

MONEY DEMAND, PURCHASING POWER PARITY
AND INFLATION MODELING IN MALAYSIA

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ABSTRACT

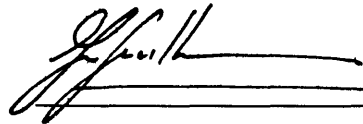
Economists have not relented and will not relent for sometime to come in their debate on the causes of inflation. Some characteristic features of earlier inflation models, which can be regarded as their Achilles' heel and a reason for their dismal performance in tracking down inflation in many countries are the loop-sidedness of the models and the lack of empirical investigation into certain claims before using them as foundation of those models. For example earlier models of inflation in Malaysia and in many other countries used growth in money supply to represent excess money supply over money demand without empirically testing the claim that the demand for money is stable or constant. This empirical investigation is necessary because, an increase in money supply, which is followed, by a corresponding increase (in the same amount) in money demand may not cause inflation. The complexity and dynamics of inflation transcends explanation by one theory. The paper was able to establish cointegration among the variables in the external sector and the monetary sector via the Johansen approach. By combining the two dominant theories (money demand and purchasing power parity) of price formation in an open economy, the paper came to the conclusion that inflation in Malaysia is influenced by growth in money supply although no evidence was found to support the theoretical axiom that inflation is driven by excess money supply over money demand. The purchasing power parity theory was also significant in explaining inflation in Malaysia. The within and out of sample performance of the error correction model of inflation developed by the paper and the ARIMA model used by the paper stamped out the error correction model of inflation as been better than the ARIMA model in explaining inflation in Malaysia.

خلاصة البحث

لم يتوقف الاقتصاديون، ولا يتوقفون في مناقشتهم عن أسباب التضخم. بعض الخصائص المميزة لمخططات دراسة التضخم والتي يمكن اعتباره موقع غير منيع وسببا في الأداء الرديء في متابعة التضخم في بلاد كثيرة، هي عيوب المخططات وغياب الاستعلام التطبيقي على بعض الافتراضات قبل استعمالها كأساس لتلك المخططات. مثلا، مخططات دراسة التضخم السابقة في ماليزيا وبلاد أخرى كثيرة، استخدمت معدل النمو في عرض المال ليمثل عرض المال الفائض على طلب المال بدون أن يختبروا تطبيقا الافتراض هل طلب المال متغير أو ثابت. هذا الاستعلام التطبيقي ضروري، لأن أي زيادة في عرض المال إن تابعتها زيادة مماثلة في طلب المال سوف لا تكون سببا في التضخم. لأن عقدة وديناميكية التضخم تفوق الشرح من قبل نظرية واحدة. هذا البحث استطاع أن يثبت “Co-integration” بين المتغيرات في القطاع الخارجي وبن القطاع المالي مستخدما طريقة “Johansen”. بجمع نظريتي (طلب المال وتكافؤ القوة الشرائية) تكوين السعر في اقتصاد مفتوح، وصل البحث إلى أن التضخم في ماليزيا متأثر بمعدل النمو في عرض المال، ولكن لم يوجد هناك دليل يؤيد القاعدة النظرية على أن التضخم سببه عرض المال الفائض على طلب المال. ونظرية تكافؤ القوة الشرائية لها دلالة في شرح التضخم في ماليزيا. وأخيرا، أثبت البحث أن مخطط “Error Correction” للتضخم أفضل من مخطط “ARIMA” في شرح و تحليل مشكلة التضخم في ماليزيا.

APPROVAL PAGE

I certify that I have supervised and read this study and that in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a research paper for the degree of Master of Economics.



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DECLARATION

I hereby declare that this research is the result of my own investigation, except where otherwise stated. Other sources are acknowledged by footnotes giving explicit references and a bibliography is appended.

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Date: 20th September 2024

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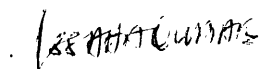
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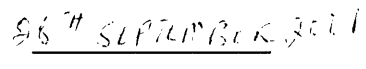
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Dedicated to my family and to my real friend Munkaila Yussif.



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All thanks are due to Allah, The Almighty, The Benevolent, and The Merciful. Praises and peace be upon His Prophet Mohammad (SAW). Most certainly with Allah nothing is impossible. Its through His Benevolence and Mercy that I have been able to reach where I am now. His grace alone brings succour.

