A TEST OF TWO OPEN-ECONOMY THEORIES: THE CASE OF OIL PRICE RISE AND VENEZUELA

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ABSTRACT

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 experience of Venezuela with respect to the sharp increase in oil prices in late 1973. The experience of Venezuela, as an oil-exporting country, supports the monetarist view.

INTRODUCTION

The Keynesian and monetarist theories dominate macro-economics, in general, and open-economies, in particular. The main goal of this study is to empirically discriminate 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 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, on the other hand, views market forces as being strong enough to re-establish full-employment relatively quickly. For classic references to the Keynesian approach, see Fleming (1962) and Mundell (1963, 1964). For classic references to the monetary approach to balance of payments, see Frenkel and Johnson (1976) and Johnson (1972, 1976).

This study, therefore, uses 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. The experience of Venezuela, as an oil-exporting country, is analyzed. The results support the monetarist view. For an exhaustive review of the theory and empirical evidence on the monetary approach to balance of payments and the limited ability of this literature in empirically discriminating between the Keynesian and monetary approaches, see Ardalan (2003, 2005a, 2005b, 2007, 2008).

This study is organized in the following way. Section II discusses the conceptual basis used for the construction of an empirical test to discriminate between the monetarist and Keynesian theories. Section III empirically tests the experience of Venezuela with respect to a major real shock, i.e., the sharp increase in oil prices in late 1973. Section IV summarizes the major conclusions.

CONCEPTUAL FRAMEWORK OF THE DISCRIMINATING 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 have about the role of stability (homeostasis). This difference is considered the basis for constructing the discriminatory test. For a classic discussion of the ideas separating Keynesians and Monetarists, see Mayor (1978), Chapter 1, pp. 1-46. This paper uses the model and the methodology of Ardalan (2013) and applies it to the data from Venezuela. The model and the methodology of Ardalan (2013) are provided here for the reader's convenience.

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 market 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 for the construction of a discriminatory test.

According to Keynesian theory, an increase in any autonomous expenditure results in multiple increases in income. In the international sphere, and under fixed exchange rates, this theory, which assumes exports are exogenous, implies the same multiplier relationship between exports and income.

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. A shift in tastes toward imports is an increased demand for imports and an increased supply of exports, either goods or assets. This shift in tastes 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 exports and income. The full-employment condition leaves no place for autonomous changes in exports to affect income. Admittedly, an autonomous increase in exports may cause output to increase 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 increase in the output. This adjustment process can be visualized as an outward move of the economy beyond 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 export function, however, has no discriminatory power. In a growth context, monetarist theory also implies a positive relationship between income and exports. Given an outward shift in the production possibilities frontier, then income increases and so do normally the exports. An empirical link between exports and income, therefore, is consistent with both approaches and has no discriminatory power. However, if one were able to account for the effects of economic growth, then it might be possible to see if exogenous changes in exports 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

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

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 interpreted as the effect of an autonomous increase in exports on income. From the foregoing analysis, a positive a_1 would support the Keynesian theory, while an insignificant a_1 would support the monetarist theory.

Unfortunately, this equation also does not provide a useful test. Exports are one of the constituents of income. Therefore, on an accounting basis, a positive relationship between income and exports is expected.

For the multiplier, i.e., equation (1), in order to overcome the problem of national income accounting, income can be decomposed into two elements: export income, X*, and non-export income, Y*. The foreign trade multiplier can now be expressed as follows:

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

In equation (2), Keynesians expect b_1 to be positive on the basis of the multiplier theory. In an IS-LM framework, and under fixed exchange rates, the increase in exports is shown as a shift of the IS curve to the right, and the resultant inflow of reserves increases the money supply which is shown by the LM curve shifting to the right. This process continues until IS and LM curves intersect at the fixed level of world interest rate, but at a higher level of income. For this issue, see Mundell (1963). Monetarists, on the other hand, expect b_1 to be negative. The reason is that an increase in exports, in conjunction with the long-run full-employment assumption, results in a decrease in non-export income. With a given production possibility frontier, an increase in the production of exports results in a reduction in the production of other commodities.

