

THE REAL ESTATE CYCLE AND REAL BUSINESS CYCLE: EVIDENCE FROM THAILAND

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ABSTRACT

This paper estimates the real estate cycle in Thailand. From the estimated results, we find that duration of the expansion period in the real estate cycle in Thailand was approximately 25.25 months while the contraction period lasted much longer (44.00 months). The duration of the trough-to-trough cycle is estimated to be approximately 69.25 months. The significant leading indicators for the real estate cycle are construction price index, money supply (M2), property stock index and post-credit finance. Compared to Thailand's economic cycle, the real estate cycle leads the trough and the peak in the business/economic cycle by approximately 14.3 months and 20.3 months respectively. In expansion periods, the real estate cycle is always found to lead the business/economic cycle. However, it is not clear that in contraction periods the real estate cycle leads the business cycle. This finding differs from that of previous studies. We found that real estate crises led to economic crises in the early 1980s and in 1997, while in other contraction periods it was an economic recession that led to a contraction in the real estate sector.

Keywords: Real estate cycle, real business cycle, Thailand

INTRODUCTION

Financial crises always lead to tremendous shocks and adverse effects wherever they occur. The major causes of this type of crisis are always investigated. Such inquiries reveal variations in market structure, timing and degree of vulnerability to the crises. During the period of this study, the real estate industry in Thailand constituted about 6-6.5% of gross domestic product (GDP). The current study investigates the conditions under which the real estate sector became a major source of vulnerability in a rapidly growing economy during the boom decade of 1986-1996. It then proceeds to show how the fundamentals of rapid economic growth originally started a genuine real estate boom that eventually turned into a costly bubble. In addition, a number of other studies have explained how a rapidly growing economy can cause inefficiency and distortion in the market when ineffective regulatory measures are in place, which in turn leads to a high degree of speculation in asset markets. The aftermath of this bubble played a major role in the domestic banking crisis. In other words, the costly financial crisis in Thailand comprised at least three different crises: a real estate crisis, a banking crisis, and finally a

currency crisis (Renaud, 2000).

Because the banking practices followed in Thailand during the boom were based on laws concerning banking and secured lending dating back to the 1920s and 1930s (without having been updated), most lending was done on a collateral basis, i.e., with physical property serving as collateral. The financial liberalization that took place at the beginning of the 1990s resulted in excessive credit being extended to the real estate sector as did the “Bangkok International Banking Facilities” (BIBF) process, which obtained foreign currencies for domestic borrowing. Huge capital flows in the form of excess lending to this sector inflated property values. When a decline in property values started because of market imbalances, there were negative effects on financial positions and loan loss provisions covered by banks and finance companies. Thailand’s financial institutions thereafter faced greater provisioning requirements against non-performing loans (NPLs), which led to a serious credit crunch.

Corsetti, Pesanti and Roubini (1998) evaluated the impacts of the real estate crisis on the banking sector and made a comparison among ASEAN banks. These studies showed that 30-40 percent of the banks’ total assets were adversely affected by property exposure and approximately 80-95 percent of the collateral put forward when attempting to obtain banking credit generally comprised physical real estate, such as land, houses or factories. Therefore, there is no question as to why the sharp drops in property prices had a direct impact on lowering the valuation of the banks’ assets.

In view of what happened in the past, some people fear that a real estate crisis may occur again in the future. Since policy makers, academics and businesspersons in Thailand want to know how to prevent real estate crises from occurring again, the real estate cycle needs to be analyzed. From this point of view, the real estate cycle can be seen as a logical sequence of recurrent events reflected in factors such as fluctuating prices, vacancies, rentals and demand. Many studies of the real estate cycle explain how it moves along with economic conditions.

In general, an upturn in the business cycle triggers the beginning of a property cycle leading to fewer vacancies, soaring rent and rising capital values. As the profitability of property development improves, building starts to increase. On the other hand, the expansion of credit fed by the building boom triggers a rise in interest rates as monetary policy tightens in order to combat inflation. The economic boom subsides and demand for property falls. The economy moves into recession and rent values fall. A credit squeeze hits property companies, resulting in a wider property slump. However, one needs to be cautious when trying to explain real estate cycles. First, it is hard to measure when the market has peaked or troughed, so relying only on some leading indicators may result in less ability to make predictions for real estate developers, house buyers and policy makers. Second, there is no clear relationship between real estate cycle and economic cycle under a boom-and-bust cycle. It is still uncertain for a developing country like Thailand what should be the endogenous determinants between the real estate cycle and

the business cycle, especially during a recession. When the economy contracts, higher interest rates result, which decreases domestic spending, and thereafter causes a downturn in the property market. As the overall economy continues to slow, developers and buyers become more cautious, particularly in their spending on big-ticket items. During this recession phase, real estate transactions still occur but few new housing projects are started, and consumers delay buying decisions. On the other hand, lower investment in the property market might be a major cause of economic recession. Observers in the real estate industry would like to know where the real market is heading so that they can develop more accurate business plans.

Since every country has its own real estate cycles, which are unique in length and magnitude, this paper aims to estimate the particular real estate cycle in Thailand by determining its peak, trough, expansion and recession periods. Starting from Section II, we analyze the causes, effects and consequences of a real estate crisis on Thailand's property market and its consequences on the severe economic crisis that occurred in Thailand in 1997. The role of excessive credit supplied by financial institutions will be discussed as the main cause of speculative patterns in the past with regard to the Thai property market. We will also analyze how the adverse effects in this sector passed along financial imbalances and economic instability afterwards. Section III estimates the real estate cycle and its pro-cyclical indicators. Section IV concludes by making a comparison between the real estate cycle and Thailand's economic cycle to explain the lead and lag between these two cycles in terms of both expansion and recession.

