IMPACTS OF EXTERNAL DEBT AND OTHER MACROECONOMIC POLICIES ON OUTPUT IN BRAZIL: A VAR APPROACH

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Abstract

This paper uses a VAR model to quantify the relative importance of external debt, exchange rates, monetary policy and other selected variables when explaining output fluctuations in Brazil. Using the money market rate as a policy instrument, impulse response functions indicate that shocks to the interest rate, the external debt, or the inflation rate have an inverse impact on output, while currency and stock prices shocks have a positive effect on economic activity. In the medium run, the explanatory power of the external debt rises while that of the money market rate and the real exchange rate decline. When money is considered as a monetary tool, output responds positively to shocks to the real monetary base or to stock prices and reacts inversely to shocks to the external debt, currency depreciation, or inflation. Therefore, the choice of different monetary policy tools is not neutral when affecting output.

I. Introduction

Recently, large external debt, the depreciation of the Brazilian real, high in-
terest rates, potential inflationary pressure, poor financial market performance,
expansionary U.S. monetary policy, and other economic issues have attracted
renewed interest in their impacts on the Brazilian economy. By October 2002,
Brazil's external debt reached to US$ 259 billion, and net public debt was near
60% of GDP. Fortunately, the IMF has provided a US$ 30 billion plan to mitigate
the potential default on its external debt, which may cause great harm to Brazil
in terms of its international credibility, exchange rates, international flows of funds,
availability of future credit, foreign investment, the stability of stock markets,
inflation, among others. The option of increasing tax revenues is quite limited
because the tax burden as a percent of GDP in 2002 was near 37% compared to
25% in the last 8 years. Some analyst predicted that for the Brazilian government
to remain solvent in 2003, its primary budget surplus should be between 4% and
5%, government spending should decrease by 9%, and the discretionary budget
should be cut by 38% (Esterl, 2002). Figure 1 shows external debt, external debt
as a percent of GDP, and real GDP during the sample period 1993.5-2002.6.

Movements of the reals per U.S. dollar based on the sale value and period
average can be characterized by substantial depreciation in the early 1990s, cur-
rency reforms, relative stability, and rapid depreciation in recent months. In a
little over 4 years during 1989.3-1993.7, the exchange rate rose from 1.0 to 62,773.
After the currency reform, the exchange rate dropped to 82.7 in 1993.8 but rose
to 2,296.3 in 1994.6. Another currency reform brought it down to 0.9333 in 1994.7
and then gradually rose to 2.3204 in 2002.4. In recent months, due to the attempt
to stimulate exports and the political development, the Brazilian real is losing
value by 53.4% with the exchange rate rising from 2.4804 in 2002.5 to 3.8059 in
2002.10. The potential impact of exchange rate depreciation and wide swings on
output needs to be analyzed (Karp, 2002).

Brazil is also well known for its very high inflation rates during some periods
of the early 1990s. For example, in March 1990, the monthly inflation rate reached
to a record high of 80.75%. The situation has improved substantially after June
1994 due to the government adoption of new fiscal and other macroeconomic
policies. However, the annual inflation rate for 2002 may be close to 10%, which
is still higher than the standard for industrialized countries.

Attempting to fight inflation and to prevent the Brazilian real from continuing
depreciating, the Central Bank in Brazil recently raised the money market rate to
26% in April 2003 from 18% in mid 2002 (Arai, 2002). Whether the monetary
policy would be effective remains to be seen. On the one hand, high interest rates
hurt consumer and business spending and increase government interest expense
on debt. On the other hand, high interest rates may slow down outflows of funds
or attract international investors, causing the exchange rate to stabilize.

Stock prices in Brazil are so volatile that potential impacts on the real sector
may be explored. During the 1990s, on several occasions the stock market in
Brazil might be near collapse. During 1991.4-1991.5, Ibovespa, which is the stock

price in Brazil, dropped from 66,753 to 11,168 or 83.3%. During the most recent setback, the stock index plunged by 90% from 88,287 in 1997.1 to 9,044 in 1997.3. Such fluctuations reduced assets or wealth substantially for households and firms and may affect their spending or investment decisions.