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CHAPTER 1

INTRODUCTION

Few issues in economics have attracted as much attention as inflation. In fact it has become a recurring theme in academic and political circles ever since the bullion controversy on the causes of the rise of prices during the Napoleonic war years. This concern about inflation has spawned a plethora of literature on the causes, effects, and policy actions necessary to reduce or stabilize it, the international transmission of inflation or even the best way to model inflation. Thus far, it seems economists are not going to relent in their debate on the subject for sometime to come or may never give up discussing the issue.

According to Marquez and Viving (1984) the concern for inflation is reflected by the increasing number of publications in which inflation appears as a key word in the title. This great volume of empirical studies illuminating the various areas of inflation by the academic community and coupled with political discussions has made inflation very popular. It's therefore not uncommon to find even the layman talking about inflation. However, confusion about the term is as common as the commonality of the term itself and only a few discussions has been illuminating.

The increasing pre-occupation with inflation can only be appreciated after a sober reflection on the effects of inflation at both micro and macro level. Although this paper is not about the effects of inflation, a brief mentioning of some of the effects of inflation will undoubtedly be refreshing. At the micro level, it has been established

that, the poor are the hardest hit group whenever an economy is experiencing high levels of inflation. This point is buttressed by the fact that, the poor do not possess effective inflation hedges (Callen and Chang, 1999). It's against this background that the maintenance of a low level of inflation can be regarded as one of the tools in the fight against poverty (Callen and Chang, 1999). Inflation also reduces real returns to working which consequently reduces the supply of labour of a country and thus output if labour cannot be substituted by capital for one reason or the other. Gilman (1993) shows on the basis of empirical research that there exist gross misallocations of productive resources from research and development to portfolio management, finding effective ways to hedge against inflation and searching for arbitraging opportunities in countries experiencing chronic inflation. This misallocation of resources coupled with the inflationary effect of reducing capital accumulation due to high cost of capital (Stockman, 1981) leads to reduced investment, falling national income, unemployment and high incidence of poverty all pushing one another in a vicious circle like manner. Other ill effects of inflation include income redistribution from creditors to debtors, risk aversion and the fact that inflation begets higher inflation (Okun, 1971; Gordin, 1971; Balk, 1978; Blejer, 1979a; Foster, 1978 and Logue-Willet, 1976).

Despite these seamy sides of chronic inflation, researchers have also documented some positive effects of mild inflation especially creeping inflation. They argue that creeping inflation is a tonic for investment and hence economic growth.

Works on inflation modeling in recent times have centred on three main views. The first strand of works adopts the monetarists' view on the causes of inflation or the

traditional/classical explanation of inflation. The second strand is anchored in the Keynesian view or what can be regarded as the structuralists' view of inflation while the third way of modeling inflation views the source of inflation as being external to the domestic economy or simply the purchasing power parity.

The monetarists are unanimous in their belief that inflation is always and every where a monetary phenomenon (Friedman, 1968). To the monetarists, whenever inflation rears its ugly head, there is always excessive money supply growth in the background. The explanation put forth for the existence of inflation is the relationship between the supply of money and the demand for money. Accordingly when the supply of money exceeds the demand for money the result is inflation. The mechanism through which excess money supply translates itself into inflation is based on the famous, long established and controversial quantity theory of money developed by one of the great classical economist, Sir Irving Fisher.

The quantity theory of money is a theory about the relationship between the quantity of money in an economy and the price level. Mathematically, it is represented as $MV = PY$; where M is the stock of money, V is the income velocity of circulation of money, P is the average price level, and Y is a measure of real output (real income). V in this formulation is a constant given the classical assumption that the economy is always at full employment. V is determined by certain institutional features of the economy such as the time intervals between wage and salary payments, which change slowly over time and can therefore be considered as a constant. The above formulation can be rewritten in the following alternative form: $M = \frac{Y}{V} P$. Since $\frac{Y}{V}$ is a constant, it

implies that changes in the stock of money are proportional to changes in the price level.

