

CHAPTER 1

Introduction

1.1 Background and Rationale

Lately, the global housing price has increased. Global housing price index was initiated by the International Monetary Fund (IMF) to measure global average price index. The Global House Price Index rose from 99.40 in 2000 to 159.31 in 2008 and slightly dropped to 153.73 in 2016 (IMF, 2016). Housing prices are usually cyclical and the fluctuations can be fundamental or speculative. However, housing price can affect the economy negatively when they are higher than the average (Abeyasinghe and Gu, 2016). Housing sector is the one which has multiplier effects, backward linkage and forward linkage within economy. Since the housing sector has the relationship with other economic sectors, housing sector can also boost up the employment and accelerate GDP (Terzi and Bolen, 2008). For Singapore, Abeyasinghe and Choy (2004) found the disadvantage of increasing housing price is that decrease in average propensity to consume which can cause volatile demand shocks.

As housing is a fundamental need of human being, a long-term housing affordability becomes a concern in several countries. Demographia International Housing Affordability was initiated by the Performance Urban Planning Organization which rates middle-income housing affordability. It is calculated by dividing median house price to the median household income which is also called as median multiple. They did the survey for 40 metropolitan housing markets in nine countries which are Australia, Canada, China, Ireland, Japan, New Zealand, Singapore, the United Kingdom and the United States. Among all of these, Singapore has median multiple of 4.9 which note as “seriously unaffordable” (Performance Urban Planning, 2016). There are also other countries facing a higher median income multiple in some cities

Anne Case (2005) viewed the increasing housing price as a positive perspective. She stated that increase in housing prices generate positive wealth to households, which can transfer to increase in households' consumption both in housing and non-housing. However, the housing affordability is a serious problem in Singapore as the country has no rural area. Therefore, this study focuses on examining housing prices in Singapore.

1.1.1 Housing Market in Singapore

Singapore is an island nation with land scarcity as it has only 277.6 squared-miles. In 1920s, the British Government established Singapore Improvement Trust to build public housing in Singapore. STI managed to build 23,000 units in 32 years but it still couldn't solve the problem of housing shortage. It wasn't enough for the population about 1.6 million at that time (Yuen and Belinda, 2007).

After their independence, their elected campaign "People's Action Party" recognized that housing provision is required urgently. The name of the "STI" was changed into Housing Development Board or HDB. The history and roles of HDB is summarized following Phang and Helble (2016). On 1 February 1960, HDB was established as a board to provide "decent homes equipped with modern amenities for all those who needed them" (Teh, 1975). The plan of HDB was to provide mortgage loan with lower interest rate compare to the other commercial banks.

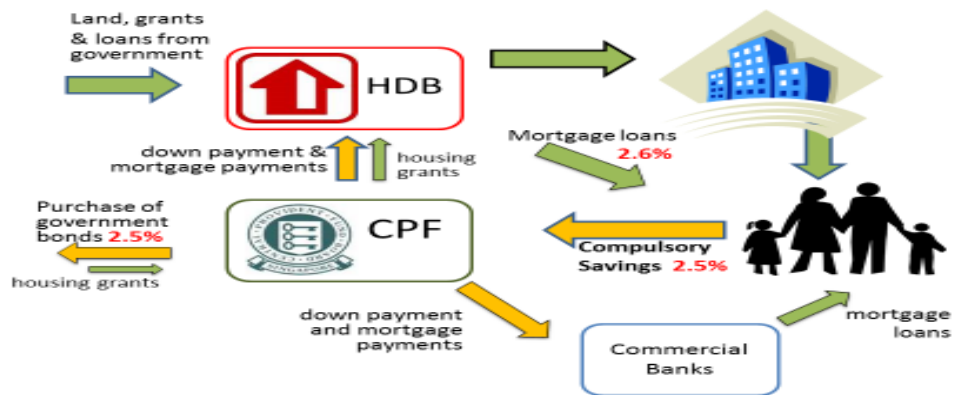
By 1965, HDB can solve the shortage of housing by providing low-cost housing to the low-income group of people. Their main objective is not to provide houses for free but they want the citizen to own low-cost public housing. To reduce the cost of construction, HDB flats are systematically designed to have simple and optimal space utilization. Normally, HDB flats are constructed median house type that contain four rooms. Due to the scarcity of land, most of the housings in Singapore are built into high-rise buildings. Housing units estimates around 50% increasing in each decade from 1970 to 2000. According to the data between 1960 and 2013, the ratio of housing investment to total investment is average 23%. It is quite a large number compared to the other countries. Singapore devote a lot of investment in housing sector. The HDB, Singapore's biggest housing provider, has built more

than 800,000 flats for 85% of Singapore's population. (Lawrence Chin,2004). Starting from 1964, the Home Ownership Scheme was also introduced to help citizens to buy instead of renting their flats.

