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A Test of Two Open-Economy Theories: The Case of Oil Price Rise and Italy

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Two major open-economy theories are the Keynesian and Monetarist theories. The goal of the study is to empirically discriminate between the two theories. Keynesian and monetarist views about the homeostatic mechanism are fundamentally different and provide a basis for constructing discriminatory empirical tests. The Keynesian theory holds that there is no, or only a very weak, homeostatic mechanism and, in the absence of government intervention, real income tends to remain below the level of full employment. In the monetary interpretation, the homeostatic mechanism is strong, and real income can be treated as though it were exogenous. This study examines the response of Italy to the sharp increase in oil prices in late 1973. The experience of Italy, as an oil-importing country, supports the monetarist view.

JEL Code: F14, F41, F43

1. Introduction

The Keynesian and monetarist theories dominate macro-economics, in general, and open-economies, in particular. Ardalan (2003, 2005a, 2005b, 2007, 2011a) has provided an exhaustive review of the theories and empirical evidence on open economies and has shown the limited ability of this literature in empirically discriminating between the Keynesian and monetary approaches. The main goal of this study is to fill this void by empirically discriminating between the two theories of open-economies.

Keynesian and monetarist theories contain fundamentally different views about the long-run equilibrium state of the economy. Their views differ on the effectiveness of market forces in re-establishing the full-employment level of real income. Keynesian theory[1] views market forces as being weak in re-establishing the full-employment level of income, so that, in the absence of government intervention, real income tends to remain below the full-employment level. Monetarist theory,[2] on the other hand, views market forces as being strong enough to re-establish full-employment relatively quickly.

Therefore, it is useful to utilize the different predictions implied by the two approaches with respect to the sharp increase in oil prices that took place in late 1973 to discriminate between them. Ardalan (2010) applies this discriminatory test to the 1973 oil-shock experience of Japan, as an oil-importing country, and the result supports the Keynesian view. Ardalan (2011b) applies this discriminatory test to the 1973 oil-shock experience of Iran, as an oil-exporting country, and the result basically supports the monetarist view, but lends some support to the Keynesian position. In the current study, the 1973 oil-shock experience of Italy, as an oil-importing country, is analyzed. The result supports the monetarist view. This result has important policy implications

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for the government of Italy. This is because if the government of Italy does not intervene by its economic policies, i.e., monetary and fiscal policies, the Italian economy will automatically re-establish full-employment.

This study is organized in the following way. Section 2 discusses the conceptual basis used for the construction of an empirical test to discriminate between the monetarist and Keynesian theories. Section 3 empirically tests the response of Italy to a major real shock, i.e., the sharp increase in oil prices in late 1973. Section 4 summarizes the major conclusions.

2. Conceptual Framework of the Test

This section discusses the construction of a test that can discriminate between the two open-economy theories. The approach is based on the different views Keynesians and monetarists[3] have about the role of stability (homeostasis). This difference is considered the basis for constructing the discriminatory test.[4]

The analysis concentrates on one of the fundamental issues separating monetarist and Keynesians – the effectiveness of market forces in re-establishing full-employment. In the monetary interpretation, market forces are strong and, in the long run, real income can be treated as though it were pre-determined. In Keynesian models, market forces are weak, and in the absence of government intervention, real income tends to remain below its full-employment level.

If market forces tending to re-establish equilibrium are strong and effective, the monetarist assumption that income can be treated as exogenous is reasonable. In that case, open-economy adjustment for a small country under fixed exchange rates must take place through changes in the stock of money or relative prices rather than through changes in employment and output. If market forces are weak and there is persistent under-employment, then income becomes endogenous as the positive feedback of multiplier analysis dominates the opposite feedback assumed by monetarists. In that case, open-economy adjustment normally involves alterations in employment and output. Restated, monetarists believe that a country's response to an external real shock will be through an adjustment in relative prices with no long-run change in employment and output. Keynesians believe that the adjustment will work through employment and output. These differing predictions provide a basis for the construction of a discriminatory test.

