THE SENSITIVITY OF BRAZIL'S BALANCE OF PAYMENTS
AND
FOREIGN DEBT
TO FUTURE CHANGES IN WORLD ECONOMIC CONDITIONS:
1987-1991

ECONOMIC HONORS SEMINAR

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Table of Contents

I. Statement of Purpose........................................ 1

II. Economic History, 1970-1987............................... 2

III. The model: ............................................ 18
   A. Summary
   B. Presentation
   C. Data Sources

   A. Three Scenarios
   B. Sensitivity Analysis

V. Conclusion............................................... 47

VI. Appendix A - Data Tables............................... 50

VII. Footnotes............................................. 53

VIII. Bibliography........................................... 57
I. Statement of Purpose

The purpose of this paper is to analyze the sensitivity of Brazil's balance of payments (including its foreign debt) to future changes in world economic conditions. To accomplish this, the determinants of the country's balance of payments will be isolated and then empirically studied. Based upon these results, forecasts will be made under three different economic scenarios. The intent will be to determine the effect that different sets of world conditions have upon Brazil's foreign debt and trade balance from 1987 to 1991.

The hypothesis of this study is that continued industrial country growth, coupled with low world interest rates, will produce annual balance of payment surpluses. This will lead to a decrease in Brazil's foreign debt over the next five years. On the other hand, if interest rates increase, followed by a world recession, Brazil will experience significant trade deficits over the next five years; this will severely undermine Brazil's ability to service its foreign debt over the coming years.

By way of conclusion this paper will relate the implications of Brazil's future balance of payments and foreign debt situation to the success of democracy in the country. In addition, some of the positive steps that have been taken or that should be taken in ameliorating the external economic problem will be discussed. They will include, a better understanding of the problem by the industrialized countries, a new forum for re-negotiating the Latin American debt, and specific policies that the Brazilian government can adopt.
II. Economic History, 1970-1987

Brazil has the notorious distinction of having the largest foreign debt of the developing countries, totaling 105.1 billion dollars at the end of 1985.¹ This brief history will address two main questions: Why does Brazil have the largest foreign debt of the developing countries? What domestic affects has this situation had on the country? To begin to answer these two questions three powerful external shocks to Brazil's economy and to the world economy will be examined. The first of these was the oil shock of 1973, which substantially increased Brazil's foreign debt and trade deficit. The second was the oil shock of 1979-1980 following the Iranian Revolution, which intensified the balance of payments deficit. The final external shock was the world recession of the early 1980's. It is interesting to note that the two main external shocks occurred in the seventies, causing immediate decreases in the rate of growth in most of the oil-importing countries, but the crisis in Brazil was only evident in 1981.²

This section will begin by examining why the crisis took eight years (from 1973 to 1981) to affect Brazil, then go on to examine what happened to the country from 1982 through early 1987. During this history it is important to keep in mind that in 1970 Brazil had a foreign debt of 4.9 billion dollars (or $13 billion in 1985 dollars) and by the end of 1985, it had a foreign debt of 105.1 billion dollars.³ A real increase of 709% over a period of fifteen years (see Graph-1).
G-1 Brazilian Foreign Debt
(1970-1985)
1970-1979

The main shock to Brazil's economy was the OPEC oil embargo of 1973. At the time of the embargo, Brazil was the largest importer of oil of the developing countries. Oil importing and the setting of domestic oil prices is controlled by the Brazilian government. However, as the price of oil quickly and consistently increased, the Brazilian government did not adjust, or even attempt to adjust to the new, higher prices. Instead, the government concentrated on sustaining high rates of growth. This attitude is clearly evidenced in the Brazilian government's Second National Development Plan that was presented to the country in 1975. The Plan specified goals of both increasing state sponsored investment and the maintenance of a rapid rate of growth (see Graph-2). Yet the Plan did not address the issue of adjusting to the new, higher oil prices.4

The immediate result was that Brazilian imports went from 6.2 billion dollars in 1973 to 12.6 billion dollars by 1974.5 A large portion of this increase was due to oil imports, which went from 986 million dollars to 3.2 billion dollars by 1974 (see Graph-3).6 This meant that in a one year time span oil imports went from 16% of total imports to 25%. In addition, the rise in oil prices increased industrial production costs worldwide, leading to substantial increases in world prices which led to an increase in level of Brazilian imports. The sharp increase in imports was paid for with large increases in foreign borrowing. Very convenient for Brazil and the other developing countries was the large supply of Petro-Dollars that became readily available
through the Western banks. The American and European recessions that followed the first oil shock led the Western banks to seek out new lending markets in which to re-circulate their new Petro-Dollars. 7

Many economists argue that the current debt situation is due in large part on the over-eagerness of Western bankers to push their money, in the form of loans, onto developing nations. Although this is a very valid criticism of the bankers, they are by no means the only ones at fault. Clearly, Brazil and most developing countries were borrowing money willingly to support their continued growth at the expense of future generations. Therefore, the Brazilian military government deserves as much, if not more, of the blame than do the Western bankers. Also, during the early nineteen-seventies, low real rates of interest made these loans extremely attractive. 8 Yet the rise in the real rates of interest during the early part of the eighties, increased dramatically the debt servicing burden. This lead to a re-assessment of the effectiveness of the huge scale foreign borrowing that was undertaken in the seventies.