Central Provident Fund scheme(CPF) is a mandatory savings scheme to finance a range of different welfare services: housing, healthcare, insurance, tertiary education and retirement. When the CPF was newly established in 1955, the contribution rate was 10% from (5% each by employees and employers) of the monthly salary. In 2016, the contribution rates are 20% from employees and 17% from employers those whose salary are above \$6,000. Four years later of housing ownership scheme (1968), the government uses (CPF) savings for the down payment and monthly mortgage loan installments for housing.

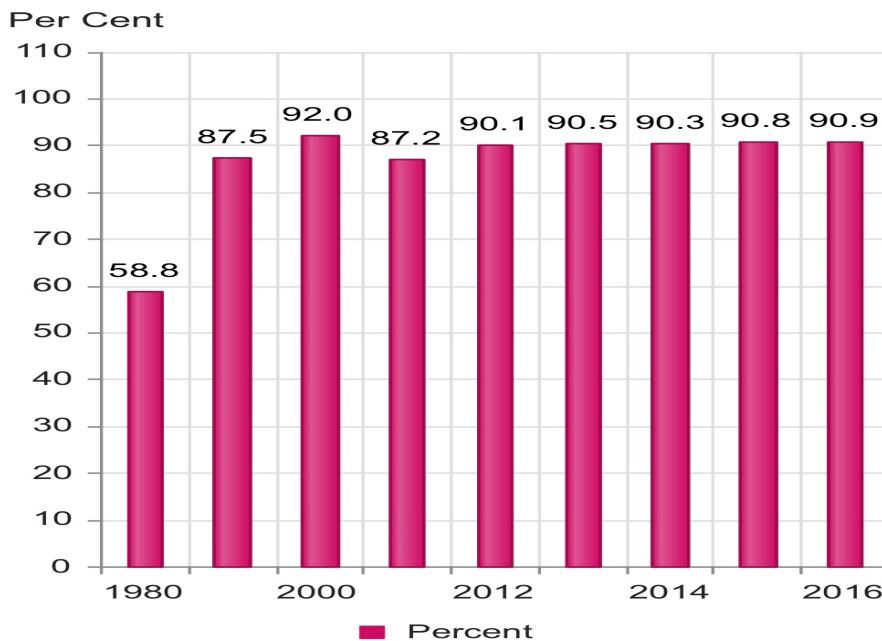
Between 1968 and 1981, CPF savings could only use for public housing. Starting from 1990, it has allowed using for other purposes including the purchases of resale public housing and private housing to offer more choices for buyers that size and location of dwelling and encourage owners to upgrade newer or larger ones. This caused the public housing resale market more efficient and profitable. Moreover, the prices of public resale housing escalated. Public resale housing price increased sharply around like 71% in 1993 when housing finance deregulation was introduced.

The HDB receives land, grants and loans from government at the rate of CPF. The HDB uses the loans to provide mortgage loans and insurance to the buyers for flats. Normally, the loan covers 80% of the housing price and buyers has to pay back within 25 years. Buyers can apply up to two grants. The structure of HDB housing and the CPF schemes are shown in Figure 1.1. As a result of the schemes, government supports a lot to own house and the ownership of housing in Singapore is 90% of which is the one of the highest rate in market economy. The annual homeownership rate of resident households is represented in figure 1.2.



Source: Modified from Phang (2007, 2013a)

