESTAT	32												
	MCOMBNK	33												
	MOTHFIN	34												
	MPRIVS	35												
	MPUBLS	36												
Factor of Production	LOB	37												
	CAP	38												
Curr. Acc. of Agents	HH1	39												
	HH2	40												
	HH3	41												
	HH4	42												
	HH5	43												
	HH6	44												
	HH7	45												
	HH8	46												
	HH9	47												
	HH10	48												
	ENT	49												
	COMBNK	50												
	BOT	51												
Cap. Acc. of Agents	HH1	52												
	HH2	53												
	HH3	54												
	HH4	55												
	HH5	56												
	HH6	57												
	HH7	58												
	HH8	59												
	HH9	60												
	HH10	61												
	ENT	62												
	COMBNK	63												
	BOT	64												
Change in Ass./Lia.	CUR	65												
	DEP	66												
	LOAN	67												
	R	68												
	OTH ASSET	69												
Curr. Acc. of Agents	GOVT	70												
	INDTAX	71												
	IMPTAX	72	4.61	45.22	211.26	40.42	0.01							0.27
	DIRTAX	73												
	ROW	74	163.86	427.92	2,292.31	183.03	0.18			21.37	1.16	1.72	98.10	30.75
Cap. Acc. of Agents	GOVT	75												
	ROW	76												
Change in Ass./Lia.	BOND	77												
	FL	78												
	FR	79												
	Total	80	168.47	473.14	2,503.57	223.44	0.19	-	-	21.37	1.16	1.72	98.10	31.02

Table A (Continued)

| | | ENDOGENOUS ACCOUNTS | | | | | | | | | | | |
| | | FAC. OF PROD. | | CURR.ACC. OF AGENTS | | | | | | | | | |
ITEM	NO.	LOB 37	CAP 38	HH1 39	HH2 40	HH3 41	HH4 42	HH5 43	HH6 44	HH7 45	HH8 46	HH9 47	HH10 48
AAGR	1												
ALIGHID	2												
AHEVID	3												
AENER	4												
ARESBLD	5												
ANONRES	6												
APUBLWK	7												
AESTAT	8												
ACOMBNK	9												
AOTHFIN	10												
APRIVS	11												
APUBLS	12												
CAGR	13			12.14	13.18	17.13	19.15	22.08	23.91	27.22	31.39	37.69	50.53
CLIGHID	14			39.85	42.69	52.11	62.31	71.24	80.83	95.00	120.89	165.88	197.27
CHEVID	15			13.10	13.53	16.86	21.35	24.46	28.18	32.84	43.30	59.36	131.74
CENER	16			3.24	3.48	5.47	6.22	8.10	9.54	12.16	16.52	22.63	47.99
CRESBLD	17			0.07	0.06	0.13	0.16	0.24	0.20	0.31	0.36	0.45	0.53
CNONRES	18												
CPUBLWK	19												
CESTAT	20			5.24	6.23	8.26	9.44	10.99	12.78	16.28	22.74	29.48	57.38
CCOMBNK	21			0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.06	0.15
COTHFIN	22			0.73	0.93	1.46	1.74	2.00	2.48	2.93	4.37	7.22	29.21
CPRIVS	23			8.97	9.52	14.37	18.43	24.30	36.61	53.33	84.13	114.77	522.40
CPUBLS	24			2.78	3.63	4.14	5.11	6.52	6.78	9.10	12.51	15.25	26.31
MAGR	25			0.24	0.27	0.36	0.39	0.46	0.51	0.60	0.74	0.94	1.43
MLIGHID	26			3.85	4.35	5.40	6.60	7.72	9.06	10.91	14.21	19.86	34.32
MHEVID	27			4.16	4.39	5.24	6.58	7.59	8.51	9.98	12.45	17.10	35.25
MENER	28			0.19	0.19	0.33	0.33	0.44	0.51	0.63	0.88	1.30	3.29
MRESBLD	29												
MNONRES	30												
MPUBLWK	31												
MESTAT	32			0.66	0.72	0.96	1.10	1.29	1.51	1.93	2.71	3.53	6.95
MCOMBNK	33			0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.07	0.16
MOTHFIN	34			0.02	0.02	0.03	0.04	0.05	0.06	0.07	0.10	0.18	0.60
MPRIVS	35			1.30	1.63	2.19	2.72	3.61	4.96	6.84	10.82	17.49	44.40
MPUBLS	36			0.91	1.32	1.16	1.49	2.21	1.94	2.55	3.37	4.62	9.57
LOB	37												
CAP	38												
HH1	39	22.53	68.67										
HH2	40	43.16	49.12										
HH3	41	58.40	57.45										
HH4	42	75.95	64.88										
HH5	43	93.37	74.25										
HH6	44	118.83	78.70										
HH7	45	145.83	110.97										
HH8	46	209.40	138.15										
HH9	47	342.21	159.13										
HH10	48	676.65	771.43										
ENT	49		759.93	0.65	0.68	0.91	1.14	1.39	1.69	2.20	3.09	4.51	10.83
COMBNK	50												
BOT	51												
HH1	52			- 0.00									
HH2	53				- 0.00								
HH3	54					- 0.00							
HH4	55						- 0.00						
HH5	56							- 0.00					
HH6	57								0.70				
HH7	58									13.36			
HH8	59										13.97		
HH9	60											39.93	
HH10	61												321.00
ENT	62												
COMBNK	63												
BOT	64												
CUR	65												
DEP	66												
LOAN	67												
R	68												
OTH ASSET	69												
GOVT	70		80.03	0.06	0.15	0.31	0.55	0.82	1.34	1.95	4.10	6.74	17.00
INDTAX	71												
IMPTAX	72												
DIRTAX	73			0.60	0.23	0.61	0.54	2.18	1.90	3.04	6.23	18.55	83.91
ROW	74		234.66								2.31	3.48	8.51
GOVT	75												
ROW	76												
BOND	77												
FL	78												
FR	79												
Total	80	1,786.33	2,647.38	98.80	107.21	137.46	165.41	197.72	234.04	303.26	411.25	591.10	1,640.74

