IMPACTS OF MONETARY AND FISCAL POLICY INTERACTION ON ECONOMIC GROWTH AND INFLATION, AND THE TAYLOR RULES IN MALAYSIA, THAILAND AND SINGAPORE

TAN CHAI THING

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By

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Chair   **: Azali Mohamed, PhD**
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Macroeconomic policies play an important role in stabilising prices and growth. Recent financial crises have raised awareness of the role of the interaction of monetary and fiscal policies. This study examines the interaction of monetary and fiscal policies in three countries namely; Malaysia, Thailand and Singapore from 1980: Q1 until 2017: Q1. The first objective of this study was to examine the interaction of monetary and fiscal policies on economic growth. The results revealed that the long-run relationship between monetary policy and output was positive for all three countries while the long-run relationship between fiscal policy and output was positive in the case of Thailand. However, its interaction with the interest rate and government spending was found to be important for economic growth. The result indicated that the interaction term between monetary and fiscal policies had a negative effect on economic growth in Malaysia and Thailand but had a positive effect in Singapore. This evidence suggested that the effects of monetary policy (fiscal policy) on economic growth were altered by different levels of government spending (interest rate). In other words, the expansion of one policy could deal more efficiently with growth with the interaction of another policy.

By examining the interaction of the policies on inflation, the results of the second objective show that the relationship between monetary policy and inflation was negative in Singapore while fiscal policy had a positive effect on inflation in Malaysia and Thailand. The interaction term between monetary and fiscal policy had a positive effect on inflation in Malaysia but had a negative effect on inflation in Singapore and Thailand. This indicates that the effectiveness of one policy will be influenced by changes in the level of another policy. Thus, regardless of the country, the interaction of monetary

and fiscal policy played an important role in influencing the effectiveness of another policy. Separating monetary and fiscal policies will overlook the importance of policy interaction on stimulating economic growth and inflation. It is important to take into account the potential interaction between monetary and fiscal policy for good policy-making (Sims, 2011). These first two objectives were estimated by using the ARDL approach.

The third strand of this thesis examined the Taylor rules by using the Generalized Method of Moments (GMM) approach. The results showed that; (i) Backwards looking Taylor rules in Malaysia and Thailand seem to provide a reasonable description of central bank behaviour while forward-looking Taylor rules apply in Singapore. This means that past inflation and the output gap play a role in influencing the monetary policy reaction function in Malaysia and Thailand. (ii) The Augmented Taylor rule incorporating the exchange rate and government spending best describes the behaviour of interest rate setting in Malaysia, Thailand and Singapore. (iii) The monetary authorities in these economies respond positively to inflation (except for Singapore) and the output gap, however, the coefficient of the inflation rate was lower than 1.5 as postulated by Taylor (1993). In addition, the results indicated central banks in all three countries have a strong preference for implementing the monetary policy rules towards interest rate smoothing, government spending and the exchange rate.

IMPAK INTERAKSI POLISI MONETARI DAN FISKAL TERHADAP PERTUMBUHAN EKONOMI DAN INFLASI, DAN PERATURAN TAYLOR DI MALAYSIA, THAILAND DAN SINGAPURA

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Dasar makroekonomi memainkan peranan penting dalam menstabilkan harga dan pertumbuhan. Krisis kewangan terkini telah meningkatkan kesedaran terhadap peranan interaksi dasar monetari dan fiskal. Kajian ini mengkaji interaksi diantara dasar monetari dan fiskal bagi tiga negara iaitu Malaysia, Thailand, dan Singapura untuk tempoh 1980: Q1 hingga 2017: Q1. Objektif pertama adalah mengkaji interaksi antara dasar monetari dan fiskal terhadap pertumbuhan ekonomi. Hasil kajian menunjukkan bahawa hubungan jangka panjang antara dasar monetari dan pertumbuhan output adalah positif di ketiga-tiga negara manakala dasar fiskal dan pertumbuhan output adalah positif di Thailand. Walau bagaimanapun, interaksi dengan kadar faedah dan perbelanjaan kerajaan didapati penting untuk pertumbuhan ekonomi. Dapatan kajian menunjukkan bahawa interaksi antara dasar monetari dan fiskal mempunyai kesan negatif terhadap pertumbuhan ekonomi di Malaysia dan Thailand tetapi kesan positif di Singapura. Bukti ini mencadangkan bahawa kesan dasar monetari (dasar fiskal) terhadap perubahan pertumbuhan ekonomi adalah disebabkan oleh perbelanjaan kerajaan yang berbeza (kadar faedah). Dalam erti kata lain, pengembangan sesuatu dasar boleh ditangani dengan lebih cekap pada pertumbuhan dengan interaksi dasar lain.

Dengan mengkaji interaksi dasar mengenai inflasi, hasil objektif kedua menunjukkan bahawa hubungan antara dasar monetari dan inflasi adalah negatif di Singapura manakala dasar fiskal mempunyai kesan positif terhadap inflasi di Malaysia dan Thailand. Interaksi antara dasar monetari dan fiskal mempunyai kesan positif terhadap inflasi di Malaysia tetapi negatif di Singapura dan Thailand. Ini menunjukkan bahawa keberkesanan satu dasar akan dipengaruhi oleh perubahan tahap dasar yang lain. Oleh itu,

tanpa mengira negara, interaksi dasar monetari dan fiskal memainkan peranan penting dalam mempengaruhi keberkesanan dasar lain. Memisahkan dasar monetari dan fiskal akan mengabaikan kepentingan interaksi dasar untuk merangsang pertumbuhan ekonomi dan inflasi. Ini adalah penting untuk mengambil kira potensi interaksi antara dasar monetari dan fiskal untuk pembuatan dasar yang baik (Sims, 2011). Model Autoregressive Distributed Lag (ARDL) telah digunakan untuk mencapai objektif pertama dan kedua.

Kajian ini juga meneliti fungsi tindak balas dasar menteri dengan menggunakan kaedah Generalised Method of Moment (GMM). Hasil kajian menunjukkan bahawa (i) Peraturan Taylor pertimbangan mundur (backward looking) di Malaysia dan Thailand, dan pertimbangan maju (forward looking) di Singapura memberikan keterangan yang munasabah mengenai perilaku bank pusat. Ini bermakna inflasi dan jurang output masa lalu memainkan peranan dalam mempengaruhi fungsi tindak balas dasar monetari di Malaysia dan Thailand. (ii) Pemeringkatan peraturan Taylor dengan kadar pertukaran dan perbelanjaan kerajaan adalah yang terbaik untuk menggambarkan tingkah laku penerapan kadar faedah di Malaysia, Singapura, dan Thailand. (iii) Pihak berkuasa monetari dalam ekonomi memberikan respon positif kepada inflasi (kecuali Singapura) dan jurang output tetapi koefisien kadar inflasi adalah lebih rendah dari 1.5 seperti yang diumum oleh Taylor (1993). Di samping itu, keputusan kajian juga menunjukkan bahawa bank negara mempunyai keutamaan yang kuat untuk melaksanakan dasar monetari ke arah melancarkan kadar faedah, perbelanjaan kerajaan, dan kadar pertukaran di ketiga-tiga negara.

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I certify that a Thesis Examination Committee has met on 28 May 2019 to conduct the final examination of Tan Chai Thing on her thesis entitled Impacts of Monetary and Fiscal Policy Interaction on Economic Growth and Inflation, and the Taylor Rules in Malaysia, Thailand and Singapore in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller
AFC	Asian Financial Crisis
ARDL	Autoregressive Distributed Lag
BLR	Base Lending Rate
BNM	Bank Negara Malaysia
BoT	Error Correction Term
ECT	Bank of Thailand
FTPL	Fiscal Theory of Price Level
GFC	Global Financial Crisis
GMM	Generalised Method of Moment
IMF	International Monetary Fund
IT	Inflation Targeting
MAS	Monetary Authority of Singapore
MWALD	Modified Wald
OLS	Ordinary Least Squares
OPR	Overnight Policy Rate
PP	Phillips-Perron
QTM	Quantity Theory of Money
SET	Stock Exchange of Thailand
SRR	Statutory Reserve Ratio
SVECM	Structural Vector Error Correction
UIP	Uncovered Interest Parity
VAR	Vector Autoregression
WEO	World Economic Outlook

CHAPTER 1

INTRODUCTION

This thesis sheds light on the issues related to the effectiveness of both monetary and fiscal policy and their interactions. Besides that, the role of monetary policy is another focus in this study. Macroeconomic policies play an important role in stabilising prices and growth. Recent economic crises have raised awareness of the role of monetary and fiscal policy interaction. The following section briefly introduces monetary and fiscal policies. The research background is discussed in Section 1.2. The problem statement, the objectives of this research and the significance of the study are discussed in the following section.