REAL ESTATE CRISIS AND ECONOMIC CRISIS IN THAILAND

The rapid growth of the economy during the period 1986-1996 paralleled the emergence of the real estate industry in Thailand. However, it remained an immature industry, lacking depth, proper monitoring, and a modern regulatory and financial infrastructure. The emergence of this new sector was obvious in Bangkok, where a wide range of facilities became available, ranging from traditional housing to condominium apartments, from upper floors of shop-houses to modern office buildings, and from street markets to shopping centers. Many of these real estate assets are heavily concentrated in the Bangkok Metropolitan Area, which dominates the Thai economy. Renaud (2000) explained the importance of the real estate sector to the Thai economy. He investigated the value of the total stock of real estate in greater Bangkok, finding that it amounted to about 2.2 trillion baht at the end of 1997, following a severe financial crisis (at that time, the value of the baht ranged from 38 to 55 baht per US dollar). However, approximately one quarter of the value was non-residential real estate, especially office and retail space. The value of Bangkok's stock in real estate was greater than its gross provincial product in 1997, which was equivalent to 45 percent of the national GDP.

The real estate market before the 1997 crisis

There were tremendous amounts of foreign direct investment (FDI) inflows when Thailand liberalized its financial sector. Approximately 45 percent of domestic investment came from foreign direct investors and approximately 15 percent of that amount was from borrowers using BIBF procedures. Also, approximately 5 percent and 15 percent of BIBF inflows were allocated, respectively, to the purchase of construction equipment related directly or indirectly to the real estate market (Renaud. 2000). The financial liberalization induced a flood of capital funds into Thailand during 1990-1996, fueling investment spending, speculation and current account deficits. What was extremely threatening was that those liberal capital flows strongly disturbed the traditional transmission mechanisms of monetary policies.¹

New policies resulted in a high inflow of foreign capital for businesses. For example, most of the medium and short-term loans were used to fund long-term real estate projects. Housing credit increased substantially during the early of 1990s, the greater proportion of which was supplied by commercial banks. At the end of 1997, the amount of credit extended to Thailand's housing sector was as high as 800 billion baht, or approximately 9 percent of the total banking credit (or approximately 26 percent of credit from finance companies). The amounts of real estate credit peaked at about 20 percent of the total credit from banks. Pre-finance credit was about 5 percent higher than that of post-finance, until the year 2000, when post-finance started to increase while that of pre-finance started to drop. Total housing credit dropped substantially to 600 billion baht in 2001.

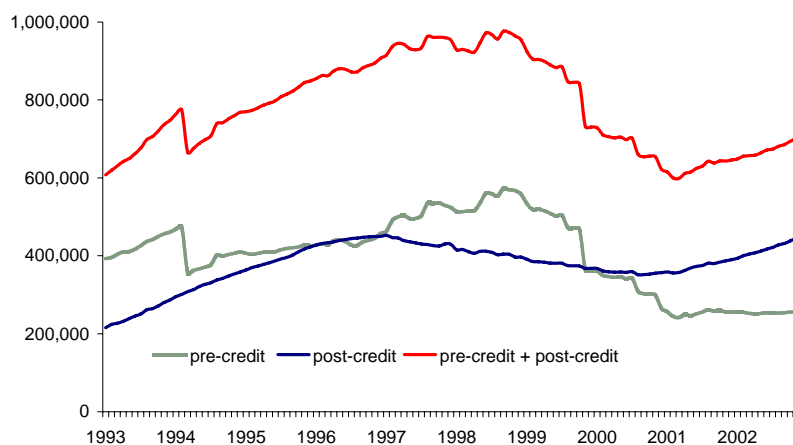
Approximately 70.1 percent of the total credit to the real estate sector in 1992 was from commercial banks; however, it dropped significantly to over 53 percent in 2002 and 52 percent in 2007. As with the finance companies, the share of total credit to this sector had been 8.5 percent in 1991, but dropped to only 0.8 percent in 2003 and 0.1 percent in 2007. A large drop of this ratio came after 56 finance companies had been suspended in 1998 due to the economic crisis. However, as the second largest provider of credit to this sector, the Government Housing Bank issued about 20.5 percent of the total real estate credit in 1991; its share increased to 40 percent in 2007.

¹ Pholphirul and Vichyanond (2008) indicate that the variable that became highly vital and influential was the exchange rate. To the central authorities, how the exchange rate should be handled was a big puzzle because while allowing it to be determined by market forces could cool down capital inflows, price instability would emerge. On the other hand, maintaining exchange rate stability meant nullifying the effects of typical monetary policies.

Table 1: Real estate credit by financial institution (Unit: Million Baht)

Financial Institutions	1992	1995	1996	1997	2000	2003	2005	2006	2007
Commercial banks	165,437	370,581	432,867	455,409	361,172	432,105	624,377	685,178	738,953
<i>Ratio (%)</i>	<i>70.1</i>	<i>65.2</i>	<i>61.9</i>	<i>58.1</i>	<i>53.4</i>	<i>50.2</i>	<i>51.5</i>	<i>51.0</i>	<i>51.8</i>
Government Savings Bank	628	1,486	4,987	22,088	26,844	89,737	115,987	120,758	120,906
<i>Ratio (%)</i>	<i>0.3</i>	<i>0.3</i>	<i>0.7</i>	<i>2.8</i>	<i>4.0</i>	<i>10.4</i>	<i>9.6</i>	<i>9.0</i>	<i>8.5</i>
Government Housing Bank	49,788	139,321	195,776	275,803	275,737	332,699	469,909	535,583	565,060
<i>Ratio (%)</i>	<i>21.1</i>	<i>24.5</i>	<i>28.0</i>	<i>35.2</i>	<i>40.8</i>	<i>38.6</i>	<i>38.8</i>	<i>39.9</i>	<i>39.6</i>
Finance & securities companies	17,587	54,205	62,619	28,697	10,886	6,609	2,165	930	796
<i>Ratio (%)</i>	<i>7.5</i>	<i>9.5</i>	<i>9.0</i>	<i>3.7</i>	<i>1.6</i>	<i>0.8</i>	<i>0.2</i>	<i>0.1</i>	<i>0.1</i>
Credit fonciers companies	2,460	2,584	2,576	2,392	1,107	191	59	155	51
<i>Ratio (%)</i>	<i>1.0</i>	<i>0.5</i>	<i>0.4</i>	<i>0.3</i>	<i>0.2</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>
Total	235,900	568,177	698,825	784,389	675,746	861,341	1,212,497	1,342,604	1,425,766