Figure 1.1: Procedures of HDB and CPF



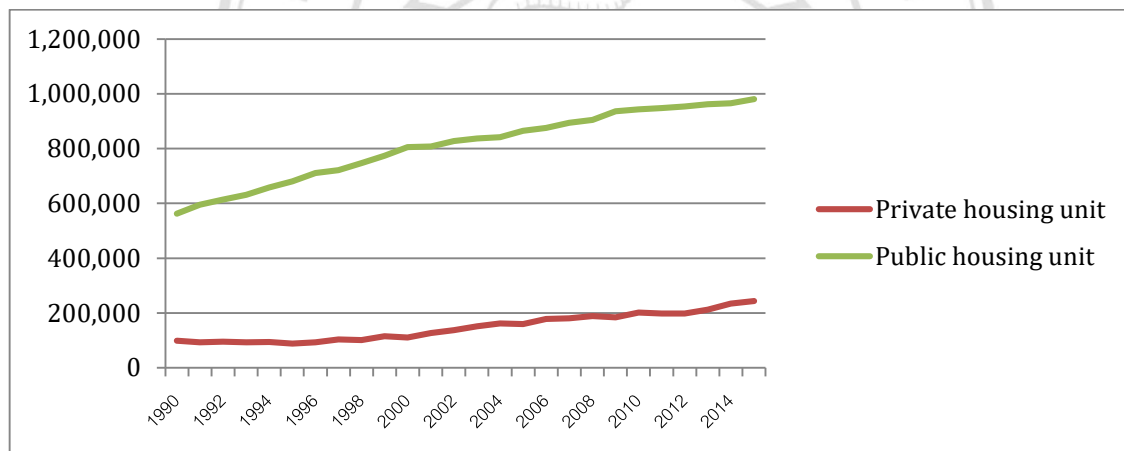
Source: Singapore Statistics

Figure 1.2: Home Ownership Rate of Resident Households

Singapore residential housing falls into two categories: Public housing and Private Housing. More than 80% of the housing provision is constructed and managed by HDB and only 20% is constructed by private sector. By 2008, 84,000 housing units were constructed by HDB and 9,000 housing units were constructed by the private sector

(Department of Statistics, Singapore). Public housing is an important source of housing wealth for liquidity constrained households in Singapore. The public housing market is a systematically regulated market, where new public (HDB) houses are sold at fair prices to eligible for households but public resale price is pricey compare to the new public houses. Private housing sales in Singapore are closely related to increases in public housing wealth (Bardhan et al., 2003). Public housing policies were also found to have significant impact on private housing price dynamics (Phang and Wong, 1997; Lum, 2002; Ong and Sing, 2002).

Singapore's public housing system has been cited as a successful planning for providing a lot of affordable housing. In 2010, HDB won the “providing one of Asia's and the world's greenest, cleanest and most socially conscious housing programs” by UN-Habitat.

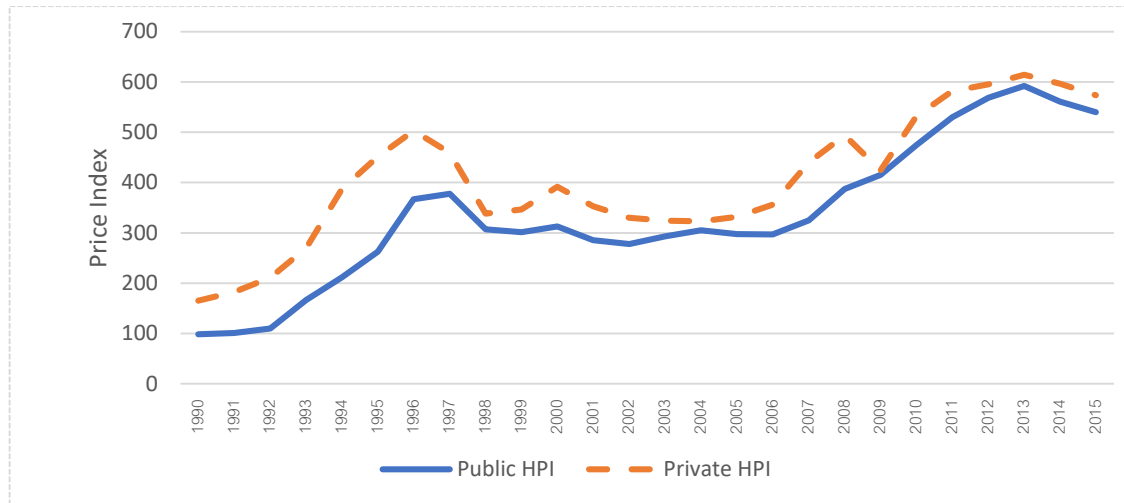


Source: The Department of Statistics, Singapore.

Figure 1.3: HBD and Private housing units (1990-2015)

1.1.2 Housing Price in Singapore

Singapore public resale and private housing prices are measured using the public resale and private housing price indices provided by the Department of Statistics, Singapore.



Source: The Department of Statistics, Singapore.