1.1   Monetary and Fiscal Policy

Classical economists generally believed that without government intervention, economies would correct themselves. The great depression, during 1929, induced policymakers and economists to reconsider the importance of policy intervention. Monetary and fiscal policies are both used for national macroeconomic stability, such as to ensure low inflation or to increase output. These two tools are the main policy instruments that policymakers use when seeking to promote optimal economic performance (Liborio, 2011). Central banks use the interest rate and the required reserve ratio, or money stock, as monetary instruments, while governments[1] use government spending, tax revenue or transfer payments as fiscal instruments.

A government's role is to act to encourage economic activity whilst keeping economic growth sustainable and avoiding financial crises. While, monetary policy is usually implemented as a stabilisation policy instrument to conduct economies towards achieving sustainable price stability and economic growth (Kirsanova, Leith & Wren-Lewis, 2009), in practice, some central bank monetary policies revolve around a single goal, such as price stability or intermediate objectives, such as evaluating monetary rules and instruments, for example, the interest rate and required reserves. When crises occur, most central banks have reacted by reducing interest rates and injecting more liquidity into the financial system (Heyzer & Mochida, 2009). For example, Malaysia cut the overnight interest rate by 1.5% during the onset of the Global Financial Crisis in 2008. At the same time, Singapore and Thailand also cut the monetary rate by 1% and 2.5 % respectively to combat the crisis (see, Table 1.2). However, some countries may find it difficult to respond to such policies. This depends on the design (e.g. monetary union) or circumstance (e.g. an interest rate near to zero) of the monetary policy

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[1] Ministry of finance

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(Tomsik, 2012) in place. Some emerging economies which have already adopted historically low interest rates have been concerned that additional interest rate cuts may possibly lead to capital outflows which could cause their currency to destabilise (Heyzer & Mochida, 2009). For example, Japan faced a sharp appreciation in the yen together with a sudden decline in exports after a cut in the interest rate. Japan suffered deflation and a zero interest rate. Conventional monetary easing loses its effectiveness during an extended downturn and where inflation changes to deflation (Heyzer & Mochida, 2009). If monetary policy is constrained under this situation, fiscal policy should be used to stabilise economic growth and for inflation control (Kirsanova et al., 2009).

It is true that in recent years, since the limitations of an expansionary monetary policy in dealing with the adverse fallout from economic shocks (notably for countries which have nearly zero interest rates) have been acknowledged, fiscal policy has become the principal tool for stimulating economic recovery (Woodford, 2001). Expansionary fiscal policies were used by many Asian countries to reduce the impacts of the Asian Financial Crisis (AFC) (Moreno, 2003). To improve domestic aggregate demand and prevent economic pessimism, many governments implemented fiscal stimulus packages to combat recession (Liborio, 2011). For example, Malaysia and Singapore devised fiscal stimulus plans amounting to about 8% of their respective GDP's during 2008 (see, Table 1.3). One of the reasons that Asian countries were able to react so strongly to the economic downturn, as compared with other countries, such as those in Latin America, was due to Asian countries facing fewer financial constraints (Moreno, 2003). Although implementing stimulus packages reduced the impact of the crises, they could also lead to some countries facing massive budget deficit problems. As the depth of the recession became more apparent, arguments in favour of expansionary policies gained strength.

Taylor (2000b) stated that either monetary or fiscal policy was insufficient to stabilizing prices and growth, he found that monetary policy was good at responding to inflation while fiscal policy was good at responding to economic growth. He concluded that fiscal policy could work with the monetary policy if the monetary policy was unable to respond to crises by itself. Some economists have focused on the stabilisation role of fiscal policy when used together with monetary policy. If fiscal policy by itself is unable to expand the economy during an economic downturn, the central bank should intervene to fill the gap, assuming a fixed level of inflation. There is no clear answer as to whether monetary policy or fiscal policy is more appropriate to be used in this context.

Nevertheless, the purposes and implications of the policies used by central banks and governments usually conflict with each other. For instance, during a negative supply shock, the government would implement an expansionary fiscal policy to combat a recession, while the central bank may implement

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contractionary monetary policies to reduce inflationary pressures. Therefore, in order to achieve the set target, the coordination of policies to effectively pursue policy decisions is needed. As there has been a widespread shift to separate the powers of the fiscal and monetary authorities this raises the question; how should the two policies interact when the policymakers' objectives differ.

To better understand the dynamics of real output and inflation, it is helpful to know the interaction of monetary and fiscal policy. In this thesis, the impact of monetary and fiscal policy and its interaction in Malaysia, Singapore and Thailand have been analysed. These countries were chosen as they have common economic characteristics and have experienced similar demographic changes (Khalid & Fakhzan, 2013). Romprasert (2015) stated that the economies of these three countries have expanded from the past 10 years, and their real GDP has in the top ranked economy in Asian. Before the empirical analysis, it is useful to understand recent monetary and fiscal policy reactions. Thus, the next section will describe the research background of the policies used during recent financial crises. Thus, a snapshot of the impacts of the recent financial crises on Malaysia, Singapore and Thailand is discussed in the following section.

1.2   Research Background

1.2.1 Financial Crises Experienced by Malaysia, Singapore and Thailand

In the past two decades, Malaysia, Singapore and Thailand have experienced two major financial crises. The first, known as the Asian Financial Crisis (AFC) occurred during 1997-1999 and the second was the Global Financial Crisis (GFC) occurring over 2007-2008, originally in the US. When the value of the Thai baht dropped on 2nd July 1997, neither the IMF nor the US Treasury, saw any threat of infection to other nations. Although Japan proposed the creation of an Asian Monetary Fund, funded with US$100 billion, this proposal was reportedly not supported by the US, as the US did not wish Japan to expand its influence in Asia. Due to many global investors believing that similar currency account deficits and weak financial systems existed in other Asian countries, the Thai financial crisis expanded to become the AFC. It first extended to Malaysia (14th July 1997) and then to Singapore (17th July 1997) causing the currencies of the two countries to devalue, bringing about sharp decreases in the value of the stock market and the bankruptcy of large companies, one after another.

When looking at the second crisis, the Global Financial Crisis, most of the countries affected by the AFC were able to avoid another financial meltdown as their banking and financial sectors had been rebuilt to become more flexible after the AFC (Lim & Goh, 2012). Asian economies were well positioned, with sustained high growth and low inflation, during the outbreak

of the GFC and avoided its worst effects, therefore, the initial impact of the crisis appeared limited in Asia. However, in late 2007, Asian nations were affected after the economy of the United States had been weakened. The situation started to deepen seriously when Lehman Brothers investment bank collapsed in September 2008.

Not only did investors start to shift capital away from countries that they considered to be less safe, but financial institutions also pulled out money from unsafe assets in an effort to reduce their risks (Glick and Spiegel, 2010). The collapse of Lehman Brothers stunned global financial markets. This rapidly evolved into an economic crisis which was likely to ruin the economic development that had been achieved over the past decade and could potentially trigger human tragedies in other developing countries (Heyzer & Mochida, 2009). The crisis plagued economies around the globe, especially those in developing countries with financial difficulties and weakened the confidence of consumers and investors alike.

During the AFC, Asian countries weakened the influence of the crisis by boosting exports (Heyzer & Mochida, 2009). However, during the GFC a sharp decline in aggregate demand from developed countries, such as the US caused exports to decline. Countries, such as Singapore, Malaysia and Thailand suffered most seriously because their enterprises directly supplied the US and EU markets through vertically integrated production networks (Heyzer & Mochida, 2009). As compared to other emerging market countries, those in Asia had good macroeconomic and financial fundamentals. This enabled them to implement countercyclical monetary and fiscal policies, which were contrary to the AFC, to dampen the external demand shock (Bernanke, 2009). By mid-2009, the recession caused by the global financial crisis had begun to end and most economies, especially those in the Asian region were in a recovery phase. Asia was one of the faster and stronger regions to emerge from the downturn, compared to other regions of the world. Asia was seen as leading the global recovery. In 2010, Singapore was the most impressive performer of the ASEAN member countries and boasted a healthy economic growth rate. The Asian region was leading the recovery over other regions, while the economies of the advanced nations remained sluggish.

1.2.2 Policy Response to the Crises

This section reviews the implementation of the monetary and fiscal policies that were carried out in Malaysia, Singapore and Thailand in response to both the AFC and the GFC.