Left margin groupings: EXOGENOUS ACCOUNTS — Activities (rows 1–12); Commodities (rows 13–24); Import (rows 25–36). Factor of Production — LOB, CAP (rows 37–38). Curr. Acc. of Agents (rows 39–51); Cap. Acc. of Agents (rows 52–64); Change in Ass./Lia. (rows 65–69). EXOGENOUS ACCOUNTS — Curr. Acc. of Agents (rows 70–74); Cap. Acc. of Agents (rows 75–76); Change in Ass./Lia. (rows 77–79).

Table A (Continued)

	ITEM	NO.	CURR.ACC. OF AGENTS			CAP.ACC.OF AGENTS									
			ENT 49	COMBNK 50	BOT 51	HH1 52	HH2 53	HH3 54	HH4 55	HH5 56	HH6 57	HH7 58	HH8 59	HH9 60	HH10 61
Activities	AAGR	1													
	ALIGHID	2													
	AHEVID	3													
	AENER	4													
	ARESBLD	5													
	ANONRES	6													
	APUBLWK	7													
	AESTAT	8													
	ACOMBNK	9													
	AOTHFIN	10													
	APRIVS	11													
	APUBLS	12													
Commodities	CAGR	13													
	CLIGHID	14													
	CHEVID	15													
	CENER	16													
	CRESBLD	17													
	CNONRES	18													
	CPUBLWK	19													
	CESTAT	20													
	CCOMBNK	21													
	COTHFIN	22													
	CPRIVS	23													
	CPUBLS	24													
Import	MAGR	25													
	MLIGHID	26													
	MHEVID	27													
	MENER	28													
	MRESBLD	29													
	MNONRES	30													
	MPUBLWK	31													
	MESTAT	32													
	MCOMBNK	33													
	MOTHFIN	34													
	MPRIVS	35													
	MPUBLS	36													
Factor of Production	LOB	37													
	CAP	38													
Curr. Acc. of Agents	HH1	39	5.15												
	HH2	40	9.46												
	HH3	41	12.35												
	HH4	42	15.51												
	HH5	43	19.43												
	HH6	44	24.27												
	HH7	45	31.49												
	HH8	46	43.28												
	HH9	47	64.33												
	HH10	48	150.46												
	ENT	49													
	COMBNK	50													
	BOT	51													
Cap. Acc. of Agents	HH1	52													
	HH2	53													
	HH3	54													
	HH4	55													
	HH5	56													
	HH6	57													
	HH7	58													
	HH8	59													
	HH9	60													
	HH10	61													
	ENT	62	138.90												
	COMBNK	63													
	BOT	64													
Change in Ass./Lia.	CUR	65				1.49	1.86	2.12	2.65	3.98	4.08	6.63	7.06	9.87	13.32
	DEP	66				4.00	5.00	5.71	7.14	10.71	11.00	17.85	18.99	26.56	35.84
	LOAN	67													
	R	68													
	OTH ASSET	69				-0.64	-0.80	-0.92	-1.15	-1.72	1.06	-10.49	17.91	6.84	276.81
Curr. Acc. of Agents	GOVT	70	6.86												
	INDTAX	71													
	IMPTAX	72													
	DIRTAX	73	316.13												
	ROW	74													
Cap. Acc. of Agents	GOVT	75													
	ROW	76													
Change in Ass./Lia.	BOND	77												28.82	28.82	38.42
	FL	78													
	FR	79													
	Total	80	837.62	-	-	4.84	6.05	6.91	8.64	12.97	14.02	34.97	36.96	72.09	364.39