It was to the credit of Milton Friedman (1971) who restated the quantity theory of money in a more convincing way. In Friedman's exposition, the demand for money and therefore V can vary. However, the variation is stable (another definition of money demand stability) and thus price changes can still be accurately predicted from the movements in money supply. With real output growing at its full capacity rate and with stable growth in velocity, price inflation is directly related only to the growth rate of money supply

The proportional relationship between money and prices has led to one of the most celebrated classical concept of neutrality of money. Money is considered to be neutral when an increase in the quantity of money supply does not affect real variables such as output, employment and interest rates. The faith in the neutrality of money is reinforced by the classical dichotomy between the money market and the real economy wherein the real economy is insulated from disturbances (changes) in the money market.

The other end of the spectrum is the structuralist, who hold the view that inflation is a situation where certain constraints, rigidities or bottlenecks leads to increase in cost of production or short falls in production leading to increases in prices. Inflation in this context is the inevitable result of a country attempting to achieve rapid economic growth in the face of structural bottlenecks. Hence the culprit for persistent and appreciable increase in the general price level is increased cost of production. The

inflationary experience of many developing countries seems to bear out the structuralists' explanation. This is because, developing economies are characterized by inefficient agricultural sector that is unable to respond to higher demand, rapid urbanization, inadequate availability of foreign and domestic inputs, distorted industrial structures and monopolized markets which inhibits output expansion causing aggregate supply to lag behind aggregate demand. For instance, supply constraints was a major cause of inflation in Malaysia in 1999 (BNM, 1999).

The purchasing power parity theory is the third way of modeling inflation. The history of the purchasing power parity theory of exchange rate determination dates back to the mercantilist writings of the seventeenth century although it was through the writings of the Swedish economist Gustav Cassel that brought it into prominence in 1916. The crux of the theory is that, equilibrium exchange rate between two currencies occurs when the purchasing power of the two currencies are equivalent at that rate of exchange. How much goods and services (the power of money) a monetary unit will be able to buy according to this theory depends on the price level in a country. Accordingly, the higher the average price level, the lower will be the purchasing power of a monetary unit and vice versa. Thus, it is this power of money, which determines the rate of exchange between two currencies. A country with a low purchasing power of money in relationship to other countries will have to give more of its currency to obtain a unit of other country's currency. Following from the above analysis, a continuous and a depreciable exchange rate, which is a result of a lower purchasing power of the domestic currency, is a reflection of inflation. Thus movements in the exchange rate can give indications of the existence of inflation.

While an entirely monetarists and an entirely structuralists model restricts their search for the determinants of inflation to domestic factors, the pure purchasing power parity theory model of inflation focuses on the external influences on inflation. Hence these entirely independent models of inflation such as a pure monetarists model or a pure structuralists or even a pure purchasing power modeling of inflation without regard to other determinants of inflation outside the purview of the theory they are using may cause these models to suffer from misspecification of one kind or another. This is because price formation in an open economy stems from both domestic and foreign factors. A good model of inflation in an open economy should be able to synthesize the external and the internal factors into one single model of inflation. In view of the highly open nature of the Malaysian economy (in fact Malaysia is considered as one of the most open economies in the world), the best model of inflation for Malaysia will be the one which combines in itself both the domestic and the foreign causes of inflation.

STATEMENT OF PROBLEM

The issues that give rise to this study are; what are the determinants of inflation in Malaysia? Is inflation in Malaysia influenced by domestic or external factors? Which of these factors (domestic or external) exert the most significant impact on inflation in Malaysia? The empirical study to be undertaken hopes to provide answers to these and other related questions.

OBJECTIVE AND EXPECTED CONTRIBUTION OF THE STUDY

Motivated by the above considerations, this research attempts to model inflation in Malaysia by incorporating into one single model the demand for money and the purchasing power parity with the objective of providing an integrated approach to the modeling of inflation. This approach is expected to overcome the shortcomings (most importantly the mis-specification problem) of the three main views cited above on the causes of inflation. In this way, the research aims at pinning down as precisely as possible the determinants of inflation in the Malaysia. In addition, the research hopes to settle the arguments as to which determinant(s) exerts the most significant influence on inflation in Malaysia. A fulfillment of the aims of this research will help policy makers to effectively and efficiently control inflation in a least costly way.