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1.2.2.1   Malaysia

The priority of the central bank of Malaysia (BNM[2]) in designing its monetary policy is to maintain price stability and to remain supportive of economic growth. To accomplish these objectives, BNM followed a strategy of monetary aggregate targeting prior to the mid-1990s (see, Figure 1.1). This strategy required consistency between the daily liquidity volume in the money market and BNM's monetary growth target without this being formally announced to the public (Ramayandi, 2007).

Before the AFC in 1997, Malaysia experienced favourable economic conditions with high economic growth and low inflation, as well as virtually full employment. Eventually, BNM changed its monetary policy strategy from monetary aggregate targeting to interest rate targeting in November 1995, mainly due to the instability of the monetary aggregates. The 3-month interbank rate was used as the operational policy target. Meanwhile, the exchange rate regime was set to be free floating within some unannounced band, which is known as a managed float by the International Monetary Fund (IMF).
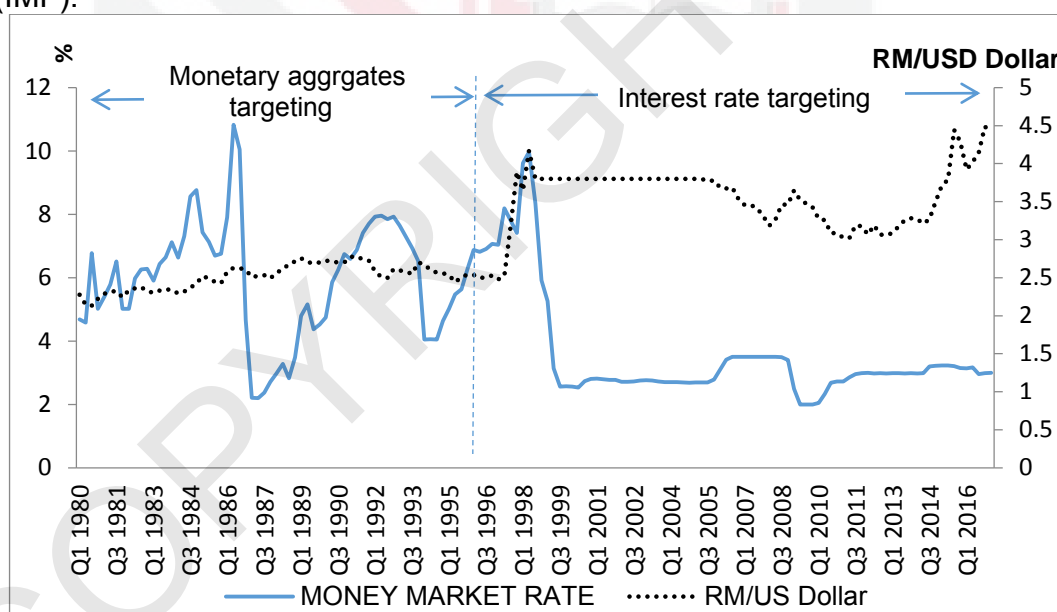
Figure 1.1: Malaysia's Monetary Policy Frameworks, 1980-2017
(Sources: World Bank: World Development Indicators, Ilzetzki, Reinhart & Rogoff (2017) and the authors' calculation)

In mid-May 1997, the Thai baht experienced a speculative attack while the Malaysian Ringgit underwent heavy selling pressure. In response to this crisis during the period from mid-1997 to mid-1998, Malaysia followed an orthodox IMF-style approach. The government deferred spending on several high profile infrastructure projects in early September 1997 and then followed up by cutting back the already stated spending by about 18% in December 1997. The government eased the inflationary pressures caused by the

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[2] Bank Negara Malaysia

depreciation of the Ringgit by decreasing the current account deficit of the balance of payments. This contractionary fiscal policy was accompanied by a contractionary monetary policy, which increased the interbank lending rate from 7.6% to 11% during the period from December 1997 to February 1998 (Menon, 2008). However, the tightened monetary and fiscal policies failed to move the economy to a path of recovery and worsened the initial financial problems to the stage of economic recession.

Due to the undesirable results, the direction of the economic policies was shifted from contractionary to expansionary. A stimulus package worth RM7 billion was implemented in July 1998, simultaneously the accessibility to credit for priority sectors was assured by expanding the specialised funds (Ariff & Abubakar, 1999). The stimulus package turned a budget surplus of 2.5 per cent of the GDP into a budget deficit of 1.8 per cent and 3.2 per cent of the GDP in 1998 and 1999 respectively. BNM eased its monetary policy by reducing the Statutory Reserve Ratio (SRR) from 13.5% to 4% between February and October 1998. On the other hand, there was downward pressure on the Base Lending Rate (BLR), which fell from 11.96% in 1998 to 7.24% in 1999, as well as the interest rate which was reduced from 11% in 1998 to 6% in 1999.

At the incidence of the AFC, Malaysia flatly rejected the IMF's aid packages for recovery. Although financial tightening policies were applied in the first phase, which did not deliver desirable results, expansionary policies were then implemented in the second phase (Ariff & Abubakar, 1999). Luckily, Malaysia underwent the crisis without building up substantial government debt.

The subsequent Global Financial Crisis (GFC) in 2008 caused monetary and fiscal policies to become more accommodative. In November 2008, the overnight policy rate (OPR) was decreased to 3.25% by BNM to alleviate the prospects of slow growth and to ease the inflationary pressure. Then, the worsening of the recession forced BNM to speed up monetary easing by cutting the OPR to 2.50% in January 2009 with another cut to 2.00% in February 2009. Over this period, the OPR was reduced by a total of 1.5%. In the meantime, the banks Statutory Reserve Requirement (SRR) was lowered by 3.0% to reduce the costs of intermediation for the banking system.

On the other hand, although Malaysia's federal government debt had already been increasing continuously, the government implemented fiscal stimulus packages worth RM67 billion at the worst stage of the financial crisis. These increases in government expenditure were not accommodated by the same pace of increment in government revenue, because the growth of the GDP was only at 3% per annum. As a result, more government borrowing was required to cover the difference between government expenditure and revenue. The government's debt has snowballed year-on-year since 1997.

The debt level reached a record of RM 362.39 billion, which was close to RM 13,000 per Malaysian citizen, in 2009. The level of government debt in 1997 was only one-fourth of the total debt in 2009.

In short, Malaysia's fiscal deficit has increased from 4.8% to 7.6% of the GDP, which is the highest budget deficit in over 20 years. Malaysia's government has adopted an expansionary fiscal policy to maintain and sustain the economy since the 1970s, however, it managed to have a balanced budget in the early 1990s, due to the country's substantial oil revenues and high domestic savings. However, in recent years, the budget deficit position in Malaysia has worsened and has drawn attention to its long-term sustainability.

1.2.2.2   Singapore

The Monetary Authority of Singapore (MAS[3]) has traditionally used the exchange rate as a policy instrument. It set the US dollar as its major currency trading partner. Thus, the MAS designs its monetary policy by following an inflation-targeting exchange rate, rather than by conventional money supply or interest rate targeting, with the primary concern being to promote price stability. The reason for implementing exchange rate targeting is because Singapore is a small and open economy with large external and services sectors as well as high accessibility to international capital flows. As a result, the domestic interest rate is highly affected by foreign interest rates and small changes in interest rate differentials can bring about large fluctuations in capital movements. Besides that, the effect of the interest rate on investment is relatively small. Furthermore, as the money supply contains a large proportion of net foreign assets, it is difficult to control the money supply.

The MAS needs to monitor its floating exchange rate from time to time[4]. In Singapore, the exchange rate transmission channel is dominant when compared to other transmission channels. Although the use of the exchange rate as a policy instrument is effective in Singapore, it is not necessarily the case that changes in the exchange rate are achieved through open market purchases in the foreign exchange market. Changes may be achieved through the domestic money market as long as the interest rate is not near, or close to zero (McCallum, 2007)[5].

