THE DETERMINANTS OF HOUSING PRICE IN SELECTED DEVELOPED AND DEVELOPING ECONOMIES

CH'NG PEI SHAN
CHEN YI HOW
CHONG KAH YEE
ONG LEI XIAN

BACHELOR OF ECONOMICS (HONS)
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BY

CH'NG PEI SHAN
CHEN YI HOW
CHONG KAH YEE
ONG LEI XIAN

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DECLARATION

We hereby declare that:

(1) This undergraduate FYP is the end result of our own work and that due acknowledgement has been given in the references to ALL sources of information be they printed, electronic, or personal.

(2) No portion of this FYP has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.

(3) Equal contribution has been made by each group member in completing the FYP.

(4) The word count of this research report is 18526 words.

Name of Student:	Student ID:	Signature:
1. Ch'ng Pei Shan	18ABB04253	
2. Chen Yi How	18ABB03493	
3. Chong Kah Yee	18ABB03444	
4. Ong Lei Xian	18ABB03394	

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LIST OF ABBREVIATIONS

ARDL	Auto-regressive Distributed Lag
BIS	Bank for International Settlements
CCOST	Construction Cost
CPI	Consumer Price Index
FEM	Fixed Effect Method
GDP	Gross Domestic Product
HPI	Home Price Index / Housing Price Index
INF	Inflation Rate
LM	Lagrange Multiplier
LNCCOST	Construction Cost (Log Form)
LNGDP	Gross Domestic Product (Log Form)
LNINF	Inflation Rate (Log Form)
LNPOP	Population (Log Form)
LNRRPPI	Real Residential Property Price Index (Log Form)
LNUNP	Unemployment Rate (Log Form)
MCI	Monetary Conditions Index

POLS	Pooled Ordinary Least Squares
POP	Population
REM	Random Effect Method
RPGT	Real Property Gains Tax
RRPPI	Real Residential Property Price Index
RSM	Repeat Sales Method
UK	United Kingdom
UNP	Unemployment Rate
US	United States

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PREFACE

The research topic is "The Determinants of Housing Price in Selected Developed and Developing Economies". It is conducted to explore the key determinants of housing prices in developed and developing economies such as Australia, Canada, Germany, Iceland, New Zealand, Switzerland, Indonesia, Malaysia, Peru, Russia, Serbia, and Thailand. The Real Residential Property Price Index is an index that measures how quickly the prices of residential properties purchased by households change over time. Therefore, it has become one of the indicators of measuring the housing price trend.

The housing sector has a major impact on the macroeconomy of any country. Over the years, housing prices are rising globally. Hence, the main purpose of this study is to determine the important determinants of housing price, which is the Real Residential Property Price Index as the indicator. Through this research, the readers will understand the determinants and the importance of the specific determinants on the housing price of Australia, Canada, Germany, Iceland, New Zealand, Switzerland, Indonesia, Malaysia, Peru, Russia, Serbia, and Thailand better.

ABSTRACT

This study attempts to assess the determinants of the housing price in selected developed and developing economies. As we all know, RRPPI is a broad measure of the movement of single-family house prices. It can also be used as an analytical tool to estimate mortgage default rates, prepayment rates, and changes in housing affordability. The rise and fall of housing prices will have a major impact on the economy. The rise in housing prices usually creates more jobs, stimulates confidence, and encourages consumer spending.

Moreover, most of the country's RRPPI began to fluctuate, these high-volatility changes provide an opportunity to carry out this research, which is to use the yearly data to test the factors affecting the RRPPI from 2004 to 2018. In addition, panel data estimation is used to study the relationship between independent variables. The independent variables are GDP, inflation rate, unemployment rate, population, and construction cost. The dependent variable is the Real Residential Property Price Index. It focuses on the selected developed and developing economies such as Australia, Canada, Germany, Iceland, New Zealand, Switzerland, Indonesia, Malaysia, Peru, Russia, Serbia, and Thailand.

Lastly, the empirical results for selected developed economies showed that the population influences housing prices positively and significantly. Besides, it revealed that the inflation rate, unemployment rate, and construction cost influence the housing prices negatively and significantly. Then, the GDP has no significant impact on the housing prices there. On the other hand, the empirical results for the selected developing economies revealed that the GDP and unemployment rate influence the housing price positively and significantly. Besides, the results showed that the construction cost influences housing price negatively and significantly. However, the inflation rate and population have no significant impact on the housing prices there.

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

This chapter provides a brief introduction to information such as the definition of a real estate price index and an explanation of the determinants of house prices in selected developed (Australia, Canada, Germany, Iceland, New Zealand, and Switzerland) and developing economies (Indonesia, Malaysia, Peru, Russia, Serbia, and Thailand). The context of index research in these countries will also be discussed. Moreover, a problem statement on the RRPPI of selected developed and developing economies and a description of the independent variables selected in this study will be prepared. This chapter also includes research objectives, research questions, hypotheses, and its significance.

1.1 Real Residential Property Price Index

The Real Residential Property Price Index (RRPPI) or the Home Price Index (HPI), is an index to measure how quickly the prices of residential properties purchased by households have changed over time. Many individuals or organizations use the RRPPI to influence actual decision-making or to formulate and implement economic policy. Housing prices affect home renovations and its spending in most countries is higher than total spending on new home construction. Housing prices are also involved in measuring the affordability of owner-occupied housing and housing policy objective in some countries.

Moreover, the simple method and economic method are the methods of measuring RRPPI. It is simple and does not require detailed attribute characterization data. Next, the economic method is also done by dividing the shared model and repeat sales method (RSM). The hedonic model is according to the notion as the price of

property relies on its characteristics and location. It follows the actual value of properties sold over time. The repeat sale method is considered a variant of the hedonic method to overcome property heterogeneity. The construction of a price index is based on properties that sold multiple times during the study period. However, this method of excluding new properties is difficult to apply to small layers (Assil, 2012).

Furthermore, the RRPPI is used as a macroeconomic indicator for economic growth, monetary policy, and inflation targeting. The increase in house prices is often linked with periods of economic expansion and economic slowdowns. The central bank also has an inflation target that is directly related to the real estate price index. For example, some central banks use the Monetary Conditions Index (MCI) as a daily operational indicator to implement monetary policy. This is because it will include some house price indicators. This variable is involved in the inflationary process, and economic development is part of the effect (Fenwick, 2013).

1.2 Research Background

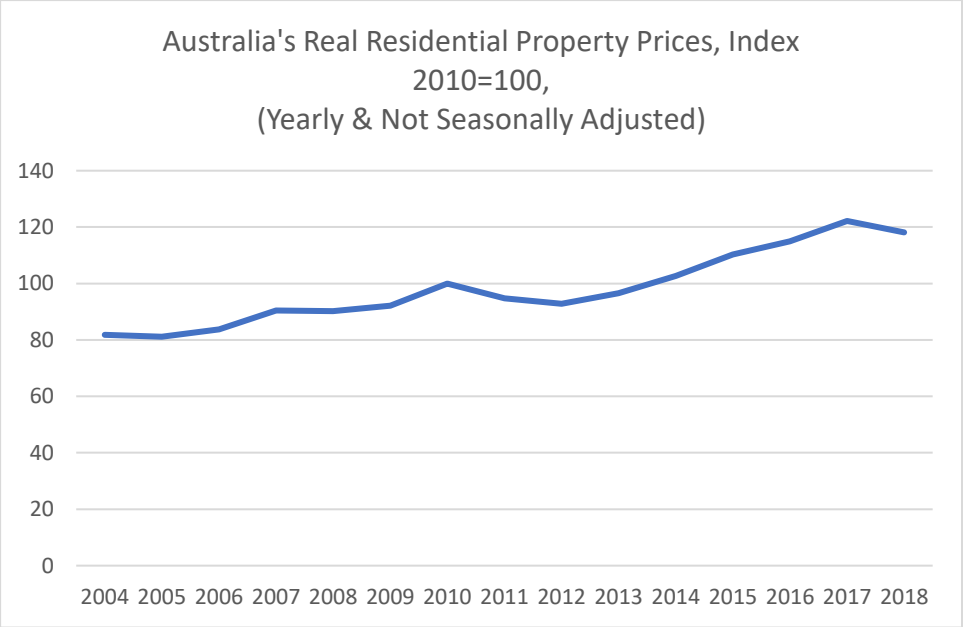
The study will focus on the determinants of house prices in selected developed and developing economies from 2004 to 2018 and study the factors that affect housing prices and propose strategies to deal with rising housing prices. Five independent variables were selected for this study, namely GDP, inflation rate, unemployment rate, population, and construction costs. Moreover, rising house prices may affect the supply and demand for housing. Therefore, the key determinants of house prices should be identified to provide advice to the government, house developers, and investors.

Housing prices affect residential investments and national economic growth. The increase in house prices could boost economic growth by adding extra construction spending to take advantage of price increases. Housing is an important component of investment and the largest component of wealth in many countries. The house prices increase normally stimulates consumer spending and lead to higher economic

growth with the wealth effect. Falling home prices have adversely affected consumer confidence, leading to slower economic growth. However, each country has different housing development, so there is an economic gap between developed and developing economies. Therefore, the supply and demand of housing, the cost of raw materials, and the adequacy of land will all vary.

1.2.1 RRPPI in Developed Economies

Figure 1.1: Yearly Real Residential Property Prices (Index 2010 = 100) of Australia from 2004 to 2018



Source: Bank for International Settlements (BIS)

Home is an important part of household wealth and an investment vehicle for Australian households (Wong, Higgins & Wakefield, 2017). Therefore, investing in the property market is popular in Australia. Australia's tax system affected the local housing affordability. For example, negative gearing and capital gains tax exemptions stimulate investors to make investments in the real estate market while subsidizing investors to participate with first-time buyers to increase housing demand. Therefore,

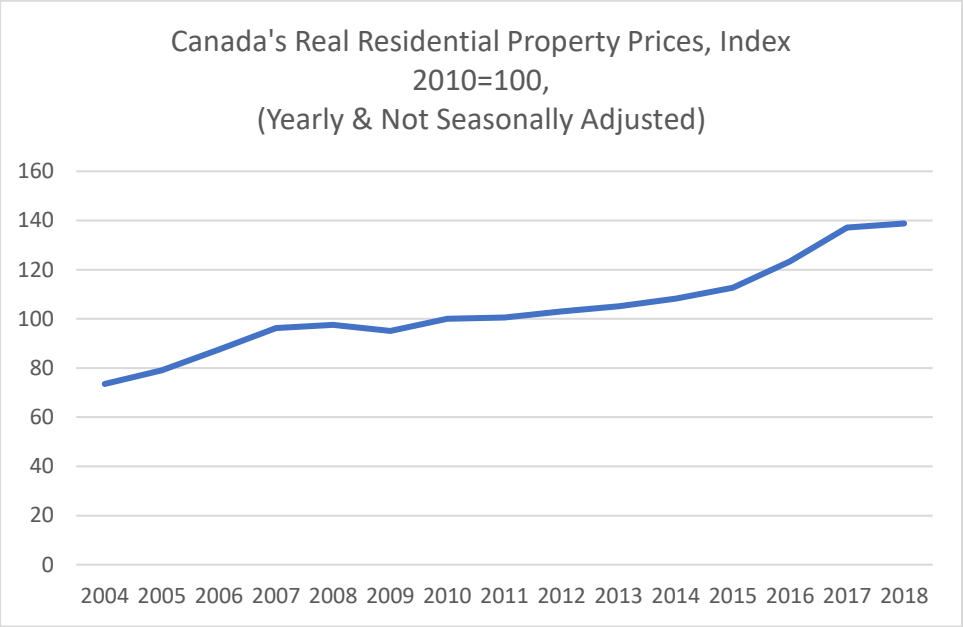
the tax system has driven strong investment demand, leading to an increase in house prices in the Australian property market.

In Figure 1.1, Australia's RRPPI trend from 2004 to 2010 showed a steady upward trend. Since the mid-2000s, the population has grown at a rate of about 150,000 a year without a corresponding increase in housing supply, resulting in a housing shortage. Housing in Australia is expensive compared to other countries with low interest rates because there is a shortage of housing supply relative to underlying demand driven by population growth (Gurran, Maalsen, & Shrestha, 2020).

Moreover, Australia's RRPPI fell slightly from 100.00 in 2010 to 92.78 in 2012. This is because global economic uncertainty and its domestic impact dampen housing demand (Bahmani-Oskooee & Xi, 2011). The pace of Australian home sales slowed in 2011 despite an increase in the stock of homes on the market. Potential buyers are affected by poor affordability, and concerns about taking on new debt, while uncertainty over the global economy remains (Cho, Li, & Uren, 2021).

Between 2012 and 2017, Australia's RRPPI began to rise again due to low interest rates, and an increase in foreign home buyers and investors led to Australia entering a period of renaissance in the property market (La Cava, Leal, & Zurawski, 2017). The lower interest rates increase borrowing capacity due to lower repayments. However, interest rate cuts in Australia led to the relaxation of home loan restrictions and income tax relief, which affected the decline in RRPPI in 2018 (Wang, Koblyakova, Tiwari & Croucher, 2018). Therefore, the main drivers of Australian house prices are low interest rates and housing shortage.

Figure 1.2: Yearly Real Residential Property Prices (Index 2010 = 100) of Canada from 2004 to 2018



Source: Bank for International Settlements (BIS)

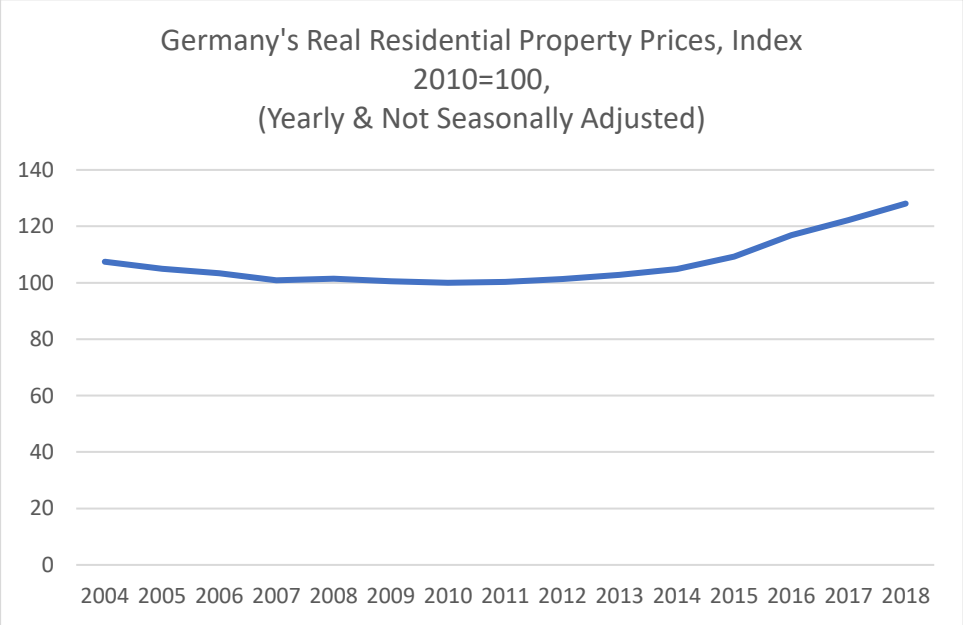
Canada's heavy reliance on real estate accounts for about 12% of the country's GDP. Homes in Canada are so expensive because the demand for homes is higher than the supply of homes. However, Canada suffered from a housing bubble issue for many years. It refers to the dramatic increase in house prices from 2002 to 2017 (Hossain & Latiff, 2007). To address this, the Canadian government has decided to slow the growth of the housing market and lower prices to help first-time buyers let the bubble slowly deflate rather than burst.

In Figure 1.2, Canada's RRPPI continue to rise from 2004 to 2018, with only a slight decline in 2009. Home prices in Canada have been rising for years due to low interest rates, immigration, and increased foreign money flowing into the country (Akbari & Aydede, 2012). Low interest rates lead to high demand and boost prices in the real estate market. Canada's RRPPI declined slightly in 2009 due to a recession in the housing market. This is because the Bank of Canada raises interest rates to control inflation.

Combined with rising debt during a period of inflation, Canada fell into recession in 2009 (Ritchie, Amaya, & Frechtling, 2010).

Furthermore, Canada's RRPPI rose rapidly from 112.64 in 2015 to 137.18 in 2018, a difference of 24.54. Low interest rates and immigration have driven up Canadian house prices for years, but they are also at the root of Canada's housing bubble problems. In 2017, contractors built more homes than at any time since the 1970s due to the huge demand for homes (Rherrad, Bago, & Mokengoy, 2021). The massive increase in housing demand has led real estate developers to raise prices to make a profit.

Figure 1.3: Yearly Real Residential Property Prices (Index 2010 = 100) of Germany from 2004 to 2018



Source: Bank for International Settlements (BIS)

Homeownership rates in Germany are generally lower than in other developed countries due to high property transfer taxes, no tax relief for owner-occupiers paying mortgage interest, and the presence of the social housing sector. Rental prices in Germany are relatively low and the proportion of rent-controlled units is high. The German government does

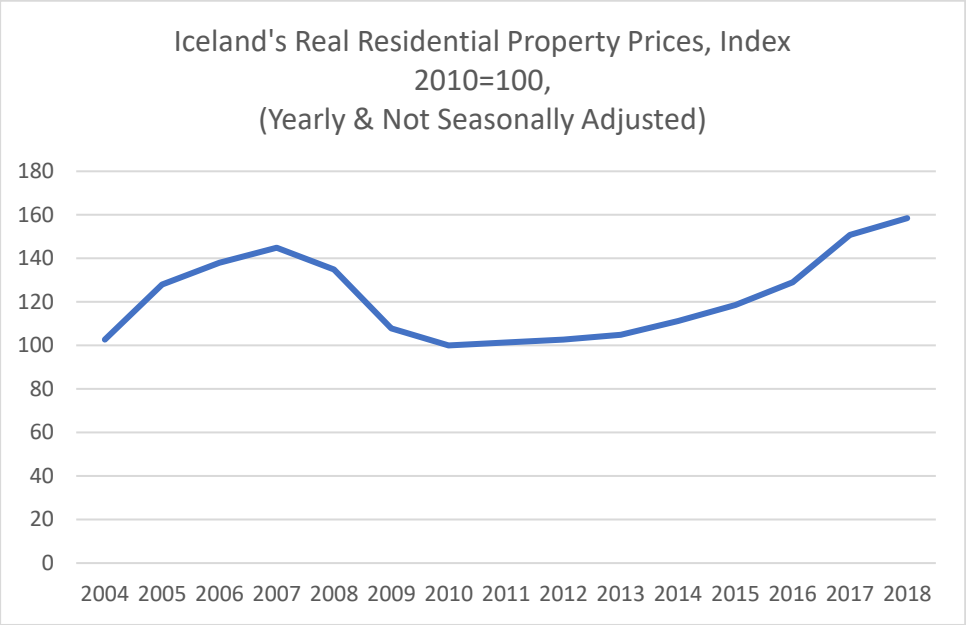
not cut mortgage interest from taxes, so most Germans prefer to rent rather than buy (Möbert, Schneider, & AG, 2018).

In Figure 1.3, Germany's RRPPI fell from 107.49 in 2004 to 100.82 in 2007. This is because German house prices and mortgage debt stagnated in the 2000s, while many European countries suffered a global housing boom in the early or mid-term. The German housing system is thought to operate outside of financialized capitalism (Tomeczek, 2020). In housing, financialization is defined as an increase in mortgage debt and mortgage securitization, driven by the mortgage transition, resulting in higher levels of personal debt. Therefore, consumers with high levels of personal debt affect purchasing power leading to house prices falling.

Moreover, Germany's RRPPI has shown a steady growth trend since 2009. German house prices accelerate in late 2010 after nearly 20 years of stagnation, after construction activity began to recover (Kajuth, 2021). A sharp rise in construction costs has also contributed to the rise in German house prices. While new construction at the high end of the market has begun, there has not been much development in compact and affordable apartments, creating a huge gap between the demand and supply chain.

Since 2012, house prices and rents have risen sharply as housing supply is less than demand and under construction. Lacking affordable housing and rising immigration are pushing up prices further (Koetter, Sikder, & Weiss, 2021). Therefore, the huge affordable housing crisis led to rising rents and land prices, which in turn led to higher house prices in Germany.