The idea reflected in equation (2) can be used to determine the effect of the oil price rise in late 1973 on Venezuela, because this country tended to retain fixed exchange rates. The basic idea behind equation (2) can be expressed as follows: Given an autonomous increase in exports, Keynesians believe that through the multiplier process output in the non-export sector will increase. Monetarists, on the other hand, permit a short-run deviation above full employment, but believe that the economy soon returns to the "natural rate of unemployment," which implies a reduction in the output of the non-export sector as resources are drawn into the production of exports.

In short, for the exporting 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 export, the income of the exporting country increases and stays high. Monetarists,

based on their view of market forces, believe that even though the income for the exporting country may go up in the short run, it will soon return 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 oil-exporting country considered is Venezuela.

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 country are more consistent with the Keynesian or the monetarist theory. This section examines the response of Venezuela, an oil-exporting 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 of 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-exporting 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, because the magnitude of the change was huge and sudden; within three months oil prices tripled. 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). On this issue see Jahangir Amuzegar (1977), p. 60.

Venezuela is chosen as the oil-producing and oil-exporting country. There are two reasons for this choice. First, this country is a member of OPEC, and oil exports constitute a major portion of its income. The oil price rise, therefore, is considered a major exogenous shock to this country. Second, Venezuela is one of the few OPEC members for which there are sufficient data. Iraq and Algeria, for example, were candidates, but the data for these countries were not continuous and did not go back far enough to constitute a sufficient number of observations for a reliable statistical test. Moreover, data for these two countries were not continuously available after 1973, so there was also not enough information about the consequences of the oil price rise of late 1973.

The tremendous increase in oil prices in late 1973 resulted in a huge increase in the value of oil exports for the oil-exporting country. Given fixed exchange rates, Keynesian theory implies that the export multiplier goes into effect and increases the output of the economy, i.e., the increase in oil exports results in an increase in both oil income (X*) and non-oil income (Y*) because of the increase in domestic aggregate demand. The monetarist theory, on the other hand, grants that non-oil income may increase in the short run, but not in the long run.

In terms of the growth path for non-oil income of the oil-exporting country, Keynesian theory suggests that the country will move on to a new higher growth path than the country would have otherwise followed, and the monetarist theory implies that even if non-oil income

deviates from its growth path in the short run, it will revert back to the original growth path in the long run.

As a statistical test therefore, if the growth path of non-oil income is predicted beyond 1973 on the basis of pre-1973 information Keynesian theory implies that the actual values for non-oil income will be higher than the predicted values, while monetarist theory implies that the values for non-oil income may deviate from the extrapolated values in the short run, but will coincide with them in the long run. This test is performed on non-oil income, as opposed to total income, because total income encompasses oil exports and the huge oil price rise will be reflected in total income. In order to overcome this problem, non-oil income, i.e., total income minus oil income, is analyzed.

Using the time trend approach, the non-oil income is regressed on polynomials of time of different degrees, and the best fit is chosen. Although such a procedure is far from ideal, it appears to be satisfactory for purposes at hand because there is no reason to believe that it biases the results in favor of either approach. The results for equation (3), below, are reported in Table 1. 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.

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

The estimated equation is used to predict non-oil income beyond 1974 under the assumption that oil prices would have behaved after 1974 as they did before 1973. The actual and predicted values for non-oil income are given in Table 2 and plotted in Figure 1. The 95 percent confidence limits for the predictions are given in Table 3 and plotted in Figure 2. The results support the monetarist theory. There is a surge in non-oil output in 1973, but within two years the country essentially has returned to its original growth path.

SUMMARY AND 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. 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 Venezuela to the sharp increase in oil prices in late 1973. The experience of Venezuela, an oil-exporting country, supports the monetarist view.