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[3] Central bank of Singapore
[4] The central bank influences the exchange rate by buying the domestic currency when it is weak and selling the domestic currency when it is strong. This helps to protect the currency from rapid fluctuations.
[5] However, in order to maintain comparability with other countries, this study will use the interest rate as the instrument for approximate monetary policy. This method is supported by the application of the uncovered interest parity (UIP) relationship as discussed in Chapter 3.
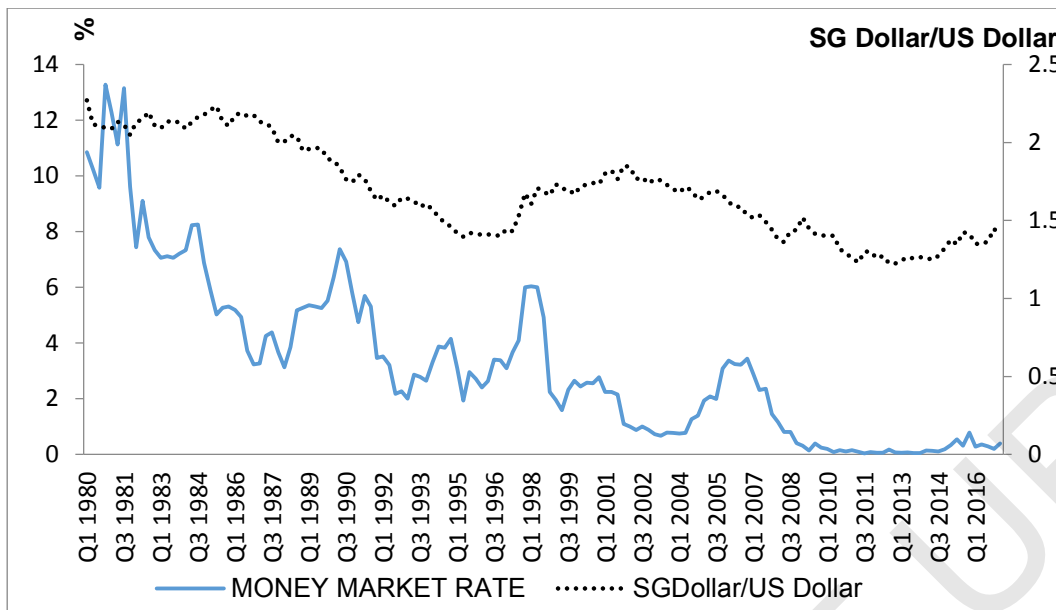
Figure 1.2: Singapore's Monetary Policy Frameworks, 1980-2017
(Sources: World Bank: World Development Indicators, Ilzetzki et al. (2017) and the authors' calculation[6])

At the commencement of the AFC, the consecutive quick depreciation of other countries' currencies influenced Singapore. Over the period from July 1997 to October 1998, the MAS allowed the Singapore Dollar to depreciate. Although the Singapore Dollar depreciated sharply against the US Dollar, by 16% over that period, it did, however, appreciate significantly against regional currencies, i.e. it appreciated by 20% against the Malaysian Ringgit, Thai baht and Philippine Peso. Besides that, the domestic interest rate increased from 3.94% to 6.63%.

However, by mid-1998, the AFC had further impacted Singapore and weakened its economy. The MAS eased the exchange rate policy and implemented an expansionary fiscal policy to deal with the crisis. The government offered two off-budget stimulus packages – S$2 billion in June 1998 and S$10.5 billion in November 1998 to boost recovery. At the beginning of April 1999, the projected budget deficit of Singapore had reached 3.5 per cent of the GDP, at the same time, the 3-month interbank rate had dropped from 6.63% to 1.88%. In a period of less than one year, the Singaporean economy had fully recovered from the negative impacts of the AFC. Singapore stood out as the economy least affected by the AFC in the Asian region, due to its strong macroeconomic fundamentals and healthy financial system (Siriwardana & Iddamalgoda, 2003).

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[6] MAS using De facto adjust +/- 2% band approximately US dollar since June 21, 1973. It changed on basket of currencies such as US dollar, UK pound, and the yen.

The GFC caused non-oil exports of manufactured goods to reduce. About 66% of Singapore's domestic production was for export. Thus, Singapore was the first East Asian country to be affected by the GFC after July 2008. Singapore's exports dropped dramatically and caused the real GDP to drop. To counter the slowdown of the economy, the MAS implemented monetary easing in October 2008. Singapore adjusted its currency to zero per cent appreciate of a neutral stance. As domestic production was cheaper this boosted domestically produced exports to other countries.

Besides this, in January 2009, Singapore introduced a US$ 13.8 billion stimulus package. Singapore's tax policies aimed to increase the nation's economic competitiveness and to attract overseas investment. With the combination of fair tax policies and prudent government spending programmes which complemented the monetary policy, Singapore was able to recover from the crisis and sustain its economic growth with no inflationary pressure (Monetary Authority of Singapore, 2009).

1.2.2.3 Thailand

The 1997 AFC was started by Thailand's currency crisis. Prior to 1997, Thailand had pegged the baht against the US dollar for a long period (see, Figure 1.3). However, on 14 and 15 May 1997, the baht was severely speculated against and attacked in the financial markets, however, Thailand's Prime Minister did not take any action to devalue the baht. Finally, as the Thai government was no longer able to defend the baht, due to its limited foreign reserves, the baht - US Dollar peg was broken on 2 July 1997 (Sek, 2009) and the baht was devalued.
Thailand received financial assistance from the IMF to deal with the AFC. Under the IMF program, the Bank of Thailand (BoT) altered its monetary policy rules to monetary-base targeting to achieve the macroeconomic objectives. Under the monetary-base targeting regime, the BoT used the financial programming approach to set the daily monetary base target to minimise the volatility of the interest rate and to maintain liquidity in the financial system (Nakornthab, 2009).

On the other hand, the IMF offered a rescue package of more than $20 billion to Thailand with certain conditions in August 1997. Firstly, Thailand was requested to implement a contractionary fiscal policy by setting the budget surplus at 1% of the GDP and encouraging privatisation in order to restructure the financial system and to improve the current account. Secondly, Thailand had to apply a contractionary monetary policy and a managed float exchange rate regime to stabilise the exchange rate as well as to control capital flows. Lastly, financial sector restructuring was to be carried out to strengthen the banking system.
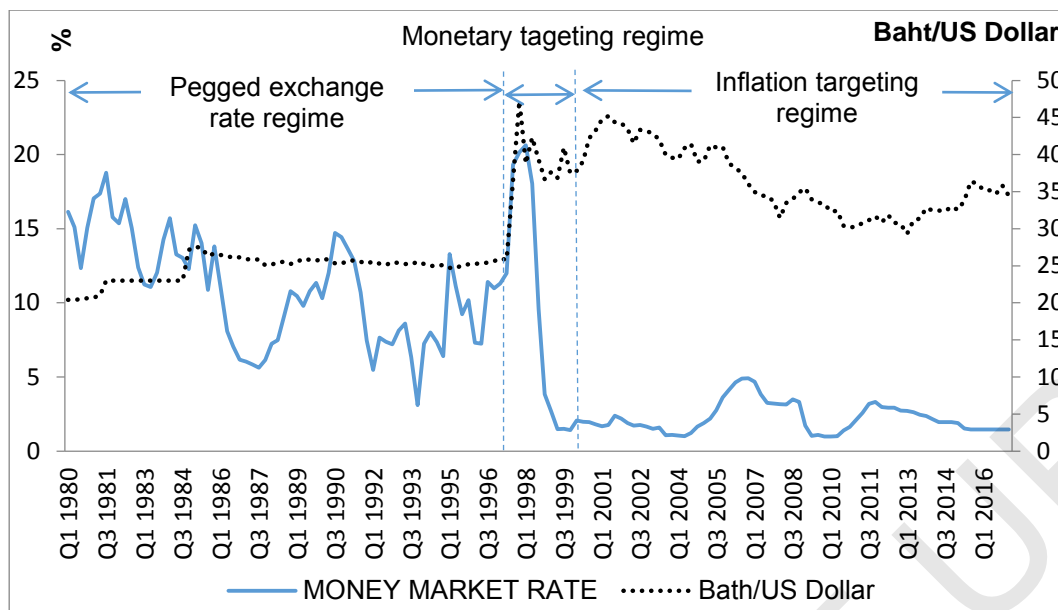
Figure 1.3: Thailand's Monetary Policy Frameworks, 1980-2017
(Sources: World Bank: World Development Indicators, Ilzetzki et al. (2017) and the authors' calculation[7])

However, the recessionary policies imposed by the IMF deepened the economic slowdown in Thailand, even though the announcement of the program had a brief positive impact. The Thai authorities suspended a total of 58 finance companies, and 56 of them were eventually liquidated. The remaining financial institutions suffered from financial panic rather than stemming the outflow of capital. This phenomenon led to a huge decrease in the value of the stock exchange of Thailand index (SET), i.e. from 787 to 337 index points in a one-year period. Then, the Thai economy transitioned from a slowdown into a recession. In January 1998, the baht devalued to its lowest point against the US dollar and the stock market dropped by 75 per cent. Furthermore, the country's largest finance company also collapsed at that time.