Figure 1.4: Yearly Real Residential Property Prices (Index 2010 = 100) of Iceland from 2004 to 2018



Source: Bank for International Settlements (BIS)

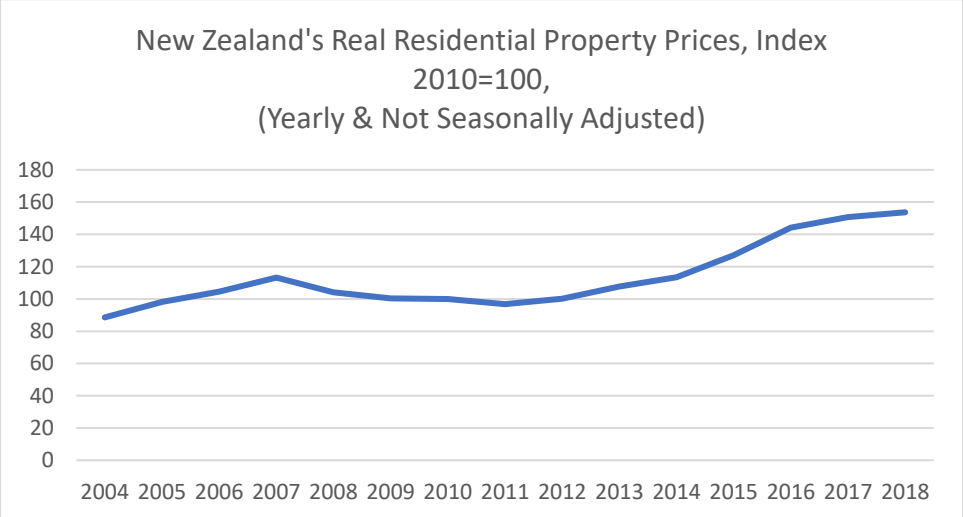
Iceland's house prices have risen strongly in recent years, mainly driven by the booming tourism industry and strong economic growth. Iceland is the second most expensive country in the world to live in. One of the main challenges of living in Iceland is finding affordable housing. Moreover, Iceland has a limited supply of land for building and even rental prices are relatively high. Iceland's limited housing supply and higher rents have pushed up housing costs (Helgadóttir, Einarsdóttir, Burns, Gunnarsdóttir, & Matthíasdóttir, 2019). Real estate in Iceland after a decade of continuous house price rises, the market continues to strengthen as demand for affordable housing increases without supply.

In Figure 1.4, Iceland's RRPPI rose rapidly from 102.67 in 2004 to 144.88 in 2007. In 2004, Iceland's government-backed housing finance fund relaxed lending rules to improve its position in the domestic credit market (Erol, 2019). This led to a striking drop in long-term real mortgage rates and more access to credit. It allowed people to remove equity from their homes without an actual transaction. This structural change has led to increased

housing demand and prices. However, Iceland's RRPPI started to fall from 144.88 in 2007 to 99.99 in 2010 due to Iceland's extreme exposure to the financial crisis (Kvalnes & Nordal, 2019). This financial crisis was due to local banks being unable to refinance their debt, and the crisis erupted. When Iceland fell into a financial crisis, it led to the collapse of its banking system and affected the currency halving. Hence, a fall in housing prices, and an increase in household debt properly due to foreign currency indexation or price levels.

The strong rise in house prices in Iceland following the financial crisis, mainly driven by the booming tourism industry and strong economic growth, led to an increase in the RRPPI from 2010 to 2019 and a moderate upward trend in house prices (Saepórsdóttir, Hall & Wendt, 2020). As a fast-growing economy, tourism creates jobs, brings in foreign currency, and increases the diversity of products available in Iceland's previously sluggish economy. Furthermore, high rental opportunities in the tourism industry could lead to the conversion of existing properties and the construction of new rental housing, ultimately reducing supply and increasing housing prices (Zhang & Yang, 2021).

Figure 1.5: Yearly Real Residential Property Prices (Index 2010 = 100) of New Zealand from 2004 to 2018



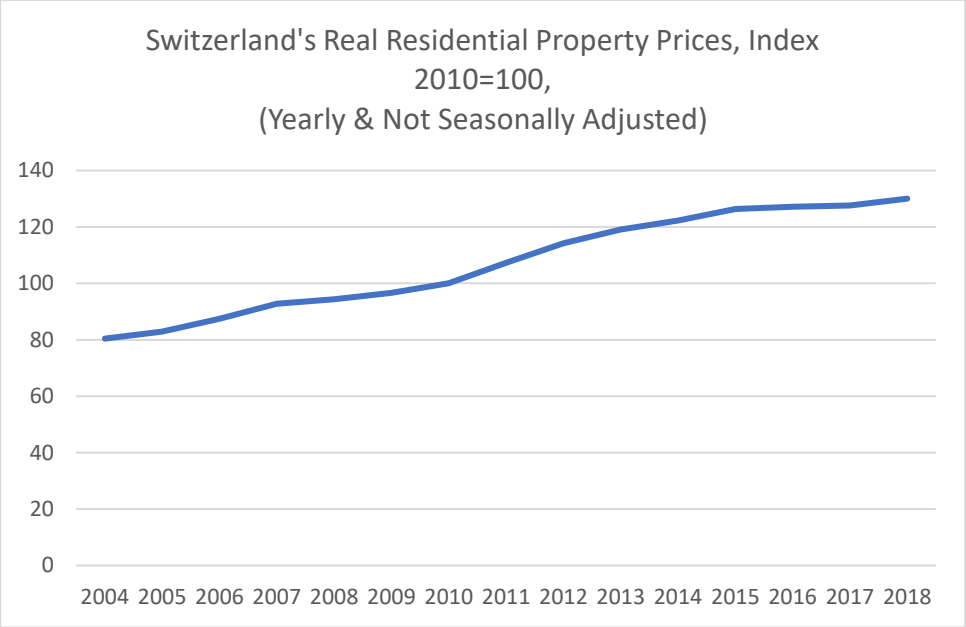
Source: Bank for International Settlements (BIS)

In New Zealand, housing affordability is critical to the well-being of New Zealanders. It could also have significant implications for the wider economy, as housing is a major part of household assets and liabilities, and the size of the housing industry as its employment is large. Demand for housing is growing across New Zealand, leading to an urgent need for homes (Tsui, Tan, Chow, & Shi, 2019). A shortage of affordable housing has pushed up house prices and rents. In addition, New Zealand's housing bubble is a crucial national economic and social problem (St John, Baucher, 2021). House prices in New Zealand have risen much faster than incomes since the early 1990s, increasing pressure on public housing developers.

In Figure 1.5, New Zealand's RRPPI rose rapidly from 88.55 in 2004 to 113.21 in 2007. This is because the shortage of affordable housing has led to rising house prices. New Zealand's growing cities face the worst housing affordability problem (Masood, Lim, & González, 2021). High demand for affordable housing coupled with limited supply, rapidly rising house prices, and affordability issues are attracting worldwide attention. However, the global crisis in New Zealand led to RRPPI began to fall from 113.21 in 2007 to 100.34 in 2009. New Zealand reined in house prices, such as making property speculation less attractive and boosting record-low housing affordability, without destabilizing the economy and disrupting the property market during the global crisis (Hazledine & Rashbrooke, 2018).

New Zealand effectively controlled house prices during the global crisis, and house prices have risen rapidly afterward. Then, New Zealand's RRPPI has risen rapidly since 2011. The government policies have been grappling with the crisis, with limited success in lowering interest rates or increasing the supply of affordable housing (Funke, Kirkby, & Mihaylovski, 2018). The combination of low interest rates and housing demand quickly created a virtuous cycle of rising house prices, driving economic growth and, in turn, house prices in New Zealand.

Figure 1.6: Yearly Real Residential Property Prices (Index 2010 = 100) of Switzerland from 2004 to 2018



Source: Bank for International Settlements (BIS)

Switzerland has one of the lowest rates of homeownership in Europe and is known as the "land of tenants", with less than 50% of Swiss residents owning a home. An increase in Swiss tenants is due to a history of quality rental housing and good legal protection for tenants (Pagani, Baur, & Binder, 2021). In addition, Swiss banks have set rules such as high minimum deposit requirements for mortgage applicants, making homeownership unaffordable for most Swiss residents. Scarcity of land also affects Switzerland's low homeownership rate and high house prices.

In Figure 1.6, the RRPPI in Switzerland showed a 15-years upward trend from 2004 to 2018. Switzerland's real estate market has experienced strong house price growth due to the real estate boom of the 2000s. The strong rise in housing in the early 2000s was due to lower mortgage rates and monetary easing by the Swiss National Bank. The mortgage rate shock has caused Swiss house prices to soar (Rérat, 2019).

The scarcity of land in Switzerland and the high standards of construction quality affect house prices, which are also the reasons for the low homeownership rate. In 2012, Switzerland had the highest number of permanent migrants per capita in the world, which greatly influenced the housing price trends (Diehl, Hinz, & Auspurg, 2018). Rising immigration and a scarcity of land supply have also pushed up house prices in Switzerland. To control the scarcity of land supply, the Swiss government has implemented the strategic use of land policy tools to build affordable housing (Solly, 2021). In addition, the increase in immigration since 2015 has indirectly increased the demand for housing, thereby affecting the local housing market and causing Swiss house prices to rise. As a result, the Swiss government has long restricted the sale of the property to immigrants. If immigrants want to buy real estate in Switzerland, they must obtain state authorization before they can take homeownership (Kuhn, 2020). Therefore, the rising house prices in Switzerland can be explained.

1.2.2 RRPPI in Developing Economies

Figure 1.7: Yearly Real Residential Property Prices (Index 2010 = 100) of Indonesia from 2004 to 2018

Source: Bank for International Settlements (BIS)

Indonesia is developing into a new economic powerhouse in Southeast Asia to attract foreign individual investors and businesses. Many foreign buyers, especially from China, are looking for investment opportunities in the Indonesian real estate market. Favorable demographics, accelerating urbanization, rising per capita income in Indonesia, and the country's large young population are expected to drive demand for the real estate market (Njo, Made, Irwanto, 2018). Huge demand in a market dominated by low-priced properties has led to a housing shortage in Indonesia.

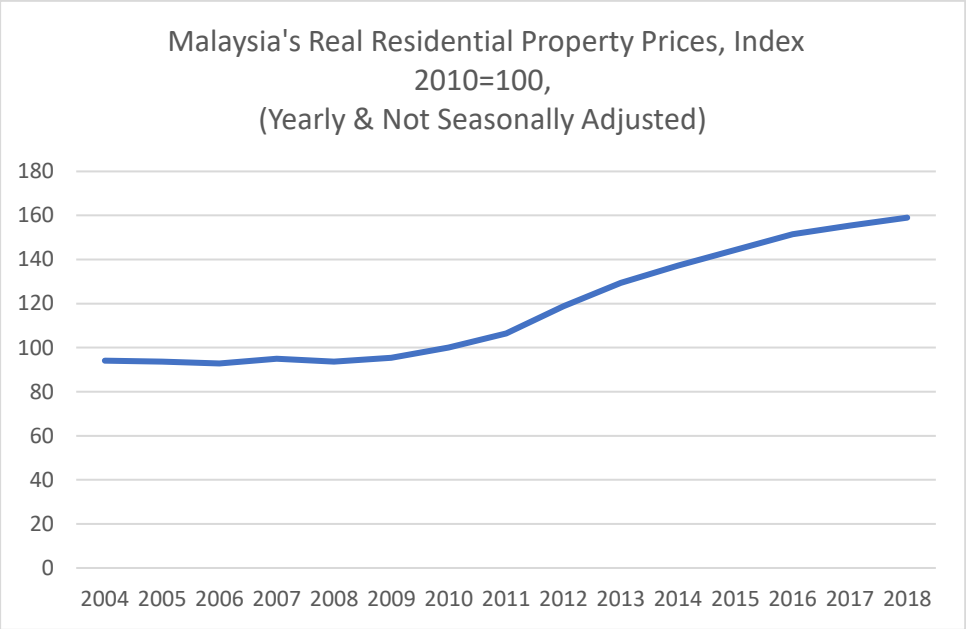
In Figure 1.7, Indonesia's RRPPI fell from 135.82 in 2004 to 99.91 in 2012. By the early 2000s, the Indonesian economy had stabilized after the Asian crisis, with stable GDP growth. However, economic growth has not led to a strong rise in house prices. The likely reason is Indonesia's highly unpredictable inflation rate, which tends to outpace economic growth (Sumaryoto, Nurfakhana, & Anita, 2021). High inflation affects economic growth, wages, and interest rates. This tends to discourage people from borrowing money to buy a home. Therefore, home prices in Indonesia have continued to decline since 2004.

Moreover, Indonesia's RRPPI edged up from 99.91 in 2012 to 105.20 in 2013. This is because the Indonesian government has taken several measures to meet real estate demand, such as lower interest rates, tax incentives, removing restrictions on individual overseas ownership, and increasing loan-to-value ratios. To encourage home buying in Indonesia, the government has also raised the threshold for the luxury property tax (Lewis, 2019).

However, population growth in Indonesia has led to a severe shortage of affordable housing. Urbanization and population growth mean that urban areas are estimated to require many new units each year due to the formation of new households and migration to cities. RRPPI grew slowly from 2013 to 2018 due to an imbalance between the supply and demand of affordable

housing. The lack of government-controlled housing development policies and land-use regulations has led to a persistent housing shortage (Dewita, Yen, & Burke, 2018).

Figure 1.8: Yearly Real Residential Property Prices (Index 2010 = 100) of Malaysia from 2004 to 2018



Source: Bank for International Settlements (BIS)

The rapid development of the Malaysian economy has led to a rise in the demand for residential properties in urban areas of Malaysia. The Malaysian residential market has experienced an increase in house prices and housing projects over the past few years (Yin, Nee, Senadjki, 2019). The development of the real estate market will have an important impact on the financial and domestic economy. Factors such as immigration, population size, and income levels lead to rapid urban growth, which has a significant impact on the housing market.

In Figure 1.8, Malaysia's RRPPI has been rising from 2004 to 2018. This means the prices in the Malaysian residential real estate market is increased sharply over the years. The Malaysian government recognizes that housing

is a basic need and an important part of the urban economy. This has led to the development of policies and programs to ensure all Malaysians have access to appropriate accommodation and related activities. In Malaysia, housing development programs are implemented jointly by the public and private sectors (Tobi, Jasimin, & Rani, 2020). Housing prices have risen as Malaysia's housing scheme ramps up, attracting investors and boosting housing demand.

Moreover, the gradual increase in the affordable housing market in recent years has attracted new home buyers in Malaysia. Rising house prices are good for homeowners but make housing less affordable for first-time buyers (Olanrewaju & Wong, 2020). Launched in 2014, the MyHome program aims to provide affordable low-cost housing to first-time homebuyers in Malaysia (Hassan, Ahmad, & Hashim, 2021). However, the relatively small supply of affordable housing in Malaysia has led to increasing in demand, pushing up house prices. Therefore, rising demand and housing development over the years have pushed up Malaysian house prices.

Figure 1.9: Yearly Real Residential Property Prices (Index 2010 = 100) of Peru from 2004 to 2018

Source: Bank for International Settlements (BIS)

Real estate is an important and potential market in Peru for real estate construction because of high housing demand and higher living standards (Muñoz Unceta, 2019). In Figure 1.9, Peru's RRPPI started to decline from 68.11 in 2004 to 61.43 in 2006. Since 2002, economic growth has been accompanied by a subsidized housing policy that provides loans at below-market rates and a program to promote affordable housing (Sharp, 2021). General interest rates have also declined due to increased competition in the market. As a result, increased competition among sellers has led to a drop in house prices.

However, Peru's RRPPI gradually increased from 62.85 in 2007 to 151.56 in 2014, a difference of 88.80. The surge in house prices is due to the economic impact on Peru. In 1999 and 2004, the Peruvian government invested US$3.3 billion in housing projects to boost economic growth (Libertun de Duren & Osorio, 2019). In addition, the government provides affordable housing policies for low-income families to increase home sales. In 2007, Peru suffered from a housing shortage as cities with higher spending levels had fewer households without access to water, sanitation, and electricity.

Moreover, house price growth in Peru has weakened since 2014 as the economy slowed due to falling copper prices. Peru is the world's second-largest copper producer (Orihuela & Echenique, 2019). Before that, the country experienced strong growth from 2010 to 2013, during which the property market boomed. Copper prices are affected by the health of the global economy, due to their usefulness in all sectors of the economy. Therefore, the fall in copper prices has dampened house price growth. Real estate development in Peru continues to offer opportunities, and while economic uncertainty has dented investment in the real estate market, it will take a long time for house prices to rise.

Figure 1.10: Yearly Real Residential Property Prices (Index 2010 = 100) of Russia from 2004 to 2018

Source: Bank for International Settlements (BIS)

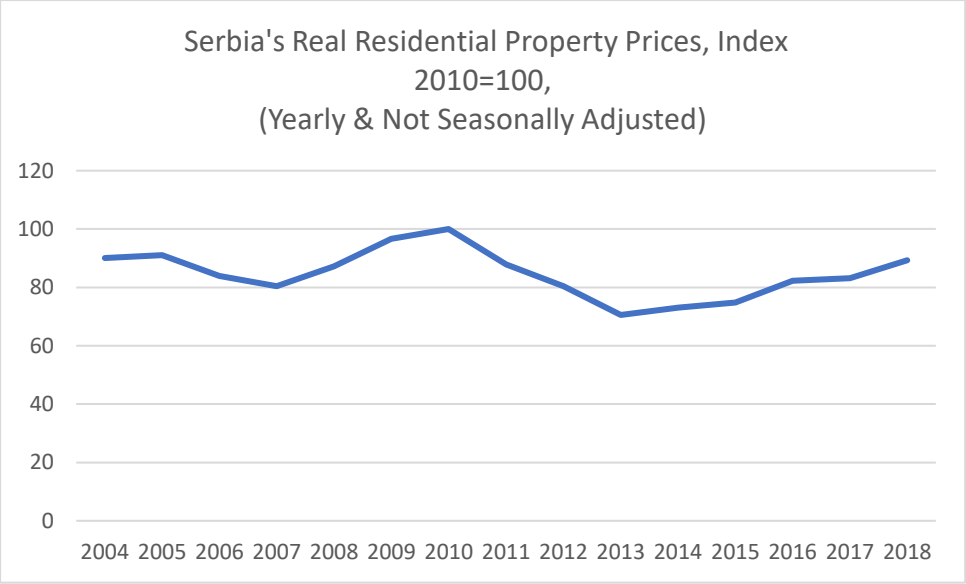
The Russian real estate market has been one of the growing markets in Europe over the past two decades. Severely affected by economic, political, demographic, and other related factors over the past decade (Tsertseil & Kookueva, 2017). However, it is now recovering and offers opportunities for domestic and foreign investors to consider holding Russian real estate directly in their portfolios. The real estate legislation in Russia is not complicated, which affects Russia to become an attractive real estate investment market for both residents and foreign investors (Asaul, Asaul, Liulin, & Chepachenko, 2019).

In Figure 1.10, Russia's RRPPI showed an upward trend from 2004 to 2008. From 2000 to 2007, a huge boom in the Russian real estate market led to a rise in Russia's RRPPI. It is rapidly developing and maturing since professional service providers and the rules continue to emerge, legislated, and improved. and housing prices are rising (Treapat, Gheorghiu, & Ochkkovskaya, 2018). Two of Russia's largest cities, such as Moscow and St. Petersburg, have become targets for long-term real estate investors.

However, Russia's RRPPI started to fall from 110.79 in 2008 to 73.02 in 2011. This is because the liquidity crisis of 2008 had a devastating effect on the Russian real estate market (Bogatyreva, Leskinen & Kolmakov, 2021). By 2008, the Russian real estate market reached its peak, with a significant downward adjustment. Therefore, many large construction companies went bankrupt. Consequently, the housing supply declined in subsequent years.

Although Russia's RRPPI rose slightly from 2011 to 2012, it began to decline again in 2018. This is because falling inflation affects the housing market. The decline was due to a stronger ruble, a weaker currency, sluggish consumer demand, and lower import prices (Voronina, Yarosh, Bereza, & Zakieva, 2018). Until 2014, the Russian financial crisis severely affected the structure of the real estate market. (Viktorov & Abramov, 2020). Investor sentiment is at historically low levels due to currency weakness, sanctions, political risk, and a downturn in the economy. Massive withdrawals of physical assets, stagnant demand, and falling house prices continued over the next few years.

Figure 1.11: Yearly Real Residential Property Prices (Index 2010 = 100) of Serbia from 2004 to 2018



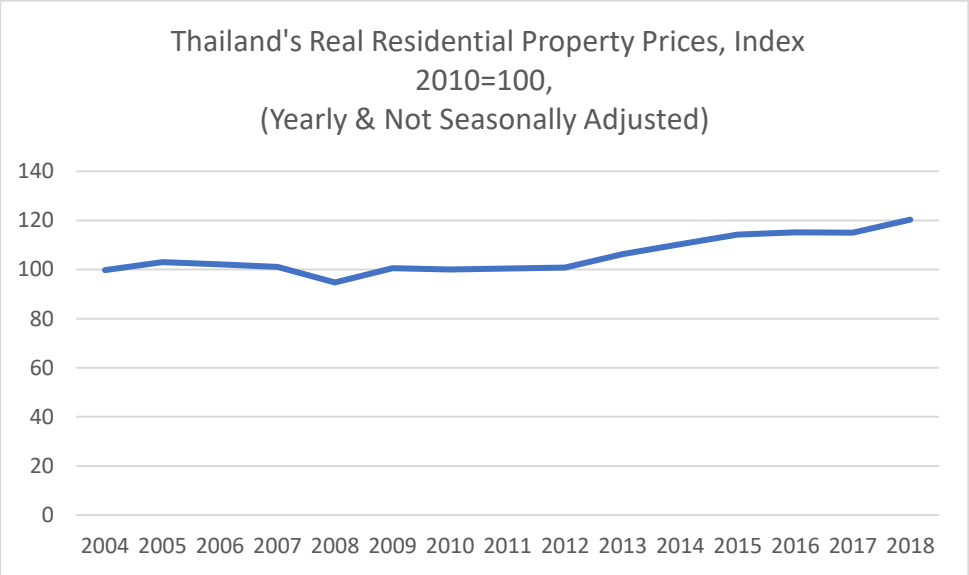
Source: Bank for International Settlements (BIS)

The Serbian residential market has been active over the past decade in three main Serbian cities. The real estate market in Serbia is dominated by home sales. The economic growth and the launching of mortgages and government mortgage insurance programs created affordable housing mortgages, leading to a significant increase in housing construction and rising house prices in the pre-global economic crisis period (Milica, Slavisa, Milan, Mariji & Aleksandar, 2022).