The organization of the research is as follows. Chapter one is the introduction, while chapter two provides the literature review on related studies to provide a theoretical and an empirical foundation for the present study. Chapter three of the research contains the methodological techniques. The empirical results are presented in chapter four and this is followed by some recommendations and a conclusion to the research in chapter five.

CHAPTER 2

LITERATURE REVIEW

Economist, policy makers and concerned citizens all remain seized with the problem of inflation. Despite differences on conceptions, causes, modeling and control of inflation, all are however united in their consensus that inflation can be controlled and ought to be controlled. Armed with this consensus, the issue then is how can policy makers control inflation. Although controlling inflation may seem to be a simple task, yet this task sets in its trail a chain of other issues or questions. Some of these issues or questions include effective control tool(s) to curb inflation which in turn brings to the fore the determinants of inflation or the etiology of inflation. Determining the causes of inflation is important because knowing the cause(s) of a problem helps in no small in solving the problem. Over the years, an increasing amount of time and resources have been spent on academic research in the hope of determining the causes of inflation and other issues pertaining to inflation. The objective of this section is to present the state of the art as far as inflation modeling in Malaysia is concerned although works on inflation in other countries may be used to reinforce certain points.

Attempts to model inflation in Malaysia have been loop sided as evidenced from the overriding importance attached to growth in money supply as a major cause of inflation in Malaysia. This is to say that the monetarists view on inflation has been very popular in Malaysia. A significant number of studies on inflation modeling in Malaysia have adopted the monetarist's path by looking at the causal nexus between money, and prices in a bivariate framework.

Notable works on the causes of inflation in Malaysia are; Rana (1984) Jusoh (1986), Lee and Li (1985) Hwa (1987), Yussoff (1988), Marasdeh (1993), Ibrahim (1995,1999), Tan and Cheng (1995), Abdullah and Yusop (1996) and Masih and Masih (1998). Employing different methodologies, all the above citations are consistent in assigning a significant role to growth in money supply as the main cause of inflation in Malaysia. Using the Geweke-Sim-Granger methodology (Granger 1969, Sim 1972, Geweke 1982) Tan and Cheng (1995) declared, “by and large, the monetarist view of inflation of being a monetary phenomenon is not contradicted”. Bank Negara (the Malaysian Central Bank) also arrived at the same conclusion in its 1995 annual report when it charged that the inflationary pressures of the 1990s were due to excessive money supply growth. The implication of these findings is that, excessive money supply growth causes inflation in Malaysia and not the other way round. A unidirectional causality exists from money to prices. An increase in money supply leads to an increase in the average price level.

Jones and Khilji (1988) do not find the bivariate models used by researchers in establishing the relationship between money and prices appropriate for the reason that they are based on the axiom that money supply growth influences prices without any attempt at verifying the validity of the specification. In line with the issue raised against bivariate models, one may not find the conclusions of a unidirectional causality from money to prices persuasive.

Ibrahim (1998), Masih and Masih (1998) and Deme and Fayisa (1995) find the protestation of Jones and Khilji (1988) against bivariate models valid. They argue that, bivariate models by nature have the potential of being wrongly specified. The

misspecification of the models may result from the omission of relevant variables that may be important in explaining the dependent variable or inflation in this case. Their objection is quite understandable in view of the fact that relationships among economic variables are not simply clear-cut as posited by bivariate models. An economic variable may not be influenced by the causal variable targeted by researchers. Both may in turn be influenced by a third variable. The exclusion of this additional variable(s) may lead to the wrong conclusion of a unidirectional causality. Finally, Onafowora (1996) finds an overwhelming body of literature on causality to back up the claim that contrary to popular held views, causality is not always unidirectional.

In a survey of theoretical and empirical studies on monetary policy, Friedman (2000) concludes, “by 1990s the empirical relationships between money (or credit) and either income and prices had broken down in many countries”. Researchers in their search for the determinants of inflation and most importantly in a bid to go around the problem of misspecification bias, accordingly had to do away with bivariate models and tried to rake in as much explanatory variables as possible in their modeling of inflation.