FIGURE 1

THE EXTERNAL DEBT/GDP RATIO (ED), EXTERNAL DEBT (DEBT),
AND REAL GDP (Y) IN BRAZIL DURING 1993.5-2002.6
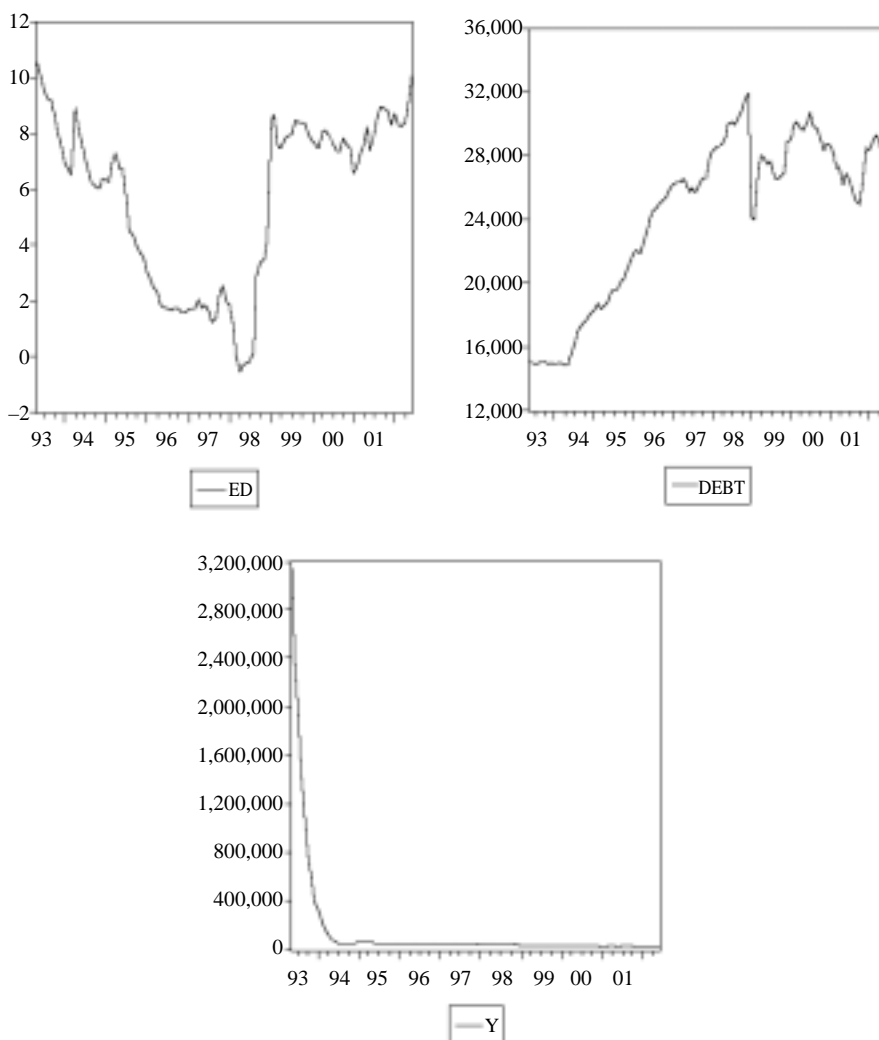
The purpose of this paper is to examine the impacts of huge external debt and several other macroeconomic variables on the Brazilian economy. The VAR model is applied, and variance decompositions and impulse response functions are estimated. The paper has several different aspects. First, this study includes the external debt and financial assets that were not considered in most previous articles. Missing of either one of the variables may cause statistical outcomes to change. Second, several external shocks are considered in order to determine whether they may affect the economy. Third, the use of monthly data may provide us with more insight in terms of short-run dynamic relationships among the variables under study.

II. Literature Survey

Several recent articles examined the interrelationships among several major macroeconomic variables and related subjects for Brazil and/or other Latin American countries. Ahmed (1999) investigated sources of economic variations for three Latin American countries including Brazil by separating the domestic and external shocks with a focus on the monetary and exchange rate policies. He indicated that real exchange rates are not sensitive to external factors and currency depreciation is expected to have a negative impact in the short run. He further implied that rigid exchange rates may not be as harmful as expected.

