UNIVERSITI PUTRA MALAYSIA

THE LIQUIDITY EFFECTS OF MONEY SHOCKS ON SHORT TERM INTEREST RATES IN THE SELECTED ASEAN COUNTRIES

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The main purpose of this study is to empirically investigate the liquidity effects of money shocks on short-term interest rates. The research was done for selected five ASEAN countries, namely Indonesia, Malaysia, the Philippines, Singapore and Thailand. Monthly data was used in the analysis covering the period of 1983:01 to 2000:12.

Empirical evidences based on the unit root test using Augmented Dicky Fuller (ADF) test showed that all the variables (consumer price index, money market rate or T-bill rate, wholesale price or industrial production or production price, money supply and US T-bill rates) were I (1) which means that all these series under study are non-stationary in the level forms, but stationary in the first difference. Johansen co-integration analyses identified that all the models represented by the five variables were co-integrated within

the system of five variables. The vector autoregressive systems estimation method (VAR) was employed for this co integration test. The vector error correction model (VECM) was used to capture the influence of the variables in long-run relationships. The VECM approach distinguished between the 'short-term; and 'long-term' Granger causality. Impulse response functions (IRFs) were then applied to test the significance effects of the short-term domestic interest rate variable due to a shock of one standard deviations innovation.

The empirical evidences obtained from this study suggested that the Johansen-Juselius multivariate co-integration indicated the existence of a stable long-run relationship between the five variables. On the other hand, the results also showed that all models in five variables were co-integrated within the equation system. The Granger causal relationship however showed a different causality for each of the countries. The Singapore and the Philippines results indicated that money supply did not affect other variables in both the short-run and long-run. However, in Thailand, consumer price index did not show effects in the short-run but was statistically significant in the long-run. For the remaining countries, all the variables also affected each other in the short-run, but opposite results were obtained for the long-run relationships. The estimation of error correction term that identified the adjustment showed that Thailand is the fastest country to adjust to the system estimation. The inflation expectation effect was not representative for all the selected countries. The income effects thus, occurred in only two out of five countries.

Impulse response function (IRFs) test was employed to investigate the existence of liquidity effects of money shocks on short-term interest rates. Liquidity effects do exists in Asean countries but were of different patterns and for different duration. A negative effect of domestic short-term interest rate immediately occurred after the money shocks for all countries accept Indonesia. The longest effect was found for Malaysia while the shortest was on the Philippines, which was only for five months. This was followed by Singapore (less than ten months). Thailand initially showed negative response for a brief period, turning positive, and ultimately negative. However, Indonesia showed the existence of liquidity effect only after twenty months subsequent to the money shock.

Empirical evidences and findings from this study conclusively found that liquidity effects do exists in the ASEAN countries which each country registering its own pattern and length. This is acceptable considering the large variations in the economy variables and the financial institutional foundation between the five countries studied.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

KESAN KECAIRAN PADA KADAR FAEDAH JANGKA PENDEK AKIBAT DARIPADA KEJUTAN PADA PENAWARAN WANG DI NEGARA ASEAN TERPILIH

Oleh

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Jun 2005

Pengerusi : **Prof. Madya Azali b. Mohamed, PhD**

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Tujuan utama kajian ini dijalankan secara empirikal adalah untuk mengetahui kesan kecairan kepada kadar faedah jangka pendek akibat berlakunya kejutan kepada penawaran wang. Lima negara Asia Tenggara telah dipilih bagi kajian ini iaitu, Indonesia, Malaysia, Filipina, Thailand dan Singapura. Data yang digunakan bagi tujuan kajian ini merangkumi data bulanan daripada 1983:1 sehingga 2002:12.