Source: Bank of Thailand

Figure 1: Pre-credit finance and post-credit finance to real estate (unit: million baht)

Source: Bank of Thailand

The boom in residential property led to the rapid modernization of Bangkok's housing stock. New housing units were built not only for the city's rapidly increasing population but also for households upgrading their housing facilities. One fundamental change in the housing sector during the boom period was the emergence and rapid growth of professional housing developers. Prior to 1984, house construction was driven mostly by

individual owner-builders. The share of developer-built housing was only 12 percent in 1984, but it increased to 83 percent in 1996, i.e., from about 30,000 units in 1974 to the peak of 172,419 units in 1995. The Gulf War and the domestic political turmoil of 1991 resulted in a temporary drop in the number of housing units constructed annually to fewer than 110,000 units in 1992. Housing started to boom again in 1994 until it peaked in 1995, which implied excess supply in the housing sector.²

During this phase, all asset prices, including land, property and securities were overpriced. Everyone wanted to get into real estate due to its profitability. However, before real estate sectors peaked and quickly became oversupplied, many purchasers had overpaid and had bought long-term real estate investments with medium and long-term loans. The segments that were severely hit included office buildings, low-rise housing, condominiums and industrial estates. By 1995, the over-supply in the office and lower quality condominium markets became noticeable.

Despite the large stock of vacant housing units, developers still kept building more houses because there were some adjustment lags in this sector in terms of demand and supply. On the supply side, developers usually spent at least six months to build a house; on the demand side, house buyers had to take some time to decide to purchase a house. Nonetheless, the number of units built started to drop significantly, from 145,355 units in 1997 to 63,864 units in 1998, and then to 33,382 units in 1999. These large drops in the stocks of housing were mainly a result of housing developers deciding not to build.

As mentioned above, the excessive amount of credit stimulated rapid investment in this sector. Besides the supply side, housing demand was also greatly affected by the huge amount of extended credit. Easy access to the capital market seemed to make people less aware of the need to use loans carefully. The formal pattern of purchasing a house in which to live changed to purchasing a house for investment—actually for speculation. Historical data show that the ratios of financial credit extended to the real estate sector were quite high before the crisis, which consequently led to the speculative behaviour of buyers and excessive construction by the sellers.

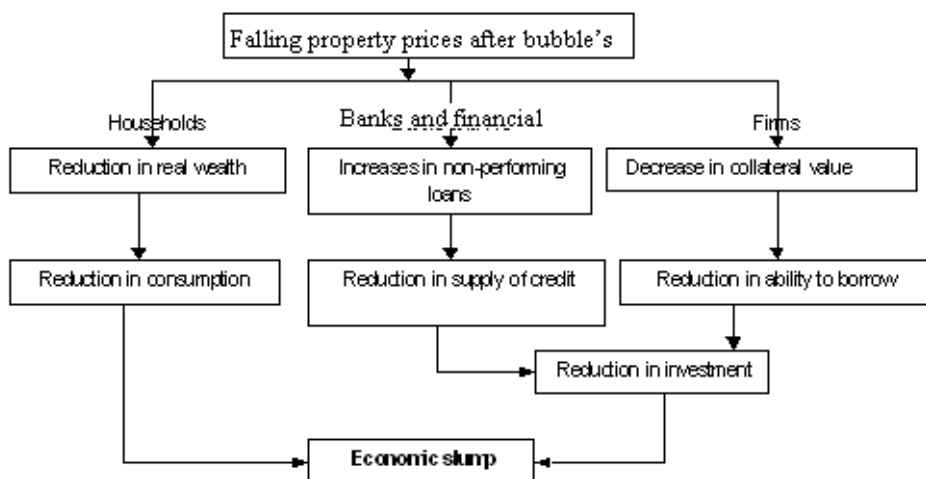
The direct impacts of the real estate crisis on property owners were prominent for two reasons. First, the value of property itself had decreased, which adversely affected the wealth of the property owners. Second, various groups were adversely affected by the drop in property prices after the bubble burst. For example, household wealth decreased. The burst of the bubble forced the economy to consume less. For businesses, the drop in property prices forced some credit-constrained firms to sell their property to cover their collateral; for others, it forced owners to shut down production, and some eventually went bankrupt. Housing developers also faced difficulties in financing their unfinished projects

² The Government Housing Bank estimated that about 300,000 residential units in greater Bangkok were unoccupied. This vacant stock was equivalent to two years of housing supply in the market.

and had to terminate them. The over-shooting effect caused by the reduction in prices turned out to have had much greater impacts on property prices compared to the initial impacts caused by the bubble bursting.³

In addition, the real estate crisis led to a costly economic crisis owing to the high vacancy rate and excessive supply of units on the market. Misallocation of resources was the major cause of overvaluation and market distortion. This type of economic cost did not receive much attention, especially with regard to accounting aspects. However, the resource misallocation generated huge losses, weighing down the overall economy.

Figure 2: Ratio of real estate credit to total credit from financial institutions



Real estate market after the 1997 crisis

After the crisis, the number of housing developers dropped substantially, from about 2,000 to only 200 companies (Vanichvattana, 2007). Real estate companies that survived found it difficult to manage their cash flows and their liquidity problems. While many were able to restructure their loans, some turned their lenders into partners and completed partially finished housing projects. Developers began paying more attention to design and product quality.

³ Over-shooting effects are varied according to different types of real estate. Renaud, Zhang, and Koeberly (1998) investigated commercial buildings in Thailand, such as shop-houses and office buildings, and found that the drop in their prices was more than three times that of residential units.

Financial institutions themselves had to face greater credit competition; they then tried to provide various loan package incentives, such as offering loans for 1-2 years at fixed interest rates. With regard to fiscal policy, transfer fees during the period 2002-2003 were reduced from 3.3 percent to 0.01 percent of the price of a property in order to stimulate the market.