Faria and Galrao Carneiro (2001) tested whether inflation would affect real output for Brazil. They found that consistent with the money neutrality view in the long run, inflation has a negative impact on real GDP in the short run and does not have any effect in the long run. Hoffmaister and Roldos (2001) examined several sources of macroeconomic fluctuations for Brazil and Korea. They identified supply shocks, aggregate demand shocks, external shocks, fiscal shocks, and nominal shocks. For Brazil, supply shocks are the main cause for output variation, aggregate demand shocks explain output variation in the short run, nominal shocks show little effect, and external shocks count for a small proportion of output variation. Fiscal shocks explain the variation in real exchange rates.

Soydemir (2002) examined the impact of the interest rate in the U.S. on stock market performance in five Latin American countries including Brazil. He found that the U.S. T-Bill rate has a gradual and different effect on each of the stock markets. Therefore, he indicated that the external factor may cause instability in the stock market even if macroeconomic policies attempt to achieve economic stability. Adrangi, *et al.* (2002) studied the relationship among stock prices, inflation, and output. They found that output, stock prices, and price levels have a long-term stable relationship and that there is a persistent negative relationship between unexpected inflation and the real return on stocks. Carneiro, Divino and Rocha (2002) tested the Fisher hypothesis for three countries including Brazil. They found that for Brazil and Argentina, the nominal rate and the inflation rate show a long-run equilibrium relationship and that the nominal rate is changed to adjust to anticipated inflation.

III. The Theoretical Model

The theoretical framework is based on the model of aggregate supply and aggregate demand and previous studies by Ahmed (1999), Hoffmaister and Roldos (2001), Kamin and Rogers (2000), Faria and Galrao Carneiro (2001), Soydemir (2002), and Hsing (2003). Suppose that consumption (C) is a function of disposable income (Y – T), wealth (ST), and the inflation rate (PC), that investment spending (I) is affected by the interest rate (IR), and that net exports (NX) are influenced by the real exchange rate (EX), which is a function of the U.S. federal funds rate and world oil prices. Equating aggregate supply (Y) with aggregate demand, we have

$$Y = C(Y – T, ST, PC) + I(IR) + G + NX[EX(USR, OP)]$$

where G is government spending. Solving for equilibrium Y (Y*), we obtain

$$Y^* = f(IR, G, T, EX, PC, ST, USR, OP)$$

Using the external debt/GDP ratio (ED) to estimate the cumulative effect of government borrowing from foreign sources to fund deficits (G – T) and other spending, a VAR specification would be:

$$V = ö(L)Vâ + Zã + u \qquad (1)$$

Where V is the vector of the endogenous variables (Y, IR, ED, EX, PC, ST)
ö(L) is a lag operator
Z is a matrix with the exogenous variables (USR, OP)
â, ã are parameters' matrixes to be estimated through OLS, and
u is a white-noise disturbance.

If the interest rate in Brazil rises, it is expected to hurt Brazilian economy mainly due to higher costs of borrowing. External debt may help or hurt the economy. If external debt is utilized efficiently to enhance infrastructures, human capital and other productive purposes, it may help the economy. On the other hand, it is possible that a government may be wasteful in spending money borrowed from abroad. That being the case, the heavy interest payment plus the return of the debt may hurt the economy.

The depreciation or appreciation of the real may help or hurt the Brazilian economy. Currency depreciation is likely to raise import or domestic prices, reduce real income and wealth, and cause outflows of funds. Depreciation may have the effects of more exports and fewer imports. Extending Irving Fisher's intertemporal budget constraint and applying the VAR model to South Korea, Hsing (2003) found that the depreciation of won would not help raise output. It suggests that the positive effects of won depreciation are outweighed by its negative impacts.