In Figure 1.11, Serbia's RRPPI started to decline from 2004 to 2007. After a dismal 2006, Serbian house prices continued to climb in 2007. This was due to weak performance due to inflationary pressures coupled with high-interest rates and increased construction activity (Ciric, 2019). Then, Serbia's RRPPI gradually increased from 2007 to 2010. This is due to the slowdown of the Serbian economy and the reduction of lending facilities, which has affected the increase in Serbian house prices (Djordjevic, 2019).

However, Serbia's RRPPI started to decline again from 2010 to 2013. This is due to the weakening of the Serbian economy and the underperformance of all major macroeconomic indicators. Serbia's rising house prices amid a softening of the domestic real estate market due to high unemployment (Mitrović, 2022). After 2014, the prices of newly constructed dwellings in Serbia have risen sharply. This is because the improvement in people's living standards has a positive impact on real estate prices (Dašić, Radosavac, Knežević, & Dervida, 2019). Prime rates on home loans also affect property prices by increasing demand. Therefore, Serbia's strong economic growth has boosted housing demand and prices.

Figure 1.12: Yearly Real Residential Property Prices (Index 2010 = 100) of Thailand from 2004 to 2018



Source: Bank for International Settlements (BIS)

The Thai economy has grown steadily over the years and is one of the largest in the region. The housing, land prices, and rent in Thailand have generally attracted investors to bring real estate investment opportunities to the market. In Thailand, its Real Residential Investment Opportunities Property Price Index has been rising over the past 10 years. Thailand's residential market will gradually improve as supply and demand become more balanced and housing lending eases (Marohabutr, 2018).

In Figure 1.12, Thailand's RRPPI showed a slight downward trend from 2004 to 2008. The decline in house prices is due to political uncertainty, weighing on consumer confidence and purchasing power of real estate (Luangaram & Sethapramote, 2018). The overall real estate activity slackened while demand was weak because of high inflation, interest rates, oil prices as well as political uncertainty. Therefore, consumer confidence has declined, making potential home buyers delay their purchases, and the number of land transactions drops.

Then, Thailand's RRPPI showed an upward trend from 2008 to 2018. At the end of 2017, property activity improved due to the loosening of reserve requirement ratio measures, and lower inflation pressures led to more accommodative monetary policy, and clearer public planning (Mahathanaseth & Tauer, 2019). The house price index is rising as land prices for planned public transport routes rise. In 2011, Thailand experienced severe flooding. The historic floods that devastated Thailand's central plains in 2011 affected the supply of new homes, leading to strong price growth in subsequent years (Sawada, Nakata, Sekiguchi, & Okuyama, 2018).

1.3 Problem Statement

According to the RRPPI's chart of developed economies and developing economies, house prices fluctuated from 2004 to 2018. Rising house prices have affected housing supply and demand, and housing affordability issues for households. Therefore, rising or falling house prices will have a certain negative impact on both developed and developing economies. Thus, consumers' purchasing power of property has implications for economic growth, equity, and stability in both developed and developing economies.

The threat of a real estate bubble is heavily concerned by both developed and developing economies. It arises when demand exceeds the supply of the real estate products leading housing prices to rise. These bubbles are usually caused by a combination of factors, including a booming economy, low interest rates, a wider range of mortgage products, and easy access to credit. The emergence of a country's real estate bubble problem leads to an increase in inflation, which has a significant impact on the national economy and reduces the ability of people to buy home.

Moreover, the insufficient land supply has affected housing shortages and high house prices in both developed and developing economies. Over the past 40 years, the housing supply has not kept up with population growth. Most countries with

strong economic growth suffer from the shortage of available land. Land use depends both on physical factors and human factors such as population density, technological capabilities, and cultural traditions. Therefore, strong population growth in a country will lead to the problem of land shortage. The challenges of current land use include urban density and renewal, and population displacement due to excessive housing prices and land hoarding. A country's government's failure to provide sound land use policies can lead to land shortages or overuse of land.

Lastly, the lack of housing affordability can also slow economic growth in developed and developing economies. Affordable housing has affected the economy, including increasing local purchasing power, creating jobs, and increasing tax revenue. In developed and developing economies, the affordable housing crisis gradually worsened in recent years. People cannot afford rising house prices, resulting in a decrease in demand for housing in the market. Therefore, the lack of supply affordable housing has many negative impacts on those developed and developing countries.

1.4 Research Objectives

1.4.1 General Research Objective

To examine the determinants of housing price in the selected developed and developing economies.

1.4.2 Specific Research Objectives

i) To examine the relationship between the GDP and the housing price in the selected developed and developing economies.

ii) To examine the relationship between the inflation rate and the housing price in the selected developed and developing economies.

iii) To examine the relationship between the unemployment rate and the housing price in the selected developed and developing economies.

iv) To examine the relationship between the population and the housing price in the selected developed and developing economies.

v) To examine the relationship between the construction cost and the housing price in the selected developed and developing economies.

1.5 Research Questions

i) Is there any significant relationship between the GDP and the housing price in the selected developed and developing economies?

ii) Is there any significant relationship between the inflation rate and the housing price in the selected developed and developing economies?

iii) Is there any significant relationship between the unemployment rate and the housing price in the selected developed and developing economies?

iv) Is there any significant relationship between the population and the housing price in the selected developed and developing economies?

v) Is there any significant relationship between the construction cost and the housing price in the selected developed and developing economies?

1.6 Significance of Study

The housing prices in developed countries and developing economies have been rising over the years, and most previous studies were mainly focusing on the housing price in one specific country, or only a few developed or developing economies with outdated data or using only a short period of research which might lead to invalid results. Besides, there is a less common perspective on the determinants that influence the housing prices in both developed countries and developing countries today.

Firstly, this study is considered an important study as it does not only identify the factors that determine the housing price such as GDP, inflation rate, and unemployment rate but also includes other macroeconomics variables such as population and construction cost that are not often used by other researchers in their studies since seldom does literature mention how population and construction cost influence housing prices. In this study, the population and construction cost might contribute to new findings on housing prices for both developed and developing economies as compared to the past studies. Besides, the data collected in this study is relatively newer than the past studies which range from the year 2004 to 2018.

Furthermore, this study comprises the housing prices in selected developed economies and developing economies. Although the housing prices might vary across different countries, little attention has been paid to some developing economies which are Peru and Serbia. Thus, this study could provide a more detailed analysis of the overall housing prices for each country and the separation of developed and developing economies can be sufficiently used as an evaluation and representation purpose when compared to the past studies.

Moreover, this study could strengthen the understanding of the housing market in both selected developed and developing economies as compared to the past studies in terms of methodology. Initially, the Likelihood Ratio Test, the Lagrange Multiplier (LM) test, and the Hausman test have been performed to choose the best model for the data collected. By applying the Fixed Effect Method (FEM)

estimation, this study then provided a shred of empirical evidence on the macroeconomic factor that determines the housing prices in the selected developed and developing economies. Then, the log transformation is used in this study to convert the dataset into near-normal distribution. This study incorporated correlation analysis to explore the strength of the association between the related determinants and the housing price in selected developed and developing economies.

This study helps the government and policymakers to implement effective policies to regulate the determinants that influence housing prices in both selected developed and developing economies so that the issues of housing prices can be resolved. This study also assists the house developers who build the house to make an informed decision in better allocating resources and sales. Meanwhile, this study gives some advice to the investors and potential house buyers in the selected developed and developing economies by using the findings obtained from the study as well as examining the relationship between the chosen factors and housing price before investing and purchasing a house for managing their return and homeownership accordingly. Lastly, this study serves as a reference for future researchers to study the relevant topic of housing prices.

1.7 Conclusion

The purpose of this study is to examine the determinants of housing prices in the selected developed and developing economies. The dependent variable is the housing prices of the countries using RRPPI, as the indicator. There are five independent variables included in this research. Through this research, the readers will gain a basic understanding of the factors that affect housing prices in the countries. For the next chapter, this research will discuss and review the underlying theories and form the hypotheses.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

This chapter will discuss the theories, dependent variables, and independent variables of past empirical studies conducted by other researchers. Additionally, it will refer to the previous research's conceptual frameworks and construct a proposed conceptual framework. Then, it will be the development of hypotheses towards the end.

2.1 Underlying Theoretical Models Review

2.1.1 Modern Portfolio Theory

This theory pioneered by Harry Markowitz in 1952 proposed that the investor would consider the level of risk for an expected return in the portfolio (Bakar & Rosbi, 2019). They might take more risk to gain more return or reduce the risk by having less return to make investment decisions based on their risk appetites (Markowitz, 1952). Housing is important in portfolio allocation as it serves as an investment asset that provides home equity to the investors and it is a durable consumption good from which the investors acquire utility (Pelletier & Tunc, 2019).

It assumed the investors are risk-averse and rational, so they prefer financial instruments with lesser risk (Veni & Kandregula, 2020). According to Jordà, Knoll, Kuvshinov, Schularick, and Taylor (2019), the housing return is much less volatile than the equity return. Thus, the equity investments need to generate a higher return to cover the risk of not achieving the expected

outcome (Hutchison, 1994). Therefore, a rational investor will prefer a lower return on housing investment (Tan, 2009).

According to Aqsha and Masih (2018), it claimed residential housing is an investment vehicle that hedges against inflation as housing prices tend to go up or move in line with inflation. Hence, this theory suggested inflation rate is one of the determinants of housing prices.

2.1.2 Migration and Urbanization Theory

This theory proposed that migration and urbanization can influence housing prices in the countries. According to Lin, Ma, Zhao, Hu, and Wei (2018), population migration can affect the urbanization level by improving urban land and infrastructure construction for a better living environment which causes indirectly affecting the housing price.

So, people would choose international migration as it allows them to increase their incomes significantly (Clemens, Montenegro & Pritchett, 2019). In this case, the "brain drain" or the international transfer of human capital occurs from developing to developed countries (Docquier & Rapoport, 2006). In this case, the gravity model can capture the migration flows (Anderson, 2011). According to Lewer and Van den Berg (2008), it stated that the population size is important in this case as more people migrate to another country due to the population growth in their own country.

On the other hand, rural-urban migration involves the transition from a traditional agricultural economy to an industry-and-service-based economy (Henderson, 2003). Urbanization occurs when people choose to migrate from rural areas to towns and cities along with place-based population growth (Sivadas & Ismail, 2020). According to Lin et al. (2018), an increase in the urban population due to migration will drive up the housing demand

as this will cause the short supply of housing in the cities and result in a surge in housing prices.

Besides, when the unemployment rate is low when the economy of the country is growing (Soylu, Çakmak, & Okur, 2018). It encourages people to migrate due to better employment opportunities and high wages in the cities (Todaro, 1969). Therefore, higher unemployment implies lower job security, and it affects the housing price negatively (Holmes, Otero, & Panagiotidis, 2017). Hence, the migration and urbanization theory suggested population and unemployment rates can determine the housing price.

2.1.3 The Law of Supply and Demand (Economic Theory)

The law of supply proposed that when the supply exceeds the demand for a product, the price will decrease and the law of demand proposed that when the demand exceeds its supply at a given price, the price of a product will rise (Wessels, 2018). The economic equilibrium happens at the point when the price adjusts itself given the balanced supply and demand (Gale, 1955). Hence, the housing supply and demand can influence the housing price (Daud & Marzuki, 2018). GDP and construction cost can show the linkage of this theory and the effect on housing prices.

GDP

According to Demary (2009), the study discovered that economic activity would impact the housing prices as the companies increase their output and labor demand and this will result in a rising household income and housing demand. According to Tang and Jin (2019), more household income will increase the willingness to spend and consumption power on housing. This leads the housing price to rise (Disney & Gathergood, 2018).

Construction Cost

According to Yap and Ng (2018), the study said that housing price is subjected to high construction cost since housing developers need to have more capital to build the house, causing more charging on the house price. It is due to the regulations such as building codes and impact fees, and this limits the housing supply and leads to an increase in housing costs and housing prices (Molloy, 2020). Hence, this theory suggested GDP and construction cost as the factors that influence housing prices.

2.2 Review of Variables

2.2.1 Housing Price

First and foremost, Baharuddin, Isa, and Zahari (2019) investigated the three factors of Malaysian housing prices using **time series data** from 2005 to 2019. According to the empirical results, interest rate, inflation rate, and GDP all have a significant relationship with housing prices at a 1% significant level. However, GDP has a positive relationship while interest rate and inflation rate have negative relationships with housing prices.

According to Aliyev, Amiraslanova, Bakirova, and Eynizada (2019), the study used **cross-sectional data set** in 2018 including 443 houses and 497 flats in Baku to examine the factors affecting housing prices. It shows location, largeness, repair level, and the existence of a bill of sale for flats determinants while land-intensive with more floors and less land area toward the city center for house determinants.

Furthermore, based on Tripathi's (2019) research, the paper evaluated the 12 macroeconomic determinants of the real housing prices for 43 nations using **panel data analysis** and covering the period 1970-2017. According to the regression results, price-to-income ratio, urbanization, inflation rate, GDP growth rate, real exchange rate, rent, price-to-rent ratio, per-capital

GDP, population, broad money all has a strong positive impact on housing price. Besides, employment in services impacts negatively on housing prices, while the real interest rate does not influence housing prices.

2.2.2 Gross Domestic Product and Housing Price

According to a study by Baharuddin et al. (2019), GDP is an indicator of an economy's overall health as it measures all products and services market value generated by an economy throughout the measurement period, usually measured on an annual basis. It combines all consumption from private and public, government spending, investment, and the value of exports minus imports within a specific nation. Several studies have used the GDP to represent economic circumstances due to the association between macroeconomic factors and housing prices. GDP is the most extensively used macroeconomic metric, with researchers utilizing it to reflect economic circumstances (Baharuddin et al., 2019).

Firstly, Guo and Wu's (2013) empirical study on Shanghai housing prices. A significant positive relationship is found between GDP and housing price, indicating a strong GDP growth and better economic development drive the growing exception of housing price, which raises housing demand, with a lack of housing supply, causing the price to rise. In addition, Ong (2013) discovered that the GDP is positively and strongly correlated with housing prices. The result is unsurprising given Wheeler and Chowdhury (1993, as cited in Ong, 2013) claimed that GDP links to macroeconomic activity in the housing sector. Moreover, studies by Baharuddin et al. (2019), and Xu and Tang (2014) demonstrated that when the cointegration test is used in a long-run relationship, the GDP is strongly positively associated with housing price.

On the contrary, Kassim, Redzuan, and Harun (2017) reported that GDP had a negative impact on the Housing Price Index (HPI). They established a significant link between Housing Price Index (HPI) and GDP by applying

simple correlation analysis and the short-run Auto-regressive Distributed Lag (ARDL) bounds test. However, when they used the long-run ARDL bounds test, the results indicate a strong negative long-run relationship between HPI and GDP. However, these results were refuted by Saudin, Jehani, Mastani, and Ab Malek (2020) that there is only a one-way relationship between housing price and GDP since housing price is the key indicator of GDP. As a result, housing price is recognized as a Granger cause of GDP which means housing price influences GDP instead of GDP influencing housing price. This finding is supported by Akkay's (2021) study on housing prices in Turkey. Therefore, this study hypothesized that GDP would have a significant impact on housing prices in both developed and developing economies.

2.2.3 Inflation Rate and Housing Price

According to Öner (2012), inflation is a commonly used metric for measuring the general rise in prices or rise in the cost of living of a specific country over a given period which is calculated on an annual basis. Since the 1970s, the inflation rate has been utilized by researchers as one of the variables that influence housing prices, with the Consumer Price Index (CPI) serving as the foundation metric of the inflation rate (Ganeson & Abdul Muin, 2015). According to Rangel & Ng (2017), inflation will impact the price-rent ratio. Most investors misjudge future cash flows when they use the nominal discount rates instead of the real discount rates. It indicates that when inflation is high, the assets are undervalued. When inflation is low, assets are overvalued.

Firstly, Rangel and Ng (2017) reported that lagged inflation rate is significant at the 1% and 5% levels. It is linked to private residential property prices positively in Singapore. It indicates Singapore's housing prices have potential hedging features against inflationary pressures. Since it has a positive coefficient, implying that private residential property can

be utilized as a hedging mechanism against inflation rises. The studies of Wong and Sarma (2019), and Liu and Shen (2005), also reached the same conclusion. It is consistent with basic economic principles where the long-run housing prices are considerably positively influenced by inflation.

In contrast, Baharuddin et al. (2019) have demonstrated that there is a strong negative relationship between the inflation rate and Malaysian housing prices in long run and it is the most vital determinant. It was supported by Mallick and Mahalik's (2015) study on housing prices in key Indian cities, which concluded that the inflation rate has a constant negative impact on housing prices in the short and long run. The inflation rate reflects the risks in the housing market because higher inflation equals higher building costs and higher housing prices, which caused a decrease in demand and, consequently, housing prices. However, these results were refuted by Ong's (2013) study indicated that the inflation rate had no significant influence on housing prices at the 1% significance level. Furthermore, Saudin et al. (2020) also reported an insignificant relationship between the home price index and inflation rate at the 5% level of significance.

Hence, this study hypothesized that inflation would have a significant impact on housing prices in both developed and developing economies.

2.2.4 Unemployment Rate and Housing Price

The unemployment rate is defined as the proportion of unemployed people in a country among those who are currently in the labor force (Bondarenko, 2019). Xu & Tang (2014) stated that rising unemployment will lead to slower wage growth and greater income uncertainty in the future. Consequently, when the unemployment rate increases, people tend to concentrate on their own financial status rather than the overall economy. By linking the labor mobility and house ownership rate, it has provided evidence of the negative effects of the housing market on the labor market,

indicating that an increase in homeownership limits labor mobility and leads to an increase in unemployment (Panagiotidis & Printzis, 2016).

According to Mohan, Hutson, MacDonald, and Lin (2019), rising unemployment causes a drop in housing prices. It means higher unemployment may demotivate consumers from buying houses, and this decreases housing demand. Additionally, the same finding reached by Gan, Wang, and Zhang (2018), when there is a rising unemployment rate, there are two reasons that discourage individuals from engaging in the housing market. The first reason is that it is more challenging for unemployed people to get a mortgage loan, and the second is that credit conditions are stricter during times of high unemployment risk. As a consequence, both housing prices and sales volume decrease. Moreover, Ganeson and Abdul Muin (2015) reported that the unemployment rate had a considerable negative impact on Malaysian housing prices. The sustained economic expansion has resulted in a lower rate of unemployment in Malaysia and has also greatly increased the demand for housing.

Contrariwise, Xu and Tang (2014) claimed that the unemployment rate is positively associated with housing prices in the cointegration vector. This discovery makes sense in the context of the United Kingdom (UK) housing market, where there is no link between house prices and unemployment rates; hence, the increasing unemployment rate can be followed by rising housing prices. Furthermore, same findings obtained by Ni, Huang, and Wen's (2011) study on the United States (US) housing market, the US's house market index will be modified to 11.7 due to the unemployment rate.

On the other hand, Saudin et al. (2020) reported an insignificant relationship between the home price index and the unemployment rate at the 5% significant level. Moreover, same results collected by Vogiazas and Alexiou (2017), the impact of unemployment, albeit insignificant, is positive, which is perplexing. This could be the study's time frame, which includes both booms and busts for the countries surveyed, hinting at possible sign shifts.

In a short, this study hypothesized that the unemployment rate would have a significant impact on housing prices in both developed and developing economies.

2.2.5 Population and Housing Price

According to Weeks (2020), the population includes the demographic characteristics of people. The rising population in today's world also increases the need for houses since it is one of the basic human needs for shelter (Ashaf, Hidayat, & Ahmadi, 2019).

A positive relationship is found between population and housing prices. An increase in the population has boosted housing demand and directly inflated housing prices for the major cities in Malaysia since the urbanization process creates competitiveness among house buyers indirectly (Yap & Ng, 2018). This can be proved by Borowiecki (2009) who showed a one percent increase in the population growth from the household group of 20 to 64 years old will cause two percent growth for higher house prices in the Swiss economy covering the period from 1991 to 2007. It can also be supported by Wang, Hui, and Sun (2017) who discovered a one percent increase in the percentage of inter-regional migrants in the population will lead to a rise in housing prices by 0.701 percent from 2005 to 2010 in China.