Thus, Thailand's policymakers shifted to an expansionary policy stance in late 1997. Beginning in early January 1998, the Thai baht had recovered strongly, partly due to the change of policy implemented by the new government in December 1997. With the situation improving, the authorities gradually reduced the level of the interest rate without hurting the exchange rate. By 2001, the Thai economy had recovered. It had taken about 5 years to resume a 5% level of GDP growth. The resulting rise in tax revenues enabled Thailand to balance its budget deficit and to settle its borrowings from the IMF four years ahead of schedule.

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[7] Pegged exchange rate with US dollar from March 8, 1978–July 1997, changed to freely floating from July 1997–January 1998, Managed floating on January 1998–September 1999. De facto adjust band approximate dollar +/- 2% band from October 1999- March 2017. Inflation targeting since May 2000.

In late 2007, Thailand was one of the countries that were affected by the first round of GFC shocks which directly hit banking institutions that were exposed to credit-debt defaults. Meanwhile, the second round of GFC shocks, which were induced by the panic caused by fear and uncertainty, were lower in Thailand because the BoT had calmed the banking system by providing sufficient liquidity and stabilising the exchange rate.

To stimulate economic recovery, Thailand kept its monetary rate at 3.75% in December 2008. However, due to the impacts of the slowdown in both exports and output, Thailand further reduced its monetary rate to 2.75% and maintained it at 1.25% in April 2009. Besides implementing global monetary policy easing, Thailand also implemented an expansionary fiscal policy for two purposes. Firstly, the stimulus packages were designed to increase domestic demand and secondly, to boost economic productivity which would stimulate economic growth. The economy became more stable in the second half of 2009 (Nidhiprabha, 2010).

1.2.3 The Impact of the Financial Crises

In response to the crises, the countries studied used different combinations of fiscal and monetary policies. The following is a snapshot of the policy actions that were taken by the studied countries during both the AFC and the GFC and their impacts on the respective macroeconomic variables.

Table 1.1 shows the decline in economic growth during both the AFC and the GFC for Malaysia, Singapore and Thailand respectively. The table provides the decline in growth as the difference in the real GDP growth between 1996 and 1998 and also between 2007-2009. It shows that all three of the selected countries faced significant drops in economic growth during the AFC with Singapore experiencing the smallest impact during the crisis. When comparing the impacts of the AFC with the GFC, it is shown that the GFC brought a greater impact to Singapore when compared to the other two countries, as the absolute difference in the growth rate was greater during the GFC.

Table 1.1: Economic Growth Slowdown, 1996-1998 & 2007-2009

Countries	1996	1997	1998	98-96 change[a]	2007	2008	2009	09-07 change[b]
Malaysia	8.6	7.7	-6.77	-15.37	6.2	4.6	-1.7	-7.9
Singapore	7.52	7.99	1.49	-6.03	7.8	1.1	-3.3	-11.1
Thailand	5.52	-0.43	-8	-13.52	4.9	2.6	-2.2	-7.1

Note: [a & b] = annual percentage change
Sources: IMF WEO Database 1999 and 2010 and the author's calculation

Figure 1.4 presents the growth rates of the three selected countries between 1980-2016. Past experience indicates a complicated picture where high economic growth has often turned an economy towards a crisis (Corsetti, Pesenti & Roubini, 1999). The overall picture is pretty clear, the growth rate in the three countries studied was on average more than 5 per cent in 1980s, except for Malaysia which was only at 3 per cent. The average growth rate during the 1990s was around 4 per cent for each of the countries. The growth rate in the 2000s was less than 4 per cent for all of the countries. Each of the countries took steps to improve their overall situation and to reinforce their economic and financial system fundamentals after the AFC in the late 1990s.
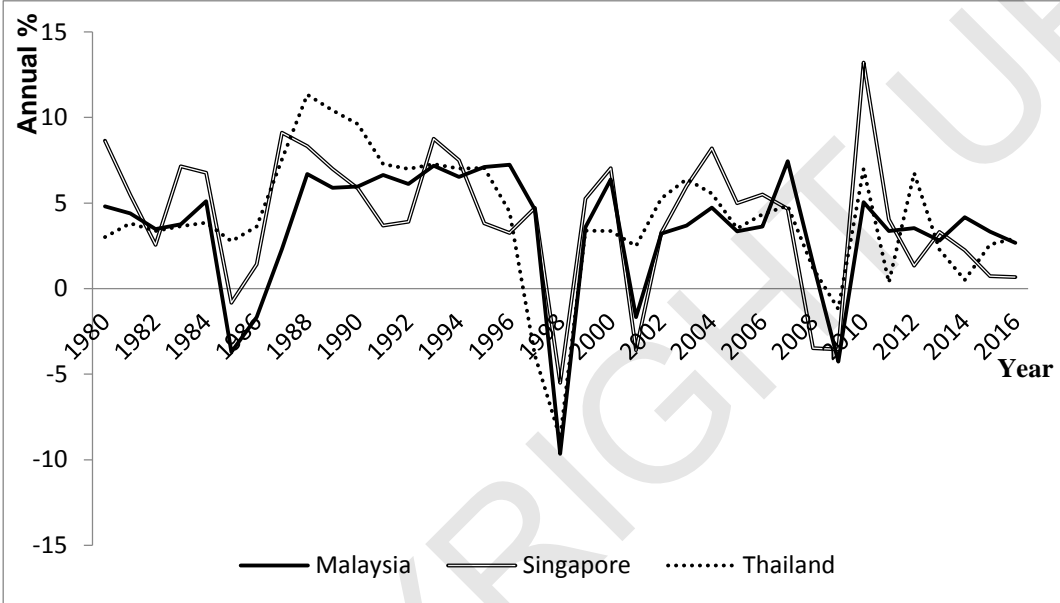
Figure 1.4: GDP per Capita Growth (annual %) in the Selected Three Countries, 1980-2016

(Source: World Bank data files.)

The three countries improved their fiscal and external debt situation, accumulated foreign exchange reserves and reformed their banking sectors. Further, in response to the crisis, they switched the policies used in the post-crisis period. For example, after the Asian Financial Crisis, Thailand adopted inflation targeting using the interest rate as its main monetary instrument (Chow, Lim & McNelis, 2014). With floating interest rate targeting, Malaysia adopted fixed exchange rate interest rate targeting in September 1998. Singapore devalued its currency against the US, Japanese and European currencies but it increased against most other Asian currencies (Ngiam, 2001)[8].

An economic downturn was unavoidable, during those difficult times both monetary and fiscal policies were used to recover from the crisis. Monetary policy led by changing the interest rates and foreign exchange rates while

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[8] Countries, such as Malaysia, Thailand, Korea and Indonesia.

fiscal policy was used for budget stimulus to defend the economies against the impacts of the crisis.

Table 1.2 summarises the policy interest rates and Table 1.3 summarises the levels of fiscal stimulus packages during both the AFC and GFC for Malaysia, Singapore and Thailand respectively. It shows that during the initial stages of the AFC, all of the countries used contractionary policies to combat the crisis. On the eve of the crisis, the countries started to change from contractionary to expansionary policies. As compared to the GFC, all three of the studied countries experienced unprecedented demand for expansionary policies in response to the severe reduction of output.