An increase in the inflation rate may reduce the real interest rate and the cost of borrowing. On the other hand, a relatively high inflation rate causes real income and wealth to decline and reduce consumption spending. A relatively high inflation rate is also harmful because it causes misallocation of resources, inconvenience, and uncertainty.

A higher stock price is expected to help the economy because of the wealth effect, Tobin-q theory, and the balance sheet effect. Higher stock prices increase wealth and cause households to spend more. When stock prices reach a certain level that the firm capitalization value is greater than its replacement cost, firms are expected to increase investment spending. Higher stock prices make it easier for firms to borrow money because of a better financial picture.

Theoretically, an increase in U.S. federal funds rate is expected to hurt output for a foreign country (Kamin and Rogers, 2001) due to its worldwide impacts and better return to invest in the U.S. However, because interest rates in Brazil are much higher than the U.S. and because a higher federal funds rate may cause U.S. dollar to appreciate and the Brazilian real to depreciate, the net impact remains to be tested. An increase in oil prices may or may not affect a country's output depending upon whether the country produces, exports, or imports large quantity of oil. Because Brazil is not an oil-exporting country, a rising oil price is expected to hurt the Brazilian economy.

Equation (1) can be treated as a VAR model due to the interrelationships among these variables. Because only lagged endogenous variables are included on the right hand side, potential simultaneity problem is not a concern and OLS produces consistent parameter estimates. In addition, even though the shocks may be contemporaneously correlated, OLS is efficient and close to GLS because all the equations include the same regressors.

IV. Empirical Results

The sample consists of monthly data during 1993.5-2002.6. Earlier data is not included because monthly GDP began in January 1990 and because very high inflation rates cause some of the real values to become outliers. The data for Brazil came from the Central Bank of Brazil. The data for the U.S. was taken from the Federal Reserve Bank of St. Louis. World crude Oil price was taken from the U.S. Department of Energy. Real GDP is measured in million of U.S. dollars. The money market rate is used as a representative interest rate. External debt refers to foreign debt. The real exchange rate (EX) is equal to the real per U.S. dollar times the ratio of the price in the U.S. to the price in Brazil. Thus, an increase in EX is a depreciation for the real, and vice versa. The stock price index is used as a proxy for wealth. The monetary base is expressed in thousands of the current monetary unit (cmu) and will be considered as another monetary policy tool in empirical work later. Note that the use of short frequency data may cause GDP series to contain output from volatile sectors such as agriculture and commodities.

The test of a unit root is performed first. The values of the test statistic at the 1%, 5%, and 10% levels are –3.49, –2.89, and –2.58, respectively. One finds that Y, IR, EX, and ST are stationary in levels at the 5% or 1%, that ED, PC, USR and OP have unit roots in levels, and that Y, IR, ED, EX, PC, ST, USR and OP are stationary in first difference. Following Greene (2000, p. 790), all the variables are differenced first to test for cointegration. According to the Johansen cointegration test, both the trace and maximum Eigenvalue statistics show that the zero cointegrating relationship between real GDP and all right-hand side variables can be rejected. Thus, they have a long-term stable relationship. In running VARs, we use levels to find any cointegrating relationship among the variables. Fuller (1976) and Hamilton (1994) indicated that the level form is the best in running VARs because differencing may throw away valuable information and does not yield asymptotic efficiency in an autoregressive time series. The U.S. federal funds rate and world oil prices are treated as exogenous variables. To address the seasonality problem, 11 monthly dummy variables except for December are included as exogenous variables. Based on the Schwarz and Akaike information criteria, a lag interval of 4 is chosen for the VAR model.

Table 1 presents variance decompositions for real GDP for a time interval of 24 months. As shown, the money market rate in Brazil can explain up to 54.74% of output fluctuations in the second month, though the impact declines gradually over time. The impact of external debt on real output continue to rise. Up to 27.33% of the variation in real output is attributable to the real exchange rate, but its impact declines.

It is also interesting to note that inflation rates can explain up to 3.48% of output variance and that real stock prices can explain up to 9.92% of output variation. The relatively small influence of inflation on output may be partly explained by the notion that many contracts and government bonds are indexed by the inflation rate and that the Brazilian people are accustomed to high inflation and know how to make adjustments accordingly. It is possible that in Brazil, due to low per capita income, only a small proportion of population was involved in the stock market and the negative impact of declining stock prices may not be as large as expected.