In addition, to cope with one of the National Housing Authority's policies, a number of developers started to promote the "buy when finished" strategy, which helped to discourage customers from purchasing unfinished houses. Since more creative and modern-style houses appeal to consumers' tastes and preferences, housing developers, both big and small, realize the fierce competition they face from each other and regularly assess the number of advertisements for real estate. GHB reported that the number of housing projects increased from 13 projects in January 1998 to 227 and 218 projects in November and December 2003 respectively. Approximately 85 percent of those projects were residential while the remaining 15 percent were non-residential.

After the economic slump in 1997, real estate quickly started to recover, along with the economy. A demand for housing was created as along with a supply. In addition, the government developed new regulations as a tool to promote the revival of this sector, for instance, the restructuring of financial institutions, bankruptcy laws and other policies that could help to stimulate investment. Monetary policy promoted fixed interest rates, which helped buyers to lower the cost of purchasing a house, since the opportunity cost of depositing in banks was as low as 0.75-1.25 percent.

The previous experience of the real estate crisis still makes many people concerned that a similar crisis might happen again. The risk of another crisis should be minimal, but more information should be released even though it is not possible to control the risk of future crises.⁴

Besides, understanding the cycle is critical to everyone. Investors, developers and even homebuyers should know which part of the cycle they are currently experiencing when they have to make decision to buy or to sell. Therefore, Section III will focus on estimating Thailand's real estate cycle and defining the leading indicators that will be used to pre-determine its boom and bust cycle.

⁴ Nevertheless, Pholphirul (2006) was able to create the first early warning system for Thailand's real estate market to predict future crises in the property market by adopting two methodological approaches: (1) signal analysis and (2) probability analysis. The system shows that there are two leading indicators: "ratio of post-finance to bank loans" and "percentage increase in the price of construction materials," which recently exceeded the threshold level, thus signaling a potential future crisis. Nevertheless, the interest rate, which the models unveil as the most significant indicator with the strongest impact on a crisis, is still far lower than the threshold level. This study predicts that probability of a real estate crisis occurring in Thailand will still remain very low.

ESTIMATION OF THE REAL ESTATE CYCLE

This section presents an estimated cycle in the real estate and property sector as well as estimating an appropriate fundamental price level for real estate and property. In addition, this section attempts to configure leading indicators of the cycle and various pro-cyclical indices using both theoretical models and existing data. Theories on asset price bubble have received great attention among both micro and macro economists. A number of studies focus on explanations of the variability of asset prices, which might not be based on fundamentals of the asset itself. When attempting to explain price movement, analysts need to understand the cycle of each asset. The price movement of each asset depends on both internal and external factors, such as demand determinants, supply determinants, governmental policies, and the status of the overall economy.

In the real estate market, the cycle of each type of asset has a distinct feature led by differences in each phase of the cycle itself. Foldvary (1991) and Mushabbar (2003) offer a hypothesis to describe the relationship between the business/economic cycle and the real estate cycle that claims that the real estate cycle always leads the business cycle because the real estate market is sensitive to interest rates. When the interest rate is low, there will be an expansion in the real estate market, which in turn stimulates the overall economy.

Ahuja, Poonpatpibool and Mallikamas (2003) study the overall real asset cycle, especially that of real estate. They find that normally the price of the asset gradually increases in the expansionary period, but decreases rapidly during the down period. There is about 40 percent chance of a gradual increase that is followed by a significant price drop. In the case that there is a significant price adjustment, the real estate price index will drop by approximately 30 percent, where the process of the adjustment from the peak period to the lowest point takes approximately 4 years. In addition, the real asset price index often correlates with the country's overall economic performance and the Gross Domestic Product (GDP). Often, the effects of the changes in the country's GDP have a significant impact on this sector. Finally, they find that the effects of the economic bubbles on the real estate sector are different in different countries because of the financial system each country exercises. If a country bases fund accumulation through the banking system, the adverse effects of an economic crisis on the real estate sector will be more severe than in countries that raise funds through financial markets.

In theory, the real estate market has adjustments that follow a cycle. This cycle affects the overall price level, rental prices and the market value of houses that have been occupied or properties that are under construction. In all, the dynamics of the real estate market are influenced by both demand and supply factors. For example, when there is a surplus, caused by an excess supply of houses or by a reduction in the demand for housing, the vacancy rate will rise, causing suppliers (landlords or real estate companies) to adjust rental prices and real estate prices down. The reduction in these prices also negatively affects the estimated market value of mortgages. Therefore, an excess supply will be

followed by a sharp drop in the overall real estate prices.

Other than factors from real demand and supply, speculation in the real estate market is one of the most important factors that determine the ups and downs of the cycle. Speculation in the real estate market is a phenomenon in which investors expect that they are able to sell (buy) a real estate asset at a higher (lower) price than the price at the time the asset is bought (sold) at a specific period. Malpezzi and Wachter (2002) suggest that speculation is a major factor affecting the fluctuation of real estate prices. They also find that speculators' irrational expectations are a major cause of real estate bubbles. In addition, some studies find that a high proportion of loans from commercial banks to the real estate sector has a significant effect on a rapid increase in real estate prices. Collyns and Senhadji (2002) and Herring and Wachter (2002) find that excessive loans from commercial banks are a major factor leading to real estate bubbles.

From a standard asset-pricing model, the price of real estate depends on expected future rents of the real estate asset and other interest rate factors. Expected future rents are determined by demand factors such as the Gross Domestic Product, population growth rate and the number of loan applications for new property. Factors from the supply side are found not to have significant effects on these expected rents since the supply in these markets is relatively inelastic due to the fact that land availability is fixed and house construction usually takes a long period of time. Thus, the number of houses supplied does not have a significant effect on the asset price.

In summary, real estate prices are determined by fundamental factors from market demand and supply and from information and adjustments in the financial market. Therefore, problems related to these factors, such as imperfect information, supply rigidities and an imbalanced financial market, can cause a movement in the real estate price that might be more than that based on the expected value of the real estate. Problems in other markets, in turn, could result in real estate bubbles.