On the contrary, there are researchers who argued the negative relationship between the population and housing prices. This is supported by Rangel and Ng (2017) who showed that population growth and private residential property prices is having a significant negative relationship during the market crash regime in Singapore due to the substitution effect and slowdown in migration growth reducing the private housing price during the crash period.

Some studies also debated there is no significant relationship between the population and housing price. This can be proved by Choy and Li (2017) who ran a panel data analysis and showed the growth of the population shares with high education does not contribute a significant impact on housing prices as it means those new talented migrants may not be the major home buyers in China's economic region.

Based on the findings, the relationship between the population and housing price varies. This means additional findings and studies are needed since mostly are positive relationships. However, it found that population size affects the housing market to a certain extent (Choi, Jung, & Su, 2019). Hence, this study hypothesized that population would have a significant impact on housing prices in both developed and developing economies.

2.2.6 Construction Cost and Housing Price

The construction cost is important in the housing market as it determines the critical success of the construction project to build houses (Davis, 2017). According to Hankinson (2018), when the profit and price of the units are higher than the construction cost, housing developers will build the house.

Therefore, there is a positive correlation between construction cost and housing price. Savva (2018) cited that construction cost is positively related to housing prices from 2001Q1 to 2015Q4 in 24 countries such as Austria, Germany, and the United Kingdom. This is because the housing developer will transfer the unavoidable construction cost to house buyers and boost the housing prices (Yap & Ng, 2018). This can also be proved by Coskun, Seven, Ertugrul, and Alp (2020) who showed a 1% increase in the construction cost would bring a 0.06% to 0.08% increase in the house price index in Turkey from 2007 to 2014 in the cointegration analysis. Furthermore, a positive relationship can also be found in the study by Sukrri, Wahab, and Yusof (2019) which uses construction costs to determine the

House Price Index in Malaysia using quarterly data from 2008 to 2017 in the long-run analysis.

However, there are few studies that argued the negative relationship between construction costs and housing prices. A study by Glindro, Subhanij, Szeto, and Zhu (2018) stated that construction cost has a negative effect on real house price growth in the market segments in Asia from 1993 to 2006 due to it can temper the magnitude of house price cycles. This can also be supported by Ong (2013) who showed the negative relationship by including various traditional independent variables and non-traditional independent variables such as real property gains tax (RPGT).

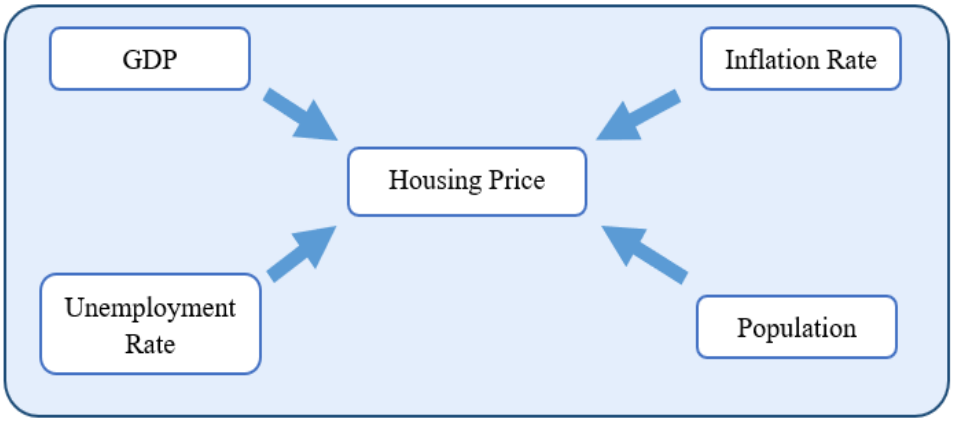
Another debate is that there is no significant relationship between the construction cost and the international housing prices in the advanced economies due to the construction cost remaining broadly stable and mostly contributed by the land prices (Knoll, Schularick & Steger, 2017).

Based on the findings, most studies showed that construction cost affects the housing price positively. This means additional findings and studies are required. However, the study by Su and Zhang (2011) concluded that construction cost has a major influence on housing prices. Hence, this study hypothesized that the construction cost could have a significant impact on housing prices in both developed and developing economies.

2.3 Conceptual Framework

2.3.1 Relevant Conceptual Framework

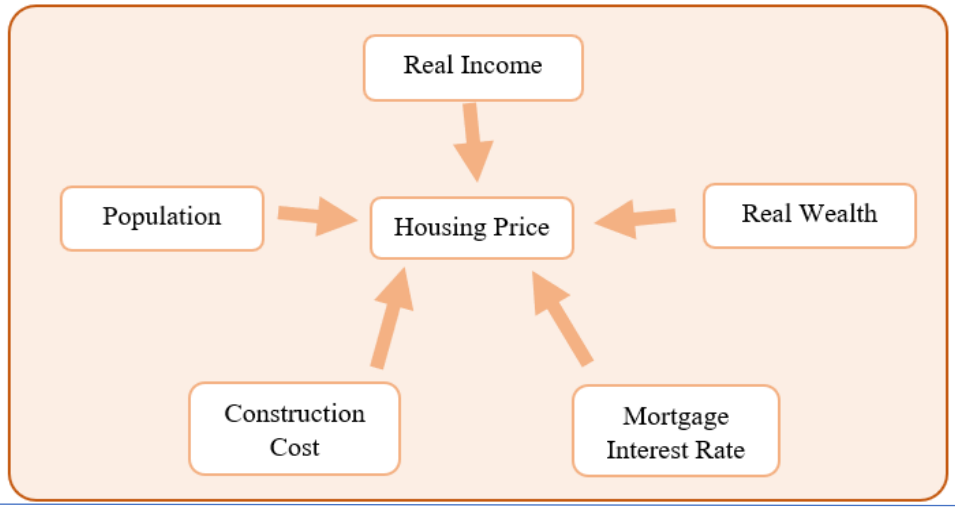
Figure 2.1: An Analysis of the Factors Affecting House Prices in Malaysia- An Econometric Approach



Source: Ganeson & Abdul Muin (2015)

Ganeson and Abdul Muin (2015) studied the factors influencing Malaysian housing prices by applying a time series analysis over a 23-year (1988-2010). The Multiple Regression Method was used to reach their regression result. They have identified the house price index as their dependent variable and the independent variables include GDP, inflation rate, unemployment rate, and population, all of which were gathered from the Malaysian Department of Statistics. According to their regression results, the inflation and unemployment rate significantly impact the housing price. However, the inflation rate has a positive relationship, whereas the unemployment rate has a negative relationship. On the other hand, they discovered that GDP and population are insignificant in relation to the housing price.

Figure 2.2: The Dynamics of Metropolitan Housing Prices

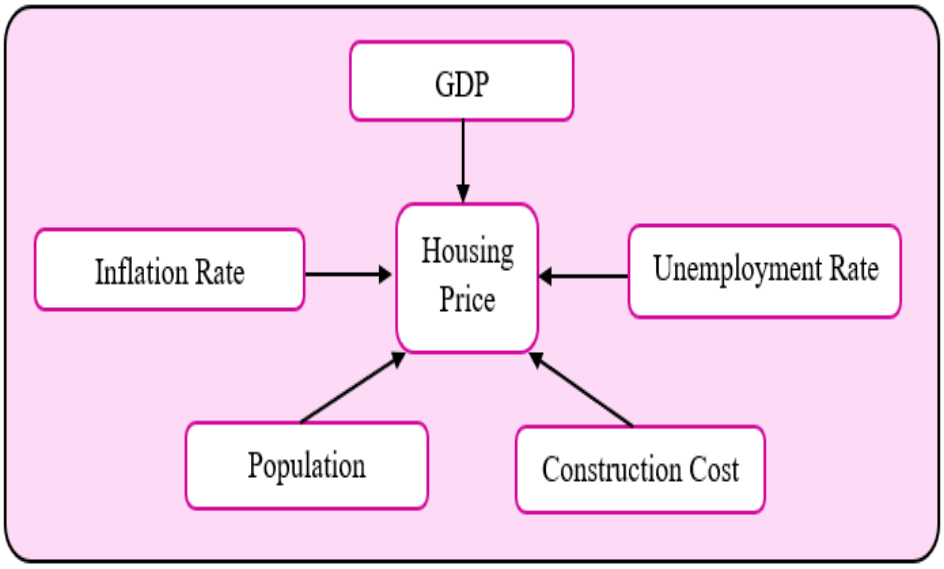


Source: Jud & Winkler (2002)

According to Jud and Winkler (2002), they used panel data analysis to investigate the determinants that affect real housing prices in 130 metropolitan regions across the United States (US) over a 15-year (1984-1998). Their regression result was obtained by using a pooled time-series cross-section approach with fixed effects. They have taken the house price index as their dependent variable and the independent variables include real income, real wealth, mortgage interest rate, construction cost, and population. According to their regression results, the house price index is significantly affected in a positive way by real income, mortgage interest rate, construction cost, and population. On the other hand, real wealth has been found to have no effect on the house price index.

2.4 Proposed Conceptual Framework

Figure 2.3: The Determinants of Housing Price in Selected Developed and Developing Economies (from 2004-2018)



Source: Developed for research

Figure 2.3 depicted the suggested conceptual framework for this study, which is a 15-year (2004-2018) of the determinants of housing prices in selected developed and developing economies. Australia, Canada, Germany, Iceland, New Zealand, and Switzerland were selected as developed countries, whereas Indonesia, Malaysia, Peru, Russia, Serbia, and Thailand were selected as developing countries. The dependent variable is the housing price (RRPPI). Furthermore, there are five independent variables which are GDP, inflation rate, unemployment rate, population, and construction cost.

Firstly, GDP is expected to have a positive relationship with housing prices. According to Guo and Wu's (2013) statement, strong GDP growth signals greater economic development, which may drive the growing exception of housing prices, which enhances housing demand, with a lack of housing supply, causing housing prices to increase.

Next, the inflation rate is expected to be positively related to housing prices. According to Rangel and Ng (2017), when the inflation rate is positively related to the price of private residential property, housing prices have potential hedging features against inflationary pressures.

Furthermore, the unemployment rate is predicted to be negatively related to housing prices. According to Mohan et al. (2019), as the unemployment rate rises, housing prices drop. Rising unemployment rate may lower home affordability, causing housing prices to fall.

Moreover, the population is expected to be positively correlated with housing prices. According to Yap and Ng (2018), the increase in the population of a city tends to boost the housing demand and directly inflated the housing prices.

Finally, the construction cost is expected to have a positive relationship with the housing price. According to Savva (2018), the housing developer will

pass on the unavoidable construction costs to home buyers, causing housing prices to rise.

2.5 Hypothesis of the Study

Five hypotheses are developed to investigate the relationship between the housing price and GDP, inflation rate, unemployment rate, population, construction cost.

2.5.1 GDP and Housing Price

H_0: There is no significant relationship between the GDP and the housing price.
H_1: There is a significant relationship between the GDP and the housing price.

2.5.2 Inflation Rate and Housing Price

H_0: There is no significant relationship between the inflation rate and the housing price.
H_1: There is a significant relationship between the inflation rate and the housing price.

2.5.3 Unemployment Rate and Housing Price

H_0: There is no significant relationship between the unemployment rate and the housing price.
H_1: There is a significant relationship between the unemployment rate and the housing price.

2.5.4 Population and Housing Price

H_0: There is no significant relationship between the population and the housing price.
H_1: There is a significant relationship between the population and the housing price.

2.5.5 Construction Cost and Housing Price

H_0: There is no significant relationship between the construction cost and the housing price.
H_1: There is a significant relationship between the construction cost and the housing price.

2.6 Gap of Literature Review

The purpose of this study is to examine the relationship between the dependent variable (RRPPI) and the independent variables (GDP, inflation rate, unemployment rate, population, and construction cost) in developed (Australia, Canada, Germany, Iceland, New Zealand, and Switzerland) and developing (Indonesia, Malaysia, Peru, Russia, Serbia, and Thailand) economies over a 15-year period (2004-2018). After a review of previous studies, there is a lack of research studying variables such as population and construction cost, both of which play important roles in influencing a country's RRPPI. On the other hand, most research focuses on the determinants of RRPPI in developed countries like the United States (US) and the United Kingdom (UK), with only a few research papers on developing countries such as Peru and Serbia. This could be related to the fact that investors are more interested in the housing markets of advanced economies, as well as the

fact that RRPPI data for developing countries was limited. Besides, many previous studies employed out-of-date data, making the results less relevant and reliable. Furthermore, most previous research has concentrated on a single country, resulting in a lack of research on comparison objectives, such as comparing developed and developing countries. As a result, our study will investigate and fill the vacuum on this topic to elucidate the relationship between the aforementioned characteristics in the developed and developing nations chosen. To elaborate, in our study, we use rarely used variables such as population and construction cost as well as other variables such as GDP, inflation rate, and unemployment rate as independent variables. Additionally, we investigate the determinants of RRPPI in both selected developed and developing economies over the last 15 years (2004-2018) to obtain a research paper on a comparison between chosen developed and developing economies. Our comparison research may provide readers with a comprehensive understanding of the differences between housing markets in chosen developed and developing economies, and it can also be useful as a reference paper for their housing purchase decision in other economies that were not covered in our research.

2.7 Conclusion

In short, chapter two reviews the past literature and conceptual frameworks of previous researchers to examine the determinants that influence the housing price. Based on the assumption, the chosen independent variables for this research such as GDP, inflation rate, unemployment rate, population, and construction cost are significantly related to the housing price in selected developed and developing economies. The table below shows the summary findings of the expected sign from the empirical studies.

Table 2.1: Expected Sign of Independent Variables

Independent Variables	Findings from Past Studies	Expected Sign

Gross Domestic Product (GDP)	Positive	Baharuddin, N. S., Isa, I. N. M., & Zahari, A. S. M. (2019) Guo, M., & Wu, Q. (2013) Ong, T. S. (2013) Xu, L., & Tang, B. (2014)	Positive
	Negative	Kassim, S. H., Redzuan, N. H., & Harun, N. Z. (2017)	
	No Relationship	Akkay, R. C. (2021) Saudin, S. B., Jehani, N. A., Mastani, N. A., & Ab Malek, I. (2020)	
Inflation Rate	Positive	Liu, H., & Shen, Y. (2005) Rangel, G. J., & Ng, J. W. J. (2017) Wong, V. K., & Sarma Aralas. (2019)	Positive
	Negative	Baharuddin, N. S., Isa, I. N. M., & Zahari, A. S. M. (2019) Mallick, H., & Mahalik, M. K. (2015)	

	No Relationship	Ong, T. S. (2013) Saudin, S. B., Jehani, N. A., Mastani, N. A., & Ab Malek, I. (2020)	
Unemployment Rate	Positive	Ni, J. S., Huang, S. S., & Wen, Y. (2011) Xu, L., & Tang, B. (2014)	Negative
	Negative	Gan, L., Wang, P., & Zhang, Q. (2018) Ganeson, C., & Abdul Muin, I. (2015) Mohan, S., Hutson, A., MacDonald, I., & Lin, C. C. (2019)	
	No Relationship	Saudin, S. B., Jehani, N. A., Mastani, N. A., & Ab Malek, I. (2020) Vogiazas, S., & Alexiou, C. (2017)	
Population	Positive	Borowiecki, K. J. (2009)	Positive

		Wang, X. R., Hui, E. C. M., & Sun, J. X. (2017) Yap, J. B. H., & Ng, X. H. (2018)	
	Negative	Rangel, G. J., & Ng, J. W. J. (2017)	
	No relationship	Choy, L. H., & Li, V. J. (2017)	
Construction cost	Positive	Coskun, Y., Seven, U., Ertugrul, H. M., & Alp, A. (2020) Savva, C. S. (2018) Sukrri, N. N. A. N. M., Wahab, N. A., & Yusof, R. M. (2019) Yap, J. B. H., & Ng, X. H. (2018)	Positive
	Negative	Glindro, E. T., Subhanij, T., Szeto, J., & Zhu, H. (2018) Ong, T. S. (2013)	
	No relationship	Knoll, K., Schularick, M., & Steger, T. (2017)	

CHAPTER 3: METHODOLOGY

3.0 Introduction

At the beginning of Chapter 3, the research design of this study will be discussed. Additionally, there are data description and data collection methods, data processing, and data sources. Moreover, it will be followed by the development of econometric models, the definition of variables, measurements, econometric techniques, and diagnostic checking.

3.1 Research Design

The research design of this study will be quantitative research, which is the process of collecting and analyzing numerical data. The relationship between the dependent variable, Real Residential Property Price Index (RRPPI), and each independent variable, that is GDP, inflation rate, unemployment rate, population, and construction cost will be examined to examine the influence of independent variables on the determinant of house prices in the selected developed and developing countries.

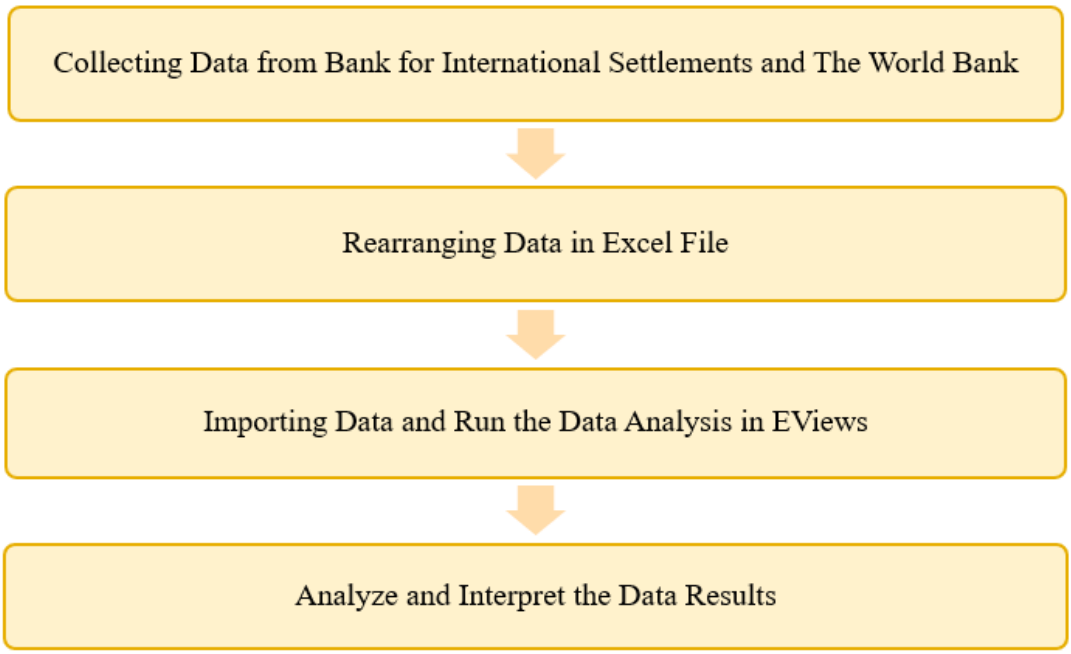
3.2 Data Description and Collection Method

This research mainly focuses on the analysis of the determinants of house prices in developed and developing countries. The dependent variable is the RRPPI in developed and developing countries. The five independent variables selected for this paper are GDP, inflation rate, unemployment rate, population, and construction cost. Moreover, this study uses panel data from 2004 to 2018 for the country of Australia, Canada, Germany, Iceland, New Zealand, Switzerland, Indonesia,

Malaysia, Peru, Russia, Serbia, and Thailand. All the variables are used secondary data, obtained from World Bank Data and the Bank for International Settlements, which provides accurate and complete data over the past 15 years.

3.3 Data Processing

Figure 3.1: Steps of Data Processing



In terms of data processing, it began with 15-years of data from the Bank for International Settlements and the World Bank. Next, before importing the data into EViews, the collected data in the Excel file is rearranged in order. The results obtained after doing the data analysis using EViews will be evaluated and interpreted.

3.4 Sources of Data

Sources and measurement results of each variable used in this paper are shown in Table 3.1 below.