Figure 2 reports impulse response functions for real GDP for a 24-month period. Several points deserve mentioning. First, an examination of the confidence interval with 2 standard errors suggests that the response of Y to IR, ED, EX, PC, or ST is significant up to the 5th month, the 8th month, the 2nd month, the 3rd month, or the 4th month, respectively. Therefore, when the confidence interval includes the zero value, the response of Y to one of the endogenous variables is statistically not different from zero with a 95% of confidence. Second, an expansionary monetary policy of reducing the money market rate to lower the borrowing cost is expected to help the economy. The money market rate of 25.24% as of July 2003 needs to be reduced to stimulate investment and consumption spending. Third, higher external debt as a percent of GDP is harmful to the economy as the graph shows. Therefore, to reduce external debt is a top priority for the Brazilian government to pursue its fiscal policy. Fourth, as the graph

TABLE 1

VARIANCE DECOMPOSITIONS FOR REAL GDP (Y)

Period	S.E.	IR	ED	EX	PC	ST	Y
1	621.95	8.76	7.88	27.33	2.61	4.90	48.52
2	778.28	54.74	8.19	14.08	0.93	5.11	16.94
3	855.51	50.75	14.02	9.51	3.48	9.92	12.32
4	945.92	49.32	20.07	8.24	3.19	8.80	10.37
5	1,028.91	47.05	22.48	7.11	3.37	8.30	11.69
6	1,073.28	43.65	26.68	7.58	3.16	8.12	10.80
7	1,225.44	40.97	29.92	6.91	2.92	7.40	11.88
8	1,285.40	39.61	32.36	6.67	2.79	7.13	11.45
9	1,327.26	38.44	34.24	6.70	2.69	6.86	11.07
10	1,336.99	37.49	35.85	6.61	2.63	6.67	10.75
11	1,348.15	36.73	37.11	6.52	2.61	6.51	10.52
12	1,361.98	36.17	38.11	6.39	2.62	6.39	10.31
13	1,370.88	35.61	39.06	6.30	2.60	6.28	10.15
14	1,371.87	35.04	39.94	6.29	2.56	6.18	9.99
15	1,373.08	34.52	40.75	6.27	2.52	6.08	9.85
16	1,373.74	34.00	41.54	6.27	2.49	5.99	9.71
17	1,374.60	33.52	42.32	6.22	2.45	5.91	9.58
18	1,375.44	33.09	43.04	6.16	2.42	5.83	9.46
19	1,375.75	32.71	43.69	6.10	2.39	5.77	9.35
20	1,376.22	32.37	44.27	6.05	2.36	5.71	9.25
21	1,376.45	32.08	44.76	6.00	2.34	5.65	9.16
22	1,376.71	31.82	45.19	5.97	2.32	5.61	9.08
23	1,376.91	31.60	45.57	5.94	2.31	5.57	9.02
24	1,377.03	31.41	45.89	5.91	2.29	5.53	8.96

Cholesky Ordering: IR ED EX PC ST Y.

shows, the depreciation of the real has positive impacts on real GDP in 10 out of 12 months during the first year. Thus, it may be considered as one of the trade policies if it is pursued gradually and moderately. Lastly, but not the least, a higher inflation rate hurts output in the long run. Hence, the continual effort to maintain price stability by the central bank is important for the economy growth. Table 2 provides accumulated impulse response functions for real output and the net impact for a 24-month period. To determine whether outcomes may vary due to different ordering, the order of ED and IR is changed. Analyses of variance decomposition and impulse response function of Y show that the results are similar.