Recall from our earlier discussions, real estate cycles are determined by two main cycles, the *Physical Market Real Estate Cycle* and the *Capital Market Real Estate Cycle*. The *Capital Market Real Estate Cycle* reveals movements in the capital market that are affected by investment and speculation in the real estate market from policies and strategic actions in the money and capital markets. A study of the capital market real estate cycle should identify pro-cyclical variables, which are variables that can forecast movements in real estate prices in different time periods. In this study, we use the housing prices or the values of the houses as the main variable to determine such cycle. The period when the housing price increases indicates real estate market expansions while the period when the housing price decreases indicates market recessions.

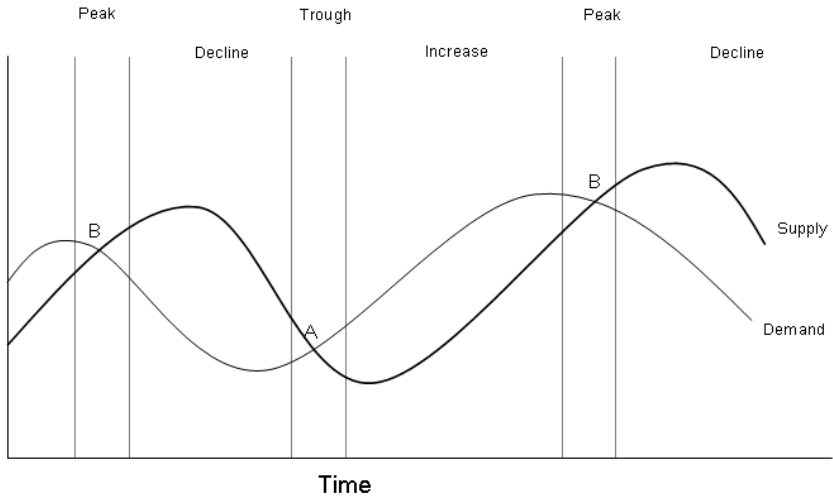
From the theoretical point of view that housing prices are determined by the demand and supply in the market, price increases from an increase in demand that is in excess of the supply. The price starts to decline when the demand begins to outstrip the supply.

Therefore, we can predict housing prices by investigating demand and supply variables and compare the magnitude of the demand and supply in the market. The effects of demand and supply variables on housing prices, and therefore on real estate prices, are summarized in the following table.

Table 2: Predicting variables of real estate price movements in different phases of real estate cycle

Variable	Contraction	Recovery	Expansion	Recession
Supply	Decrease	Recovery	Increase	Increase more than demand
Demand	Decrease	Recovery	Increase more than supply	Gradually increase
Vacancy Rate	Significantly Increase	Decrease to normal level	Lower than normal level	Increase to normal level
Rent (I)	Decrease	No change	No change	Low expansion
Investment	Low transactions	Almost no transactions	High transaction volume	High transaction volume
The effects on the value of real estate	Decrease rent and increase cap rate	Increase rent but cap rate at highest level (no change)	Increase rent and decrease cap rate	Stable rent or decrease rent but cap rate starts to increase

Figure 3: Real estate cycle and the demand and supply of real estate



Since the housing price, which can reflect the real transaction prices in the market, is a key to studying the real estate cycle, understanding the cycle can be difficult when housing prices are not available. Nevertheless, we can estimate the housing price by using an “income approach”. This approach identifies the housing price from two components of the price, the fundamental component and the speculative component. The fundamental component is an important component in the real housing price since it is the real value of the real estate asset. The value is equal to the summation of discounted expected future income or rents from the real estate asset. The second component, the speculative component, is derived from the theory mentioned earlier; namely, that housing prices are determined also by real estate bubbles that are caused by speculation in the real estate market. The following equation represents the housing (real estate) price at time t .

$$P(t) = B_0 \cdot e^{rt} + e^{rt} \int_{t=0}^{\infty} (I(t) - c \cdot I(t)) e^{gt} dt, \quad (1)$$

$P(t)$ is the value or the price of housing at time t , I is the income or rents from the real estate asset that has an annual growth rate of g , c is a coefficient or the proportion of expenses on maintenance the real estate, and r is the interest rate.

$$P(t) = B_0 \cdot e^{rt} + \frac{(1 - c)I_0 \cdot e^{gt}}{r - g} = B_0 \cdot e^{rt} + \frac{(1 - c) \cdot I(t)}{r - g} \quad (2)$$

From the above equation, the real estate price is determined by 1) the fundamental value/price of the asset itself, which is determined by the discounted value of future rents $\left(\frac{(1-c) \cdot I(t)}{r-g} \right)$ and 2) the speculative bubble (B), which has the growth rate of $(B_0 \cdot e^{rt})$. Therefore, the discrepancy between the housing (real estate) price and the present value of the asset reveals information about the level of the real estate bubble in the market. The ratio of the real estate price and the real estate rent $\left(\frac{P(t)}{I(t)} \right)$ can be estimated from the following equation.

$$\frac{P(t)}{I(t)} = \frac{B_0 \cdot e^{rt}}{I(t)} + \frac{1-c}{r-g} = \frac{B_0}{I_0} \cdot e^{(r-g)t} + \frac{1-c}{r-g} \quad (3)$$

In this equation, the price-rent ratio is comprised of factors from 1) speculative bubbles and 2) fundamental factors of the real estate asset. In this paper, this price-rent ratio is denoted¹ “Gross Income Multiplier” (GIM), which is a term used in previous related studies⁵.