Ujian 'unit root' ini dijalankan dengan menggunakan kaedah 'Augmented Dicky Fuller' (ADF). Keputusan menunjukkan bahawa angkubah-angkubah (indeks harga pengguna, kadar faedah pasaran wang atau kadar faedah T-bill, harga borong atau harga industri atau pengeluaran industri, penawaran wang dan kadar faedah U.S T-bill) tersebut adalah I(1) iaitu 'non-stationary' pada aras mendatar dan 'stationary' pada perbezaan pertama. Seterusnya, analisa kointegrasi Johansen dijalankan dan keputusannya menunjukkan

bahawa kelima-lima angkubah makroekonomi berkointegrasi di antara satu sama lain dalam sistem persamaan. Penggunaan kaedah VECM adalah untuk mengenalpasti angkubah-angkubah yang memberi kesan dalam jangka panjang. Kaedah ini juga boleh digunakan untuk mencari penyebab 'Granger' dalam jangka pendek dan jangka panjang. Kaedah 'impulse response functions' (IRFs) pula dijalankan untuk mngenalpasti tindakbalas angkubah apabila berlakunya kejutan pada penawaran wang.

Keputusan empirikal yang diperolehi daripada ujian ini mencadangkan beberapa perkara penting. Ujian rangka kerja multivariate Johansen-Juselius menunjukkan kewujudan pergerakan bersama di antara lima angkubah makroekonomi dalam jangka panjang. Ini menjelaskan bahawa terdapat kointegrasi dalam sistem persamaan bagi model-model tersebut. Hubungan penyebab 'Granger' setiap negara memberikan keputusan yang berbeza. Singapura dan Filipina, misalnya, menunjukkan bahawa penawaran wang tidak memberi kesan dalam ekonomi dalam jangka pendek, mahupun jangka panjang. Bagi negara Thailand, indeks harga pengguna hanya memberi kesan dalam jangka panjang. Walaubagaimanapun, dua lagi negara menunjukkan bahawa kelima-lima angkubah adalah penting dalam jangka pendek dan panjang bagi mencapai keseimbangan. Anggaran bagi 'error correction term' dikenalpasti bagi melihat tahap penyesuaian di antara angkubah yang terbabit. Thailand menunjukkan kadar penyesuaian yang paling tinggi iaitu 2.8 peratus. Kesan anggaran inflasi tidak terdapat di semua negara manakala kesan pendapatan dapat di kesan di dua negara.

Ujian IRFs yang dijalankan memberikan keputusan bahawa kesan negatif bagi kadar faedah jangka pendek akan berlaku apabila adanya kejutan pada penawaran wang.

Kesan negatif kecairan dapat dilihat bagi kesemua lima negara yang terlibat. Perbezaan keputusan hanyalah berdasarkan paten dan jangkamasa kesan berlaku. Tindakbalas negatif pada kadar faedah jangka pendek dikesan sebaik sahaja berlakunya kejutan pada penawaran wang kecuali Indonesia. Malaysia menunjukkan jangkamasa kejutan paling lama. Filipina mengalami kesan kejutan kurang dari lima bulan, diikuti oleh Singapura, kurang daripada sepuluh bulan. Thailand menunjukkan paten yang berbeza, dengan kejutan negatif pada mulanya, diikuti positif dan berakhir dengan negatif. Indonesia mennjukkan bahawa kesan kecairan negatif berlaku selepas sepuluh bulan berlakunya kejutan. Kesimpulannya, kesan kecairan ini dapat dikesan di semua lima negara Asia Tenggara yang dikaji. Malaysia, Indonesia dan Thailand menunjukkan kesan kecairan negatif yang panjang akibat kejutan pada penawaran wang.

Daripada kajian yang dijalankan, penemuan dan keputusan empirikal menunjukkan bahawa kesan kecairan terdapat di semua lima negara yang dikaji, dengan paten dan jangkamasa yang berbeza. Keputusan ini dapat diterima berdasarkan kepada pertubuhan institusi kewangan dan pelbagai variasi dalam ekonomi di antara negara yang dikaji.