Real monetary base is also considered as a monetary policy instrument. The discussion below refers to the parameter estimates that are statistically significant at the 95% level. Real monetary base can explain 36.6% of output variation in the first month. External debt can explain up to 33.0% of output variance in the 7th

FIGURE 2

IMPULSE RESPONSE FUNCTIONS FOR REAL GDP

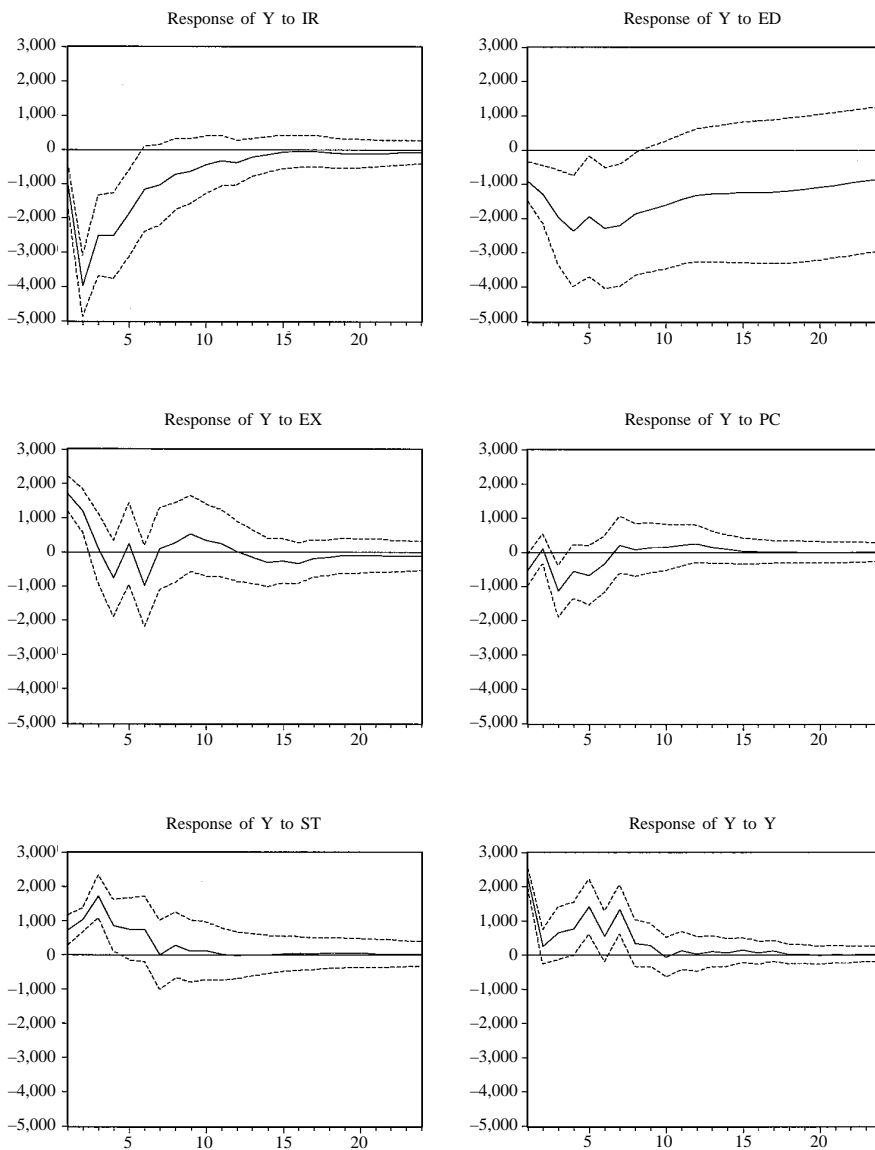Response to Cholesky One S.D. Innovations ± 2 S.E.

