UNIVERSITI PUTRA MALAYSIA

TESTING LONG-RUN NEUTRALITY OF MONEY IN THIRTEEN ASIAN DEVELOPING COUNTRIES

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Chairman   **: Associate Professor Dr. Muzafar Shah Habibullah**

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The long-run neutrality (LRN) proposition suggests that a permanent change in the money stock has no long-run consequences on the level of real output. Most of the empirical studies of the neutrality of money are focused on industrialised countries. The main objective of this study is to investigate the LRN of money on real output in thirteen Asian developing economies using a reduced-form ARIMA model developed by Fisher and Seater (1993).

This study makes use of annual data for money supply (M1 and M2) and real GDP, which spans from 1950 to 1997. Consideration of two measures of money supply serves as a sensitivity analysis for the potential effects of different measures of money on real output. In this study, the sample countries include: Bangladesh, India, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Singapore, South Korea, Sri Lanka, Taiwan, and Thailand.

This study uses cross-sectional data from the thirteen Asian countries to examine one of the monetary propositions, that is, changes in the money supply are not associated with the permanent changes in real output. Money (both M1 and M2) is said to have no influence on the movements of real output in the long run.

For time series data, results of the unit root test suggest that LRN is testable in twelve of the thirteen countries and money is found to be neutral in nine of the twelve countries. This conclusion is robust whether M1 or M2 is used as the money measure. However, in three countries (Indonesia, South Korea and Taiwan), the LRN test outcomes are sensitive to the measure of money used. Only in India, both M1 and M2 are not long run neutral with respect to real output.

Based on these results, LRN can be said to describe a general feature of the Asian developing economy. This indicates that money supply do not play an important role in influencing the long run real output movement. Therefore, both monetary aggregates probably are not useful policy instrument in the Asian countries. However, the narrow money supply might be treated as a useful policy instrument in some of the countries since it has the ability to influence the long-run movement of real output in these countries.

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

PENGUJIAN KENEUTRALAN WANG JANGKA PANJANG UNTUK TIGA BELAS BUAH NEGARA ASIA SEDANG MEMBANGUN

Oleh

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Pernyataan keneutralan jangka panjang (LRN) menyatakan bahawa perubahan kekal pada stok wang tidak memberi kesan jangka panjang terhadap tingkat output benar. Kebanyakan kajian empirik keneutralan wang menumpukan kepada negara-negara perindustrian sahaja. Tujuan utama kajian ini adalah untuk menyelidik keneutralan wang terhadap output benar dalam tiga belas buah negara sedang membangun di Asia dengan menggunakan model bentuk terkurang (reduced-form) ARIMA yang diutarakan oleh Fisher dan Seater (1993).

Kajian ini mengguna data tahunan bagi penawaran wang (M1 dan M2) serta KDNK benar yang merangkumi tahun 1950 sehingga tahun 1997. Penggunaan dua jenis pengukur penawaran wang ini adalah untuk menguji kepekaan output benar terhadap pengukur wang yang berbeza. Dalam kajian ini, negara-negara sampel termasuk: Bangladesh, India, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, Filipina, Singapura, Korea Selatan, Sri Lanka, Taiwan, dan Thailand.

Dengan mengguna data keratan lintang untuk tiga belas buah negara Asia sedang membangun, didapati bahawa wang (M1 dan M2) tidak berpengaruh terhadap pergerakan output benar untuk jangka panjang.

Bagi data siri masa, keputusan ujian punca satu (unit root) mencadangkan bahawa LRN boleh diuji untuk dua belas negara daripada tiga belas buah negara yang dikaji. Hasil kajian juga mencadangkan bahawa wang adalah neutral untuk sembilan negara Asia tersebut. Kesimpulan ini tidak berubah sama ada M1 atau M2 digunakan sebagai pengukur wang. Walau bagaimanapun, dalam tiga buah negara (iaitu Indonesia, Korea Selatan dan Taiwan), hasil pengujian LRN didapati sensitif terhadap jenis pengukur wang yang digunakan. Hanya di negara India sahaja, kedua-dua M1 dan M2 tidak neutral terhadap output benar untuk jangka panjang.