In 1973, General Ernesto Geisel became President of Brazil (1973-1979). President Geisel was committed to raising real wages (which in fact rose during the 1970's) and to sustaining rapid growth. Throughout the seventies, domestic industrial costs increased, both because of the rise in fuel prices and because of the rise in wages. 9 The rise in costs led to increases in consumer prices. This further increased wages, and caused the inflation rate to spiral upwards. Furthermore, real Brazilian growth was made possible by Brazil's avoidance of its
transfer problem to the OPEC nations, through increased foreign borrowing. By doing this, the Brazilian military government passed the burden of the increased oil prices and increased foreign debt onto future governments and future generations. It is clear that in many respects the military government's economic action was politically motivated: by maintaining high growth rates, the military was able to stay firmly in power (see Graph-2).

A large proportion of the new borrowed money was used to modernize Brazil, by investing it in capital-intensive and technologically intensive projects. However, some of this money was invested inefficiently in controversial projects. Two examples of this were the construction of the nuclear power plant in Angra dos Reis and the Trans-Amazonic Highway project. Nonetheless, with hindsight it has become clear that many of the investments made in the seventies, which at the time seemed dubious, were in fact very wise and insightful. Two good examples of this are the alcohol-fuel program and domestic steel production.

1979-1982

In 1979, General Joao Figueiredo became President of Brazil (1979-1985). During this year Brazilian exports totalled $15.2 billion and imports totalled $18.1 billion (see Graph-4). The foreign debt stood at $51.4 billion. At GATT's request President Figueiredo removed the government tax incentives and credit subsidies to exporters. He also began devaluing the currency at frequent intervals; this is known as mini-devaluations. The
G-4 Brazilian Exports-Imports
(1970-1985)
President's intent was to deflate the currency, making Brazilian exports more competitive. The devaluations accelerated Brazil's domestic rate of inflation.\textsuperscript{13}

During 1978 and 1979, a series of droughts and frosts destroyed a large part of the domestic agricultural production. Because of this Brazil began importing some of its food staples, such as beans and rice, from abroad. To encourage domestic food production, the government increased the prices of food. These increases boosted the short-run inflationary rate. In addition, the fall of the Shah of Iran precipitated the second oil crisis which further increased the domestic inflation rate, the foreign debt, and the trade deficit.\textsuperscript{14}

In 1980, seven years after the first oil shock the Brazilian government recognized that the economy was approaching a crisis situation, due to Brazil's failure to adjust to the oil price shocks of the seventies. The government began the year by limiting the mini-devaluations to small but frequent increments, with the intent of slowing the inflation rate. The government strengthened its control over domestic prices, which prevented producers from passing on the costs of the devaluations, as well as the rising inflation rate, onto the consumers.\textsuperscript{15}

By the second quarter of 1980, it was obvious that the government would have to take drastic measures to alleviate the impending crisis. The government took two main steps: First, it substantially reduced expenditures and investment by state-owned corporations. This involved reductions of up to 15\% in their budgets. With the intent of reducing aggregate demand and inflation, the government also reduced its spending in other
fiscal areas. Second, a wage indexing policy, designed to slow wage increases, was instituted. The government also temporarily eliminated the currency devaluations.\textsuperscript{16}

The results of this limited austerity program were fairly favorable. Brazilian growth for 1980 remained high; real Gross Domestic Product grew by 7.9\%. A large part of this growth stemmed from an agricultural recovery after the frosts and droughts that occurred during 1978 and 1979. In addition, industrial production increased because of a strong demand for durables. This increase was due to increased inflationary expectations and the existence of relatively cheap domestic credit. Two serious problems would remain for the coming years: the domestic savings rate was declining and inflation was increasing. The domestic inflation off-set any export trade benefits that might have resulted from the domestic currency devaluations.\textsuperscript{17}

**Recession, 1981-1982**

During 1981 and 1982, the Brazilian government made slowing the domestic inflation rate its primary economic goal, even at the expense of slower overall growth. To accomplish this goal the government used a combination of fiscal, monetary and incomes policies. The fiscal measures were designed to decrease aggregate demand. They included: limiting the growth of state-owned corporations, decreasing government spending on wages and fringe benefits, and delaying payment to government suppliers for goods that were provided. On the monetary side, the government tightened the money supply (only allowing it to grow at a rate
slower than that of the inflation), tightened consumer credit, and increased the frequency of the currency devaluations. Finally, on the incomes side, the government re-introduced full indexation, tightened its previous wage indexing policy and maintained high domestic energy prices.¹⁸