In view of the important role played by external factors such as import price index and the price index of the industrialized countries on the inflationary situation in the importing country, many researchers have incorporated into their models of inflation import prices. The rationale of this is seen in the fact that, when the major trading partner(s) of a country is/are experiencing inflation, it is likely to be transmitted into the country through importation and thereby raises the average price level in the

importing country. The case of developing countries is quite easy to visualize given the inelastic nature of import demand. These countries import for two basic reasons. One is for survival in terms of food, clothing and medicare. The second is in terms of development wherein they import raw materials, inputs and technology to quicken up their pace of economic growth and development. They will therefore have to import regardless of the prices in the exporting country. Producers too are caught up in this scenario as explained by the import intensity of most production process in developing countries. Producers face with import dependent production structures will have to import the necessary inputs and equipments to meet demand. The consequence of these is that, if the exporting country is experiencing inflation, it passes through to the importing country and this increases prices. The process through which prices in an exporting country is transmitted into an importing country has been termed imported inflation in economic literature.

In the case of Malaysia, models which account for inflation by incorporating import price index and price index of industrialized countries are; Samudram (1982), Rana (1984), Ibrahim (1995) and Masih and Masih (1998). The approach is valid on the grounds that, a lot of studies generally points to the import dependency of the Malaysian economy. External developments such as inflation in the economies of Malaysia's major trading partners can be passed to the domestic economy. Justifiably, the above-mentioned studies were able to document a significant influence of the external factors on inflation in Malaysia.

Pioneering work on the dynamics of inflation in Malaysia using exchange rate as one of the explanatory variables was undertaken by Rana (1984) and later by Ibrahim (1999). The justification put forth by Ibrahim (1999) for the use of the exchange rate

in the context of Malaysia is in line with the highly open nature of the Malaysian economy and an increasing import intensity of the production structures. The inclusion of the exchange rate variable in the analysis of inflation can be rationalized on both theoretical and empirical grounds. The exchange rate is the price (rate) at which one currency is exchanged for another currency(s). When the price of a foreign currency in terms of the domestic currency increases, it means depreciation of the domestic currency has occurred and the domestic currency has become cheaper while the foreign currency is now expensive. The reverse is true for an appreciation of the domestic currency.

The effect of a depreciation of the domestic currency is to increase the domestic price of foreign exports and reduce the foreign price of domestic exports. This makes domestic exports to foreigners cheaper and foreign exports to the domestic country expensive. Depreciation serves to discourage imports and encourage exports other things being equal. Whether depreciation is effective in meeting the objective of discouraging imports and encouraging exports is not of concern here. What is of concern is the impact of depreciation on the average price level and therefore inflation in the domestic economy.

It was stated earlier that, developing countries have an inelastic demand for foreign goods and services. A depreciation of the domestic currency coupled with an inelastic import demand function may not reduce importation or may only reduce imports marginally. For instance in a situation where imports is composed mainly of equipments and inputs for further production in the domestic economy, it may lead to rising cost of production since imports cannot be reduced. The higher cost of

production most often than not is translated into higher prices even under the assumption of a perfectly competitive market. This is because prices must reflect cost (marginal cost) in competitive markets. One outstanding feature of many developing economies is chronic and appreciable depreciation of domestic currencies. A natural outcome in these economies will be rising prices generally translated to mean inflation. The inflationary effects of depreciation can be possible even in the advanced countries where the volume of trade to Gross Domestic Product is high. In fact the exchange rate channel of inflation is well acknowledged in both theoretical and empirical works as reflected in the voluminous literature on inflation that uses the exchange rate as an explanatory variable.

The pitfall however with the use of the exchange rate in the inflation accounting process is that it may not lead to inflation when depreciation of the domestic currency occurs. In many countries, governments due to political reasons may not allow upward price adjustments to take place for fear of incurring the wrath of the electorate who may vote out the government. It is in this connection that exchange rate depreciation may not exert any impact on the average price level. Though this may not have any theoretical foundation, yet empirical evidence in many developing countries has validated this argument. The use of the exchange rate variable in inflation models in countries with price controls may not be convincing from an empirical standpoint. This however is not to undermine the significance of the exchange rate in inflation models. Exchange rate may be a good transmission channel in countries where markets are left unfettered and prices adjust accordingly. Also in developing countries with competitive markets, the predictive power of the exchange rate may be very strong.