Figure 1.4: Public Resale and Private Housing Price Index of Singapore (1990-2015)

The price indices show fluctuations in the housing prices as shown in Figure 3. The trend and the fluctuation of the housing prices are due to both the market forces and policy interventions. For the market forces, studies have examined both demand and supply factors. The demand factors are such as the size of the population (Mankiw and Weil, 1998; Ding, 2014), the economic growth (Leung, 2003), economic crisis and so on. The supply factors are such as Price, Housing stock, Construction cost and Labor cost (HUANG and ZHANG, 2012).

Resale public housing prices went up faster than the private housing prices. Subsidy for housing in Singapore play the key role. According to the public housing policies in 1980s, these let citizens to choose the type of houses and support to upgrade larger and nicer houses. This caused the public housing resale market more efficient and profitable. Moreover, the prices of public resale housing escalated. In first half of 1990s, Singapore's GDP increased very rapidly. From 1990 to 1996, Singapore's GDP accelerated and employment rate had 98%. Compare to the real income in 1980s, it increased tripled in 1990s. Housing price increased by more than 250% during the first half of the 1990s. Experts conclude that strong economic growth led to increase in housing price. Due to the introducing of housing finance deregulation in 1993, Housing price increased rapidly 71%. Starting from

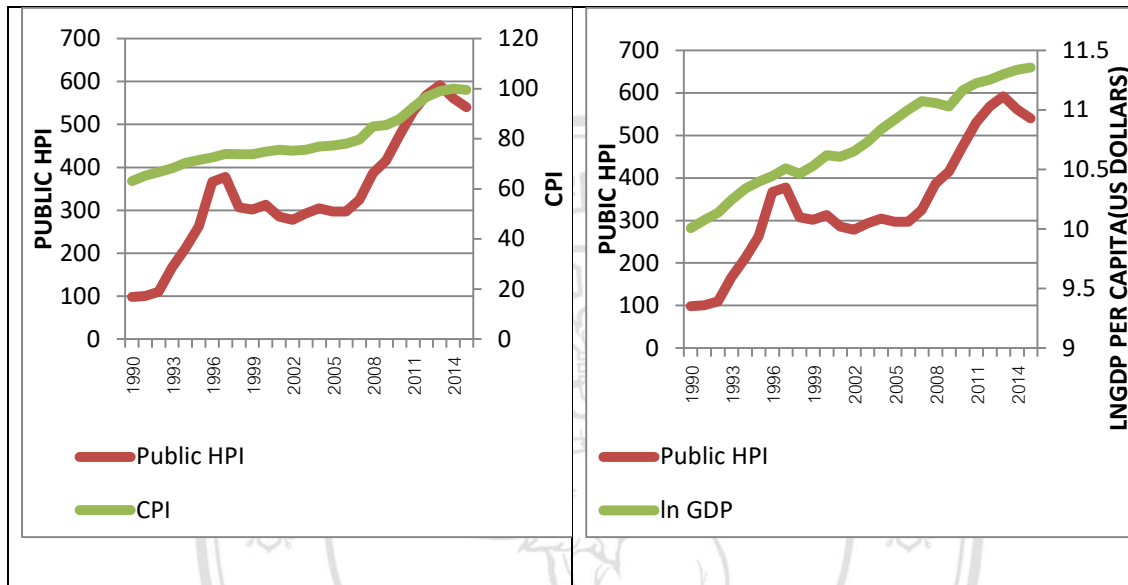
1994, CPF housing grants can be used to purchase resale HDB flats which is only for the ones who apply for households for the first time. The public resale housing price accelerated further more after CPF housing grants were initiated. This price increase had to be expected, because resale public and private housing markets had become less segmented since high-income citizens as well as permanent residents could purchase HDB resale flats. To compare the increasing rate of housing price, the public resale is much higher than the private in the years of 1993, 1995, 1996, 2004 and 2010.

There is financial crisis in 1997 and housing prices fell sharply. This crisis cause Singapore's economic growth rate decreased from 8.5% in 1997 to 0.1% in 1998. The declining rate in HDB resale prices was less than the declining rate in private housing prices in 1998. There was also a crisis on between 2000 and 2003. The demand of housing fell and so, the price of housing decreased. To recover from global financial crisis in 2008, American Federal Reserve intentionally dropped interest rate and so mortgage rate fell. During that 2008 financial crisis, public resale prices continued to increase while private housing prices fell. After 2008 global financial crisis period, continuously accelerated in housing price due to the physical housing shortage, sharply increased population, the mortgage loans with low interest rate and high global liquidity, resulting from accommodative monetary policies of central banks in developed economies. The highest price reached in Feb 2013. In 2012 and 2013, the biggest buyers from China bought properties in Singapore.