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CPI   consumer price index (1990 = 100)

M3   money supply

MR   call money rate

WP   wholesale price (Include Petroleum)

TBR   t-bill rates

IP   industrial production

PP   producer price

USR   us t-bill rates

CHAPTER I

INTRODUCTION

Thomas (1997) defined the liquidity of an asset as the ease and quickness with which the asset can be exchanged for goods, services or other assets. Money is a highly liquid asset due to its high acceptability for making payments. Besides making transaction easier and cheaper, liquidity gives the asset holder flexibility. A liquid asset can easily be disposed in emergency needs of funds or if an unexpectedly good financial investment opportunity arises. Thus, everything else being equal, the more liquid an asset is, the more attractive it will be to wealth holders. By liquidity, we mean the relative ease with which an asset can be converted into money quickly without significant inconvenience, loss of time, commissions or other charges, or risk of loss of principal. Money, which is ready to spend at a moment's notice, is the ultimate asset in the liquidity.

Assets can be classified on the basis of their liquidity, or the ease and convenience with which they may be converted into a medium of exchange. Three considerations determine assets liquidity; how easily and quickly it can sell; the cost of selling it; and the stability and predictability of its price. An asset that can be sold quickly at a low transaction cost may not be considered very liquid if the price has changed significantly since it was purchased. There is a continuum of liquidity among assets, ranging from highly liquid passbook savings account to highly illiquid real estate and antique cars.

Other financial assets, ranging from commercial bank savings accounts to common stocks, involve various inconveniences, transaction costs and risks. These assets therefore suffer from varying degrees of illiquidity (lack of liquidity). For this reason most people choose to hold some portion of their wealth in the form of money, to finance current and medium-term transactions.

Money is defined as anything that is widely acceptable as payments for goods and services or repayment of debt. Today, the measure of money consists of the public's holdings of currency and coins, and demand deposits and other checkable deposits in banks and other depository institutions. The use of money benefits society by reducing transactions costs and stimulating the specialization and division of labor by increasing economic efficiency. Money serves as a medium of exchange for payment, a standard of value or measuring rod in assessing the worth of tens of thousands of items, and a store of value or means of preserving wealth over time.

Today, society often uses credit money, which derives its value not by the substance from which it is made, but rather by government decree. A fiat monetary system allows the money supply to be the product of human decision rather than the bounty of nature. Changes in quantity of money have important implications for key economic variables such as output, employment and the price level. Too rapid an expansion of the money supply leads to inflation while too slow an increase typically results in recession.

The short run negative response of interest rates to shocks in the money supply has been an integral part of traditional monetary policy analysis. This "liquidity effect" of an expansionary monetary policy is intuitively appealing and many explanations have been suggested. The effect of an increase in the money supply on the level of interest rates may be divided into three channels: a liquidity effect, an income effect and an inflation expectation effect. Initially, an increase in the money supply increases liquidity in the economy triggering a decline in interest rate leading to higher liquidity. Ohanian and Stockman (1995), defines the liquidity effect as the 'purported statistical relation between expansion of bank reserves or a monetary aggregate and short run reductions in short term interest rates'.

Their analysis shows that in a general equilibrium environment, exogenous changes in money can, in principal, affect real output, prices or the interest rate. If money is neutral and prices adjust instantaneously, monetary policy changes the prices level, but not output or the real interest rate. If a price does not adjust instantaneously, a liquidity effect occurs, the real interest rate declines in response to a monetary expansion. The failure of the price level to adjust immediately to its new long run equilibrium however also produces expectations of inflation. From the Fisher relation (referred to Fisher Hypothesis), the nominal interest rate may either rise or fall, depending on the relative size of the liquidity and price expectation effects. If the liquidity effect is dominant, both the nominal and real price expectations will be affected and nominal and real rates will fall. However, if the price expectation effects are dominant, the nominal interest rates will rise.

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Ohanian and Stockman's also define a liquidity effect to be the systemic change in an interest rate as the result of a monetary expansion and subsequently distinguished between real and nominal liquidity effects. Hoover (1995) however said that it would be better to reserve the term liquidity effect only to those changes in the real rate of interest induced directly by monetary expansion. The only interesting liquidity effects are real because, without a change in the real rate of interest, there can be no accompanying affect on any other variables that interest us: GNP, investment; consumption and employment.