TABLE 2

ACCUMULATED RESPONSE OF REAL GDP (Y) TO CHOLESKY
ONE S.D. INNOVATION

Period	IR	ED	EX	PC	ST	Y
1	–961.53	–912.34	1,698.69	–525.38	719.68	2,263.54
2	–4,938.41	–2,205.77	2,890.45	–427.98	1,742.35	2,505.07
3	–7,449.62	–4,171.13	2,995.74	–1,565.26	3,457.57	3,145.62
4	–9,963.41	–6,533.65	2,227.01	–2,130.31	4,313.54	3,909.61
5	–11,831.80	–8,469.92	2,466.17	–2,806.70	5,059.65	5,318.53
6	–12,986.49	–10,750.02	1,478.42	–3,146.62	5,813.68	5,865.93
7	–14,015.79	–12,950.54	1,569.66	–2,939.61	5,812.89	7,193.75
8	–14,739.38	–14,817.84	1,835.65	–2,875.04	6,094.03	7,533.68
9	–15,375.81	–16,547.79	2,366.26	–2,744.26	6,198.20	7,817.93
10	–15,816.87	–18,148.00	2,702.87	–2,605.38	6,310.04	7,743.35
11	–16,139.62	–19,585.36	2,942.44	–2,405.22	6,319.69	7,873.97
12	–16,520.71	–20,905.11	2,955.97	–2,158.60	6,290.52	7,898.17
13	–16,748.54	–22,188.82	2,814.45	–2,019.92	6,291.92	8,002.54
14	–16,894.88	–23,451.89	2,500.40	–1,931.44	6,288.28	8,061.56
15	–16,966.04	–24,674.93	2,234.74	–1,906.63	6,314.35	8,199.62
16	–17,011.73	–25,908.87	1,902.21	–1,888.36	6,349.61	8,254.74
17	–17,058.51	–27,131.42	1,709.41	–1,881.93	6,374.60	8,371.73
18	–17,153.21	–28,316.38	1,543.90	–1,873.49	6,428.30	8,388.15
19	–17,267.39	–29,457.53	1,434.84	–1,871.95	6,476.19	8,410.90
20	–17,384.46	–30,548.86	1,310.25	–1,873.48	6,527.78	8,395.77
21	–17,496.82	–31,571.05	1,203.43	–1,870.34	6,561.89	8,412.35
22	–17,594.17	–32,531.21	1,072.89	–1,865.68	6,596.73	8,416.73
23	–17,676.45	–33,434.09	949.69	–1,854.12	6,617.99	8,446.35
24	–17,745.71	–34,279.49	833.70	–1,843.74	6,637.71	8,466.25

Cholesky Ordering: IR ED EX PC ST Y.

month. The real exchange rate can explain output variation up to 33.3% during
the first 6 months. The inflation rate can only explain up to 1.91% of output
variance during the first 5 months. Stock prices can explain up to 10.6% of the
variation in output during the first 6 months. Real output responds positively to
a shock to real monetary base or stock prices and negatively to a shock to exter-
nal debt, exchange rate depreciation, or the inflation rate. Compared with the
choice of the money market rate as a policy tool, the use of real monetary base
may yield different results. For example, an increase in real monetary base has a
positive impact only in the first month and has no effect statistically after the first
month. Exchange rate depreciation causes output to decline. The exchange rate
has more explanatory power after the first month when real monetary base is
used. Therefore, policy makers need to be cautious in interpreting and applying

the results. To save space, the results are not presented here and will be available upon request.

In comparison, the results in this study are different from previous articles in several aspects. This paper finds that when the money market rate is used, the impact of depreciation on output is positive in the first 2 months. Ahmed (1999) showed that the depreciation of the real has a negative impact on output in the short run. The author finds that a higher inflation rate is harmful in the first 3 months whereas Faria and Galrao Carneiro (2001) indicated that inflation is neutral in the long run.

V. Summary and Conclusions

In this study, the author applies the VAR model to examine the responses of real GDP in Brazil to shocks to several macroeconomic variables and the relative importance of these variables in explaining output variance. When the money market rate is considered as a policy tool, real GDP in Brazil responds positively to a shock to the exchange rate depreciation or stock prices and negatively to a shock to the money market rate, external debt, or the inflation rate. The money market rate, external debt, and the real exchange rate in order are the most important variables in explaining output variance. Over time, the explanatory power of the money market rate and the real exchange rate declines whereas the explanatory power of external debt rises.