The controversy over stability (homeostasis) is based on different views about the effectiveness of market forces in re-establishing equilibrium. If market forces are effective, as monetarists believe, then if the economy is shocked, equilibrium tends to be re-established relatively quickly. If market forces are weak, as Keynesians believe, then the economy is at the mercy of random shocks and autonomous factors. If market forces tend to re-establish full employment quickly after some contractionary shock, then it is reasonable to view annual income as approximately determined by the existing labor force, capital stock, technology, etc. Keynesians, however, believe that it is only by coincidence that an economy is at full employment because market forces are not strong, and a contractionary shock can lead to prolonged unemployment. In terms of the production possibilities frontier, monetarists believe that the economy is either on the frontier or moving towards it. Keynesians, on the other hand, believe that

the economy tends to be inside the feasible set represented by the frontier. In terms of growth, given a random shock, monetarists permit a short-run deviation from the full-employment growth path, but believe that the economy tends to return to a full-employment growth path relatively quickly. Keynesians, on the other hand, believe that the economy will follow a new growth path, different from the original one. These differing views about the strength of market forces can provide the basis of a discriminatory test.

In Keynesian models of an open economy, imports directly and positively depend on income and income is an endogenous variable. Monetarists, on the other hand, have a different view. The macro-economic assumptions of the monetarists appear to rest, explicitly or implicitly, on the micro-economic foundations provided by the classical model of international specialization and exchange. In that framework imports are financed by exports and, in the absence of growth, there is no relationship between imports and income. An increase in imports is an increase in supply of exports, either goods or assets. This shift in imports may alter the composition of output, but it does not create unemployment.

For the monetarist theory, on a comparative basis, exports finance imports and there is no relationship between imports and income. The full-employment condition leaves no place for autonomous changes in imports to affect income. Admittedly, an autonomous increase in imports may cause output to decrease in the short run, but over time, the economy will be pushed back to its original full-employment level and there will be no long-run reduction in the output. This adjustment process can be visualized as an inward move of the economy within the production possibility frontier in the short run, and returning back to it in the long run. The price-theoretic approach of monetarists, of course, would be the vehicle for the adjustment process, i.e., the change in relative prices and the corresponding substitution in consumption and production.

Using time series data to estimate an import function, however, has no discriminatory power. In a growth context, the pure theory of trade and the monetarist approach to the open economy imply a positive relationship between income and imports. This situation can be visualized as a shift in the production possibilities frontier that, given relative prices, results in a higher level of imports, more exports, and higher income. Therefore, the monetarist model in the context of growth is consistent with the same positive relationship between output and imports implied by the Keynesian model. However, if one were able to account for the effects of economic growth, then it might be possible to see if exogenous changes in imports affect income.

In order to account for growth, factors associated with growth can be introduced into the estimating equation (1):

Y = income
IM = imports
X = exports
POP = population
K = capital stock
T = index of technological progress
D = first difference operator

$$DIM = a_0 + a_1.DY + a_2.DPOP + a_3.DK + a_4.DT \quad (1)$$

where population, the capital stock, and technological progress are treated as exogenous. Now, the effect of growth is captured by the last three variables. Therefore, a_1 can be considered as showing the effect of an autonomous increase in income on imports. From the foregoing analysis, an insignificant a_1 would support the monetarist theory.

Most of the major oil-importing countries adopted flexible rates early in the 1970s. Therefore, we need to consider how an autonomous increase in the price of a major import is likely to affect income in a Keynesian approach when exchange rates are flexible.

Under flexible exchange rates, an increase in the value of imports shifts the IS curve to the left and depreciates currency. As a result, imports decrease, exports increase, and the IS curve shifts back to the right in order to intersect the LM curve at the fixed level of world interest rate.[5] This means that after all adjustments have taken place there is no change in income as a result of an autonomous increase in imports. However, if the increase in imports is the result of the increase in price of an imported raw material that constitutes an important factor of production, then after the leftward shift in the IS curve, the increased raw material prices will be reflected in a higher domestic price level[6] and increased demand for money. The LM curve shifts to the left, and in the absence of expansionary monetary policy, the IS curve also must shift to the left in order to intersect with the LM curve at the fixed world interest rate and lower level of income. For an autonomous increase in the price of an important raw material that is not produced domestically, a Keynesian approach suggests a negative b_1, while the monetarist theory expects an insignificant b_1.

$$DY = b_0 + b_1.DIM + b_2.DPOP + b_3.DK + b_4.DT \quad (2)$$

The sign of b_1 of course is determined only if we can identify the change in imports as exogenous.