Table 3.1: Source and Measurement of Each Variables

Variables	Indicator Name	Proxy	Source of Data
Real Residential Property Price Index	RRPPI	RRPPI (2010 = 100(base year))	Bank for International Settlements
Gross Domestic Product	GDP	Real GDP (Nominal GDP/ GDP Deflator), Annual Percentage	The World Bank
Inflation Rate	INF	Consumer Price Index (2010=100), Annual Percentage (%)	The World Bank
Unemployment Rate	UNP	Percentage of Total Labor Force, Annual Percentage (%)	The World Bank
Population	POP	Sum of Population	The World Bank
Construction Cost	CCOST	Industry Value Added, Percentage of GDP (%)	The World Bank

Table 3.2: Selected Developed and Developing Countries with Time Range

Developed	Developing
Australia, Canada, Germany, Iceland, New Zealand, Switzerland	Indonesia, Malaysia, Peru, Russia, Serbia, Thailand
Time Range	
2004-2018	

3.5 Econometric Model

Real Residential Property Price Index = f (Gross Domestic Product, Inflation Rate, Unemployment Rate, Population, Construction Cost)

Log-log model:

$$LRRPPI_{it} = \beta_0 + \beta_1 LGDP_{it} + \beta_2 LINF_{it} + \beta_3 LUNP_{it} + \beta_4 LPOP_{it} + \beta_5 LCCOST_{it} + \mu_{it}$$

Whereby,

$RRPPI_{it}$= Real Residential Property Price Index for country i at the time t

GDP_{it}= Real Gross Domestic Product for country i at the time t

INF_{it}= Inflation rate for country i at the time t

UNP_{it}= Unemployment Rate for country i at the time t

POP_{it}= Population for country i at the time t

$CCOST_{it}$= Construction Cost for country i at the time t

μ_{it}= Error term

i= Australia, Canada, Germany, Iceland, New Zealand, Switzerland, Indonesia, Malaysia, Peru, Russia, Serbia, Thailand.

t= 1, 2, 3, 4, …., 15 (2004-2018)

3.6 Variables and Measurement

3.6.1 Real Residential Property Price Index (RRPPI)

The dependent variable of this research is housing price which is then converted into RRPPI for analysis. RRPPI is a measure used to quantify changes in single-family home prices throughout a designated market, indicating whether the property value is increasing or decreasing. Based on the paper of Mansur, Abdul Hamid and Yusof (2016), they used RRPPI as the proxy for housing prices in their studies. Hence, it is also applicable for this paper to use the same proxy.

Selecting 2010 as the base year is due to year 2010 serves as separation of 2 decades allowing it to represent the RRPPI 2 decades. Besides that, the source of the data is the Bank for International Settlements and the range of the data collected is from 2004 to 2018.

3.6.2 Gross Domestic Products (GDP)

Gross Domestic Products is one of the independent variables in this paper. GDP is a monetary measure of the market value of all final goods and services produced in a country within a specific period. The proxy used on this variable is the real GDP as it was supported by the paper of Xu (2017) which used the same proxy in her paper. Besides, the source of data is from the World Bank and the range of the data collected is from 2004 to 2018.

Under the theory of Law of Supply and Demand, GDP is viewed as an important factor which influences the housing price. Similar study is shown in the paper of Guo and Wu's (2013), Baharuddin et al. (2019), Xu and Tang (2014) and so on.

3.6.3 Inflation Rate (INF)

In this paper, inflation is also one of the independent variables. Inflation refers to the increase in the price of goods and services for a specific period within a country. The inflation rate is measured by Consumer Price Index in annual percentage in this paper. Similar proxy is also used by Tsatsaronis and Zhu (2004) in their research. Then, the source of data is the World Bank and the range of the data collected is from 2004 to 2018.

Modern Portfolio Theory suggested that inflation rate is one of the determinants of housing price. We can observe similar variable is used in the study of Liu and Shen (2005), Rangel and Ng (2017), Wong and Sarma (2019) and the list goes on.

3.6.4 Unemployment Rate (UNP)

The upcoming independent variable is the unemployment rate, which indicates the percentage of labor force which are jobless at the moment. Based on the study of Jacobsen (n.d.), he had used the percentage of total labor force which is unemployed annually. Hence, it is suitable for this paper to use the similar proxy. In addition, the source of data is the World Bank and the range of the data collected is from 2004 to 2018.

According to Migration and Urbanization Theory, it suggested that unemployment rate can determine the housing price. The study of Mohan et al. (2019), Gan, Wang, and Zhang (2018) also using the same variable in determining the housing price.

3.6.5 Population (POP)

The population is the next independent variable in this paper. Population refers to the total amount of all nationals present in and temporary absent from the country. According to the research done by Ong (2013), the proxy used for the population is the sum of the population of a country. Therefore, it is also suitable for this paper to use the sum of the population of a country as the proxy of population. Besides, the source of data is the World Bank and the range of the data collected is from 2004 to 2018.

According to Migration and Urbanization Theory, it suggested that population can determine the housing price. The study of Wang, Hui, and Sun (2017), Borowiecki (2009), Yap and Ng (2018) all shown that population does influence the housing price.

3.6.6 Construction Cost (CCOST)

The last independent variable is the construction cost, which is the total cost incurred during the development of a housing assets. For this variable, the proxy used is the industry value added to the GDP of a country in percentage. According to the study of Ong (2013), similar proxy is used. Besides that, the source of data is the World Bank and the range of the data collected is from 2004 to 2018.

Under the theory of Law of Supply and Demand, construction cost is view as an important factor which influences the housing price. According to the study Savva (2018), Coskun et al. (2020), Sukrri et al. (2009) and so on, similar variable is used in determining the housing prices.

3.7 Econometric Technique

The econometric technique which is suitable and applicable for this model will lie between Pooled OLS (POLS) method, Fixed Effect Method (FEM) as well as Random Effect Method (REM).

Three main tests are performed which are the Likelihood Ratio Test, the Lagrange Multiplier (LM) test, and the Hausman test. First, the Likelihood Ratio Test is conducted to identify whether the FEM or POLS method should be used. By comparing the p-value and the significant level, if the p-value is lower than the significant level, reject the null hypothesis, indicating that FEM is favoured over POLS, vice versa (Park, 2011). On the other hand, the LM test is utilized to determine whether we should apply the REM or POLS method. Therefore, by comparing the p-value and the significant level, if the p-value is lower than the significant level, reject null hypothesis and we should choose REM over POLS, vice versa (Park, 2011). If the null hypothesis is not rejected in both the F-test and the LM test, the POLS method will be more appropriate and applicable in this paper. If null hypothesis is rejected in both F-test and the LM test, the Hausman test will be performed. If the p-value is lower than the significant value, reject null hypothesis, indicating that FEM will be more appropriate and applicable for this paper than REM, vice versa (Park, 2011).

3.8 Diagnostic Checking

3.8.1 Autocorrelation (Breusch-Pagan LM Test)

Autocorrelation which is also known as serial correlation refers to the correlation of a time series with its own past and future values. It measures how the lagged version of the value of a variable is related to the original version of itself in a time series. Since panel data include both time-series data and cross-sectional data, it is likely that autocorrelation will occur. Furthermore, Autocorrelation can be divided into positive serial correlation and negative serial correlation.

Hence, the Breusch-Pagan LM test will be used to detect autocorrelation in the regression model (ZACH, 2020). The residual of the model is being studied and the p-value is obtained from the residual. The null hypothesis will be set as there is no autocorrelation problem while the alternative hypothesis is set as there is an autocorrelation problem. The decision-making will be using the p-value and the significant level. Reject the null hypothesis if the p-value is lower than the significant level (0.01, 0.05, 0.10).

3.8.2 Stationarity (Levin-Lin-Chu Test)

In this study, the Levin-Lin-Chu test is used to test for unit roots, also known as stationarity. The Levin-Lin-Chu Test is a panel unit root test where its power is significantly greater than the time-series unit root test in finite samples against the alternative hypothesis with highly persistence deviations from equilibrium. Furthermore, the panel unit root test result is more likely to be a more precise parameter estimator since panel unit root tests depend not only on variance across time but also on variation across countries.

The Levin-Lin-Chu Test procedure began with the establishment of the null hypothesis and alternative hypothesis. The null hypothesis states that the panels contain unit roots, whereas the alternative hypothesis states that the panels are stationary. By comparing the p-value and the significant level, if the p-value is lower than the significant value (0.01, 0.05, 0.10), reject the null hypothesis, indicating that the panels are stationary; otherwise, vice versa.

3.8.3 Normality (Jarque-Bera Test)

The normality test determines whether a data set obeys a normal distribution (Ghasemi & Zahediasi, 2012). The reliability of the research results will be

weakened if the data set is not normally distributed. Normality tests include the Jarque-Bera test, the Anderson-Darling test, D'Agostino's K-squared test, Kolmogorov-Smirnov test, Lilliefors test, Shapiro-Wilk test, and Pearson's chi-squared test. Among the available tests, we will use the Jarque-Bera test to determine the normality of our research data.

The Jarque-Bera test can be used to determine whether the sample data contains skewness and kurtosis that are consistent with a normal distribution. Skewness is a measure of the degree of imbalance in the frequency distribution. Conversely, kurtosis is a measure of the degree of tailing in the frequency distribution (Surbhi, 2017). The normal distribution has a skewness of zero and a kurtosis of three. A kurtosis of larger than three implies a narrow distribution while a kurtosis of less than 3 indicates a flat distribution. The null hypothesis states that the error term is normally distributed; the alternative hypothesis states that the error term is not normally distributed. If the p-value is less than the significance level, reject the null hypothesis, indicating that the error term is not normally distributed.

3.9 Conclusion

In conclusion, in Chapter 3, we have discussed the methodologies employed to conduct this research. All the data in this study were collected from the World Bank and the Bank for International Settlements. The economic model will fall in between POLS, FEM, and REM. Moreover, a few tests have been listed and will be performed for diagnostic checking to ensure the validity of the model. Lastly, the regression model and diagnostic checking results will be discussed and evaluated in Chapter 4.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

This chapter will examine whether the independent variables of GDP, inflation rate, unemployment rate, population, and construction cost have a significant effect on the dependent variable of RRPPI in chosen developed and developing countries. Given the panel data, it focuses on a total of twelve countries, six from each developed and developing country, over a 15-years period (2004-2018). Hence, it determines whether to use POLS, FEM, or REM for this research. Following that, the final model's result will be discussed and interpreted. In addition, diagnostic checking such as autocorrelation, stationary, and normality will be tested and analyzed.

4.1 Selection of Econometric Model

4.1.1 Likelihood Ratio Test

Table 4.1: Likelihood Ratio Test

	Developed	Developing
Cross-Section F	102.784506	26.903034
P-value	0.0000	0.0000

H_0: POLS is the preferable model.

H_1: FEM is the preferable model.

Significant level: $\alpha = 0.05$

P-value: 0.0000 (Developed); 0.0000 (Developing)

Decision Rule: If p-value is lower than α, reject H_0. Otherwise, do not reject H_0.

Decision Making: Since p-value for both developed (0.0000) and developing (0.0000) are lower than α (0.05), Reject H_0.

Conclusion: FEM is the preferable model for both equations.

4.1.2 Lagrange Multiplier Test (LM Test)

Table 4.2: Lagrange Multiplier Test

	Developed	Developing
Breusch-Pagan	50.41348	0.163698
P-value	0.0000	0.6858

H_0: POLS is the preferable model.
H_1: REM is the preferable model.

Significant level: α = 0.05

P-value: 0.0000 (Developed); 0.6858 (Developing)

Decision Rule: If p-value is lower than α, reject H_0. Otherwise, do not reject H_0.

Decision Making: Since p-value for developed (0.0000) is lower than α (0.05), reject H_0. Do not reject H_0 since p-value for developing (0.6858) is greater than α (0.05).

Conclusion: REM is the preferable model for selected developed countries, while POLS seems to be the preferable model for selected developing countries.

4.1.3 Hausman Test

Table 4.3: Hausman Test

	Developed	Developing
Chi-Sq. Statistic	513.922528	134.515169
P-value	0.0000	0.0000

H_0: REM is a preferable model.
H_1: FEM is a preferable model.

Significant level: $\alpha = 0.05$

P-value: 0.0000 (Developed), 0.0000 (Developing)

Decision Rule: If p-value is lower than α, reject H_0. Otherwise, do not reject H_0.

Decision Making: Since p-value for both developing (0.0000) and developed (0.0000) are lower than α (0.05), reject H_0.

Conclusion: FEM is the preferable model for both equations.

4.1.4 Conclusion for Selection of Econometric Model

Table 4.4: Summary Table for Test Results

	Developed	Developing

Likelihood Ratio Test	FEM	FEM
Lagrange Multiplier Test	REM	POLS
Hausman Test	FEM	FEM

For developed countries, both Likelihood Ratio test and LM test rejected POLS model. Hence, according to the result of Hausman test, FEM is the best model for developed countries. On the other hand, for developing countries, REM is rejected based on the result of LM test. Furthermore, the result of Likelihood ratio test and Hausman Test suggest that FEM is the best model for developing countries.

4.2 Descriptive Statistic

4.2.1 Descriptive Statistic for Developed Countries Model

Table 4.5: Descriptive Statistic for Developed Countries Model

Variables	Mean	Median	Maximum	Minimum	Standard Deviation
RRPPI	4.674913	4.642137	5.065664	4.297503	0.162123
GDP	22.34988	22.84270	24.44882	18.92393	1.717467
INF	4.605204	4.605170	4.830144	4.166636	0.116819
UNP	1.647930	1.653454	2.413232	0.810930	0.316425
POP	16.05954	16.38743	18.23322	12.58476	1.796225
CCOST	3.188261	3.206928	3.379021	2.971542	0.109486

Table 4.5 displays descriptive statistics for selected developed countries over a 15-year period. RRPPI, GDP, INF, UNP, POP, and CCOST have mean values of 4.674913, 22.34988, 4.605204, 1.647930, 16.05954, and 3.188261, respectively. Furthermore, the median values of RRPPI, GDP, INF, UNP, POP, and CCOST are 4.642137, 22.84270, 4.605170, 1.653454, 16.38743, and 3.206928, respectively. Additionally, GDP has the highest

maximum value of 24.44882, followed by POP (18.23322), RRPPI (5.065664), INF (4.830144), CCOST (3.379021), and UNP (2.413232). UNP, on the other hand, has the lowest minimum value of 0.810930, followed by CCOST (2.971542), INF (4.166636), RRPPI (4.297503), POP (12.58476), and GDP (18.92393). Moreover, POP has the biggest standard deviation (1.796225), whereas CCOST has the lowest (0.109486).

4.2.2 Descriptive Statistic for Developing Countries Model

Table 4.6: Descriptive Statistic for Developing Countries Model

Variables	Mean	Median	Maximum	Minimum	Standard Deviation
RRPPI	4.571856	4.605102	5.068933	3.947514	0.258623
GDP	21.81075	21.74758	24.21164	19.79834	1.215365
INF	4.632182	4.647735	5.153383	3.998779	0.232802
UNP	1.453764	1.443266	3.178054	-1.386294	0.959082
POP	17.71329	17.63537	19.40527	15.75893	1.166361
CCOST	3.557790	3.590522	3.882189	3.214934	0.182752

Table 4.6 displays descriptive statistics for selected developing countries over a 15-year period. RRPPI, GDP, INF, UNP, POP, and CCOST have mean values of 4.571856, 21.81075, 4.632182, 1.453764, 17.71329, and 3.557790, respectively. Furthermore, the median values of RRPPI, GDP, INF, UNP, POP, and CCOST are 4.605102, 21.74758, 4.647735, 1.443266, 17.63537, and 3.590522, respectively. Additionally, GDP has the highest maximum value of 24.21164, followed by POP (19.40527), INF (5.153383), RRPPI (5.068933), CCOST (3.882189), and UNP (3.178054). UNP, on the other hand, has the lowest minimum value of -1.386294, followed by CCOST (3.214934), RRPPI (3.947514), INF (3.998779), POP (15.75893), and GDP (19.79834). Moreover, GDP has the biggest standard deviation (1.215365), whereas CCOST has the lowest (0.182752).

4.3 Correlation Analysis

4.3.1 Correlation Analysis for Developed Countries Model

Table 4.7: Correlation Analysis (Developed)

	LNRRPPI	LNGDP	LNINF	LNUNP	LNPOP	LNCCOST
LNRRPPI	1.000000	-0.295488	0.292931	-0.367493	-0.320726	-0.529527
LNGDP	-0.295488	1.000000	0.139340	0.461864	0.987344	0.826173
LNINF	0.292931	0.139340	1.000000	0.174303	0.167178	-0.106835
LNUNP	-0.367493	0.461864	0.174303	1.000000	0.515037	0.344566
LNPOP	-0.320726	0.987344	0.167178	0.515037	1.000000	0.800413
LNCCOST	-0.529527	0.826173	-0.106835	0.344566	0.800413	1.000000

According to Table 4.7, we can observe a weak negative correlation between LNGDP, LNUNP, and LNPOP and LNRRPPI, and a weak positive correlation between LNINF and LNRRPPI, with absolute values ranging from 0.25 to 0.50. Furthermore, LNCCOST and LNRRPPI have a moderate negative correlation, indicating that they move in opposite directions. On the other hand, there is a strong positive correlation between LNGDP and LNPOP, LNGDP and LNCCOST, LNPOP and LNCCOST. For instance, since the correlation is positive, both LNGDP and LNPOP tend to increase or fall together, which is unsurprising given that a larger population contributes more to the country's GDP.

4.3.2 Correlation Analysis for Developing Countries Model

Table 4.8: Correlation Analysis (Developing)

	LNRRPPI	LNGDP	LNINF	LNUNP	LNPOP	LNCCOST
LNRRPPI	1.000000	-0.074144	0.013936	-0.336168	0.037372	0.374684
LNGDP	-0.074144	1.000000	0.014126	-0.179769	0.864089	0.242861
LNINF	0.013936	0.014126	1.000000	-0.112211	0.027643	-0.217668
LNUNP	-0.336168	-0.179769	-0.112211	1.000000	-0.347621	-0.486138
LNPOP	0.037372	0.864089	0.027643	-0.347621	1.000000	0.503024
LNCCOST	0.374684	0.242861	-0.217668	-0.486138	0.503024	1.000000

According to Table 4.8, there is a weak negative correlation between LNGDP, LNUNP, and LNRRPPI, and a weak positive correlation between LNINF, LNPOP, LNCCOST, and LNRRPPI, with absolute values ranging from 0.01 to 0.40. Furthermore, LNCCOST and LNPOP have a moderate positive correlation, indicating that they move in same directions. On the other hand, there is a strong positive correlation between LNGDP and LNPOP. For instance, since the correlation is positive, both LNGDP and LNPOP will move in the same direction, which is unsurprising since a larger population often leads to higher GDP.

4.4 Final Econometric Model

Table 4.9: Result of FEM Regression for Selected Developed and Developing Countries

Variable	Developed		Developing	
	Coefficient	**P-value**	**Coefficient**	**P-value**
Gross Domestic Product (GDP)	0.001877 (0.041352)	0.9639	0.627992*** (0.104236)	0.0000
Inflation Rate (INF)	-0.612970*** (0.077462)	0.0000	0.012492 (0.106285)	0.9067
Unemployment Rate (UNP)	-0.240181*** (0.020487)	0.0000	0.191130** (0.080355)	0.0198
Population (POP)	3.393821*** (0.234809)	0.0000	-0.361947 (0.593596)	0.5438
Construction Cost (CCOST)	-0.398176*** (0.122389)	0.0017	-0.980056** (0.385399)	0.0129
R-squared	0.933293		0.710847	
Adjusted R-squared	0.924849		0.674245	
F-statistic	110.5286***	0.000000	19.42117***	0.000000

Notes: *** indicates that at 0.01 significance level the variables are significant
** indicates that at 0.05 significance level the variables are significant.
The number stated in the parenthesis is the standard error.

Source: Developed for research

4.4.1 Interpretation of Slope Coefficient for Developed Countries

$\beta_1 = 0.001877$

GDP and RRPPI of selected developed countries have a positive relationship. If the GDP increased by 1%, on average, the RRPPI of selected developed countries will increase by 0.001877%, ceteris paribus.

$\beta_2 = -0.612970$

INF and RRPPI of selected developed countries have a negative relationship. If the INF increased by 1%, on average, the RRPPI of selected developed countries will decrease by 0.612970%, ceteris paribus.

$\beta_3 = -0.240181$

UNP and RRPPI of selected developed countries have a negative relationship. If the UNP increased by 1%, on average, the RRPPI of selected developed countries will decrease by 0.240181%, ceteris paribus.

$\beta_4 = 3.393821$

POP and RRPPI of selected developed countries have a positive relationship. If the POP increased by 1%, on average, the RRPPI of selected developed countries will increase by 3.393821%, ceteris paribus.

$\beta_5 = -0.398176$

CCOST and RRPPI of selected developed countries have a negative relationship. If the CCOST increased by 1%, on average, the RRPPI of selected developed countries will decrease by 0.398176%, ceteris paribus.

4.4.2 Interpretation of Slope Coefficient for Developing Countries

$\beta_1 = 0.627992$

GDP and RRPPI of selected developing countries have a positive relationship. If the GDP increased by 1%, on average, the RRPPI of selected developing countries will increase by 0.627992%, ceteris paribus.

$\beta_2 = 0.012492$

INF and RRPPI of selected developing countries have a positive relationship. If the INF increased by 1%, on average, the RRPPI of selected developing countries will increase by 0.012492%, ceteris paribus.

$\beta_3 = 0.191130$

UNP and RRPPI of selected developing countries have a positive relationship. If the UNP increased by 1%, on average, the RRPPI of selected developing countries will increase by 0.191130%, ceteris paribus.

$\beta_4 = -0.361947$

POP and RRPPI of selected developing countries have a negative relationship. If the POP increased by 1%, on average, the RRPPI of selected developing countries will decrease by 0.361947%, ceteris paribus.