Table 1
Trend in Non-Oil Income

c_0	c_1	c_2	R-squared	D-W	Rho
-1.769	0.065	0.001	0.98	1.44	0.47
(-58.70)	(27.80)	(8.07)			

The numbers in parentheses are t-statistics.

Table 2
Actual and Predicted Values for LOG Y*

Year	Actual	Predicted
1953	-1.7728	-1.7038
1954	-1.6679	-1.6384
1955	-1.5965	-1.5731
1956	-1.4796	-1.5078
1957	-1.3310	-1.4425
1958	-1.2868	-1.3771
1959	-1.2577	-1.3118
1960	-1.2853	-1.2465
1961	-1.1995	-1.1811
1962	-1.0952	-1.1158
1963	-0.9929	-1.0505
1964	-0.9924	-0.9852
1965	-0.9240	-0.9198
1966	-0.8719	-0.8545
1967	-0.8213	-0.7892
1968	-0.7353	-0.7238
1969	-0.6945	-0.6585
1970	-0.6039	-0.5932
1971	-0.5709	-0.5278
1972	-0.4605	-0.4625
1973	-0.3772	-0.3972
1974	-0.0821	-0.3291
1975	-0.1089	-0.2724
1976	-0.1195	-0.2118
1977	-0.0687	-0.1493
1978	0.0008	-0.0859

Table 3
Actual, Predicted, Upper, and Lower Bounds for LOG Y*

Year	Actual	Predicted	Upper Bound	Lower Bound
1974	-0.0821	-0.3291	-0.2394	-0.4188
1975	-0.1089	-0.2724	-0.1739	-0.3709
1976	-0.1195	-0.2118	-0.1106	-0.3130
1977	-0.0687	-0.1493	-0.0466	-0.2520
1978	0.0008	-0.0892	0.0181	-0.1899