The basic idea behind equations (2) can be expressed as follows: Given an exogenous increase in the price of an important raw material that is imported tends to reduce income under a Keynesian approach. Monetarists admit that there will be a short-run reduction in output and employment, but contend it will not be long before the economy returns to the full-employment level of output.

In short, for the importing country of an important raw material, an exogenous increase in the value of the raw material leads to two different outcomes by Keynesian and monetarists. Keynesians, based on the multiplier process, believe that when there is an exogenous increase in the value of an import, the income of the importing country decreases, and in the absence of other shocks, remains low. Monetarists, based on their view of market forces, believe that for the importing country, income may go down in the short run, but it will not be long before it returns to the full-employment level. This difference suggests that the test can be applied and evaluated, which is done in the next section. The exogenous shock examined is the increase in oil prices in 1973-74. The importing country is Italy.

3. Statistical Application of the Discriminating Test

The purpose of this section is to see whether the consequences of the oil price rise for an oil-exporting or an oil-importing country are more consistent with the Keynesian or the monetarist theory. This section examines the response of Italy, an importing country, to the sharp increase in oil prices in late 1973. The annual data are obtained from various issues of I.M.F.'s "International Financial Statistics" for the 1953-1978 time period. Note should be taken that data collection was stopped at 1978 which marks the point before the next round of oil price rise.

A clear example of an exogenous shock in the international sphere is the sharp increase in oil prices in the mid 1970s. In late 1973, there was an unprecedented increase in oil prices, which is treated here as a purely exogenous shock to an oil-importing country. It was exogenous because it was based on the negotiations that took place among Organization of Petroleum Exporting Countries (OPEC). It was a shock,[7] because the magnitude of the change was huge and sudden; within three months oil prices tripled.[8]

Among the oil-importing countries, Italy is chosen. The criteria for choosing this country are two. First, oil constitutes a relatively major portion of its total imports, and second, the ratio of its imports to its income is relatively high. These ratios are shown in Table 1.

The tremendous increase in oil prices in late 1973 resulted in a huge increase in the value of oil imports for oil-importing countries. For an oil-importing country, Keynesian theory implies that it should follow a lower growth path because of increased imports and reduced demand for domestic output. Monetarist theory, although admitting a short-run downward deviation from the growth path of output, expects the original growth path to be followed in the long run.

Table 1:
Italy: Oil/Import and Import/Income Ratios

Year	Oil/IM	IM/Y
1953	10	12
1954	12	12
1955	11	12
1956	11	13
1957	12	14
1958	12	12
1959	11	12
1960	9	15
1961	9	15
1962	9	15
1963	8	17
1964	10	15
1965	11	14
1966	11	15
1967	12	16
1968	12	15
1969	11	17
1970	11	18
1971	13	18
1972	11	19
1973	11	22
1974	22	29
1975	19	22
1976	19	25
1977	19	24
1978	17	24
1979	17	26

Table 2:
Italy: Trend in Income

c_0	c_1	c_2	R-Squared	D-W	Rho
5.942	0.060	-0.0004	0.99	1.45	0.47
(375.40)	(18.20)	(2.55)			

The numbers in parentheses are t-statistics.

Table 3:
Italy: Actual and Predicted
LOG Y

Year	Actual	Predicted
1953	6.01319	6.00220
1954	6.05459	6.06128
1955	6.12446	6.11961
1956	6.16745	6.17721
1957	6.22118	6.23407
1958	6.26975	6.29019
1959	6.33822	6.34557
1960	6.39287	6.40021
1961	6.46904	6.45411
1962	6.52909	6.50727
1963	6.58225	6.55968
1964	6.60809	6.61138
1965	6.63886	6.66232
1966	6.69481	6.71252
1967	6.76290	6.76199
1968	6.82508	6.81071
1969	6.87898	6.85870
1970	6.92758	6.90594
1971	6.94419	6.95245
1972	6.97481	6.99821
1973	7.04254	7.04324
1974	7.08383	7.08565
1975	7.13392	7.12818
1976	7.18944	7.16999
1977	7.21445	7.21103
1978	7.23648	7.25127
1979	7.27957	7.29070