Nevertheless, in practice, measuring the level of real estate bubbles (B_0) is difficult due to the fact that the analyst needs to know the duration that the bubble takes to form and the level of the “bubble seed.” However, the fundamental price of the real estate asset can be estimated by looking at movements of GIM that are from fundamental factors only. In this paper, we first assume that there is no bubble in the real estate market. In this case, the GIM of the real estate asset can be estimated from the movement of three factors; namely, 1) the interest rates (r), (2) the growth rate of rent (g) and 3) the coefficient of housing expenses (c)⁵:

$$GIM = \frac{P(t)}{I(t)} = \frac{1-c}{r-g} \quad (4)$$

In general, the physical real estate cycle has direct effects on rents (I) and the growth rate of rent (g). When there is more excess supply, which results in higher vacancy rates, rents or income from rents will decline. At the same time, the capital market cycle has a direct effect on the interest rate. When the interest rate decreases, there will be an increase in the demand for housing, which causes an increase in housing prices. We can roughly conclude that the “fundamental real estate value” depends on the movement of rents or the movements of interest rates or both. For example, if the rent increases while there is no change in the interest rate, real estate prices will increase. If the rent stays relatively

⁵ Or Gross Rent Multiplier (GRM)

⁶ Bjorklund and Soderberg (1999) suggest that, in theory, “Net Income Multiplier” (NIM) = $1/(r-g)$ should be a better measure than GIM in the case that “ c ” is constant or relatively stable.

constant while the interest rates are increased, there will be a decline in the real estate price. When the real estate market, in its expansion period, undergoes a sharp increase in real estate prices, rents must significantly increase and the interest rate must be relatively low. Therefore, we can study or forecast the movement of these two variables to estimate the fundamental real estate value.

In this paper, we estimate the fundamental price-rent ratio (P/I) or the GIM from the rental price index, (I), the borrowing rate or MLR) (r) and the coefficient of housing expenses or the proportion of housing expenses to total household expenses (c). The estimated average fundamental rent in Bangkok and Bangkok suburbs are found to be higher than that of the country as a whole. The estimated GIM for the whole country is found to be 5.99, which is lower than that of the Bangkok market, which has an average GIM of 6.43. In addition, when comparing the variability of the price-rent ratio using the standard deviation of the GIM, the Bangkok market is found to be more variable than the overall market. The standard deviation of the GIM for the Bangkok market is 2.17 while that of the whole country is 1.94. This verifies the fact that the property value of the Bangkok metropolitan area is higher and more volatile than it is for the country as a whole.

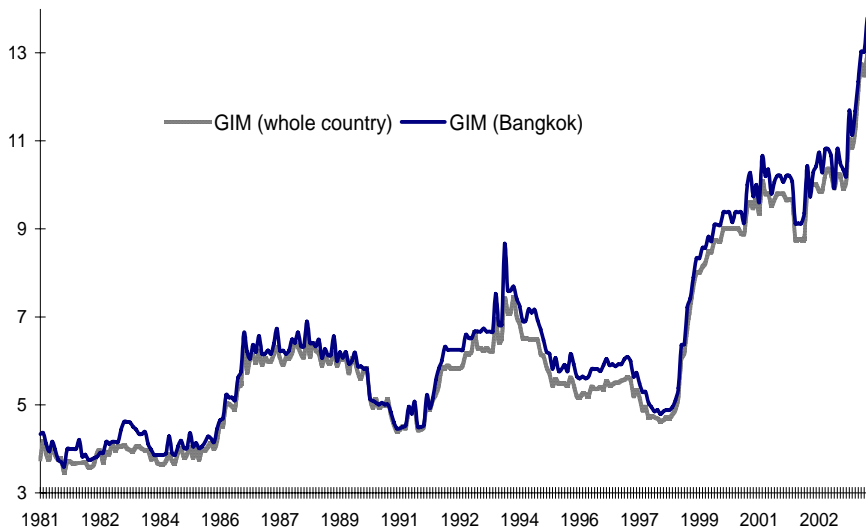
Furthermore, we find that the historical GIM that is identified only by fundamental factors has also adjusted in cycle. When compared with before-crisis GIM, the GIM was at the lowest value during 1992-1992 and at the peak during 1994-1995. The period in which the GIM dramatically declined after 1995-1998 parallels the period when there was a real estate crisis. Similarly, during the period of economic boom and real estate market expansion (such as during 1984-1990), the estimated GIM also significantly increased. These results suggest that GIM is an appropriate indicator of a real estate cycle that is influenced by fundamental factors, in the absence of real estate bubbles. This indicator should then reflect the real price or the equilibrium price in the market that results from the interaction of real demand and supply factors without price speculation.

Even though GIM is an appropriate indicator of the real estate cycle, information on actual rental prices is needed for the estimation of the GIM. To date, information on rental prices is limited. The GIM calculation cannot be performed for different types, quality or ages of the real estate assets. However, Ratcliff (1971) and Boykin and Gray (1994) argue that GIM is an effective indicator of fundamental factors that identify the real estate cycle at a macro level. GIM was found to be accurate and highly reliable in its prediction power.

Next, we study the real estate cycle using the "Growth Cycle Approach". This approach investigates price movement (GIM) and the long-term trend of the real estate cycle. A GIM variable that increases at a lower rate than that of the long-term trend indicates that the real estate market is in a contraction phase even when GIM is increasing. On the other hand, when the growth rate of the GIM is higher than that of the long-term trend, the

market is in its expansion phase⁶. In general, time series data on prices have basic components namely, 1) seasonal factors, 2) a time trend, 3) the cycle and 4) irregular components. Therefore, when studying a real estate cycle, we need to eliminate other components to be able to study the real estate cycle in its own right, especially in identifying the turning point of each phrase.

Figure 4: Estimated GIM for Thailand and Bangkok



For calculations following the Growth Cycle Approach in this paper, we use the Bry-Boschan Turning Point Program developed by the National Bureau of Economic Research (NBER) in the United States. The program eliminates irregular components, finds the time trend and takes the time trend to adjust de-seasoned data. Finally, the program calculates the peaks, the troughs, expansion phases and contraction phases of the cycle. After these key outputs are identified, we can investigate whether (and, if so, how) the GIM variable deviates from the phase average trend. The period in which the variable is lower than the trend indicates a contraction period. On the other hand, the period in which the variable is

⁶ Other than the Growth Cycle Approach, another approach to investigate the real estate cycle is the Classical Cycle Approach, which investigates the level of activities in the real estate market instead of the growth rate. However, this study uses the Growth Cycle Approach because it is more appropriate in the case of Thailand, where the real estate market continuously expands.

lower than the trend indicates an expansion period. The duration between a peak and a trough indicates the duration of contraction and expansion phases⁷.