The effect on interest rates of a change in monetary policy has long been an important topic in monetary economics and there is now a large body of literature that has studied the existence and magnitude of such effects. Such effects can be represented in money demand and supply relationship models as below:

$$m_t^d = \alpha_1 + \alpha_2 r_t + \varepsilon_t^d \qquad (1.1)$$

$$m_t^s = \beta_1 + \beta_2 r_t + \varepsilon_t^s \qquad (1.2)$$

$$\therefore m_t^d = m_t^s$$

where d indicates demand, s supply, m_t is the log of nominal money, r_t is the nominal interest rate, while ε_t^d and ε_t^s are mutually correlated demand and supply shocks. r_t responds to shifts in money supply engineered by varying β_1 and the relation $dr_t / d\beta_1 = (\alpha_2 - \beta_2)^{-1}$ means that the interest rate decreases when money supply increases, provided $\alpha_2 < 0$ and $\beta_2 \leq -\alpha_2$. This negative reaction of the interest rate to a rise in money supply is termed the liquidity effect.

When there is a random variable attached to money supply, a change in β_1 can be thought of as a movement in the expected value of $\beta_1 + \varepsilon^s_t$, and the money supply shock might simply be re-labeled $\varepsilon^{s'}_t$, with the conceptual experiment performed by changing the expected value of $\varepsilon^{s'}_t$ from $\beta1$ to a new value. Mathematically, there is no difference between the responses to a change in $\varepsilon^{s'}_t$, so we concentrate only on describing the effects of a change in ε^s_t. This orientation showed that the liquidity effect focused upon the simulated response of interest rates to a money supply shock, setting all other shocks to zero.

The Liquidity and Inflation Effects

When there is an announcement of the increase in the money supply, interest rates tend to increase and as a result, the inflation expectation effects will occur. If the financial markets are highly sensitize to inflation, and if it attributes inflation principally to the money growth rate, the evidence of more rapid money growth may push long term interest rates up quickly. That is, the inflation expectations effect may sometimes outweigh the liquidity effect, resulting in higher interest rates. The inflation expectations effect may show up more strongly in long-term interest rates, which are more heavily influenced by other factors such as business cycle conditions and the liquidity of the banking system.

For example, the U.S Federal has more influence on short-term interest rates than long-term interest rates, which are more sensitive to expected inflation. When the

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U.S Federal first pumps funds into banks in an effort to stimulate bank lending and reduce interest rates, most of the effect manifested in short term interest rates. Results on increase in the money supply will boost expected inflation; the Fisher effect may lead to an increase in long-term interest rates.

Figure 1.1 is the canonical (classical) IS-LM. The aggregate supply (AS) curve is vertical, indicating market clearing in labor and product markets. If the money supply increases by ΔM, the LM curve shifts to the right, and equivalently the AD (aggregate demand) curve shifts upward. At the original price level, p, aggregate demand exceeds aggregate supply. If such a situation is technically infeasible, then prices must rise from p to p', which shifts the LM curve back to its original position, since the location of the LM curve depends on the real money supply, M/p. Interest rate remains unchanged. This is the flexible price case.