Table 4:
Italy: Actual, Predicted, and 95% Band for LOG Y

Year	Actual	Predicted	Upper Bound	Lower Bound
1974	7.08383	7.08565	7.12124	7.05006
1975	7.13392	7.12818	7.16861	7.08774
1976	7.18944	7.16999	7.21384	7.12614
1977	7.21445	7.21103	7.25849	7.16357
1978	7.23648	7.25127	7.30285	7.19970
1979	7.27957	7.29070	7.34694	7.23446

Figure 1:
Italy: Time Trend
*** = Predicted**
+ = Actual

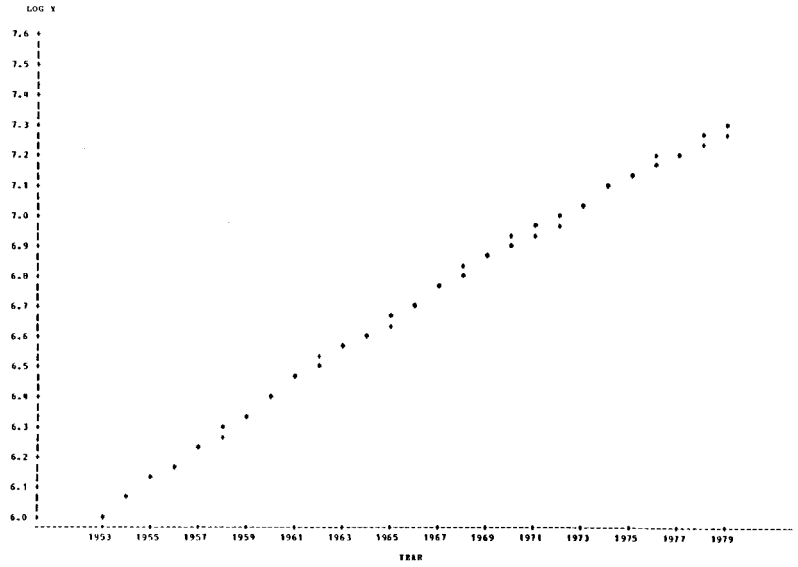
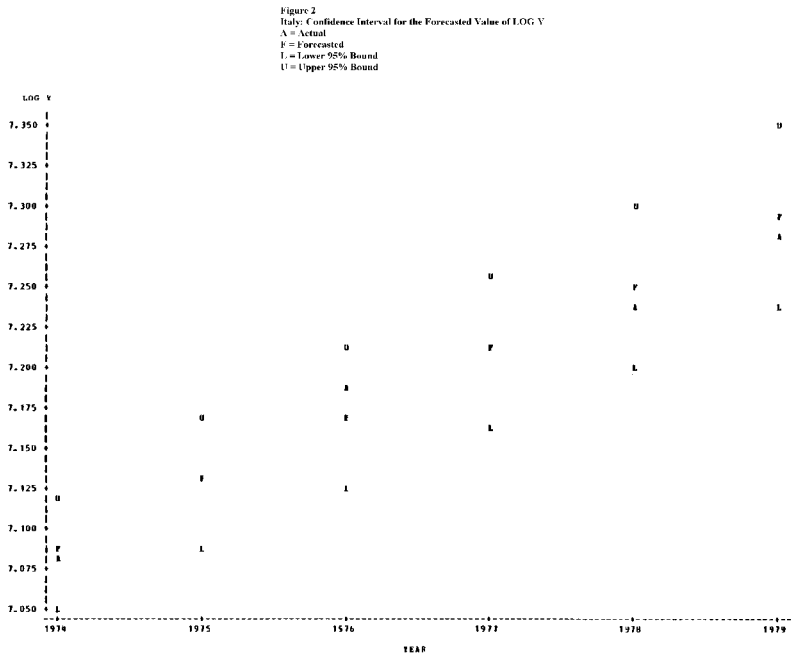


Figure 2:
Italy: Confidence Interval for the Forecasted Values of LOG Y
A = Actual **F = Forecasted**
L = Lower 95% Bound **U = Upper 95% Bound**



In terms of the growth path, Keynesian theory suggests that oil-importing countries will move to a new lower growth path of income than would otherwise follow had the oil price change not occurred. Monetarist theory implies that income in these countries may deviate from its original growth path downward in the short run, but should revert back in the long run. In the early 1970s, industrialized countries abandoned fixed exchange rates, and adopted a system of floating exchange rates. In Section 2 it was shown that for an important imported raw material, and under flexible exchange rates, Keynesians and monetarists expect the same results (with respect to the variables under consideration) as they do under fixed exchange rates, respectively.