The expansion phase of the cycle took approximately 25.3 months while the contraction period took approximately 44.0 months, which was much longer than the expansion period. The real housing price in the market started to adjust downward in December 1993. This price reduction signaled the real estate crisis that took place later and which led to a total cycle duration of 89.0 months, which is much longer than other phases in the cycle. The duration from one lowest price to the next (trough to trough) took on average 69.3 months, which is almost 6 years.

Table 3: Troughs and peaks of the pro-cyclical indicator of real estate cycle (GIM)

Trough		Peak		Expansion Phase	Contraction Phase	Cycle Duration
Year	Month	Year	Month	Months	Months	Months
1980	4	1983	1	33	29	62
1985	6	1986	9	15	51	66
1990	12	1993	12	36	53	89
1998	5	2001	10	17	43	60
2003	5	---	---	---	---	---
Average				25.25	44	69.25

The real estate cycle should be defined by real prices in the real estate market. This study uses GIM as an indicator of the real estate cycle since real data on real estate prices are not available and GIM is obtained from an estimation of price adjustment in the real estate market. The estimated GIM can be used as a pro-cyclical indicator with some level of confidence. In order to study a pro-cyclical indicator, we need to also study leading indicators. This leading indicator can be then used to forecast the direction of the real estate business. When studying leading indicators, we can use the Granger Causality Test to indicate the predictive power of such a variable.

Prospective variables for leading indicators that are collected in monthly data are: (1) the “Construction Price Index”, (2) the “Stock Exchange of Thailand (SET) Index (Property

⁷ In this case, we can also analyze expansion and contraction phases of the cycle in more detail by designating the period in which the indicator is lower than the trend and declining as a “recession.” The phase in which the indicator is higher than the trend and increasing is called an “expansion phase.” Finally, the phase is which the indicator is higher than the trend, but decreasing, is called a “contraction phase.” However, this paper identifies only two phases in order to make comparisons with results from previous studies of real estate cycles.

Sector)", (3) the "Money Supply (M2)", (4) "Pre-Credit Finance", (5) "Post-Credit Finance", (6) "Real GDP Growth", (7) the "Number of Licenses for Housing Registration", (8) the "Number of Licenses for Land Registration" and (9) "Population." Among these variables, there are 4 leading indicators that are statistically significant explaining the real estate cycle or GIM. The table below shows lag periods for each the 4 leading indicators.

Table 4: Predictive power of lead variables using granger causality test

Variable	Statistical Value	Period of Data	Leading Period
Construction Price Index	1.64**	1985:10 – 2004:1	6 months
Money Supply M2	1.75**	1981:6 – 2004:1	11 months
Property Stock Index in the Stock Exchange of Thailand (SET)	1.96**	1988:6 – 2004:1	2 months
Post-Credit Finance	2.33***	1993:6 – 2003:8	12 months

Note: ** = 0.05 and *** = 0.01 significant level

The leading period can be obtained from comparing the turning points of the lead variable and those of the reference pro-cyclical indicator. To find the peaks and troughs of each variable, we use the Bry-Boschan Turning Point Program. However, since there are too few observations (120 observations or 10 years) of the post-credit finance variable (the program requires at least 180 observations), we cannot include post-credit finance in this calculation. The average duration of leading period (number of months) of the remaining 3 leading indicators are shown in Table 5.

Table 5: Turning points and average duration of leading period (months) of leading variables

Variables	Leading period before the peak
Construction Price Index	4 months
Money Supply M2	27.5 months
Property Stock Index in the Stock Exchange of Thailand	7 months
Variables	Leading period before the trough
Construction Price Index	9
Money Supply M2	35.6
Property Stock Index in the Stock Exchange of Thailand	2

From our estimations, a decrease in the construction price index leads the real estate cycle

approximately 4 months before the peak of the cycle takes place. A decrease in the construction price index, however, leads the cycle approximately 9 months before the trough takes place. These estimated durations are taken from a comparison of the averages of the duration between the turning points of leading indicators and pro-cyclical indicators. We find that the Property Stock Index is the shortest-term leading indicator among the other three significant variables. The index leads the real estate cycle only about 7 months at the peak and about 2 months at the trough. For M2, we find that the leading duration for M2 is much longer than other indicators. This is because the M2 variable has no direct effect on the real estate cycle as do other indicators such as construction price and post-credit finance in the real estate sector. An increase in M2 results in an interest rate cut, which in turn affects the total investment that partly goes to the real estate sector. However, an expansionary monetary policy (cutting the interest rate) should generate a policy lag. Due to its policy lag, the effects from monetary expansion, therefore, take more time than those effects from other variables that have direct impacts on the real estate market.

Nevertheless, when we compare the estimated movement of the real-estate cycle with the business/economic cycle, we find that our results are consistent with the findings of Foldvary (1991) and Mushabbar (2003). We find that the real estate cycle leads the business/economic cycle in the expansion period. When the interest rate is low, there is an investment in the real estate market, which in turn stimulates the overall economy. When we compare the estimated real estate cycle with the business/ economic cycle, as estimated by the Thailand Development Research Institute, we find that during the pre-crisis period (1980-1995) the real estate cycle led the business/economic cycle by approximately 14.33 months during expansion periods and approximately 20.33 months during recession periods. We do not analyze the relationship after the 1997 crisis since the market is still adjusting, which does not give a precise relationship.

Note that if we compare the real estate cycle and the business/economic cycle, we observe that in expansion periods, the real estate cycle leads the business/economic cycle. In recession periods, however, it is not clear that the real estate cycle leads the business cycle. Table 6 shows that real estate crisis preceded the economic crisis in the early 1980s by 4 months and the one in 1997 by only 2 months while in other contraction periods, which took place during economic crises, real estate contraction is preceded by economic recession.⁸ The reverse causality is due to the fact that lower income resulted from an economic crisis, which in turn caused investment demand in the real estate sector to decrease. This result on unclear causality of the Thai property sector during this downturn period is different from findings from Foldvary (1991) and Mushabbar (2003).