Moreover, Phang and Helble (2016) emphasizes that Singapore housing sector is highly regulated and, thus, the housing prices are also influenced by both demand and supply side policies such as changes in rules regarding CPF grants, deregulation in the resale market and capital gain taxes on property sales.

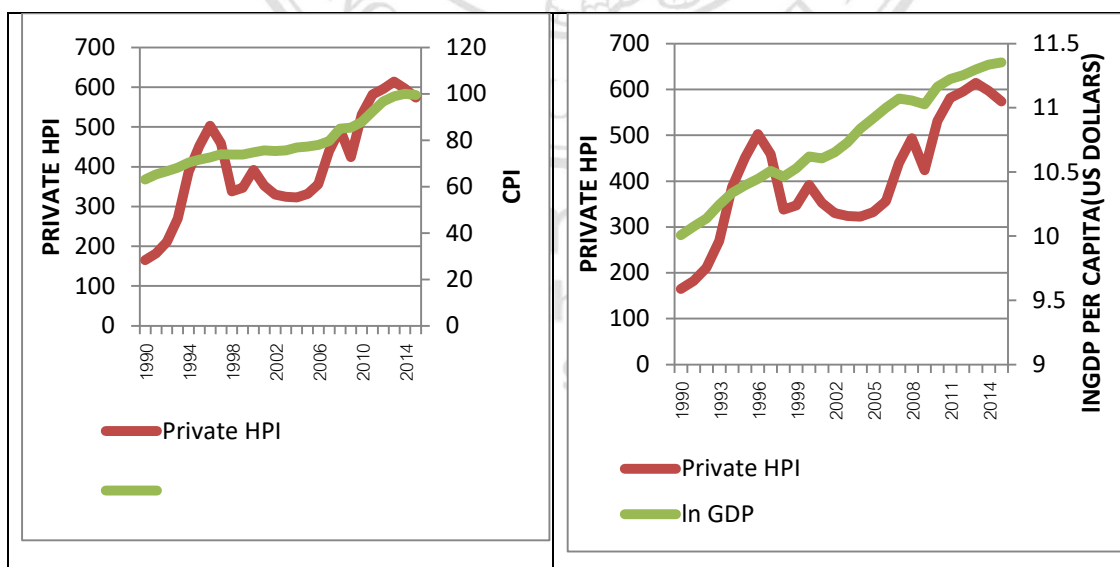
Since there are several sets of factors affecting housing prices in Singapore in different period of times, we expect different pattern long-term relationships among housing prices and macroeconomic factors. Specifically, it is possible that market forces would lead to a cointegration in the housing prices and some macroeconomic factors in some time periods and policy intervention can break the relationship in another time periods. This

heterogeneous pattern of relationships across time is shown in Figures 1.4 and 1.5, which illustrate the relationships of Singapore's public resale and private housing prices with macroeconomic factors.



Sources: Singapore's Department of Statistics and World Bank.

Figure1.5: The comparison between public resale housing price and other macroeconomic variables



Sources: Singapore's Department of Statistics and World Bank.

Figure 1.6: The comparison between private housing price and other macroeconomic variables

The paper aims to empirically test the long-run co-movements between public resale and private housing sub-markets in Singapore and macroeconomic variables. In modeling the impact of macroeconomic variables on public resale and private housing prices, Engle-granger and ECM model is used to capture the full interaction of the housing sector with the selected variables of the economy. With the information of the long-term relationship between housing price indices and macroeconomic variables, the long-run housing affordability can be discussed further.

The paper aims to empirically test the long-run co-movements between public resale and private residential sub-markets in Singapore and macro economic variables. In modelling the impact of macroeconomic variables on public resale and private housing prices, Engle-granger and ECM model is used to capture the full interaction of the housing sector with the selected variables of the economy. Once we have information about the long-term relationship between housing price indices and macroeconomic variables, we can then discuss long-term housing affordability.

There are some policies to ease housing prices from literature reviews. Due to the study of policies to ease pressure on the housing market, policies to alleviate the price of housing are suggested by Tejvan Pettinger (2014). He considers that the high price of accommodation is caused by a shortage of supply and high demand. The policies referenced in the literature below control both the demand and supply sides to assure the price stability of housing.

The policies from supply sides are below;

- (1) To build a new city

It can increase the number of houses by building a new town.

(2) Reduce the restrictions for investors

There are the restrictions for investors whenever they want to invest. By loosening these by the government, it would be easier for investors who expect more elasticity in housing supply.