Using the time trend approach, the growth path of income is obtained by regressing real income up to 1973 on polynomials of time of different degrees, and choosing the best fit, i.e., the regression with the lowest R^2. After running various regressions, it was noted that the best fit was provided by a polynomial of the second degree, as in equation (3) below. Although such a procedure is far from ideal, it appears to be satisfactory for our purposes because there is no reason to believe that it biases the results in favor of either approach, i.e., Keynesian approach versus the monetarist approach. The results for equation (3), below, are reported in Table 2. It is adjusted for serial correlation. In order to adjust for serial correlation, there is a two-step procedure. The first step is to find out the error structure by regressing the present error term on its past values. The second step is to incorporate this information and re-estimate the original regression. In the first step, the order or the degree of correlation is known, and in the second step, the original regression is estimated by accounting for the degree of serial correlation in the error term. Rho indicates the coefficient of serial correlation that is adjusted for.

$$\text{LOG } Y = c_0 + c_1.T + c_2.T^2 \qquad (3)$$

This regression is used to predict the values beyond 1973. That is, for each year following 1973, the year is inserted into equation (3) and the corresponding value for “LOG Y” is calculated. The “LOG Y” values thus calculated constitute the predicted values for “LOG Y”. The actual and predicted values of income for years after 1973, together with those values for the years before 1973, are given in Table 3, and plotted in Figure 1. In order to more clearly see the actual and predicted values for the years after 1973, only these values together with the 95 percent confidence limits for the predictions are given in Table 4 and plotted in Figure 2.

The results support the pure monetarist theory. The economy slightly deviates from the income growth path only after a long delay of five years. This deviation is insignificant and is presumably the result of something other than the increase in oil prices.

4. Conclusion

Two major open-economy theories are the Keynesian and monetarist theories. The goal of the present study is to empirically discriminate between the two theories. Keynesian and monetarist views about the homeostatic mechanism are fundamentally different and provide the basis for a discriminatory test. On the homeostatic mechanism, Keynesian theory holds that there is no, or only a very weak, homeostatic mechanism and, in the absence of government intervention, real income tends to remain below the level of full employment. In the monetary interpretation, the

homeostatic mechanism is strong, and real income can be treated as though it were exogenous. Ardalan (2010) uses this difference and applies it to the 1973 oil-shock experience of Japan, as an oil-importing country, and the result supports the Keynesian view. Ardalan (2011b) applies it to the 1973 oil-shock experience of Iran, as an oil-exporting country, and the result basically supports the monetarist view, but lends some support to the Keynesian position. This study examines the response of Italy to the sharp increase in oil prices in late 1973. The experience of Italy, an oil-importing country, is in complete conformity with the monetarist approach. This result has important policy implications for the government of Italy. This is because if the government of Italy does not intervene by its economic policies, i.e., monetary and fiscal policies, the Italian economy will automatically re-establish full-employment.

Endnotes

1. For classic references to the Keynesian approach, see Fleming (1962) and Mundell (1963, 1964).

2. For classic references to the monetary approach to balance of payments, see Frenkel and Johnson (1976) and Johnson (1972, 1976).

3. For a classic discussion of the ideas separating Keynesians and Monetarists, see Mayor (1978), Chapter 1, pp. 1-46.

4. This paper uses the methodology of Ardalan (2010, 2011b) and applies it to the data from Italy.

5. Johnson (1972).

6. For a series of papers on the Keynesian view see: Fried and Schultze (1975).

7. There is a sizable literature on various issues related to the oil price shocks. See, for example, Farzanegan and Markwardt (2009), Jimenez-Rodriquez (2008), and Zhang (2008).

8. Jahangir Amuzegar (1977), p. 60.

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