EXOGENOUS ACCOUNTS

ENDOGENOUS ACCOUNTS

Table A (Continued)

					ENDOGENOUS ACCOUNTS					EXOGENOUS ACCOUNTS		
		CAP.ACC.OF AGENTS			CHANGE IN ASS./LIA					CURR.ACC.		
ITEM	NO.	ENT	COMBNK	BOT	CUR	DEP	LOAN	R	OTH	GOVT	INDTAX	IMPTAX
		62	63	64	65	66	67	68	69	70	71	72
AAGR	1											
ALIGHID	2											
AHEVID	3											
AENER	4											
ARESBLD	5											
ANONRES	6											
APUBLWK	7											
AESTAT	8											
ACOMBNK	9											
AOTHFIN	10											
APRIVS	11											
APUBLS	12											
CAGR	13									1.32		
CLIGHID	14									16.56		
CHEVID	15									22.98		
CENER	16									16.47		
CRESBLD	17									0.04		
CNONRES	18									1.49		
CPUBLWK	19									0.51		
CESTAT	20									0.00		
CCOMBNK	21									0.48		
COTHFIN	22									0.35		
CPRIVS	23									25.98		
CPUBLS	24									549.33		
MAGR	25											
MLIGHID	26											
MHEVID	27									0.48		
MENER	28											
MRESBLD	29											
MNONRES	30											
MPUBLWK	31											
MESTAT	32											
MCOMBNK	33											
MOTHFIN	34											
MPRIVS	35											
MPUBLS	36											
LOB	37											
CAP	38											
HH1	39									1.36		
HH2	40									3.04		
HH3	41									5.16		
HH4	42									5.05		
HH5	43									5.94		
HH6	44									6.81		
HH7	45									8.32		
HH8	46									11.35		
HH9	47									14.13		
HH10	48									23.44		
ENT	49									50.59		
COMBNK	50											
BOT	51											
HH1	52						4.84					
HH2	53						6.05					
HH3	54						6.92					
HH4	55						8.64					
HH5	56						12.97					
HH6	57						13.31					
HH7	58						21.61					
HH8	59						22.99					
HH9	60						32.16					
HH10	61						43.39					
ENT	62						315.15					
COMBNK	63					281.65			592.13			
BOT	64				58.69			408.22				
CUR	65	5.63										
DEP	66	88.35										
LOAN	67		494.39									
R	68		408.22									
OTH ASSET	69			220.54								
GOVT	70										1,330.55	301.78
INDTAX	71											
IMPTAX	72											
DIRTAX	73											
ROW	74									272.05		
GOVT	75						6.00			1,197.57		
ROW	76											
BOND	77	54.29	8.73	16.44								
FL	78											
FR	79			229.93								
Total	80	148.27	911.34	466.90	58.69	281.65	494.03	408.22	592.13	2,240.81	1,330.55	301.78