(3) Government help citizens to buy

According to the experts, it can increase demand and cause asset appreciation by helping citizens to buy homes. It can provide some incentives to investors to invest in housing because they are confident that there might be demand for the new homes.

(4) Government subsidies for affordable housing

People worldwide suffer from housing unaffordability. Governments can help by providing subsidies to build “social” housing, thereby increasing the supply of affordable housing.

The policies from demand sides are below;

(1) Discouraged to buy second homes

Rich people tend to buy second property even if they owned ones already which cause to increase in price. To discourage this trend, the policy should aim to charge a higher tax on second property. It would decrease incentive in buying a second property, and prices would fall. Thus, housing prices would be more affordable for ordinary home-buyers.

(2) Monetary Policy

By increasing the interest rate, the people would discourage to take out mortgage loans which might lead to decrease in housing demand and housing price.

According to the study of housing policies by Sock-Yong Phang, David Lee, Alan Cheong, Kok-Fai Phoon and Karol Wee, their policy recommendations for longer term housing price stability are as below.

(1) Policy which has the supply target vacancy rate for HDB and private sector

(2) Policy to monitor housing affordability by viewing excess demand for housing, incomes and household type

(3) Policy to provide an alternative investment option and to develop an efficient and affordable rental sector, and Policy to give a choice in investment and develop in affordable rental housing sector as well.

(4) The policy should levy stamp duties and property taxes on foreigners to reduce foreign demand and assure housing price affordability and stability. The government should get more detailed data on the total number of foreigners in the population for better analysis.

Due to the study of actions needed to reduce housing imbalances by Grant Spencer and Deputy Governor (2015), there is a significant physical shortage of accommodation and rapidly expanding migrant population in Auckland. So, the author thinks it is better to increase the supply of accommodation rather than make houses even less affordable and add risk to the financial system. However, the problem is the slow supply response.

(1) An important policy on the demand side is to control the stem the net inflow of migrants.

(2) To increase in housing supply, the tax treatment is a major factor with the potential to influence the demand/supply imbalance in the housing market. By doing this, increasing investors in the Auckland market due to the expectation of high rates of return based on untaxed capital gains.

1.2 Purpose of the study

The purposes of this study are to

(1) Investigate the long run relationship between public resale and private housing price indices and macroeconomic variables in Singapore using the Markov-Switching Engle-Granger (MS-EG) cointegration test for intermittent cointegration.

(2) Analyze long-run housing affordability in Singapore based on the growth in the housing prices relative to the growth in the CPI and GDP per capita.

1.3 Scope of the study

In this study, we use the secondary data of Singapore HPI and macroeconomic variables upon the available data (1990-2015). Variables are selected upon the criteria and guidelines of theories, previous empirical evidence, and availability of the data. Even though there are still many factors that go along with HPI, the author excluded some of them because of data limitations and methodology constraints.

Table 1.1: Scope of the study

Scope of the study	Singapore
Time Frame	1990-2015(Annual Data)
Sources of data	Singapore Statistics and World Bank

Source: Created by author

1.4 Advantage of the study

The results of this study provide information of long-run and short-run relationships among public resale housing price, private housing price and macroeconomic factors in Singapore. The results should benefit policy makers and Singapore residents and investors as follows.

(1) For policy makers, the knowledge about cointegration of housing prices and macroeconomic variables including CPI and GDP per capita allows us to know that the variables have long-run relationships. We then can estimate the ratios, in which the housing prices grow relative to the CPI and GDP per capita. The housing prices growing faster than the CPI indicates that housing prices go up more than prices of other goods and services in the economy in the long-run. The housing prices growing faster than the GDP per capita indicates that housing prices go up more than average income in the long-run. These facts

show evidences for the lower housing affordability for Singaporean citizens over time. The results from this study call for government's actions to keep housing affordable in the long-run.

(2) For residents and investors, the information on macroeconomic factors that have long run cointegration with the housing prices in Singapore can help investors make better decision on the timing of their housing purchases and investments.

1.5 Outline of the Chapters

There are five chapters altogether- (1) Introduction, (2) Theory and Literature Review, (3) Methodology, (4) Empirical Findings and (5) Conclusion.

In chapter (1), There are a brief and background of Singapore housing price index; the purpose, scope and advantages of the study. There are related theories and the empirical evidences and literature reviews are including in chapter (2). Chapter (3) includes conceptual framework and detailed explanation of methodology that we used in this study. The estimation results are compared and discussed in chapter (4) and recommendations and conclusions are stated in Chapter (5).