Berdasarkan kepada keputusan ini, dapat disimpulkan bahawa LRN merupakan satu ciri umum bagi negara-negara Asia sedang membangun. Ini menunjukkan bahawa penawaran wang tidak memainkan peranan dalam pergerakan output benar untuk jangka panjang. Justeru itu, kedua-dua aggregat kewangan mungkin tidak berpotensi untuk digunakan sebagai alat dasar di negara-negara Asia. Walau bagaimanapun, penawaran wang sempit mungkin boleh digunakan untuk tujuan alat dasar dalam beberapa negara tertentu kerana ianya mempunyai kebolehan untuk mempengaruhi pergerakan output benar di negara-negara tersebut.

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LIST OF ABBREVIATIONS

EC	European Community
G7	Group-7
OECD	Organisation for Economic Co-operation and Development
LDC	Less Developed Country
LRY	Natural Logarithm of Real Output
LM1	Natural Logarithm of Narrow Definition of Money Supply M1
LM2	Natural Logarithm of Broad Definition of Money Supply M2

CHAPTER I

INTRODUCTION

In economics, money is most commonly defined as anything that is generally acceptable as payment for goods and services or for the discharge of debts. One reason that money is important is that most prices are expressed in units of money. Because prices are measured in money terms, understanding the role of money in the economy is basic to the studying of issues related to the price level, such as inflation and its causes. Moreover, many economists believe that the amount of money in the economy affects real economic variable, such as output and employment. Thus, it may be possible to use monetary policy to fight inflation and unemployment as well as to promote stable output growth in the economy.

Money normally serves three functions. It is a unit of account, a medium of exchange, and a store of value. As a unit of account, it measures the value of things, thereby providing a common basis for comparison. If one item is priced at RM10 and another at RM5, people will know immediately the relative cost of each item – the first costs twice as much as the second. The unit of account function is important, especially, for computation, record keeping, and decision making. Money also serves as a medium of exchange, something that can be used to purchase goods and services and pay debts. Hence, money facilitates the exchanges of goods and services. Finally, money serves as a store of value. People usually would not spend all their incomes, part of them are saved in monetary form. Money is use worldwide as a store of value because of its usefulness as a

unit of account and medium of exchange, although its return is relatively low compared to other financial assets such as stocks and bonds.

Money in Developing Economies

The most significant feature of a typical less developed country (henceforth referred to as LDC) is its economic dualism, where there exists a modern sector together with a traditional sector within the domestic economy. The modern sector can be identified with an exchange economy (monetised sector) and the traditional sector with the subsistence economy (non-monetised sector) (see Myint, 1971). With economic growth, it is reasonable to expect that the proportion of the non-monetised sector to the monetised sector will decline. The financial markets in a modern or monetised sector can be further divided into organised money markets and the unorganised money markets.

In many LDC's, the interest rate is administered by the central bank rather than market determined in the organised sector (Ghatak, 1981). Under these circumstances, it is difficult to see how the interaction between the demand for and supply of money could determine the interest rate. For this reason, investigators observe the expected rate of inflation, rather than the interest rate, as a major variable in influencing the demand for money in LDC's (Deaver, 1970; Campbell, 1970; Wong, 1977 and Balino, 1983). In particular, of those countries that have experienced hyperinflation, it has been shown that the demand for real cash balances is sensitive to the expected rate of inflation, which in

the absence of any meaningful interest rates, is used as a proxy to measure the cost of holding money.

The Money Supply

The money supply is the amount of money available in an economy. Monetarists consider the quantity of money and the rate of change of the quantity of money as important factors in the functioning of the economy. The quantity of money is thought to have important effects on output, employment and prices. They also believe that the quantity of money is a variable determined primarily by supply conditions, postulating a close link between the high-powered money (monetary base) supplied by the central bank, and the quantity of nominal money available to the public. Therefore, the quantity of money supply can be controlled by the monetary authorities and can be used for policy purpose.