If in the short-run aggregate supply (AS) can exceed its long run level at AS, Ohanian and Stockman (1995) observed that as a result of monopolistic competition and if prices are sticky at p, then output will rise and interest rates will fall from i to i'. This is the liquidity effect: an expansion of money results in a fall in interest rates. Due to sticky prices, a fall in the nominal interest rate would also result in a fall of real interest rate as well.
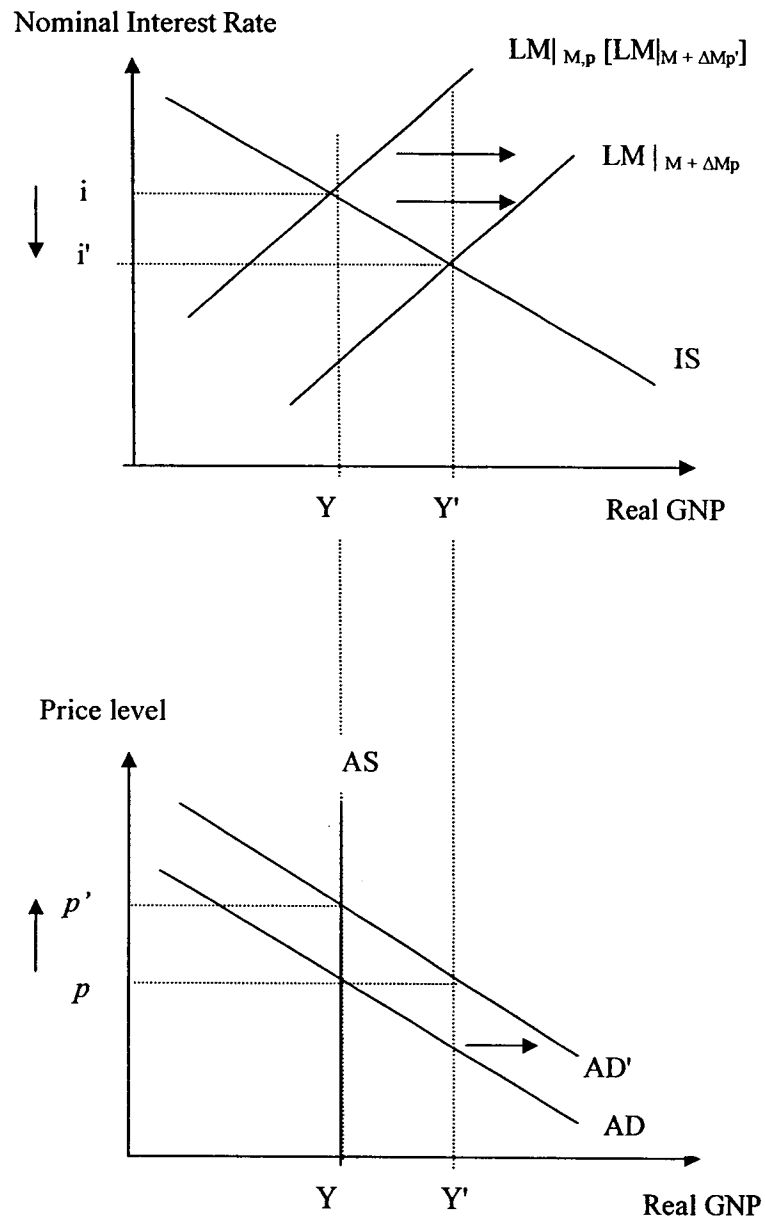
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Figure 1.1: Canonical (classical) IS-LM

Fisher Effect

The level of interest rates strongly tends to rise in periods in which the expected rate of inflation increases. Interest rates typically fall when expected inflation declines. The loanable funds framework as in Figure 1.2 can explain this phenomenon. Supposing that inflation has been relatively subdued for several years (e.g.: 3% per year for the past decade). The supply and demand curves for loanable funds are represented by S_1 and D_1 respectively with equilibrium at A and interest rate i_1. The inflation rate increases about 6% per year and the public expects higher rate of inflation to continue for some time. The development of prospects for continuing inflation of 6% reduces the supply of loanable funds, shifting the curve to the left from S_1 to S_2. At each and every level of interest rate, the willingness to lend money is reduced because the real value of the principal is expected to erode more rapidly as inflation increases. Lenders would then consider substituting goods that they believed to be more effective hedges against inflation than debt instruments. For these reason, the supply of loanable funds decreases, shifting the supply curve to the left. At any given interest rate, lending is less attractive, now that expected inflation has increased.

At the same time, the increases in expected inflation raise the demand for loanable funds. At each and every level of interest rate, the willingness to borrow is stimulated, shifting the demand curve upward from D_1 to D_2. This is because of the price or nominal value of goods or assets purchased with borrowed funds is expected to rise with inflation while the nominal value of the principal borrowed does not. As

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