Table A (Continued)

	ITEM	NO.	CURR.ACC. DIRTAX 73	CURR.ACC. ROW 74	CAP.ACC. GOVT 75	CAP.ACC. ROW 76	CHANGE IN ASS./LIA BOND 77	CHANGE IN ASS./LIA FL 78	CHANGE IN ASS./LIA FR 79	Total 80
Activities	AAGR	1								1,024.57
	ALIGHID	2								2,896.60
	AHEVID	3								8,434.76
	AENER	4								1,459.58
	ARESBLD	5								65.49
	ANONRES	6								96.99
	APUBLWK	7								224.03
	AESTAT	8								240.54
	ACOMBNK	9								87.25
	AOTHFIN	10								136.11
	APRIVS	11								1,849.03
	APUBLS	12								733.60
Commodities	CAGR	13		43.08						1,082.33
	CLIGHID	14		1,108.89						3,368.48
	CHEVID	15		1,725.65						9,735.09
	CENER	16		360.34						1,493.40
	CRESBLD	17		1.00						5.08
	CNONRES	18		-						10.41
	CPUBLWK	19		-						0.79
	CESTAT	20		33.26						239.43
	CCOMBNK	21		0.39						87.91
	COTHFIN	22		0.67						136.67
	CPRIVS	23		546.64						1,975.08
	CPUBLS	24		66.63						787.97
Import	MAGR	25								168.37
	MLIGHID	26								472.48
	MHEVID	27								2,069.99
	MENER	28								223.44
	MRESBLD	29								-
	MNONRES	30								-
	MPUBLWK	31								-
	MESTAT	32								21.37
	MCOMBNK	33								1.16
	MOTHFIN	34								1.72
	MPRIVS	35								98.10
	MPUBLS	36								31.02
Factor of Production	LOB	37								1,786.33
	CAP	38								2,647.38
Curr. Acc. of Agents	HH1	39		1.10						98.80
	HH2	40		2.42						107.21
	HH3	41		4.11						137.46
	HH4	42		4.03						165.41
	HH5	43		4.73						197.72
	HH6	44		5.43						234.04
	HH7	45		6.64						303.26
	HH8	46		9.07						411.25
	HH9	47		11.30						591.10
	HH10	48		18.77						1,640.74
	ENT	49								837.62
	COMBNK	50								-
	BOT	51								-
Cap. Acc. of Agents	HH1	52								4.84
	HH2	53								6.05
	HH3	54								6.91
	HH4	55								8.64
	HH5	56								12.97
	HH6	57								14.02
	HH7	58								34.97
	HH8	59								36.96
	HH9	60								72.09
	HH10	61								364.39
	ENT	62						63.84		517.89
	COMBNK	63						37.55		911.33
	BOT	64								466.90
Change in Ass./Lia.	CUR	65								58.69
	DEP	66			50.51					281.65
	LOAN	67								494.39
	R	68								408.22
	OTH ASSET	69			1,389.36	68.55				1,948.38
Curr. Acc. of Agents	GOVT	70	433.92	54.64						2,240.81
	INDTAX	71								1,330.55
	IMPTAX	72								301.78
	DIRTAX	73								433.92
	ROW	74								3,741.41
Cap. Acc. of Agents	GOVT	75					175.52	59.99		1,439.08
	ROW	76							229.93	229.93
Change in Ass./Lia.	BOND	77								175.52
	FL	78				161.38				161.38
	FR	79								229.93
	Total	80	433.92	4,008.80	1,439.87	229.93	175.52	161.38	229.93	64,350.78

APPENDIX B

Notations

Activity Accounts

AAGR	Agriculture
ALIGHID	Light Industry
AHEVID	Heavy Industry
AENER	Energy
ARESBLD	Residential Building
ANONRES	Non-Residential Building
APUBLWK	Public Work
AESTAT	Real estate
ACOMBNK	Commercial bank
AOTHFIN	Other financial institutions
APRIVS	Private service
APUBLS	Public service