At the outbreak of the AFC, the respective central banks controlled the total reserves in the market. This enabled the central banks to set the OPR to signal the level of the preferred interest rate. Figure 1.5 shows that the policy rate was high when compared with the period after the AFC. This may be partly explained by the expansion of the level of M2/GDP. The decrease in the policy rate resorted to expanding M2, as shown in Figure 1.6, all of the central banks had been consistently expanding their money supply. Yet, in comparison to the excessive expansion in M2, the fiscal stimulus package does not appear to have been as expansionary as the monetary aggregates. Fiscal spending in Malaysia and Thailand increased more than in Singapore throughout the year as shown in Figure 1.7. The increase in both M2 and the fiscal stimulus led the consumer price index to increase smoothly, this is visible in Figure 1.8. It shows that the higher level of government spending caused the consumer price index to increase. The increases in both government spending and the consumer price index were the highest in Thailand followed by Malaysia and Singapore respectively.
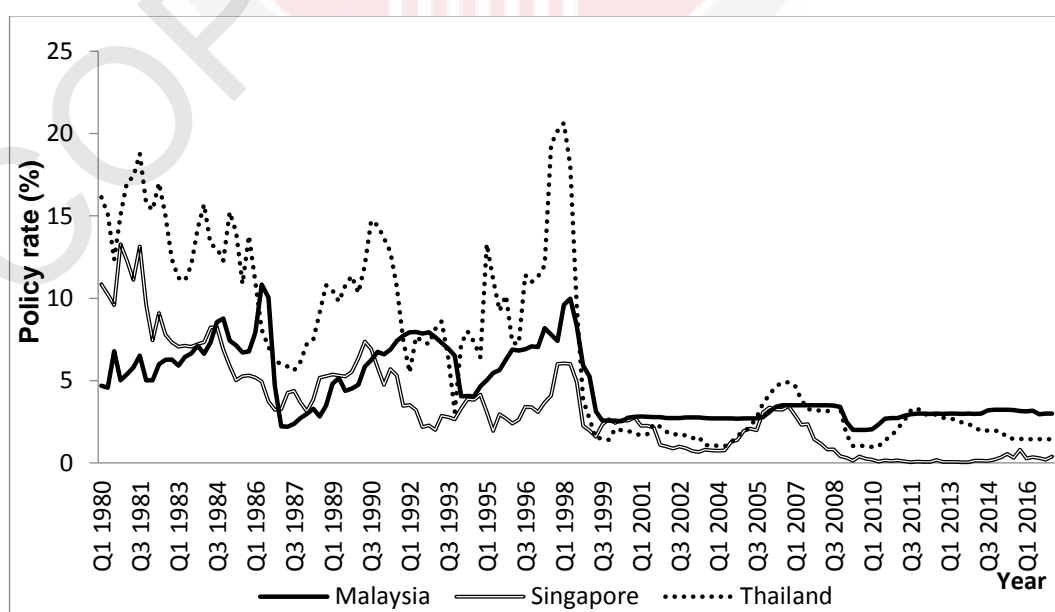
Figure 1.5: Policy Rate (%) in the Selected Three Countries, 1980-2017
(Note: Money market rate. Sources: World Bank: World Development Indicators)

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Table 1.2: Monetary Policy Responses (Policy Interest Rate) During the AFC and GFC (in %)

Country	Interest rate	Asian Financial Crisis-Stage 1			Asian Financial Crisis-Stage 2			Stage 1-2	Global Financial Crisis (2008: Q4-2009: Q2)			
		Initial	Current rate	Change from initial	Initial	Current rate	Change from initial	C/E	Initial	Current rate	Change from initial	C/E
Malaysia	OPR	-	-	-				C-E	3.5	2	-1.5	E
	SRR	-	-	-	13.5	4	-9.5		4	1	-3	
	Lending rate	7.6	11	3.4	11.96	7.24	-4.72		-	-	-	
Singapore	Monetary rate	3.94	6.63	2.69	6.63	1.88	-4.7	C-E	1.69	0.69	-1	E
Thailand	Monetary rate	17	27	10	27	12.5	-14.5	C-E	3.75	1.25	-2.5	E

Note: C refers to contractionary monetary policy while E refers to expansionary monetary policy, C-E refers to a change in fiscal policy contractionary to expansionary.
Sources: News reports .

Table 1.3: Fiscal Stimulus During the AFC and GFC

Country	AFC-Stage 1[a]	AFC -Stage 2[b]	C/E	GFC[c]	As a Percentage of 2008 GDP[d]	C/E
Malaysia	Contractionary of G	RM 13 billion	C-E	US$ 18.1 billion	8.1	E
Singapore	Contractionary of T	S$5.05 billion	C-E	US$ 13.8 billion	7.6	E
Thailand	Contractionary	Expansionary	C-E	US$ 3.3 billion	1.2	E

Note: C refers to contractionary monetary policy while E refers to expansionary monetary policy, C-E refer to a change in fiscal policy from contractionary to expansionary.
Sources: [a] and [b] news reports, the size of the packages were not fully comparable across countries. [c] and [d] Abidin, 2010.

The three selected countries commenced significant fiscal expansion stimulus packages, amounting, in total to US$35.2 billion. Malaysia was the main driver of this stimulus spending with stimulus packages worth 8.1 per cent of its 2008 GDP, followed by Singapore which spent 7.6% of its 2008 GDP (see, Table 1.3). However, Thailand only stimulus 1.2% of its 2008 GDP due to large existing budget deficits.
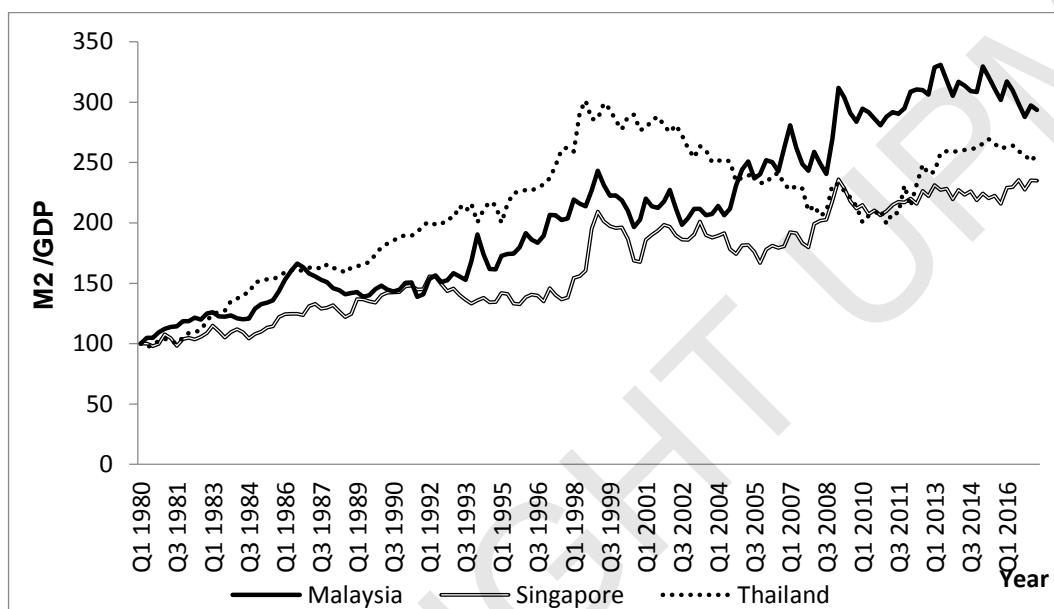
Figure 1.6: M2/GDP (1980=100) in the Selected Three Countries, 1980-2017

(Note: Monetary aggregates M2/GDP with 1980 as the base year.)
(Sources: World Bank: World Development Indicators)
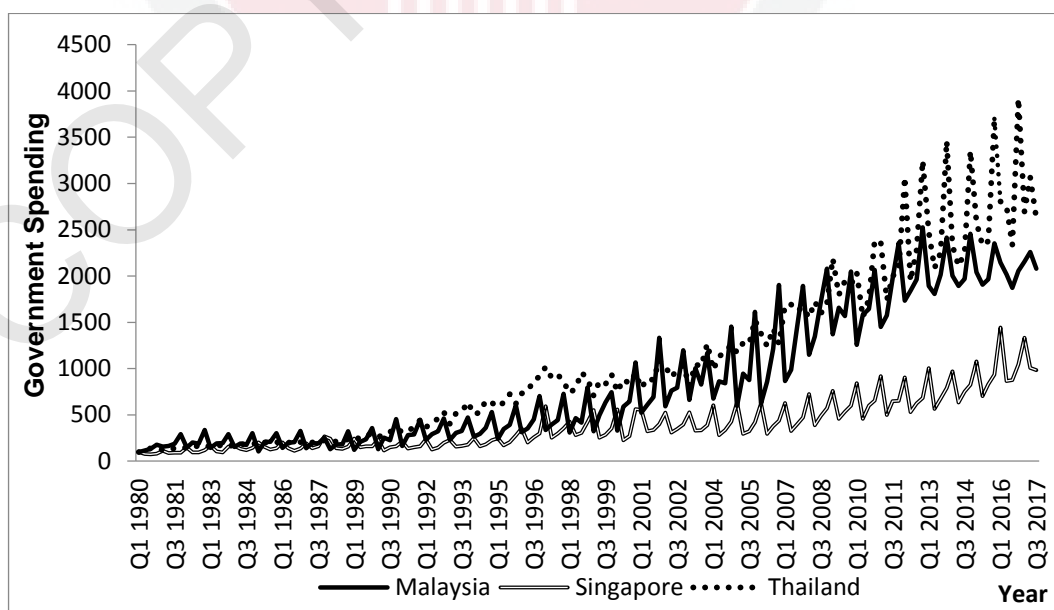
Figure 1.7: General Government Spending (1980=100) in the Selected Three Countries, 1980-2017