In modern economies, the money supply in one country is mainly determined by the central bank of that country. To increase the money supply, the central bank normally will use newly minted currency to buy financial assets, such as government bonds, from the public through an open-market purchase transaction. In making this swap, the public increases its holdings of money, and the amount of money in circulation rises. In contrast, to reduce

to the public in exchange for currency through an open-market sale transaction.

The central bank can also affects the money supply through two other ways: changes in reserve requirements and discount window lending. The central bank sets the minimum fraction of each type of deposit that banks must hold as reserves. An increase in reserve requirements forces banks to hold more reserves and increases the reserve-deposit ratio. A higher reserve-deposit ratio reduces the money multiplier and thus reduces the money supply for any level of the monetary base. The discount window lending is the lending of reserves to banks by the central bank. The central bank can affect the money supply by changing the discount rate it charges for the lending reserves. An increase in the discount rate makes borrowing at the discount window more costly, thus banks reduce their borrowing, and ultimately the monetary base falls. For a constant money multiplier, a drop in the monetary base implies a decline in the money supply as well.

Assets are differing in their "moneyness", therefore there is no single measure of the amount of money or money stock in the economy that is likely to be completely satisfactory. For this reason, in most countries, economists and policymakers use several different measures of the money stock, which are known as monetary aggregates. The various monetary aggregates differ in how narrowly they define the concept of money. The two most widely used monetary aggregates are the narrow definition of money, M1, and the broad definition of money, M2. Narrow money (M1) consists of currency in circulation and demand deposits, whereas broad money (M2) consists of M1 plus personal savings deposits and nonpersonal notice deposits.

Mayer, Duesenberry and Aliber (1984) justify alternative definitions of money as an a priori approach and an empirical approach. The a priori approach is a functional approach, that is, a rather philosophical one that focuses on the nature of money. It searches for one characteristic that most distinguishes money from other things, and then defines money in terms of these characteristics. According to this approach, it is the medium of exchange characteristic that distinguishes money, thus functional views of money are those assets that eliminate the difficulties of barter. This approach defines money supply as M1 plus transactions accounts and travellers checks.

The second approach favoured an empirical definition of money 'a definition that will enable us most readily and accurately to predict the consequences for the important economic variables of a change in the conditions of demand for or supply of money' (Friedman and Schwartz, 1969; see also Laidler, 1969). In this approach, the definition of money relies on empirical tests, and focuses on what makes money supply important. To define money in this fashion, one should first collects data and estimates the relationship between money defined in alternative ways and other economic variables, and then measures which yields the strongest statistical relationship between them.

This approach argues that money supply is important for two reasons: changes in money supply have a major impact on national income, and the central bank can control the supply of money. The empirical definition, therefore, defines money as liquid assets that: (1) has the most predictable impact on nominal income, and (2) can be controlled by the central bank. Notice that if the consequences of alterations of money supply are to be

predictable with a fair degree of accuracy, then the demand function for money must be reasonably stable. The monetary authorities will then be able to control the level of output, employment and prices by changing the money supply, which now consists of a class of financial assets that includes notes and coins.

Money, Nominal Output and Real Output

The quantity theory of money stated that, in the long run, changes in money growth are reflected one-for-one in nominal output growth and inflation but have no impact on the output of real goods. Thus, we expect that an increase in the growth rate of money will be associated with an increase in the growth rate of nominal output, but not associated with permanent changes in real output.