Commodity Accounts

CAGR	Agriculture
CLIGHID	Light Industry
CHEVID	Heavy Industry
CENER	Energy
CRESBLD	Residential Building
CNONRES	Non-Residential Building
CPUBLWK	Public Work
CESTAT	Real estate
CCOMBNK	Commercial bank
COTHFIN	Other financial institutions
CPRIVS	Private service
CPUBLS	Public service

Import

MAGR	Agriculture
MLIGHID	Light Industry
MHEVID	Heavy Industry
MENER	Energy
MRESBLD	Residential Building
MNONRES	Non-Residential Building
MPUBLWK	Public Work
MESTAT	Real estate
MCOMBNK	Commercial bank

MOTHFIN	Other financial institutions
MPRIVS	Private service
MPUBLS	Public service

Factors of Production

| LAB | Labor |
| CAP | Capital |

Current Account of Economic Agents

HH1	Households in lowest 10% of the income distribution
HH2	Households in 10%-20% of the income distribution
HH3	Households in 20%-30% of the income distribution
HH4	Households in 30%-40% of the income distribution
HH5	Households in 40%-50% of the income distribution
HH6	Households in 50%-60% of the income distribution
HH7	Households in 60%-70% of the income distribution
HH8	Households in 70%-80% of the income distribution
HH9	Households in 80%-90% of the income distribution
HH10	Households in top 10% of the income distribution
ENT	Enterprises
GOVT	Government
INDTAX	Indirect or sales taxes
IMPTAX	Import tariff
DIRTAX	Direct taxes on domestic products
COMBNK	Commercial banks
BOT	Bank of Thailand
ROW	Rest of the World

Capital Account of Economic Agents

HH1	Lowest with 10% in the income distribution
HH2	10%-20%
HH3	20%-30%
HH4	30%-40%
HH5	40%-50%
HH6	50%-60%
HH7	60%-70%
HH8	70%-80%
HH9	80%-90%
HH10	Top 10%
ENT	Enterprise
GOVT	Government
COMBNK	Commercial banks
BOT	Bank of Thailand

ROW   Rest of the World

Change in Asset and Liabilities

CUR	Currency
DEP	Deposit
BOND	Government Bond
LOAN	Bank Loan
FL	Foreign Loan
R	Reserves
FR	Foreign Reserves
OTH ASSET	Other financial Asset
OTH LIA.	Other financial Liability

Appendix C

Building the 2004 Financial SAM for Thailand

The simply 2004 financial SAM is constructed as a database for analyzing the linkages between the property sector and the financial sector, especially for the commercial banks, and their impact on Thailand economy. This part illustrates the method in constructing the simply 2004 Financial SAM for Thailand.

As mentioned earlier, the financial SAM integrates the traditional SAM by adding more financial agents, including commercial bank account and BOT account. Moreover, the capital accounts and the financial assets/liabilities accounts are separated according to each of institutions.

There are 3 steps of constructing the simply 2004 Financial SAM database.

The first step is aggregating the 2004 SAM into 12 sectors of agriculture, light industry, heavy industry, energy, residential building, non-residential building, public works, real estate, commercial banks, other financial institutions, private service, and public service.

The second step is constructing T–accounts of each agent. The data are gathered from Flow of Funds by the Bank of Thailand. The T–accounts show the total financial assets/financial liabilities of each agent. The rows depict the financial assets of each agent, and the columns depict the financial liabilities. Total assets of each agent must be balanced with its total liabilities due to the double-entry accounting system. In other words, the sum of row must equal to the sum of column.

The third step is incorporating the financial accounts to the 2004 SAM.