(Note: Government spending with 1980 as the base year.)
(Sources: World Bank: World Development Indicators and the authors' calculations.)
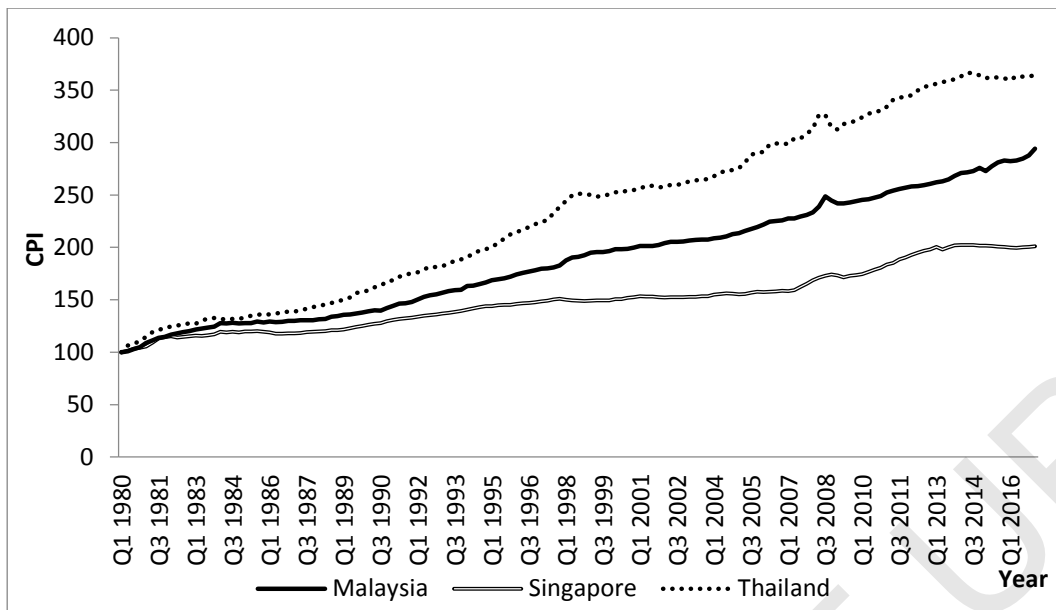
Figure 1.8: Consumer Price Index (1980=100) in the Selected Three Countries, 1980-2017

(Note: Consumer price index with 1980 as the base year.)
(Sources: World Bank: World Development Indicators and the authors' calculations)
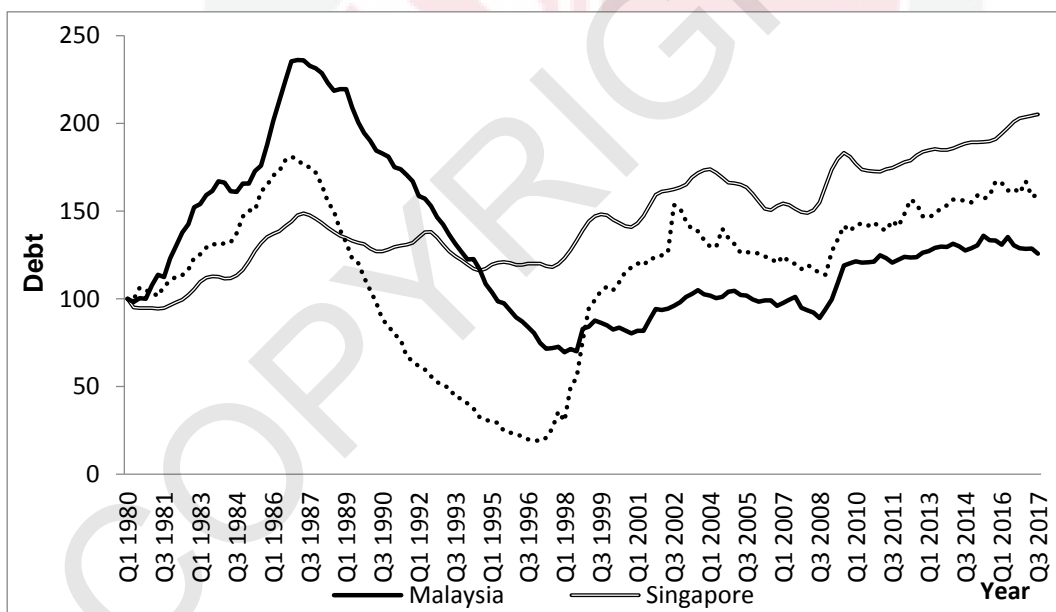
Figure 1.9: General Government Debt (%GDP) (1980=100) in the Selected Three Countries, 1980-2017

(Note: General Government Debt (% of GDP) with 1980 as the base year.)
(Sources: World Bank: World Development Indicators)

The effectiveness of monetary and fiscal policies usually depends on their capability to control both the expansion and recession of the economy. Yet, the continuous use of such policies may become ineffective or even counterproductive if the level of debt is high enough. This is because a large and persistent budget deficit compared to the GDP will raise debt levels and raise the issue of debt sustainability. The level of government spending in all

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of the three countries studied has remained high, and in deficit, since the AFC, this situation persisted and worsened during the GFC.

Table 1.4 shows the level of government debt to the GDP during both the AFC and GFC. It shows the level of government debt to the GDP was relatively higher during the GFC when compared with the AFC. In Singapore, the size of the public debt (89.94 per cent of the GDP) was of particular concern. However, Malaysia (42.9 per cent) and Thailand (39.2 per cent) indicated relatively lower levels of public debt. Notably, deficits have grown in recent years in Malaysia, Thailand and Singapore due to the GFC and the level of debt held by the public was estimated to reach new high levels of 52.6% of the GDP in Malaysia, 122% of the GDP in Singapore and 32.2% of the GDP in Thailand in 2017, as compared with the levels before the GFC of 39%, 91.6% and 23.3% respectively in 2006. Figure 1.9 shows that the level of government debt (% of the GDP) increased significantly after the AFC, this proved that expansionary fiscal policies will contribute to government debt. There is no yardstick to gauge whether a country will face a sovereign debt problem, even in developed countries with good fiscal situations the level of debt can deteriorate very quickly. When comparing the three countries studied to the 60% total debt to GDP rule set by the Euro system, it shows that these three countries are generally safe except for Singapore. However, this rule is too lax for developing countries which tend to have poorer tax and expenditure management and longer lag effects of fiscal policy (Hemming et al., 2002). The rule failed to capture the majority (55%) of the defaults in emerging economies (IMF, 2003) and in some developed (Euro) countries where their debt-to-GDP was not high before the GFC. Thus, the IMF (2008) noted that a level above 25% should be considered as high debt in emerging economies. Comparing the three countries studied against this 25% threshold indicates a less comfortable situation. Thailand had a relatively low debt level when compared with Malaysia and Singapore. Malaysia took more than a decade to reduce its public debt ratio of over 100% since the twin-deficit crisis in the mid-1980s to less than 40%. However, its public debt ratio has remained above 40% since the GFC. Singapore's debt ratio kept rising throughout the 1990s and has reached over 100% in recent years.

Table 1.4: Government Debt to Gross Domestic Product, 1996-1998 & 2007-2009

Countries	1996	1997	1998	average 96-98	2007	2008	2009	average 07-09
Malaysia	35.16	31.78	36.09	34.34	43.16	42.71	42.84	42.90
Singapore	69.56	68.87	82.38	73.60	86.76	85.85	97.21	89.94
Thailand	15.19	40.46	49.88	35.18	41.99	38.35	37.27	39.20

Note: Sources: IMF WEO Database 1999 and 2010

Different countries have used various combinations of monetary and fiscal policies to reduce external shocks. From a simple statistical viewpoint, it seems that expansionary policies are more efficient during periods of recession when compared to contractionary policies, however, whether monetary or fiscal policies are more efficient cannot be told. It is undeniable that the policies enacted succeeded in avoiding further contractions of the economies. In fact, after the GFC, Asia was considered one of the fastest growing regions while economic recovery remained fragile in the rest of the world. Thus, a better understanding of the macroeconomic policies used during the crises is important as this will appropriately reflect on the issues related to the policies as a result of the crisis experience. In other words, understanding the past impacts of monetary and fiscal policy will enable us to forecast the outcomes of future policy use. Further to this, historical experience has shown that the interactions between expansionary monetary policies and fiscal policies may be a point of concern.

1.3   Problem Statement

Macroeconomic policies play an important role in stabilising prices and economic growth and are applied when crises occur. Without these policy responses, economies may suffer a deep and prolong recession, however, policy missteps may cause any crisis to become severe. Which kind of policy is most appropriate to recover economic growth — monetary or fiscal? There is no clear answer as to the appropriate monetary or fiscal policy in this context. It is clear that to prevent a crisis, a country must have a better framework with which to understand and predict the actions of its government to respond to such events. However, most existing research has focused either on the roles of monetary policy or fiscal policy individually but has rarely focused on the combination and interactions between monetary policy and fiscal policy. Therefore, governments should urgently consider improved policies. By studying the effectiveness of previously applied monetary and fiscal policies, this may provide guidelines for governments when similar crises occur in the future.