Figure 1
Venezuela: Trend in Non-Oil Income
*** = Predicted**
+ = Actual

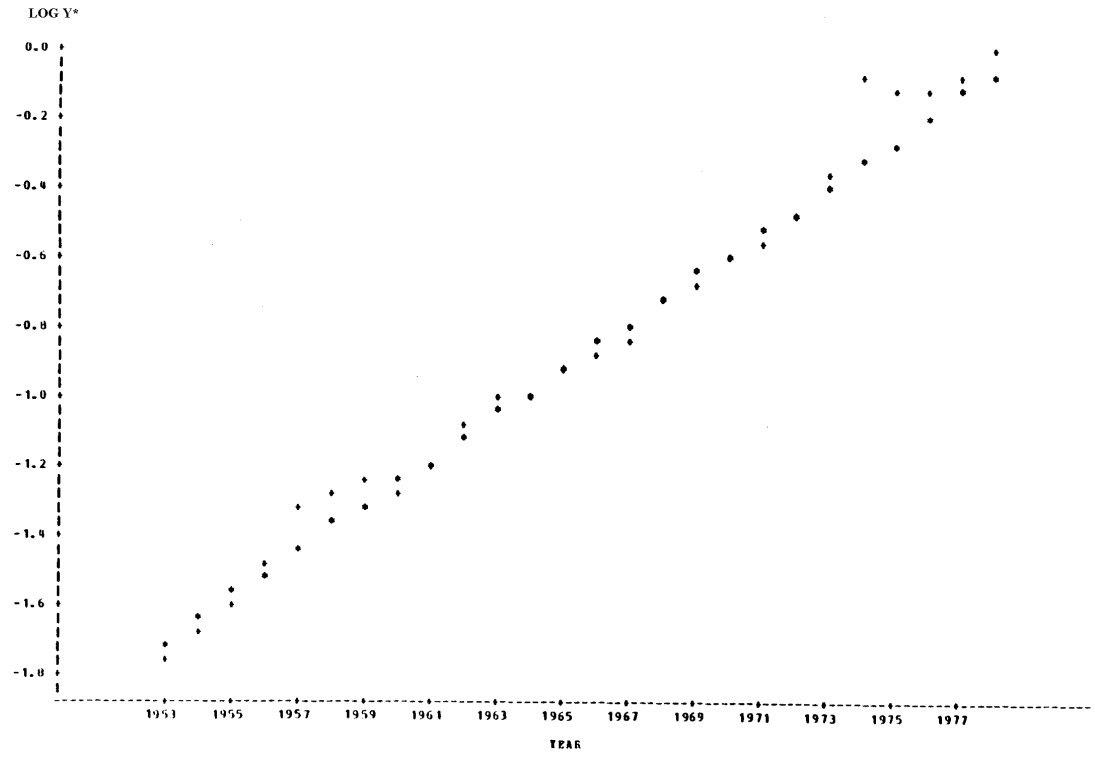
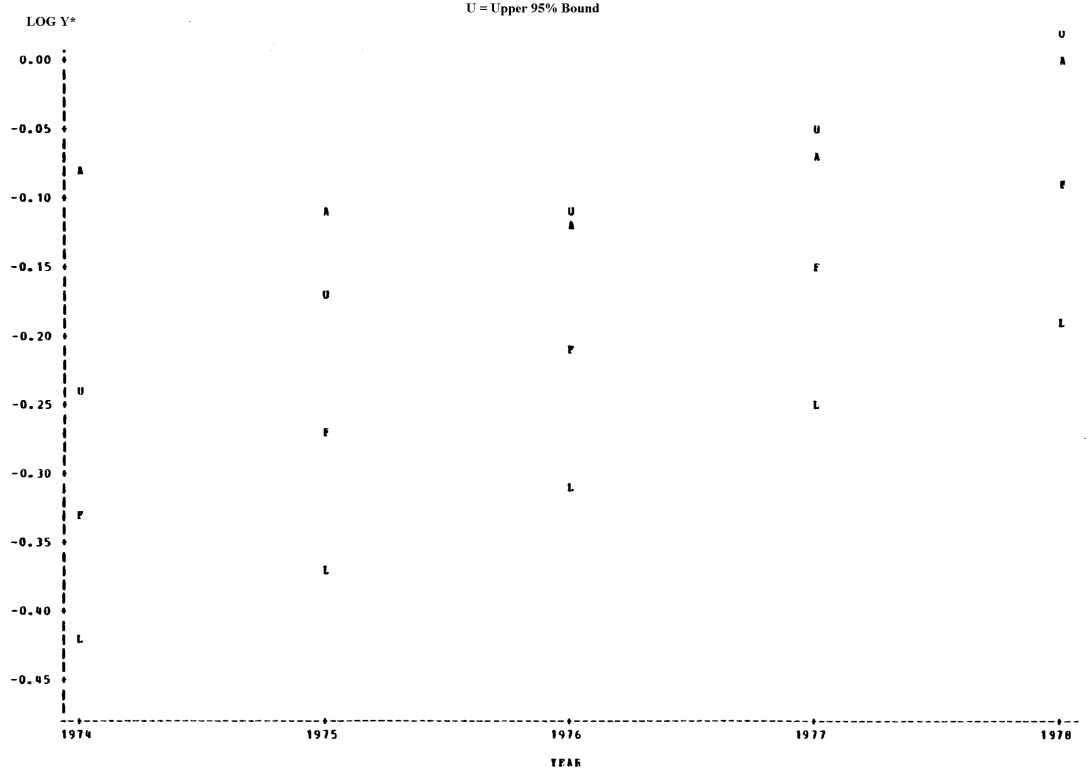


Figure 2
Venezuela: Confidence Interval for Forecasted Value of LOG Y*
A = Actual
F = Forecasted
L = Lower 95% Bound
U = Upper 95% Bound



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