This paper has several major contributions. The paper shows clear empirical results that may be considered by the Brazilian government. Higher interest rates, external debt/GDP ratios, and inflation rates in Brazil are harmful to real output. When the money market rate is employed, the depreciation of the real has a significant positive effect in the first 2 months. A higher stock price would help the economy in the long run. While a high interest rate policy may contain inflation and help stabilize the exchange rate, the interest rate should be lowered in order to stimulate consumer and business investment spending. The Brazilian government needs to reduce external debt so that interest burden will decrease and more budget can be used for other productive activities. It may be desirable to maintain a strong currency. However, the short-term impact of the depreciation of the real is expansionary. The positive effect of stock prices on output may suggest that the government should take measures to maintain a healthy stock market by reducing irregularities and enhancing the accuracy and quality of financial statements.

There may be areas for future research. More research may be considered to explore the reason for different outcomes that were observed when different monetary policy instruments are employed. The impact of domestic debt may be explored. Fiscal policy may be analyzed using other approaches.

References

AHMED, S. (1999). "Sources of Economic Fluctuations in Latin America and Implications for Choice of Exchange Rate Regime". Board of Governors of the Federal Reserve System, *International Finance Discussion Paper* Number 656.

ARAI, A. (2002). "Brazil Vote: Fiscal Policy Poses High Challenge for Lula". *Dow Jones Newswires*, October 28.

BAUMANN, R. (2001). "Brazil in the 1990s: An Economy in Transition". *CEPAL Review*, 0(73), April, pp. 147-169.

CARNEIRO, F. G.; J.A.C.A. DIVINO, C. H. ROCHA (2002). "Revisiting the Fisher Hypothesis for the Cases of Argentina, Brazil and Mexico". *Applied Economics Letters*, 9(2), February, pp. 95-98.

ADRANGI, B., *et al*. (2002). "Inflation, Output, and Stock Prices: Evidence from Brazil". *Journal of Applied Business Research*, 18 (1), Winter, pp. 61-76.

BEVILAQUA, A. S. and M.G. P. GARCIA (2002). "Debt Management in Brazil: Evaluation of the Real Plan and Challenges Ahead". *International Journal of Finance and Economics*, 7 (1), January, pp. 15-35.

ESTERL, M. (2002). "Wall Street Outlines Challenges Facing Brazil's Lula". *Dow Jones Newswires*, October 29.

FARIA, J. R. and F. GALRAO-CARNEIRO (2001). "Does High Inflation Affect Growth in the Long and Short run?" *Journal of Applied Economics*, 4 (1), May, pp. 89-105.

FULLER, W. A. (1976). *Introduction to Statistical Time Series*. New York: Wiley, 1976.

GRUBEN, W. C. and J. H. WELCH (2001). "Banking and Currency Crisis Recovery: Brazil's Turn-around of 1999". *Federal Reserve Bank of Dallas Economic and Financial Review*, 4th Quarter, pp. 12-23.

HAMILTON, J. D. (1994). "A New Approach to the Economic Analysis of Nonstationary Time Series and the Business Cycle". In: A. Harvey (ed.). *Time Series*, Volume 2, Ashgate, Brookfield, Vermont, pp. 273-300.

HOFFMAISTER, A. W. and J. E. ROLDOS (2001). "The Sources of Macroeconomic Fluctuations in Developing Countries: Brazil and Korea". *Journal of Macroeconomics*, 23 (1), pp. 213-239.

HSING, Y. (2003). "Impacts of the Exchange Rate and Interest Rate Policies on Output in South Korea: A VAR Model". *International Review of Economics and Business*, 50 (2), 279-288.

KAMIN, S. B. and J. H. ROGERS (2000). "Output and Exchange Rate in Developing Countries: An Application to Mexico". *Journal of Economic Development*, 61, pp. 85-109.

KARP, J. (2002). "Brazil Raises Rates to Stem Inflation From Real's Slide". *The Wall Street Journal*, October 15.

PHILLIPS, M. M. and J. KARP (2002). "External Economic Factors Could Force Brazil Default". *The Wall Street Journal*, October 25.

SOYDEMIR, G. A. (2002). "The Impact of the Movements in US Three-Month Treasury Bill Yields on the Equity Markets in Latin America". *Applied Financial Economics*, 12 (2), February, pp. 77-84.