APPENDIX D

The Convertor of Input- Output Table Classification

Table D The Convertor of Input- Output Table Classification

16 x 16 Sectors	26 x 26 Sectors	58 x 58 Sectors	180 x 180 Sectors
001 Agriculture (001-029)	001 Crops (001-017, 024)	001 Paddy (001)	001 Paddy
		002 Maize (002)	002 Maize
		003 Cassava (004)	004 Cassava
		004 Beans and Nuts (006)	006 Beans and Nuts
		005 Vegetables and Fruits (007-008)	007 Vegeables
			008 Fruits
		006 Sugarcane (009)	009 Sugarcane
		007 Rubber (Latex) (016)	016 Rubber
		008 Other Crops (003, 005, 010-015,017, 024)	003 Other Cereals
			005 Other Root Crops
			010 Coconut
			011 Oil Palm
			012 Kenaf and Jute
			013 Crops for Textile and Matting
			014 Tobacco
			015 Coffee and Tea
			017 Other Agricultural Products
			024 Agricultural Services
	002 Livestock (018-023)	009 Livestock (018-023)	018 Cattle and Buffalo
			019 Swine
			020 Other Livestock
			021 Poultry
			022 Poultry Products
			023 Silk Worm
	003 Forestry (025-027)	010 Forestry 025-027)	025 Logging
			026 Charcoal and Firewood
			027 Other Forestry Products
	004 Fishery (028-029)	011 Fishery (028-029)	028 Ocean and Coastal Fishing
			029 Inland Fishing
002 Mining and Quarrying (030-041)	005 Mining and Quarrying (030-041)	012 Crude Oil and Coal (030-031)	030 Coal and Lignite
			031 Petroleum and Natural Gas
		013 Metal Ore (032-035)	032 Iron Ore
			033 Tin Ore
			034 Tungsten Ore
			035 Other Non-ferrous Metal Ore
		014 Non-Metal Ore (036-041)	036 Fluorite
			037 Chemical Fertilizer Minerals
			038 Salt Evaporation
			039 Limestone
			040 Stone Quarrying
			041 Other Mining and Quarrying

Table D (Continued)

16 x 16 Sectors	26 x 26 Sectors	58 x 58 Sectors	180 x 180 Sectors
003 Food Manufacturing (042-066)	006 Food Manufacturing (042-061)	015 Slaughtering (042)	042 Slaughtering
		016 Processing and Presering of Foods (043-048)	043 Canning Preserving of Meat
			044 Dairy Products
			045 Canning of Fruits and Vegetables
			046 Canning Preserving of Fish
			047 Coconut and Palm Oil
			048 Other Vegetable Animal Oils
		017 Rice and Other Grain Milling (049-052)	049 Rice Milling
			050 Tapioca Milling
			051 Drying and Grinding of Maize
			052 Flour and Other Grain Milling
		018 Sugar Refineries (055)	055 Sugar
		019 Other Foods (053-054, 056-060)	053 Bakery Products
			054 Noodles and Similar Products
			056 Confectionery
			057 Ice
			058 Monosodium Glutamate
			059 Coffee and Tea Processing
			060 Other Food Products
		020 Animal Food (061)	061 Animal Feed
	007 Beverages and Tobacco Products (062-066)	021 Beverages (062-064)	062 Distilling Blending Spirits
			063 Breweries
			064 Soft Drinks
		022 Tobacco Processing and Products (065-066)	065 Tobacco Processing
			066 Tobacco Products
004 Textile Industry (067-074)	008 Textile Industry (067-074)	023 Spinning, Weaving and Bleaching (067-069)	067 Spinning
			068 Weaving
			069 Textile Bleaching and Finishing
		024 Textile Products (070-074)	070 Made-up Textile Goods
			071 Knitting
			072 Wearing Apparels Except Footware
			073 Carpets and Rugs
			074 Cordage Rope and Twine Products
006 Paper Industries and Printing (081-083)	009 Paper Products and Printing (081-083)	025 Paper and Paper Products (081-082)	081 Pulp Paper and Paperboard
			082 Paper Products
		026 Printing and Publishing (083)	083 Printing and Publishing
007 Rubber, Chemical and Petroleum Industries (084-098)	010 Chemical Industries (084-092)	027 Basic Chemical Products (084,086)	084 Basic Industrial Chemicals
			086 Synthetic Resins and Plastics
		028 Fertilizer and Pesticides (085)	085 Fertilizer and Pesticides
		029 Other Chemical Products (087-092)	087 Paints Varnishes and Lacquers
			088 Drugs and Medicines
			089 Soap and Cleaning Preparations
			090 Cosmetics
			091 Matches
			092 Other Chemical Products

Table D (Continued)