When compared with AFC, the GFC brought forth dramatic responses with joint monetary and fiscal policies. After the GFC when interest rates dropped to zero. Monetary policy, whether referring to M1, M2, M3 or even quantitative easing (QE), involved the sale and purchase of Treasury Bills (T-bill). Monetary policy was, thus, no longer separate from fiscal policy as the interest rate could not be reduced to operate the monetary policy, the policy objectives could only be accomplished by selling or buying T-bills. T-bills are part of fiscal policy. The key interaction policies are related to the financing of the budget deficit and its consequences for monetary management. The GFC recession has raised awareness on the role of monetary-fiscal policy interactions in determining the behaviours of economic aggregates. Looking at one policy alone will not identify the effect of the policy on economic growth and inflation as it is a mixed factor. It is crucial to understand the

effects of monetary-fiscal policy to ensure that the policies can be implemented effectively avoiding tension or inconsistencies.

Further, the widespread shift of the separation of powers between fiscal and monetary authorities has raised the question about how the two policies can interact when the policymakers' objectives differ. Moving in the same direction will increase the effectiveness of the other policy and will contribute to greater stability of the financial system. While, ineffective policy design will lead to high interest rates, financial instability, exchange rate pressure, rapid inflation and an adverse impact on economic growth. Thus, the final effect of the measures taken in either policy will inevitably depend on how they affect each other. As a change in one policy will affect the effectiveness of another policy and cause the overall impact of the policy to change. Therefore, it is important to analyse the issues regarding the relative effectiveness of both monetary and fiscal policies on economic growth and inflation and how they interact.

Although Malaysia, Singapore and Thailand have each used different exchange rate and monetary policy frameworks, it is notable that their interest rate patterns have been about the same (see, Figure 1.5). The interest rates were relatively high before the AFC when compared with the GFC. Based on the Quantity Theory of Money (QTM), MV=PY, where a higher money supply will cause the price to increase. As shown in Figures 1.6 and 1.8, the higher the level of M2/GDP the higher will be the rate of inflation. Monetarist's share the view that inflation is always a monetary phenomenon, thus, government spending will not affect the price. However, according to the fiscal theory of price level, fiscal policy is important. Fiscal policy can be illustrated by government spending (see, Figure 1.7) increasing with prices (see, Figure 1.8). The persistent increases in government spending over recent years in Malaysia, Thailand and Singapore, due to the GFC, has increased government debt to reach new high levels of 52.6% of the GDP in Malaysia, 122% of the GDP in Singapore and 32.2% of the GDP in Thailand in 2017 when compared to the levels of 39%, 91.6% and 23.3% before the crisis in 2006. This increase prompts the research question; Is monetary or fiscal policy dominant in Malaysia, Singapore and Thailand. In other words, how effective are the policies in affecting economic growth and inflation?

Another potential implication of the fiscal stance for monetary policy regards the conduct of monetary policy. Research using the Taylor rule provides a straightforward method to estimate the stance of monetary policy. It provides guidance to central banks on setting the interest rate during changes in economic conditions while keeping prices and economic growth stable. For macroeconomic stabilisation, the choice of the optimal monetary policy is important. Although, central banks do not explicitly follow an instrument rule, however, studies have found that Taylor-type rules do have an influence on policy and it could be argued that central banks implicitly follow them (Paez-

Farrell, 2007). Further, the Taylor rule has been criticised for being too simplistic, as it does not include all of the relevant information needed to conduct monetary policy. An omission that is a likely cause of the misspecification in the estimated reaction functions is only the inclusion of inflation and the output gap. Central banks may have other objectives, such as the maintenance of financial stability or an exchange rate objective which are not included with specific variables used in the Taylor rule. This issue becomes more important for countries where the exchange rate is not flexible and where their governments depend heavily on seignorage revenues due to their inability to generate revenues from other sources and to counter a larger budget deficit (Malik, 2007). Thus, an alternative variable has been included to enhance and better reflect the broader considerations of the central banks. The inclusion of additional or other production or monetary variables may help in a fuller analysis. An interesting point is to estimate if the monetary policy actually pursued can be captured satisfactorily by the estimated specification of the Taylor-type function.

1.4 Research Questions

This study aims to answer the question of how monetary and fiscal policies and their interaction affect economic outcomes, such as economic growth and inflation as well as the role on monetary policy in Malaysia, Singapore and Thailand. This study aims to answer the following questions:

1. Do monetary and fiscal policies have any influence on economic growth?
2. Do monetary and fiscal policies have any influence on inflation?
3. Which specification of the Taylor rule performs best in Malaysia, Singapore and Thailand?

1.5   Research Objectives

The general objective of this study is to examine the impact of monetary and fiscal policies and their interaction on economic growth and inflation as well as the role of monetary policy in Malaysia, Singapore and Thailand. The specific objectives pursued in this study include:

1. To examine the impact of monetary and fiscal policies and their interaction on economic growth.
2. To examine the impact of monetary and fiscal policies and their interaction on inflation.
3. To investigate the role of inflation, the output gap, interest rate smoothing, the exchange rate and government spending on the monetary policy reaction function

1.6   Significance of the Study

Three contributions are made by this study. Firstly, prior research has almost exclusively focused on how either monetary or fiscal policy may affect economic growth and inflation separately. Very little prior research has focused on the interaction between monetary and fiscal policies. This study offers an overview to policymakers on whether the level of government spending (interest rate) has been properly managed to accelerate economic growth and inflation. Further, this study intends to contribute to the literature by examining the interaction between monetary and fiscal policies. By including this interaction, the study can assist in understanding how changes in the level of one policy may influence the effectiveness of the other policy in influencing economic growth and the rate of inflation. This study aims to augment previous results to provide a better understanding of the effectiveness of monetary and fiscal policy and to fill the empirical gap and to shed more light in understanding the interaction between the policies to ensure that the policies can be implemented more effectively.

Secondly, this study aimed to estimate which Taylor rule specification best describes central bank behaviour. The Taylor rule is a useful guide to characterise the monetary policy in use, as it explicitly links the current policy to current economic conditions, as captured by the inflation rate and the output gap. Further, empirical evidence could help to determine the way in which monetary authorities 'implicitly' reacted to economic developments (Sánchez-Fung, 2005). Given the importance of the monetary authorities' reaction functions in macro modelling, research into this topic should be useful because it provides a transparent description of the monetary policy in use. Gerlach and Schnabel (2000) suggested that using a rule that is known to the public may help to reduce uncertainty regarding future monetary policy and also to avoid instability of the macroeconomic environment. This type of framework has been implemented in advanced economies, however, little work has been carried out for countries such as Malaysia, Singapore and Thailand. This study aims to fill this empirical gap and to shed more light on understanding the monetary policy reaction functions in these three countries.

Thirdly, the majority of previous studies have applied and developed the Taylor rule to examine the behaviour of central banks (such as Taylor, 1993; Clarida, Galı & Gertle, 1998; Judd & Rudebusch, 1998; to name a few) in contrast there have been very few empirical analyses on monetary policy rules for looking at fiscal policy (Kumhof, Nunes, & Yakadina, 2010). The question of whether government spending plays a role in monetary policy is important to policymakers, especially for central banks. In particular, higher government spending will lead to a reduction in the interest rate, therefore, this study aims to fill the empirical gap to examine how the central banks should respond to government spending. This can provide useful information to policymakers

1.7 Organisation of the Study

This study consists of six chapters. The first chapter briefly introduces the monetary and fiscal policies in Malaysia, Singapore and Thailand. The history of the monetary and fiscal policy used in the three selected countries, including the period encompassing the two recent financial crises had been analysed. The remaining chapters are outlined as follows: Chapter two provides theoretical and empirical reviews on the effectiveness of monetary and fiscal policies and their interaction on economic growth and inflation. Besides this, Chapter two also provides extensive reviews of previous studies using the Taylor rules and their extensions. Chapter three introduces the methodology and model specification used in this study. Chapter four focuses on the empirical results obtained from the research regarding the effectiveness of monetary and fiscal policies on the real GDP and prices. While Chapter five details the empirical results of the Taylor rule specification. Finally, Chapter six presents the conclusion of the thesis together with some thoughts on the policy implications of the issues examined and a discussion on the scope of possible future research.

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