$\beta_5 = -0.980056$

CCOST and RRPPI of selected developing countries have a negative relationship. If the CCOST increased by 1%, on average, the RRPPI of selected developing countries will decrease by 0.980056%, ceteris paribus.

4.4.3 R-Squared of Developed and Developing Countries Model

According to Table 4.9, the R-squared for the developed countries model is greater, at 0.933293, compared to 0.710847 for the developing countries model. It means that there is about 93.3293% of the variation in RRPPI of chosen developed countries is able to explain by the total variation in GDP, INF, UNP, POP, and CCOST. Similarly, the total variation in GDP, INF, UNP, POP, and CCOST can explain 71.0847% of the variation in RRPPI of chosen developing countries.

Aside from that, the adjusted R-squared is the modified R-squared after taking the degree of freedom into account. According to Table 4.9, the adjusted R-squared of the developed and developing countries' models is 0.924849 and 0.674245, respectively. It implies that there is about 92.4849% of the variation in RRPPI of chosen developed countries is able to explain by the total variation in GDP, INF, UNP, POP, and CCOST after taking the

degree of freedom into account. Similarly, taking the degree of freedom into account, the total variation in GDP, INF, UNP, POP, and CCOST can explain 67.4245% of the variation in RRPPI of chosen developing countries.

The R-squared of both the developed and developing countries models exceeded 0.7, indicating a good fit for the model. Therefore, both models can be used to predict the RRPPI of chosen developed and developing countries. As a consequence, the generated results will be unbiased, dependable, and consistent.

4.4.4 F-Test for Developed and Developing Countries Model

The F-test is used to determine whether the model is significant in predicting the outcome and to demonstrate whether the independent variables have a significant impact on the dependent variable.

Based on Table 4.9, the developed and developing countries' models are significant because the p-value of the F-statistic for both models is 0.000000, which is less than the 1% significance level. As a result, we have sufficient evidence to reject H_0 and conclude that both developed and developing countries' models are significant.

4.4.5 T-Test for Developed and Developing Countries Model

If the p-value of the t-statistic is less than the significance level of 1% or 5%, the independent variables are considered to have a significant impact on the dependent variable, whereas if the p-value of the t-statistic is greater than the significance level of 1% or 5%, the independent variables are considered to have an insignificant impact on the dependent variable.

Based on Table 4.9, for the developed countries model, INF, UNP, POP, and CCOST are significant at the 1% significance level because their p-values are less than 0.01. Only GDP, on the other hand, is insignificant at the 5% significance level as its p-value is greater than 0.05.

Besides, for the developing countries model, GDP is significant at the 1% significance level, whereas UNP and CCOST are significant at the 5% significance level. Moreover, INF and POP are insignificant at the 5% significance levels because their p-values are greater than 0.05.

4.5 Diagnostic Checking

4.5.1 Autocorrelation (Breusch-Pagan LM Test)

Autocorrelation refers to the correlation of a time series with its own past and future values. Since panel data consist of both time-series and cross-sectional data, it is likely that autocorrelation will occur. Hence, the Breusch-Pagan LM test is used to detect autocorrelation problems in the model.

Table 4.10: Breusch-Pagan LM Test

	Developed	**Developing**
Breusch-Pagan LM	21.44024	27.80323
P-value	0.1233	0.0228

H_0: No autocorrelation problem is present.
H_1: Autocorrelation problem is present.

Significant level: $\alpha = 0.01$

P-value: 0.1233 (Developed); 0.0228 (Developing)

Decision rule: If p-value is lower than α, reject H_0. Otherwise, do not reject H_0.

Decision Making: Since p-value for both developed (0.1233) and developing (0.0228) is higher than α (0.01), do not reject H_0.

Conclusion: No autocorrelation problem detected for both developed and developing.

4.5.2 Stationarity (Levin-Lin-Chu Test)

A stationary process has the property that the mean, variance and autocorrelation structure is stable and do not change over time. In this study, Levin-Lin-Chu test which is a panel unit root test is carried out to determine the stationarity of the model.

Table 4.11: Levin-Lin-Chu Test

	Developed	Developing
Levin, Lin & Chu	-2.00637	-1.93113
P-value	0.0224	0.0267

H_0: The panels contain unit roots.
H_1: The panels are stationary.

Significant level: α = 0.05

P-value: 0.0224 (Developed); 0.0267 (Developing)

Decision rule: Reject H_0, if p-value is lower than α. Otherwise, do not reject H_0.

Decision Making: Reject H_0 since p-value for both developed (0.0224) and developing (0.0267) is lower than α (0.05).

Conclusion: The panels are stationary for both developed and developing.

4.5.3 Normality (Jarque-Bera Test)

The normality test determines whether a data set obeys a normal distribution. The reliability of the research results will be weakened if the data set is not normally distributed. Jarque-Bera Test is used for the normality of the model.

Table 4.12: Jarque-Bera Test

	Developed	Developing
Jarque-Bera	2.331859	2.836578
P-value	0.311633	0.242128

H_0: The error term is normally distributed.
H_1: The error term is not normally distributed.

Significant level: α = 0.05

P-value: 0.311633 (Developed); 0.242128 (Developing)

Decision rule: If p-value is lower than α, reject H_0. Otherwise, do not reject H_0.

Decision Making: Since p-value for both developed (0.311633) and developing (0.242128) are higher than α (0.05), do not reject H_0.

Conclusion: For both developed and developing, the error term is normally distributed.

4.6 Discussions of Major Findings

Table 4.13: Findings of Selected Developed and Developing Economies

Independent Variable(s)	Expected Sign	Regression Result	
		Developed	Developing
Gross Domestic Product	Positive	Insignificant	Positive
Inflation Rate	Positive	Negative	Insignificant
Unemployment Rate	Negative	Negative	Positive
Population	Positive	Positive	Insignificant
Construction Cost	Positive	Negative	Negative

Source: Developed for the research

4.6.1 Gross Domestic Product

Surprisingly, the regression result shows GDP is insignificantly influencing the RRPPI in the selected developed economies at the 5% significance level. It is not consistent with the Law of Supply and Demand and the past studies such as Xu and Tang (2014); and Baharuddin et al. (2019). However, the insignificant results can be supported by the studies of Gaspareniene, Remeikiene, and Skuka (2017); He, Cai, and Hamori (2018) whereby stated that GDP has no influence on housing prices.

This might be due to the housing price being the leading indicator of GDP, rather than the other way around as it is a one-way association that happened between the housing price and GDP (Saudin et al., 2020). This will cause housing prices to diverge from the economic fundamentals which makes GDP no significant impact on housing prices in the developed economies.

On the other hand, it discovers GDP influences the RRPPI in the selected developing economies positively and significantly at the 1% significance level. The result is consistent with the theory and the past studies. This can be supported by the studies of Bishar (2015); Faiz and Rahim (2020).

The possible explanation might be an increase in GDP will raise the household consumption that drives up the housing investment and the wealth value of housing prices in the selected developing economies (Wong & Sarma, 2019). Another possible explanation might be the rising purchasing power of people affect the public housing demand in developing economies and causes the housing prices to rise (Duja & Supriyanto, 2019).

In comparison, GDP is significant in developing countries but not in developed countries because the preferences of the people might vary in different locations. This is because the housing products are usually immobile, and it exhibits strong regional characteristics across various countries. Hence, the people in the selected developed countries with higher incomes will change their spending patterns to consume more luxurious goods instead of necessary goods (Henry, 2014).

4.6.2 Inflation Rate

The regression result discovers that the inflation rate influences the RRPPI in the selected developed economies negatively and significantly at the 1% significance level. It is not consistent with the Modern Portfolio Theory and the past studies such as Liu and Shen (2005); Wong and Sarma (2019). However, similar negative results are also shown in the studies of Mallick and Mahalik (2015); Syuhada, Naqiah, and Suffian (2019).

This might be the money illusion that drives the mispricing of the housing product that provided inconsistent results between inflation rate and housing prices (Tsai, 2020). Besides, another explanation might be the higher

inflation rate increases the real interest rate and makes the real cost of mortgage higher that causing people difficult to purchase a house in the selected developed economies (Ampofo, 2020). This reduces housing demand and causes the housing price to decrease.

The regression result also shows that the inflation rate is not significantly influencing the RRPPI in the selected developing economies at the 5% significance level. It is also not consistent with the theory and the past studies. Similar insignificant results can also be supported by the studies of Ong (2013); Saudin et al. (2020).

This might be because the housing values and the inflation rate have an opposite relationship, and this causes the inflation rate to have no effect on housing prices even if they are moving in the same direction (Manaf, Said, Al & Adenan, 2019). It might be the different composition of CPI in each developing economy makes the connection between the inflation rate and the housing price weaker (Tang, Ye & Qian, 2019).

In comparison, the inflation rate is negatively influencing the housing price in developed economies while not significant in developing economies. The investment in housing markets might not necessarily stimulate consumption in developing economies as people will have higher housing debt which results in the substitution wealth effect that generates a crowding-out effect on their consumption (Tang et al., 2019). This will lead to inflation rate might not be obvious and significant influence housing prices in the developing economies as compared to developed economies.

4.6.3 Unemployment Rate

The regression result finds the unemployment rate is negatively and significantly influencing the RRPPI in the selected developed economies at the 1% significance level. It is consistent with the Migration and

Urbanization Theory and the past studies such as Gan, Wang, and Zhang (2018); Mohan et al. (2019). This can be supported by the studies of Stratton (2017) and Ting (2021).

The possible explanation is the rise in homeownership will reduce the housing price and restrict labor mobility due to the increase in the unemployment rate (Blanchflower & Oswald, 2013). Besides, it might be the weaker demand for workers in the cities with high unemployment rates that causes a reduction in housing prices (Belke & Keil, 2018).

Besides, it is shocking to see the regression result shows that the unemployment rate is positively and significantly influencing the RRPPI in the selected developing economies at the 5% significance level. It is not consistent with the theory and the past studies. However, similar positive results are also shown by the studies of Tripathi (2019); Xu and Tang (2014).

This might be due to high unemployment indicating a weaker economy leads to less turnover intention and less opportunity for labor movement (Speer, Dutta, Chen & Trussell, 2019). It causes an increase in labor costs which might transfer to the cost of production in the housing sector (Danso & Obeng-Ahenkora, 2018). It might also be due to the housing bubbles effect on the labor due to increased unemployment and lost value of the capital in the housing sector (Majid, Said & Chong, 2017).

In comparison, the unemployment rate is negatively influencing the housing price in developed economies while it is positively influencing the housing price in developing economies. The relationship between the developed economies is clearer due to the co-movement of housing prices and unemployment rate and it can be justified by the factors that drive the business cycle (Irandoust, 2019). More housing problems in developing economies such as a shortage of residential units as well as the exceeded housing units in the region which is more than the ability of people with less income due to the unemployment rate and this creates the housing demand and supply there is unbalanced (Torab, 2018).

4.6.4 Population

The regression result discovers the population influencing the RRPPI in selected developed economies positively and significantly at the 1% significance level. It is consistent with the Migration and Urbanization Theory and the past studies such as Yap and Ng (2018); and Wang et al. (2017). Similar positive results are also shown in the studies of Degen and Fischer (2017); Nistor and Reianu (2018).

The possible explanation is the immigrants would demand the house for living, homeownership, and rented properties and the immigration flows increase housing prices through the present value relationship of higher flows of future rents (Degen & Fischer, 2017). Another possible explanation might be the immigration combined with the population growth in the age group for household formation that boosts the housing demand and eventually the real housing prices (Geng, 2018).

The regression result also shows that there is no significant relationship between the population and RRPPI in selected developing economies at the 5% significance level. It is not consistent with the theory and the past studies. Similar insignificant results are also shown in the study of Choy and Li (2017), and the study of Lin et al. (2018).

The possible explanation is the rise in population is due to migration with high education might not be the major homebuyers in the selected developing countries (Choy & Li, 2017). Another possible explanation is the shift in demographic which includes the population only affects the housing prices in the short run since the housing prices were price elastic (Lin et al., 2018).

For comparison, the population is positively influencing the housing price in developed economies while it is not significantly influencing the housing price in developing economies. This might be because the people prefer to emigrate internationally from developing economies that lack the economic opportunity to developed economies due to wider employment opportunities with higher wages than the job in the developing economies (Massey, 2019). Since the people have moved to developed economies, the local population in the developing countries would have less effect on the housing price as combined with the changes in real per capita income might offset any negative effects in the market of developing economies (Basso & Jimeno, 2021).

4.6.5 Construction Cost

The regression result shows that the construction cost negatively and significantly influences the RRPPI in developed economies at the 1% significance level and in developing economies at the 5% significance level. Both results are not consistent with the Law of Supply and Demand and past studies such as Savva (2018); Coskun, et al. (2020). Similar negative results are shown in the studies of Glindro et al. (2018); Ong (2013).

Therefore, it is not able to compare the results between both groups of countries. This might be due to the problem of cost overruns occurring frequently which include the buildings materials, labor, and machinery or equipment expenses due to the reasons such as corruption and those costs would all be absorbed by house developers themselves in the construction sector (Musarat, Alaloul, & Liew, 2021). Besides, a large gap occurred between construction costs and housing prices in both selected developed and developing economies since the land and taxes are expensive and high which might not indicate that the house developers are earning a profit (Glaeser, Huang, Ma, & Shleifer, 2017). In short, the behavior of the housing developers in the construction sector of both developed and

developing economies might share the same characteristics and perspectives regarding the construction cost in the housing supply which leads to a decrease in housing prices.

4.7 Conclusion

This chapter covers the selection of an econometric model, the descriptive statistic, the FEM results, and the diagnostics checking. The FEM is chosen as the best model for both developed and developing economies after conducting the Likelihood Ratio Test, LM Test, and Hausman Test.

The R-squared of both the developed and developing countries' models was greater than 0.7, indicating a good fit for the model. Hence, the result will be unbiased, dependable, and consistent. Aside from that, we may conclude from the F-test that both models are significant in predicting the RRPPI.

With the 1% significance level, neither model suffers from auto-correlation problems. Furthermore, both models pass the stationarity test, suggesting that neither panel has the unit-root issue. The error term is also normally distributed for both developed and developing models, as evidenced by the normality test results (Jarque-Bera Test). In conclusion, both models passed all diagnostic checking.

Based on the major findings, the developed economies fulfilled most expected signs and are quite consistent with nearly all theories and past studies compared to the developing economies as their housing market are more mature with transparency and liquidity. Different relationships are mainly shown between RRPPI and all determinants indicating different instruments can be used to influence the housing prices in both selected developed and developing economies.

CHAPTER 5: CONCLUSION

5.0 Introduction

The implication of the study and policy recommendations for government, house developers, and investors will be addressed in this chapter. It will also mention the limitation of the study and the recommendations for future researchers. Lastly, it is concluded by having a short summary of all chapters.

5.1 Implications of the Study

This study provides implications for housing markets in the selected developed economies which are Australia, Canada, Germany, Iceland, New Zealand, and Switzerland while selected developing economies which are Indonesia, Malaysia, Peru, Russia, Serbia, and Thailand relating to GDP, inflation rate, unemployment rate, population, and construction cost. Therefore, the findings from this study are hoped to be significant to the government, house developers, and investors for comparison purposes.

In addition, higher housing prices might lead to wealth inequality, geographical mobility, and even macroeconomic instability due to unsustainable asset booms and busts while lower housing price usually reflects the slowdown in the market. Therefore, few policies are being suggested that might help to monitor the factors that influence the changes in housing prices in selected developed and developing economies as well as enhance the performance of the housing market.

5.1.1 Government

As the housing sector plays a significant role in every economy, this study can serve as a reference for governments to better understand the dynamics of the real estate market and make effective policies that control the stability of the housing price in both groups of selected countries.

The findings in Chapter 4 show the positive relationship between population and the housing price in the selected developed countries, so its growth is an underlying factor in housing demand that pushes up rents and home purchase prices. To control the housing price from further rising in the selected developed countries, the government is recommended to manage population growth in the developed countries by revising or designing restricted immigration policies to limit the of movement low-skill or high-skill workers from other countries. The government is also advised to improve the affordable housing system by having additional spending to build more public housing that helps increase the housing supply to meet the demand in the migrant population and local population in the developed economies.

A negative relationship is shown between the unemployment rate and housing prices in the selected developed economies as the rising unemployment rate lowers home affordability, causing housing prices to fall. Therefore, the government should stabilize the housing price in the selected developed economies by using the expansionary fiscal and monetary policy so the unemployment rate can be controlled by changing the aggregate demand and the rate of economic growth to prevent housing prices from plummeting dramatically and sustain developments in the housing market.

The findings in Chapter 4 reveal the relationship between the unemployment rate and housing prices is positive in the selected developing economies due to it leads less turnover intention and limits labor movement which increases the production cost and housing price. Thus, the government may design active labor market policies to improve population employment in the selected developing economies such as providing wage subsidies and training programs to improve the skills or human capital to make them

motivated to find and begin work. The government can also try to reduce occupational immobility in the labor force to reduce the unemployed population which could control the housing price since people can afford the house with more income.

5.1.2 House Developers

This study is also hoped to provide some guidelines to house developers to build and supply houses in both developed and developing economies more efficiently.

Based on Chapter 4, the relationship between the construction cost and housing prices is negative in both groups of economies due to the cost overrun absorbed by the house developers themselves.

Therefore, the house developers should conduct demand forecasting in both groups of countries to make more informed business decisions. This makes it better to allocate resources to reduce material waste. It controls the construction cost and stops the housing price to drop further. Besides, it is advisable for the house developers to deal with the inflation rate cautiously, especially on the budget of construction projects in both selected developed and developing economies as it might lead to the price of construction costs such as materials, labor, equipment, or machinery increase.

5.1.3 Investors

As investors can help to develop and maintain the success of the housing sector, this study can serve as a reference for those who would like to invest in the housing market of both selected developed and developing economies as it provides the sensitivity of housing prices to its determinants.

Investors can adopt the strategy of "buy low sell high" as the results in Chapter 4 show the negative relationship between inflation rate and housing price in selected developed economies due to money illusion which drives the mispricing of the housing product. Hence, it is advised for the investors to purchase a house when the inflation rate is high with a lower price to reduce their costs or lessen the housing loan amount. Besides, GDP and housing prices is having a positive relationship in the selected developing countries as it can impact the house prices that reflect housing wealth positively. Therefore, the investors are suggested to sell the house at a higher price when the economy is growing in the selected developing countries. This allows the investors to gain profit from the real estate investment.

The investors should watch closely and tread carefully on the trends of the GDP and the inflations rate to make more diversified housing investments in terms of location, asset class, and the assets' risk profile during various time horizons as different results are witnessed across the developed and developing economies as to reduce the overall risk in the market.

5.2 Limitations of the Study

The first limitation that has been identified in this study is the data discrepancy, whereby the data collected are lacking compatibility or similarity. This is because the selected developed and developing economies in this study cannot be used to represent all countries in the world as some countries are classified under the same region.

Another limitation is the shortage of covered sample periods as the data ranged from 2004 to 2018, whereby consists only of 15 years of the period. This is because the data of all the independent variables collected from the World Bank and the data of the dependent variable collected from the Bank for International Settlements are based on an annual basis. It will cause a smaller number of observations in the study and lead to lesser precision and power.

5.3 Recommendations for Future Researchers

Future researchers may try to include more independent variables that are not available in this study such as real interest rates or more variables that are based on the demand or supply factors in the housing markets. Adding extra independent variables will enhance the flexibility and decrease the bias of the regression to create a better fit model but must have the justification of theoretical framework otherwise it may result in an over-fit model.

They are also advised to incorporate more countries in their studies as this provides a more comprehensive review and analysis of the housing price to create specific estimations on the performance of the housing market in the countries more properly.

Lastly, future researchers are suggested to apply different frequencies of data such as weekly, monthly, or quarterly as some of the variables might be more fluctuated than other variables. This can provide better test reliability and easier to capture the changes between the variables.

5.4 Conclusion

Firstly, the study mainly investigates the determinants of housing prices in selected developed economies which are Australia, Canada, Germany, Iceland, New Zealand, and Switzerland while selected developing economies which are Indonesia, Malaysia, Peru, Russia, Serbia, and Thailand. Besides, the result of this study is reliable and trustable as the FEM model used in this study is free from the econometric problem by using diagnostic checking and data from 2004 to 2018.

For selected developed economies, the empirical results revealed that the population influences housing prices positively and significantly. Besides, the results showed that the inflation rate, unemployment rate, and construction cost influence the housing prices negatively and significantly. However, the GDP is insignificantly affecting the housing price.

For selected developing economies, the empirical results revealed that the GDP and unemployment rate influence the housing price positively and significantly. Besides, the results showed that the construction cost influences housing price negatively and significantly. However, the inflation rate and population are insignificantly affecting the housing price.

The outcome of this study might offer some insights to the government, house developers, and investors from the macroeconomics aspects such as GDP and how they affect the housing price in the real estate market. This study also provides some guidelines for the authority or policymakers to have to govern housing prices considering the factors that determine the house price, regardless of the selected developed and developing economies. Lastly, several limitations and recommendations are made for future researchers to avoid problems and improve their future studies on the relevant topic.