16 x 16 Sectors	26 x 26 Sectors	58 x 58 Sectors	180 x 180 Sectors
	011 Petroleum Refineries (093-094)	030 Petroleum Refineries (093-094)	093 Petroleum Refineries
			094 Other Petroleum Products
	012 Rubber and Plastic Products (095-098)	031 Rubber Products (095-097)	095 Rubber Sheets and Block Rubber
			096 Tyres and Tubes
			097 Other Rubber Products
		032 Plastic Wares (098)	098 Plastic Wares
008 Non-metallic Products (099-104)	013 Non-metallic Products (099-104)	033 Cement and Concrete Products (102-103)	102 Cement
			103 Concrete and Cement Products
		034 Other Non-metallic Products (099-101, 104)	099 Caramic and Earthen Wares
			100 Glass and Glass Products
			101 Structural Clay Products
			104 Other Non-metallic Products
009 Metal, Metal Products and Machinery (105-128)	014 Basic Metal (105-107)	035 Iron and Steel (105-106)	105 Iron and Steel
			106 Secondary Steel Products
		036 Non-ferrous Metal (107)	107 Non-ferrous Metal
	015 Fabricated Metal Products (108-111)	037 Fabricated Metal Products (108-111)	108 Cutlery and Hand Tools
			109 Furniture and Fixtures Metal
			110 Structural Metal Products
			111 Other Fabricated Metal Products
	016 Machinery (112-128)	038 Industrial Machinery (112-115)	112 Engines and Turbines
			113 Agricultural Machinery
			114 Wood and Metal Working Machinery
			115 Special Industrial Machinery
		039 Electrical Machinery and Apparatus (116-122)	116 Office and Household Machinery
			117 Electrical Industrial Machinery
			118 Radio and Television
			119 Household Electrical Appliances
			120 Insulated Wire and Cable
			121 Electric Accumulator & Battery
			122 Other Electrical Aparatuses & Supplies
		040 Motor Vehicles and Repairing (125-127)	125 Motor Vehicle
			126 Motorcycle, Bicycle & Other Carriages
			127 Repairing of Motor Vehicle
		041 Other Transportation Equipment (123-124, 128)	123 Ship Building
			124 Railway Equipment
			128 Aircraft
010 Other Manufacturing (075-077, 129-134)	017 Other Manufacturing (075-080, 129-134)	042 Leather Products (075-077)	075 Tanneries Leather Finishing
			076 Leather Products
			077 Footwear Except Rubber
005 Saw Mills and Wood Products (078-080)		043 Saw Mills and Wood Products (078-080)	078 Saws Mills
			079 Wood and Cork Products
			080 Furniture and Fixtures Wood

Table D (Continued)

16 x 16 Sectors	26 x 26 Sectors	58 x 58 Sectors	180 x 180 Sectors
010 Other Manufacturing (Continued)		044 Other Manufacturing Products (129-134)	129 Scientific Equipments
			130 Photographic & Optical Goods
			131 Watches and Clocks
			132 Jewelry & Related Articles
			133 Recreational and Athletic Equipment
			134 Other Manufacturing Goods
011 Public Utilities (135-137)	018 Electricity and Water Works (135-137)	045 Electricity and Gas (135-136)	135 Electricity
			136 Pipe Line
		046 Water Works and Supply (137)	137 Water Supply System
012 Construction (138-144)	019 Construction (138-144)	047 Building Construction (138-139)	138 Residential Building Construction
			139 Non-Residential Building Construction
		048 Public Works and Other Construction (140-144)	140 Public Works for Agriculture & Forestry
			141 Non-Agricultural Public Works
			142 Construction of Electric Plant
			143 Construction of Communication Facilities
			144 Other Constructions
013 Trade (145-146)	020 Trade (145-146)	049 Trade (145-146)	145 Wholesale Trade
			146 Retail Trade
015 Services (147-148, 160-178)	021 Restaurants and Hotels (147-148)	050 Restaurants and Hotels (147-148)	147 Restaurant and Drinking Place
			148 Hotel and Lodging Place
014 Transportation and Communication (149-159)	022 Transportation and Communication (149-159)	051 Transportation (149-158)	149 Railways
			150 Route & Non Route of Road Passenger Trans.
			151 Road Freight Transport
			152 Land Transport Supporting Services
			153 Ocean Transport
			154 Coastal & Inland Water Transport
			155 Water Transport Services
			156 Air Transports
			157 Other Services
			158 Silo and Warehouse
		052 Communication (159)	159 Post and Telecommunication
015 Services (Continued)	023 Banking and Insurance (160-162)	053 Banking and Insurance (160-162)	160 Banking Services
			161 Life Insurnce Service
			162 Other Insurance Service
	024 Real Estate (163)	054 Real Estate (163)	163 Real-estate
	025 Services (164-178)	055 Business Services (164)	164 Business Service
		056 Public Services (165-169)	165 Public Administration
			166 Sanitary and Similar Services
			167 Education
			168 Research
			169 Hospital