Nevertheless, it should also be noted that the estimation of the real estate cycle in this analysis may not be used to precisely estimate real estate bubbles due to the fact that data

⁸ Pholphirul and Vichyanond (2008) explain how linkages of the property sector led to a downturn in the Thai economy due to the crisis in the early 1980s and the one in 1997.

from real estate sector in Thailand is limited and still unreliable. The study of the turning points in the real estate cycle and other leading indicators in this paper only suggest factors that identify the expansions and the contractions in the cycle. The result confirms that the past real estate crisis in Thailand took place because of contraction in the real estate market. Extensive investment in housing and thus excess supply therefore quickly led to a real estate crisis, and thereafter an economic crisis.

Table 6: Comparison of the real estate cycle and the business/economic cycle

Real Estate Cycle				Business/economic Cycle				Leading Period	
Trough		Peak		Trough		Peak		Expansion Phase	Contraction Phase
Year	Month	Year	Month	Year	Month	Year	Month	Number of Months	Number of Months
1980	4	1983	1	1981	11	1982	9	19	-4
1985	6	1986	9	1986	1	1990	7	7	46
1990	12	1993	12	1992	5	1995	7	17	19
1993	5	1999	10	1998	5	1999	12	60	-2
2003	5	–	–	2000	6	–	–	-35	–
Duration of the leading period before the business/economic cycle (pre-crisis period: 1980-1995)								14.33	20.33

CONCLUSION

In this paper, the Gross Income Multiplier (GIM) is estimated and used along with a procyclical variable for the real estate cycle in Thailand. We find that the duration of the expansion period in the real estate cycle in Thailand was approximately 25.25 months while the contraction period lasted much longer (44.00 months). The duration of the trough-to-trough cycle is estimated to be approximately 69.25 months. We find that significant leading indicators for the real estate cycle are construction price index, money supply (M2), property stock index and post-credit finance.

When investigating the relationship between the real estate cycle and the business/economic cycle, we find that the real estate cycle leads the trough and the peak in the business/economic cycle by approximately 14.3 months and 20.3 months, respectively. In addition, we observe that in expansion periods, the real estate cycle leads the business/economic cycle. However, what is different from other studies is that it is not clear in the contraction periods that the real estate cycle in Thailand leads the business cycle. We found that real estate crises led to economic crises in the early 1980s and in 1997 while in other contraction periods an economic recession is what led to a contraction in the real estate sector.

REFERENCES

- Ahuja, Ashvin, Poonpatpibul, Chaipat, and Mallikamas, Titinun (2003) “Asset Price Bubble and Monetary Policy: Identification and Policy Response under Inflation Targeting”, The Bank of Thailand Symposium Paper, *Managing the Recovery: Challenges Ahead*, Bangkok: Bank of Thailand
- Bjorklund, Kicki, and Soderberg, Bo (1999) “Property Cycles, Speculative Bubbles and the Gross Income Multiplier,” *Journal of Real Estate Research*, 18(1): 151-174.
- Collyns, Charles and Senhadji, Abdelhak (2002) “Lending Booms, Real Estate Bubbles, and the Asian Crisis”, *IMF Working Paper* No. WP/02/20, Washington, D.C.: International Monetary Fund.
- Corsetti, Giancarlo, Paolo Pesenti, and Roubini, Nouriel (1998) “What Caused the Asian Currency and Financial Crisis? Part I: A Macroeconomic Overview.” Mimeo, 1-39.
- Foldvary, E. Fred (1991) “Real Estate and Business Cycle: Henry George’s Theory of the Trade Cycle”, Latvia University of Agriculture, Mimeo.
- Herrera, Santiago and Perry, Guillermo E.(2001) “Tropical Bubbles: Asset Prices in Latin America, 1980–2001,” in *Asset Price Bubbles: Implications for Monetary, Regulatory, and International Policies*, Research in Financial Services Private and Public Policy, William C. Hunter, George G. Kaufman and Michael Pomerleano (Editors), New York: Elsevier.
- Melpazzi, Stephen and Wachter, Susan M.(2002) “The Role of Speculation in Real Estate Cycles”, paper prepared for the July 2002 joint meeting of the American Real Estate and Urban Economics Association, Seoul, South Korea, Mimeo.
- Mushabbar, Maliha (2003) “Dynamics of Real Estate Market”, *Master of Science Thesis No. 181*, Department of Infrastructure, Royal Institute of Technology, Sweden.
- Pholphirul, Piriya and Vichyanond, Pakorn (2008) “Thailand”, in the Chapter 7 of Jose M. Fanelli (Editor), *Macroeconomic Volatility, Institutions, and Financial Architectures: The Developing World Experience*, pp.157-189, London: The Palgrave Macmilan.
- Pholphirul, Piriya (2006) “Using the Past Experiences of Predict an Early Warning System in Thailand’s Property Market”, *Pacific Rim Property Research Journal*, 12(1): 85-106.

Renaud, Bertrand (2000) “How Real Estate Contributed to the Thailand Financial Crisis”, in Koichi Mera and Bertrand Renaud (Editors) *Asia’s Financial Crisis and the Role of Real Estate*. M.E. Sharpe, Armonk, New York.

Renaud, Bertrand, Zhang, Ming, and Koeberle, Stefan (1998) “How the Real Estate Boom Undid Financial Institutions: What Can Be Done Now?” Proceedings of the National Economic and Social Development Board-World Bank Conference on Thailand’s Dynamic Recovery and Competitiveness, May 21-24, Bangkok.

Vanichvattana, Sonthya (2007) “Thailand Real Estate Market Cycles: Case Study of 1997 Economic Crisis”, *GH Bank Housing Journal*, 1(1): 38-47.

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