The perspective of the economics profession on the effect of money or a monetary impulse on real output is one of the most controversial issues in macroeconomics today. At the present time, there appears to be general support among economists and in the assumptions or implications of theoretical macroeconomic models that in the long run there is no substantial positive effects on real output or real output growth from a monetary expansion. As shown in Table 1.1, Myanmar experienced a high growth rate in both M1 and M2 but recorded the lowest rate of growth in real income. In contrast, other countries have relatively low money growth but fast real income growth. Malaysia, Thailand and Singapore, for instance, have an average real income growth of 7.6 percent to 8.4 percent with relatively low money growth rate. The empirical evidences of these

Table 1.1: General Economic Indicators in Thirteen Asian Countries, 1974-1997

Country	% Growth in M1	% Growth in M2	% Growth in Nominal GDP	% Growth in Real GDP
Bangladesh	13.9	17.4	14.8	5.5
India	14.6	17.5	14.3	5.9
Indonesia	21.1	27.2	19.6	8.1
Malaysia	14.4	16.7	11.7	7.6
Myanmar	21.2	21.3	19.9	4.1
Nepal	16.1	19.2	14.5	5.1
Pakistan	16.3	17.2	15.8	6.0
Philippines	16.2	19.9	15.1	2.9
Singapore	10.5	13.5	11.3	8.4
South Korea	17.7	21.4	19.4	9.2
Sri Lanka	16.1	20.1	17.2	5.5
Taiwan	17.6	19.6	12.5	7.8
Thailand	12.1	18.5	13.3	7.1
Average	16.0	19.2	15.3	6.4

Sources: International Financial Statistics, various issues.

Asian economies proved that changes in the money supply are not associated with permanent changes in real income.

Many classical economists argue that money growth is endogenous to economic expansion, a relationship they call reverse causation. Specifically, reverse causation means that expected future increases in output cause increases in the current money supply and that expected future decreases in output cause decreases in the current money supply, rather than the other way around. Reverse causation explains how money could be a procyclical and leading variable even if the classical model is correct and changes in the money supply are neutral and have no real effects (see for example, King and Plosser, 1984).

The Quantity Theory and the Neutrality of Money

The Classical, Keynesian and the Monetarist view differently regarding the role of money in economic activity. Briefly, in the classical theory the role of money has been relegated to the background. It is argued that monetary forces do not affect the movements of the real variables, that are, output and employment, in the economy. In the Keynesian theory, it is suggested that a change in the money supply may change the level of output via changes in interest rates. The 'monetarist' school, headed by Milton Friedman, contends that the classical rather than the Keynesian theory would be valid as long as money can affect real variables in the short run, but only nominal magnitudes in the long run.

The debate regarding the role of money in the economy finds its origins in the quantity theory of money, an identity developed to illustrate the classical dichotomy – the idea that the real variables in the economy, such as real interest rates, relative prices and real income, are determined by real forces and that monetary forces only affected nominal quantities. Thus, in the classical model money is said to be neutral or money is a veil.

The classical quantity theory of money is best illustrated with the help of Irving Fisher's (1911) equation of exchange. Let M indicates the nominal stock of money in the economy, V its velocity, P the price level and Y the real income or output of that period. Then we have

$$MV = PY \qquad\qquad (1.1)$$

The above equation is basically an identity which simply states that when the money stock is multiplied by V or the number of times money is used to buy final output, we obtain total expenditure which must be equal to the product of P and Y or the value of output bought.

Assume now that V is relatively fixed because payments patterns and habits could be regarded as relatively constant. Y is fixed too because real output is to be at its full employment level. M is assumed to be determined independently of PY. With V and Y predetermined and M exogenous, P is the only endogenous variable in the system. We will then obtain a direct relationship between M and other variables since

$$M = \frac{PY}{V} \qquad\qquad (1.2)$$

If the money supply is doubled, the price level will be doubled; in contrast, if M is halved, P will be halved too. In the long run variations in M are reflected in equiproportionate changes in P, but not real effect on Y. Hence, in the long-run money does not matter or money is neutral.

It should be noted that the neutrality of money is dependent on a number of conditions: price/wage flexibility, an absence of money illusion, an absence of distribution effects and price, and interest rate expectations of unitary elasticity. These