Table D (Continued)

16 x 16 Sectors	26 x 26 Sectors	58 x 58 Sectors	180 x 180 Sectors
		057 Other Services (170-178)	170 Business and Labor Associations
			171 Other Community Services
			172 Motion Picture Production
			173 Movie Theater
			174 Radio, Television and Related Services
			175 Livrary and Museum
			176 Amusement and Recreation
			177 Repair, Not Elsewhere Classified
			178 Personal Services
016 Unclassified (180)	026 Unclassified (180)	058 Unclassified (180)	180 Unclassified
190 Total Intermedite Transaction	190 Total Intermedite Transaction	190 Total Intermedite Transaction	190 Total Intermedite Transaction
201 Wages and Salaries	201 Wages and Salaries	201 Wages and Salaries	201 Wages and Salaries
202 Operating Surplus	202 Operating Surplus	202 Operating Surplus	202 Operating Surplus
203 Depreciation	203 Depreciation	203 Depreciation	203 Depreciation
204 Indirect Taxes less Subsidies	204 Indirect Taxes less Subsidies	204 Indirect Taxes less Subsidies	204 Indirect Taxes less Subsidies
209 Total Value Added	209 Total Value Added	209 Total Value Added	209 Total Value Added
210 Control Total	210 Control Total	210 Control Total	210 Control Total
301 Private Consumption Expenditure	301 Private Consumption Expenditure	301 Private Consumption Expenditure	301 Private Consumption Expenditure
302 Government Consumption Expenditure	302 Government Consumption Expenditure	302 Government Consumption Expenditure	302 Government Consumption Expenditure
303 Gross Fixed Capital Formation	303 Gross Fixed Capital Formation	303 Gross Fixed Capital Formation	303 Gross Fixed Capital Formation
304 Increase in Stock	304 Increase in Stock	304 Increase in Stock	304 Increase in Stock
305 Exports (F.O.B.)	305 Exports (F.O.B.)	305 Exports (F.O.B.)	305 Exports (F.O.B.)
306 Special Exports	306 Special Exports	306 Special Exports	306 Special Exports
309 Total Final Demand	309 Total Final Demand	309 Total Final Demand	309 Total Final Demand
310 Total Demand	310 Total Demand	310 Total Demand	310 Total Demand
401 Imports (C.I.F.)	401 Imports (C.I.F.)	401 Imports (C.I.F.)	401 Imports (C.I.F.)
402 Import Tax	402 Import Duty	402 Import Duty	402 Import Duty
403 Import Duty	403 Import Tax	403 Import Tax	403 Import Tax
404 Special Imports	404 Special Imports	404 Special Imports	404 Special Imports
409 Total Imports	409 Total Imports	409 Total Imports	409 Total Imports
501 Wholesale Trade Margin	501 Wholesale Trade Margin	501 Wholesale Trade Margin	501 Wholesale Trade Margin
502 Retail Trade Margin	502 Retail Trade Margin	502 Retail Trade Margin	502 Retail Trade Margin
503 Transportation Cost	503 Transportation Cost	503 Transportation Cost	503 Transportation Cost
509 Total Margin and Transportation Cost	509 Total Margin and Transportation Cost	509 Total Margin and Transportation Cost	509 Total Margin and Transportation Cost
600 Control Total	600 Control Total	600 Control Total	600 Control Total
700 Total Supply	700 Total Supply	700 Total Supply	700 Total Supply

Sources: NESDB, 2010.

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