REFERENCES

Akbari, A. H., & Aydede, Y. (2012). Effects of immigration on house prices in Canada. *Applied Economics*, *44*(13), 1645-1658.

Akkay, R. C. (2021). The Macroeconomic Determinants of The Housing Prices in Turkey. *Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, *58*, 241-264.

Aliyev, K., Amiraslanova, M., Bakirova, N., & Eynizada, N. (2019). Determinants of housing prices in Baku: empirical analyses. *International Journal of Housing Markets and Analysis*.

Ampofo, J. A. (2020). The nature of mortgage repayment plans in Ghana. *Finance & Accounting Research Journal*, *2*(3), 91-104.

Anderson, J. E. (2011). The gravity model. *Annu. Rev. Econ.*, *3*(1), 133-160.

Aqsha, N. S., & Masih, A. (2018). *Is residential property the ultimate hedge against inflation? new evidence from Malaysia based on ARDL and nonlinear ARDL*. University Library of Munich, Germany.

Asaul, A. N., Asaul, M. A., Liulin, P. B., & Chepachenko, N. V. (2019). Housing Construction in Russia: Trends and Medium-Range Forecasts. *Studies on Russian Economic Development*, *30*, 313-318.

Ashaf, D. H., Hidayat, S. W., & Ahmadi, A. (2019). Decision Support System Determines the Purchase of House Right Using Analytical Hierarchy Process (AHP) And Borda Methods. *JOURNAL ASRO*, *10*(1), 1-9.

Assil, E. M. (2012). Constructing a real estate price index: the Moroccan experience. *IFC Bulletin*, *28*, 134.

Baharuddin, N. S., Isa, I. N. M., & Zahari, A. S. M. (2019). Housing price in Malaysia: the impact of macroeconomic indicators. *Journal of Global Business and Social Entrepreneurship (GBSE)*, *5*(16).

Bahmani-Oskooee, M., & Xi, D. (2011). Economic uncertainty, monetary uncertainty and the demand for money in Australia. *Australian Economic Papers*, *50*(4), 115-128.

Bakar, N. A., & Rosbi, S. (2019). Robust Statistical Portfolio Investment in Modern Portfolio Theory: A Case Study of Two Stocks Combination in Kuala Lumpur Stock Exchange. *International Journal of Engineering and Advanced Technology (IJEAT)*, *8*(5C), 214-221.

Basso, H. S., & Jimeno, J. F. (2021). From secular stagnation to robocalypse? Implications of demographic and technological changes. *Journal of Monetary Economics*, *117*, 833-847.

Belke, A., & Keil, J. (2018). Fundamental determinants of real estate prices: A panel study of German regions. *International Advances in Economic Research*, *24*(1), 25-45.

Bishar, A. (2015). The Relationship Between Selected Macroeconomic Variables and The Performance of Real Estate Properties in Nairobi County. *Research of University of Nairobi.*

Blanchflower, D. G., & Oswald, A. J. (2013). *Does high home-ownership impair the labor market? (No. w19079).* National Bureau of Economic Research.

Bogatyreva, M. V., Leskinen, M., & Kolmakov, M. A. (2021). The Domestic Real Estate Market During Financial Crises. *Earth and Environmental Science*, *75*(1).

Bondarenko, P. (2019, October 1). *Unemployment rate.* Retrieved August 5, 2021, from https://www.britannica.com/topic/unemployment-rate

Borowiecki, K. J. (2009). The determinants of house prices and construction: an empirical investigation of the Swiss housing economy. *International Real Estate Review*, *12*(3), 193-220.

Cho, Y., Li, S. M., & Uren, L. (2021). Understanding Housing Affordability in Australia. *Australian Economic Review*, *54*(3), 375-386.

Choi, C., Jung, H., & Su, L. (2019). Population structure and housing prices: evidence from Chinese provincial panel data. *Emerging Markets Finance and Trade*, *55*(1), 29-38.

Choy, L. H., & Li, V. J. (2017). The role of higher education in China's inclusive urbanization. *Cities*, *60*, 504-510.

Ciric, R. M. (2019). Review of techno-economic and environmental aspects of building small hydroelectric plants–A case study in Serbia. *Renewable Energy*, *140*, 715-721.

Clemens, M. A., Montenegro, C. E., & Pritchett, L. (2019). The place premium: Bounding the price equivalent of migration barriers. *Review of Economics and Statistics*, *101*(2), 201-213.

Coskun, Y., Seven, U., Ertugrul, H. M., & Alp, A. (2020). Housing price dynamics and bubble risk: the case of Turkey. *Housing Studies*, *35*(1), 50-86.

Danso, H., & Obeng-Ahenkora, N. K. (2018). Major determinants of prices increase of building materials on Ghanaian construction market. *Open Journal of Civil Engineering*, *8*(2), 142-154.

Dašić, G., Radosavac, A., Knežević, D., & Đervida, R. (2019). Preferences of customers and improvement of production and sales of organic products in Serbia. *Економика пољопривреде, 66*(1), 127-142.

Daud, S. N. M., & Marzuki, A. (2018). An unobserved component analysis of Malaysia's house prices. *International Journal of Housing Markets and Analysis*.

Davis, K. (2017). An empirical investigation into different stakeholder groups perception of project success. *International Journal of Project Management*, *35*(4), 604-617.

Degen, K., & Fischer, A. M. (2017). Immigration and Swiss house prices. *Swiss Journal of Economics and Statistics*, *153*(1), 15-36.

Demary, M. (2009). *The link between output, inflation, monetary policy and housing price dynamics.* Retrieved August 5, 2021, from https://mpra.ub.uni-muenchen.de/15978/1/MPRA_paper_15978.pdf

Dewita, Y., Yen, B. T., & Burke, M. (2018). The effect of transport cost on housing affordability: Experiences from the Bandung Metropolitan Area, Indonesia. *Land use policy*, *79*, 507-519.

Diehl, C., Hinz, T., & Auspurg, K. (2018). Who is afraid of skilled migrants from Europe? Exploring support for immigration control in Switzerland. *Schweizerische Zeitschrift Für Soziologie*, *44*(1), 59-88.

Disney, R., & Gathergood, J. (2018). House prices, wealth effects and labour supply. *Economica*, *85*(339), 449-478.

Djordjevic, B. S. (2019). Commodity prices and economic growth: an empirical study from Serbia. *Economic and Social Development: Book of Proceedings*, 44-55.

Docquier, F., & Rapoport, H. (2006). The brain drain. *New Palgrave Dictionary of Economics*.

Duja, B., & Supriyanto, H. (2019). The Influence of GDP, Interest Rate, Wage, Inflation and Exchange Rate on Residential Property Price in Indonesia. *Journal of the Malaysian Institute of Planners*, *17*(1), 389-400.

Erol, I. (2019). New geographies of residential capitalism: Financialization of the Turkish housing market since the early 2000s. *International Journal of Urban and Regional Research*, *43*(4), 724-740.

Faiz, A. R. & Rahim, A. R. (2020). Factors that Determine House Price Index in Malaysia. International Journal of Academic *Research in Accounting Finance and Management Sciences*, *10*(1):351-359.

Fenwick, D. (2013). *Handbook on Residential Property Price Indices*. Retrieved August 2, 2021, from https://www.oecd-ilibrary.org/docserver/9789264197183-4-en.pdf?expires=1628538420&id=id&accname=guest&checksum=D6E86021F97DDA1FDE153C402BC6FCE3

Funke, M., Kirkby, R., & Mihaylovski, P. (2018). House prices and macroprudential policy in an estimated DSGE model of New Zealand. *Journal of Macroeconomics*, *56*, 152-171.

Gale, D. (1955). The law of supply and demand. *Mathematica scandinavica*, 155-169.

Gan, L., Wang, P., & Zhang, Q. (2018). Market thickness and the impact of unemployment on housing market outcomes. *Journal of Monetary Economics*, *98*, 27-49.

Ganeson, C., & Abdul Muin, I. (2015). An analysis of the factors affecting house prices in Malaysia–an econometric approach. In *Conference Proceedings of Social Sciences Postgraduate International Seminar (SSPIS).* School of Social Sciences, Pulau Pinang, Malaysia (pp. 224-235).

Gaspareniene, L., Remeikiene, R., & Skuka, A. (2017). Assessment of the Impact of Macroeconomic Factors on Housing Price Level: Lithuanian Case. *Intellectual Economics.*

Geng, M. N. (2018). *Fundamental drivers of house prices in advanced economies*. International Monetary Fund.

Ghasemi, A. & Zahediasi, S. (2012). *Normality Tests for Statistical Analysis: A Guide for Non-Statisticians.* Retrieved from August 30, 2021, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3693611/

Glaeser, E., Huang, W., Ma, Y., & Shleifer, A. (2017). A real estate boom with Chinese characteristics. *Journal of Economic Perspectives*, *31*(1), 93-116.

Glindro, E. T., Subhanij, T., Szeto, J., & Zhu, H. (2018). Determinants of house prices in nine Asia-Pacific economies. *26th issue (September 2011) of the International Journal of Central Banking*.

Guo, M., & Wu, Q. (2013). The empirical analysis of affecting factors of Shanghai housing prices. *International Journal of Business and Social Science*, *4*(14).

Gurran, N., Maalsen, S., & Shrestha, P. (2020). Is 'informal' housing an affordability solution for expensive cities? Evidence from Sydney, Australia. *International Journal of Housing Policy*, 1-24.

Hankinson, M. (2018). When do renters behave like homeowners? High rent, price anxiety, and NIMBYism. *American Political Science Review*, *112*(3), 473-493.

Hassan, M. M., Ahmad, N., & Hashim, A. H. (2021). A Review on Housing Affordability in Malaysia: Are We Doing Fine. *Malaysian Journal of Consumer and Family Economics*, *26*, 181-206.

Hazledine, T., & Rashbrooke, M. (2018). The New Zealand rich list twenty years on. *New Zealand economic papers*, *52*(3), 289-303.

He, X., Cai, X. J. & Hamori, S. (2018). Evidence from a TVP-VAR Model with Stochastic Volatility. *Journal of Risk Financial Management*, *11*(4), 90.

Helgadóttir, G., Einarsdóttir, A. V., Burns, G. L., Gunnarsdóttir, G. Þ., & Matthíasdóttir, J. M. E. (2019). Social sustainability of tourism in Iceland: A qualitative inquiry. *Scandinavian Journal of Hospitality and Tourism*, *19*(4-5), 404-421.

Henderson, V. (2003). The urbanization process and economic growth: The so-what question. *Journal of Economic growth*, *8*(1), 47-71.

Henry, L. (2014). Income inequality and income-class consumption patterns. *Economic Commentary*, (2014-18).

Holmes, M. J., Otero, J., & Panagiotidis, T. (2017). A pair-wise analysis of intra-city price convergence within the Paris housing market. *The Journal of Real Estate Finance and Economics*, *54*(1), 1-16.

Hossain, B. & Latif, E. (2007). Determinants of Housing Price Volatility in Canada: A Dynamic Analysis. *Applied Economics*, *41*(27), 3521-3531.

Hutchison, N. E. (1994). Housing as an investment? A Comparison of Returns from Housing with other types of investment. *Journal of Property Finance*.

Irandoust, M. (2019). House prices and unemployment: an empirical analysis of causality. *International Journal of Housing Markets and Analysis*.

Jacobsen, D. H. (n.d.). What drives house prices? *Economic Bulletin 05 Q1*, 29-41.

Jordà, Ò., Knoll, K., Kuvshinov, D., Schularick, M., & Taylor, A. M. (2019). The rate of return on everything, 1870–2015. *The Quarterly Journal of Economics*, *134*(3), 1225-1298.

Jud, G. D., & Winkler, D. T. (2002). The dynamics of metropolitan housing prices. *The journal of real estate research*, *23*(1/2), 29-46.

Kajuth, F. (2021). Land leverage and the housing market: Evidence from Germany. *Journal of Housing Economics*, *51*, 101746.

Kassim, S. H., Redzuan, N. H., & Harun, N. Z. (2017). What drives house Price in Malaysia? In search of an alternative pricing benchmark for Islamic home financing. *PLANNING MALAYSIA*, *15*(4).

Knoll, K., Schularick, M., & Steger, T. (2017). No price like home: Global house prices, 1870-2012. *American Economic Review*, *107*(2), 331-53.

Koetter, T., Sikder, S. K., & Weiss, D. (2021). The cooperative urban land development model in Germany - An effective instrument to support affordable housing. *Land Use Policy*, *107*, 105481.

Kuhn, U. (2020). Augmented wealth in Switzerland: the influence of pension wealth on wealth inequality. *Swiss journal of economics and statistics*, *156*(1), 1-16.

Kvalnes, Ø., & Nordal, S. (2019). Normalization of questionable behavior: An ethical root of the financial crisis in Iceland. *Journal of Business Ethics*, *159*(3), 761-775.

La Cava, G., Leal, H., & Zurawski, A. (2017). Housing accessibility for first home buyers. *Reserve Bank of Australia Bulletin*, 19-28.

Lewer, J. J., & Van den Berg, H. (2008). A gravity model of immigration. *Economics letters*, *99*(1), 164-167.

Lewis, C. (2019). *Raising more public revenue in Indonesia in a growth-and equity-friendly way* (No. 1534). OECD Publishing.

Libertun de Duren, N., & Osorio, R. (2020). The Effect of Public Expenditure on the Housing Deficit in Peru at the Municipal Level. *Housing Policy Debate*, *30*(5), 718-740.

Lin, Y., Ma, Z., Zhao, K., Hu, W., & Wei, J. (2018). The impact of population migration on urban housing prices: Evidence from China's major cities. *Sustainability*, *10*(9), 3169.

Liu, H., & Shen, Y. (2005). Housing prices and general economic conditions: an analysis of Chinese new dwelling market. *Tsinghua Science and Technology*, *10*(3), 334-343.

Luangaram, P., & Sethapramote, Y. (2018). *Economic impacts of political uncertainty in Thailand* (No. 86). Puey Ungphakorn Institute for Economic Research.

Mahathanaseth, I., & Tauer, L. W. (2019). Monetary policy transmission through the bank lending channel in Thailand. *Journal of Asian Economics*, *60*, 14-32.

Majid, R. A., Said, R., & Chong, J. T. S. (2017). Assessment of bubbles in the Malaysian housing market. *Planning Malaysia*, *15*.

Mallick, H., & Mahalik, M. K. (2015). Factors determining regional housing prices: evidence from major cities in India. *Journal of Property Research*, *32*(2), 123-146.

Manaf, S. M. A., Said, N. S. M., Al, S. R. O., & Adenan, N. D. (2019). Housing price variation analysis in Malaysian scenario. *E–Academia Special Issue GraCe Journal*, 240-245.

Mansur, S. A., Abdul Hamid, A. R., & Yusof, N. A. (2016). Rising Trend in Construction Cost and Housing. *Journal of Advanced Research in Business and Management Studies ISSN (online): 2462-1935, Vol. 3, No. 1.*, 94-104.

Markowitz, H. (1952). Portfolio Selection. *The Journal of Finance*, *7*(1), 77-91.

Marohabutr, T. (2018). Housing Segmentation and Diverging Outcomes in Housing Wellbeing in Bangkok, Thailand. *Housing Policy, Wellbeing and Social Development in Asi*a, 19.

Masood, R., Lim, J. B., & González, V. A. (2021). Performance of the supply chains for New Zealand prefabricated house-building. *Sustainable Cities and Society*, *64*, 102537.

Massey, D. S. (2019). Economic development and international migration in comparative perspective. In *Determinants of Emigration from Mexico, Central America, and the Caribbean* (pp. 13-47). Routledge.

Milica, Z., Slavisa, K., Milan, T., Mariji, S., & Aleksandar, K. (2022). Flexibility and Current Housing Conditions in Serbia: A Case Study of the City of Nis. *Technical Gazette*, *29*, 401-407.

Mitrović, Đ. (2022). Serbian Economy–History, Transition and Present. In *The Geography of Serbia* (pp. 185-197). Springer, Cham.

Möbert, J., Schneider, S., & AG, D. B. (2018). The German housing market in 2018. *Deutsche Bank Research*.

Mohan, S., Hutson, A., MacDonald, I., & Lin, C. C. (2019). Impact of macroeconomic indicators on housing prices. *International Journal of Housing Markets and Analysis*.

Molloy, R. (2020). The effect of housing supply regulation on housing affordability: A review. *Regional science and urban economics*, *80*, 103350.

Muñoz Unceta, P. (2019). Looking for alternatives in the city of the slopes: Housing as a process to reduce socio-spatial segregation in Lima, Peru.

Musarat, M. A., Alaloul, W. S., & Liew, M. S. (2021). Impact of inflation rate on construction projects budget: A review. *Ain Shams Engineering Journal*, *12*(1), 407-414.

Ni, J. S., Huang, S. S., & Wen, Y. (2011). Interest rates, unemployment rate and house market in US. In *International Conference on Social Science and Humanity*. IACSIT Press, Singapore.

Nistor, A., & Reianu, D. (2018). Determinants of housing prices: evidence from Ontario cities, 2001-2011. *International Journal of Housing Markets and Analysis*.

Njo, A., Made, N. I., & Irwanto, A. (2018). Dual process of dual motives in real estate market Indonesia. *International Journal of Housing Markets and Analysis*.

Olanrewaju, A., & Wong, H. C. (2020). Evaluation of the requirements of first time buyers in the purchase of affordable housing in Malaysia. *Journal of Housing and the Built Environment*, *35*(1), 309-333.

Öner, C. (2012). Inflation: Prices on the rise. *International Monetary Fund*. Retrieved August 2, 2021, from https://www.imf.org/external/pubs/ft/fandd/basics/pdf/oner_inflation.pdf

Ong, T. S. (2013). Factors affecting the price of housing in Malaysia. Journal of Emerging Issues in Economics, *Finance and Banking (JEIEFB)*, *1*, 414-429.

Orihuela, J. C., & Echenique, V. G. (2019). Volatile and spatially varied: the geographically differentiated economic outcomes of resource-based

development in Peru, 2001–2015. *The Extractive Industries and Society*, *6*(4), 1143-1155.

Pagani, A., Baur, I., & Binder, C. R. (2021). Tenants' residential mobility in Switzerland: the role of housing functions. *Journal of Housing and the Built Environment*, *36*(4), 1417-1456.

Panagiotidis, T., & Printzis, P. (2016). On the macroeconomic determinants of the housing market in Greece: a VECM approach. *International Economics and Economic Policy*, *13*(3), 387–409.

Park, H. M. (2011). Practical Guides To Panel Data Modeling: A Step by Step Analysis Using Stata. *Graduate School of International*.

Pelletier, D., & Tunc, C. (2019). Endogenous Life-Cycle Housing Investment and Portfolio Allocation. *Journal of Money, Credit and Banking*, *51*(4), 991-1019.

Rangel, G. J., & Ng, J. W. J. (2017). Macroeconomic Drivers of Singapore Private Residential Prices: A Markov-Switching Approach. *Capital Markets Review*, *25*(2), 15-31.

Rérat, P. (2019). The return of cities: the trajectory of Swiss cities from demographic loss to reurbanization. *European planning studies*, *27*(2), 355-376.

Rherrad, I., Bago, J. L., & Mokengoy, M. (2021). Real estate bubbles and contagion: new empirical evidence from Canada. *New Zealand Economic Papers*, *55*(1), 38-51.

Ritchie, J. B., Amaya Molinar, C. M., & Frechtling, D. C. (2010). Impacts of the world recession and economic crisis on tourism: North America. *Journal of travel research*, *49*(1), 5-15.

Saepórsdóttir, A. D., & Hall, C. M., & Wendt, M. (2020). From Boiling to Frozen? The Rise and Fall of International Tourism to Iceland in the Era of Overtourism. *Journal of Environments, 7*(8), 59.

Saudin, S. B., Jehani, N. A., Mastani, N. A., & Ab Malek, I. (2020). A study on the relationship between house price index and its determinants in Malaysia. *Malaysian Journal of Computing*, *5*(2), 515-522.

Savva, C. S. (2018). Factors affecting housing prices: International evidence. *Cyprus Economic Policy Review*, *12*(2), 87-96.

Sawada, Y., Nakata, H., Sekiguchi, K., & Okuyama, Y. (2018). Land and Real Estate Price Sensitivity to a Disaster: Evidence from the 2011 Thai Floods. *Economics Bulletin*, *38*(1), 89-97.

Sharp, D. A. (2021). 14. US Aid to Peru under the Alliance for Progress Submitted by the Peru Desk of the US Department of State. In *US Foreign Policy and Peru* (pp. 423-442). University of Texas Press.

Sivadas, S., & Ismail, N. W. (2020). Increasing Urban Vulnerability in Malaysia: A Myth or Reality? *Journal of Islamic, 5*(28), 130-140.

Solly, A. (2021). Land use challenges, sustainability and the spatial planning balancing act: Insights from Sweden and Switzerland. *European Planning Studies*, *29*(4), 637-653.

Soylu, Ö. B., Çakmak, İ., & Okur, F. (2018). Economic growth and unemployment issue: Panel data analysis in Eastern European Countries. J*ournal of International Studies*, *11*(1), 93-107.

Speer, A. B., Dutta, S., Chen, M., & Trussell, G. (2019). Here to stay or go? Connecting turnover research to applied attrition modeling. *Industrial and Organizational Psychology*, *12*(3), 277-301.

St John, S., & Baucher, T. (2021). *The Fair Economic Return: Restoring equity to the social fabric of New Zealand*. RPRC working paper 2021-1 30th June.

Stratton, L. S. (2017). Housing Prices, Unemployment Rates, Disadvantage, and Progress toward a Degree. *Institute of Labor Economics.*

Su, Y., & Zhang, Y. (2011). The empirical study of influencing factors of our country's real estate prices--based on 2003-2008 data. *J. Jiangxi Social Sciences, 12,* 54-57.

Sukrri, N. N. A. N. M., Wahab, N. A., & Yusof, R. M. (2019). Constructing an enhanced house price index model in Malaysia: Empirical evidence. *Jurnal Ekonomi Malaysia, 53,* 3.

Sumaryoto, S., Nurfarkhana, A., & Anita, T. (2021). The Impact of Money Supply And The Inflation Rate on Indonesia Composite Index: Case Study In Indonesia Stock Exchange 2008-2017. *International Journal of Economics, Business and Accounting Research (IJEBAR), 5*(2).

Surbhi, S. (2017). *Differences Between Skewness and Kurtosis.* Retrieved August 30, 2021, from https://keydifferences.com/differences-between-skewness-and-kurtosis.html

Syuhada, B., Naqiah, I. I., & Suffian A. Z. (2019). Housing Price in Malaysia: The Impact of Macroeconomic Indicators. *Journal of Global Business and Social Entrepreneurship, 5*(16), 69-80.

Tan, T. H. (2009). Homeowning Motivation in Malaysia. *Journal of Accounting, Business & Management*, *16*(1).

Tang, J., Ye, K., & Qian, Y. (2019). Rethinking the relationship between housing prices and inflation: new evidence from 29 large cities in China. *International Journal of Strategic Property Management*, *23*(3), 142-155.

Tang, Q., & Jin, P. (2019). Analysis of Influential Factors of Housing Price in Nanjing Based on Improved Grey Relational Analysis. *DEStech Transactions on Social Science, Education and Human Science.*

Ting, L. (2021). The Impact of Gambling Gross Income, Unemployment Rate, Money Supply and CPI on Residential Housing Value in Macau: Theory and Evidence. *Institute of Accounting and Finance, vol. 11(6).*

Tobi, S. U. M., Jasimin, T. H., & Rani, W. N. M. W. M. (2020). Overview of Affordable Housing from Supply and Demand Context in Malaysia. In *IOP Conference Series: Earth and Environmental Science* (Vol. 409, No. 1, p. 012010). IOP Publishing.

Todaro, M. P. (1969). A model of labor migration and urban unemployment in less developed countries. *The American economic review*, *59*(1), 138-148.

Tomeczek, A. (2020). The secular stagnation hypothesis and the future of Europe's advanced economies. *Politeja-Pismo Wydziału Studiów Międzynarodowych i Politycznych Uniwersytetu Jagiellońskiego*, *17*(66), 53-66.

Torab, E. S. (2018). A Law or Just a Hypothesis? A Critical Review of Supply and Demand Effect on the Affordable Residential Markets in Developing Countries. *Alexandria Engineering Journal, 54*(4), 4081-4090.

Treapăt, L. M., Gheorghiu, A., & Ochkovskaya, M. (2018). A synthesis of the sharing economy in Romania and Russia. In *Knowledge Management in the Sharing Economy* (pp. 57-73). Springer, Cham.

Tripathi, S. (2019). *Macroeconomic Determinants of Housing Prices: A Cross Country Level Analysis.* National Research University Higher School of Economics.

Tsai, I. C. (2020). Alternative explanation of the money illusion: The effect of unexpected low inflation. *International Review of Economics & Finance*, *69*, 110-123.

Tsatsaronis, K., & Zhu, H. (2004). What drives housing price dynamics: cross-country. *BIS Quarterly Review*, 65-78.

Tsertseil, J. S. & Kookueva, V. V. (2017). Problems of Property Market Development in Russia in the Modern Text. *Journal of Espacios, 38*(41).

Tsui, K. W. H., Tan, D., Chow, C. K. W., & Shi, S. (2019). Regional airline capacity, tourism demand and housing prices: A case study of New Zealand. *Transport Policy*, *77*, 8-22.

Veni, P., & Kandregula, R. (2020). Evolution of behavioral finance. *International Journal of Scientific Development and Research*.

Viktorov, I., & Abramov, A. (2020). The 2014–15 financial crisis in Russia and the foundations of weak monetary power autonomy in the international political economy. *New political economy*, *25*(4), 487-510.

Vogiazas, S., & Alexiou, C. (2017). Determinants of housing prices and bubble detection: evidence from seven advanced economies. *Atlantic Economic Journal*, *45*(1), 119-131.

Voronina, E. V., Yarosh, O. B., Bereza, N. V., & Zakieva, N. I. (2018). Mathematical model of forecasting the residential real estate market prices level. In *Materials Science Forum* (Vol. 931, pp. 1101-1106). Trans Tech Publications Ltd.

Wang, J., Koblyakova, A., Tiwari, P., & Croucher, J.S. (2018). Is the Australian Housing Market in a Bubble? *International Journal of Housing Markets and Analysis.*

Wang, X. R., Hui, E. C. M., & Sun, J. X. (2017). Population migration, urbanization, and housing prices: Evidence from the cities in China. *Habitat International*, *66*, 49-56.

Weeks, J. R. (2020). *Population: An introduction to concepts and issues*. Cengage Learning.

Wessels, W. J. (2018). *Economics*. Simon and Schuster.

Wong, P., Higgins, D., & Wakefield, R. (2017). Foreign real estate investment, residential tourism and the Australian residential property market. *International Journal of Housing Markets and Analysis*, *10*(5), 586-606.

Wong, V. K., & Sarma A. (2019). Macroeconomic Variables and Housing Price in Malaysia. In *Proceedings of the International Conference on Economics* (pp. 23-34).

Xu, L., & Tang, B. (2014). On the determinants of UK house prices. *International Journal of Economics and Research*, *5*(2), 57-64.

Xu, T. (2017). The Relationship between Interest Rates, Income, GDP Growth. *Research in Economics and Management Vol. 2, No. 1*, ISSN 2470-4407.

Yap, J. B. H., & Ng, X. H. (2018). Housing affordability in Malaysia: perception, price range, influencing factors and policies. *International Journal of Housing Markets and Analysis*.

Yin, Y. C., Nee, A. Y. H., & Senadjki, A. (2019). The nexus between housing glut, economic growth, housing affordability and house price in Malaysia. *PLANNING MALAYSIA*, *17*.

ZACH. (2020, December 31). *The Breusch-Pagan Test: Definition & Example*. Retrieved August 30, 2021, from STATOLOGY: https://www.statology.org/breusch-pagan-test/

Zhang, H., & Yang, Y. (2021). Does tourism contribute to real estate boom? A DSGE modeling in small open economy. *Journal of Hospitality & Tourism Research*, *45*(1), 257-279.

APPENDICES

Appendix 1: Likelihood Ratio Test (Developed)

Redundant Fixed Effects Tests

Equation: Untitled

Test cross-section fixed effects

Effect Test	Statistic	d.f.	Prob.
Cross-section F	102.784506	(5,79)	0.000
Cross-section Chi-square	181.405431	5	0.000

Appendix 2: Likelihood Ratio Test (Developing)

Redundant Fixed Effects Tests

Equation: Untitled

Test cross-section fixed effects

Effect Test	Statistic	d.f.	Prob.
Cross-section F	26.903034	(5,79)	0.000
Cross-section Chi-square	89.483402	5	0.000

Appendix 3: Lagrange Multiplier Test (Developed)

Lagrange Multiplier Tests for Random Effects

Null hypotheses: No effects

Alternative hypotheses: Two-sided(Breusch-Pagan) and one-sided (all others) alternatives

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	50.41348 (0.0000)	1.958296 (0.1617)	52.37178 (0.0000)
Honda	7.100245 (0.0000)	1.399391 (0.0808)	6.010151 (0.0000)
King-Wu	7.100245 (0.0000)	1.399391 (0.0808)	6.812688 (0.0000)
Standardized Honda	11.18999 (0.0000)	1.718413 (0.0429)	4.134039 (0.0000)
Standardized King-Wu	11.18999 (0.0000)	1.718413 (0.0429)	6.029236 (0.0000)
Gourieroux, et al.	-	-	52.37178 (0.0000)

Appendix 4: Lagrange Multiplier Test (Developing)

Lagrange Multiplier Tests for Random Effects

Null hypotheses: No effects

Alternative hypotheses: Two-sided(Breusch-Pagan) and one-sided (all others) alternatives

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	0.163698 (0.6858)	1.785968 (0.1814)	1.949666 (0.1626)
Honda	0.404596 (0.3429)	-1.336401 (0.9093)	-0.658886 (0.7450)
King-Wu	0.404596 (0.3429)	-1.336401 (0.9093)	-0.338256 (0.6324)
Standardized Honda	3.904616 (0.0000)	-1.161355 (0.8773)	-3.895580 (1.0000)
Standardized King-Wu	3.904616 (0.0000)	-1.161355 (0.8773)	-3.424758 (0.9997)
Gourieroux, et al.	-	-	0.163698 (0.5732)

Appendix 5: Hausman Test (Developed)

Correlated Random Effects – Hausman Test

Equation: Untitled

Test cross-section fixed effects

Test Summary	Chi-Sq.Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	513.922528	5	0.000

Appendix 6: Hausman Test (Developing)

Correlated Random Effects – Hausman Test

Equation: Untitled

Test cross-section fixed effects

Test Summary	Chi-Sq.Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	134.515169	5	0.000

Appendix 7: Descriptive Statistic (Developed)

	LNRRPPI	LNGDP	LNINF	LNUNP	LNPOP	LNCCOST
Mean	4.674913	22.34988	4.605204	1.647930	16.05954	3.188261
Median	4.642137	22.84270	4.605170	1.653454	16.38743	3.206928
Maximum	5.065664	24.44882	4.830144	2.413232	18.23322	3.379021
Minimum	4.297503	18.92393	4.166636	0.810930	12.58476	2.971542
Std. Dev.	0.162123	1.717467	0.116819	0.316425	1.796225	0.109486

Appendix 8: Descriptive Statistic (Developing)

	LNRRPPI	LNGDP	LNINF	LNUNP	LNPOP	LNCCOST
Mean	4.571856	21.81075	4.632182	1.453764	17.71329	3.557790
Median	4.605102	21.74758	4.647735	1.443266	17.63537	3.590522
Maximum	5.068933	24.21164	5.153383	3.178054	19.40527	3.882189
Minimum	3.947514	19.79834	3.998779	-1.386294	15.75893	3.214934
Std. Dev.	0.258623	1.215365	0.232802	0.959082	1.166361	0.182752

Appendix 9: Correlation Analysis (Developed)

	LNRRPPI	LNGDP	LNINF	LNUNP	LNPOP	LNCCOST
LNRRPPI	1.000000	-0.295488	0.292931	-0.367493	-0.320726	-0.529527
LNGDP	-0.295488	1.000000	0.139340	0.461864	0.987344	0.826173
LNINF	0.292931	0.139340	1.000000	0.174303	0.167178	-0.106835
LNUNP	-0.367493	0.461864	0.174303	1.000000	0.515037	0.344566
LNPOP	-0.320726	0.987344	0.167178	0.515037	1.000000	0.800413
LNCCOST	-0.529527	0.826173	-0.106835	0.344566	0.800413	1.000000

Appendix 10: Correlation Analysis (Developing)

	LNRRPPI	LNGDP	LNINF	LNUNP	LNPOP	LNCCOST
LNRRPPI	1.000000	-0.074144	0.013936	-0.336168	0.037372	0.374684
LNGDP	-0.074144	1.000000	0.014126	-0.179769	0.864089	0.242861
LNINF	0.013936	0.014126	1.000000	-0.112211	0.027643	-0.217668
LNUNP	-0.336168	-0.179769	-0.112211	1.000000	-0.347621	-0.486138
LNPOP	0.037372	0.864089	0.027643	-0.347621	1.000000	0.503024
LNCCOST	0.374684	0.242861	-0.217668	-0.486138	0.503024	1.000000

Appendix 11: The Fixed Effect Model (Developed)

Dependent Variable: LNRRPPI

Method: Panel Least Squares

Date: 03/25/22 Time: 22:06

Sample: 2004 2018

Periods included: 15

Cross-sections included: 6

Total panel (balanced) observations: 90

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP	0.001877	0.041352	0.045389	0.9639
LNINF	-0.612970	0.077462	-7.913213	0.0000
LNUNP	-0.240181	0.020487	-11.72376	0.0000
LNPOP	3.393821	0.234809	14.45356	0.0000
LNCCOST	-0.398176	0.122389	-3.253356	0.0017
C	-45.38210	3.143061	-14.43882	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.933293	Mean dependent var	4.674913
Adjusted R-squared	0.924849	S.D. dependent var	0.162123
S.E. of regression	0.044444	Akaike info criterion	-3.275095
Sum squared resid	0.156046	Schwarz criterion	-2.969563
Log likelihood	158.3793	Hannan-Quinn criter.	-3.151887
F-statistic	110.5286	Durbin-Watson stat	0.807797
Prob(F-statistic)	0.000000		

Appendix 12: The Fixed Effect Model (Developing)

Dependent Variable: LNRRPPI

Method: Panel Least Squares

Date: 03/25/22 Time: 22:39

Sample: 2004 2018

Periods included: 15

Ross-sections included: 6

Total panel (balanced) observations: 90

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP	0.627992	0.104236	6.024716	0.0000
LNINF	0.012492	0.106285	0.117533	0.9067
LNUNP	0.191130	0.080355	2.378551	0.0198
LNPOP	-0.361947	0.593596	-0.609754	0.5438
LNCCOST	-0.980056	0.385399	-2.542965	0.0129
C	0.437275	10.27631	0.042552	0.9662

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.710847	Mean dependent var	4.571856
Adjusted R-squared	0.674245	S.D. dependent var	0.258623
S.E. of regression	0.147609	Akaike info criterion	-0.874415
Sum squared resid	1.721288	Schwarz criterion	-0.568883
Log likelihood	50.34869	Hannan-Quinn criter.	-0.751207
F-statistic	19.42117	Durbin-Watson stat	0.482621
Prob(F-statistic)	0.000000		

Appendix 13: Breusch-Pagan LM (Developed)

Residual Cross-Section Dependence Test

Null hypothesis: No cross-section dependence (correlation) in residuals

Equation: Untitled

Periods included: 15

Cross-section included: 6

Total panel observations: 90

Cross-section effects were removed during estimation

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	21.44024	15	0.1233
Pesaran scaled LM	1.175822		0.2397
Bias-corrected scaled LM	0.961536		0.3363
Pesaran CD	-0.725169		0.4683

Appendix 14: Breusch-Pagan LM (Developing)

Residual Cross-Section Dependence Test

Null hypothesis: No cross-section dependence (correlation) in residuals

Equation: Untitled

Periods included: 15

Cross-section included: 6

Total panel observations: 90

Cross-section effects were removed during estimation

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	27.80323	15	0.0228
Pesaran scaled LM	2.337539		0.0194
Bias-corrected scaled LM	2.123253		0.0337
Pesaran CD	-0.674829		0.4998

Appendix 15: Levin-Lin-Chu Test (Developed)

Panel unit root test: Summary

Series: LNRRPPI

Date: 03/30/22 Time:15:35

Sample: 2004 2018

Exogenous variables: Individual effects

User-specific lags: 1

Newey-West automatic bandwidth selection and Barlett kernel

Balanced observations for each test

Method	Statistic	Prob **	Cross-sections	Obs
Null: Unit root(assumes common unit root process)				
Levin, Lin & Chu t**	-2.00637	0.0224	6	72
Null: Unit root(assumes individual unit root process)				
IM, Pesaran and Shin W-stat	-1.24520	0.1065	6	72
ADF - Fisher Chi-square	18.0070	0.1155	6	72
PP - Fisher Chi-square	19.5503	0.0761	6	78

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Appendix 16: Levin-Lin-Chu Test (Developing)

Panel unit root test: Summary

Series: LNRRPPI

Date: 03/30/22 Time:15:35

Sample: 2004 2018

Exogenous variables: Individual effects

User-specific lags: 1

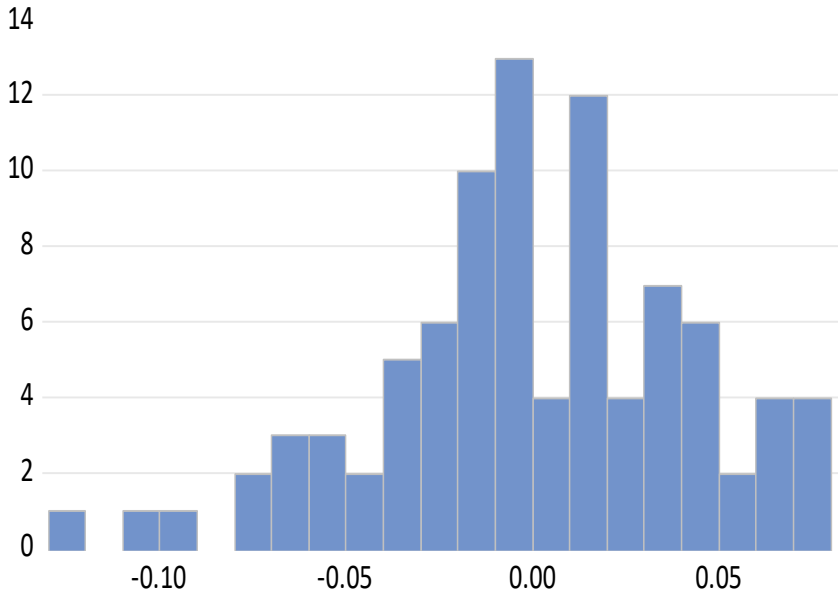
Newey-West automatic bandwidth selection and Barlett kernel

Balanced observations for each test

Method	Statistic	Prob **	Cross-sections	Obs
Null: Unit root(assumes common unit root process)				
Levin, Lin & Chu t**	-1.93113	0.0267	6	78
Null: Unit root(assumes individual unit root process)				
IM, Pesaran and Shin W-stat	-0.51559	0.3031	6	78
ADF - Fisher Chi-square	16.2780	0.1788	6	78
PP - Fisher Chi-square	12.1383	0.4346	6	84

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Appendix 17: Jarque-Bera Test (Developed)



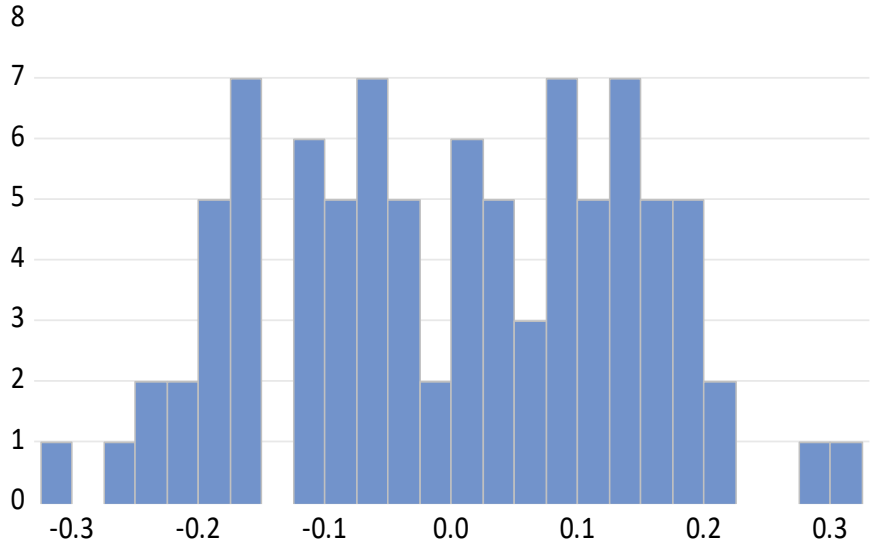
Series: Standardized Residuals

Sample: 2004 2018

Observations 90

Mean	-1.28e-16
Median	-0.002618
Maximum	0.078992
Minimum	-0.125434
Std. Dev.	0.041873
Skewness	-0.390672
Kurtosis	3.106448
Jarque-Bera	2.331859
Probability	0.311633

Appendix 18: Jarque-Bera Test (Developing)



Series: Standardized Residuals

Sample: 2004 2018

Observations 90

Mean	1.20e-17
Median	0.006332
Maximum	0.305818
Minimum	-0.310197
Std. Dev.	0.139069
Skewness	-0.049333
Kurtosis	2.135890
Jarque-Bera	2.836578
Probability	0.242128