By the end of 1981, the results of the government's action were clearly evident. Real Brazilian GDP decreased by 1.6% over the previous period (see G-5).¹⁹ Industrial output decreased by 5.4%, and unemployment reached a high of 9.0%. The exception to this downward trend in growth was in the agricultural sector, which grew by 6.8%.²⁰ The outcome for 1982 indicated that Brazil's policy of slowing inflation had been successful, with an inflation rate down from 110% in 1981 to 91.2%.²¹ Also, the balance of payments situation improved, and Brazil actually experienced a trade surplus in 1981, the first since 1977.²²

It is notable that Brazil experienced a trade surplus while the world economy was in a severe economic recession. The questions at this point are how was this achieved and what implications does this have for the future balance of payments situation? The increase in exports was due to the re-introduction of export incentives. Also, the weakness in the domestic market encouraged Brazilian exporters to look abroad. In terms of imports, the decrease in Brazilian growth and an effective import-substitution program led to a decline in imports. The two factors that had the greatest affect in decreasing imports were increased domestic oil production and substitution from gasoline to alcohol-fuel (produced from sugar cane) for powering automobiles (see Graph-6).²³
The Brazilian economic situation, at the end of 1982, was characterized by four important events. First, the Brazilian debt reached an astonishing level of 91 billion dollars. Second, imports were drastically cut. Third, the government reduced its investment expenditures. Finally, Brazil, and most of the other developing countries were forced to renegotiate their foreign debts due to illiquidity problems. Even with this pessimistic scenario, the long term outlook for Brazil remained very favorable. Brazil's diversified export structure, both in terms of the commodities exported and their destinations, would be a great asset to the country once the world recession ended. Brazil's domestic energy policy began achieving impressive results. They included increased domestic fuel production, increased alcohol-fuel production, and the opening of the Itaipu power plant (the world's largest hydroelectric power plant). In terms of demographics, as of 1982, the situation also looked very favorable. The average population growth rate was steadily declining: from 3% in the 1950's to 2.9% in the 1970's, and finally to an average growth rate of only 2% in the 1980's.

1983-1984

At the beginning of 1983 Brazil implemented an austerity program designed by the IMF. It was designed to coax the IMF and the Western commercial banks, involved in international lending, to renew lending to Brazil. The program included a 30% government imposed maxi-devaluation of the Cruzeiro, a reduction in the public deficit and new wage restrictions. The wage
restrictions were designed to slow the inflation rate. They prevented wages from increasing as quickly as the domestic price index. The devaluation of the currency was designed to increase exports, by making their relative prices more competitive, and to decrease imports, by increasing the relative prices of imports. \(^{29}\)

This program convinced the IMF and the Western banks that Brazil was well on its way towards stabilizing its economy. In February, a new lending agreement was arranged. The agreement specified that Brazil would receive 5.5 billion dollars from the IMF over the next three years, and 4.4 billion dollars from the Western commercial banks. In addition, 4 billion dollars of medium and long-term loans were rescheduled over an eight year period. \(^{30}\)

However, by May, Brazil had fallen behind on its interest payments. It became obvious that the country could not maintain its ambitious austerity program. Therefore, the IMF suspended its loan payments from the February agreement, and the commercial banks quickly followed suit. \(^{31}\)

In late June, with the internal political, social, and economic situation quickly becoming worse, the government put together its own austerity program. The program focused specifically on the federal budget deficit and the inflation rate. To decrease the deficit, the government substantially reduced fiscal spending. This was accomplished by reducing the subsidies given to the state-owned corporations. The government's intention was to eliminate the budget deficit by the end of 1984. With respect to inflation, the government attempted to maintain an inflation rate at 5% per month for the rest of
1983. To accomplish this, a series of five wage control decree-laws (a decree law is a law that is passed by the President, without submitting it to the congress) were imposed;\textsuperscript{32} but, these measures were not effective in slowing the rapidly increasing inflation rate (see Graph-7).

The year ended with the international bankers giving Brazil a new loan of 6.5 billion dollars.\textsuperscript{33} Although this new loan temporarily stabilized Brazil's external economic sector, the various austerity programs, implemented during 1983, had some very adverse affects on Brazil's political, social, and domestic economic situation. The most blatant illustration of the growing domestic ills were the supermarket sackings in 1983; there were over 900 sackings by the hungry and jobless - or an average of three supermarket sackings per day. On the political front, the military threatened to end the democratic reforms that were being carried out unless President Figueiredo's administration stabilized the situation.\textsuperscript{34}

During 1984, the government's austerity program began to produce considerable improvements to the balance of payments situation. Exports increased 25\% for the year, and imports decreased 10\% for the year. By March, Brazil was experiencing monthly trade surpluses of approximately 1 billion dollars. These favorable results allowed the government to liberalize imports, thus providing for future growth.\textsuperscript{35} Because of the increase in exports and the decrease in imports, Brazil experienced a current account surplus (its first since 1965) of 42 million dollars. This occurred only two years after Brazil
G-7 Brazilian Inflation
(Wholesale Price Index, % change)
experienced its worst current account deficit ever, one of 16 billion dollars. In addition, by the end of the year, Brazil paid all of the accumulated arrears on its foreign debt.

The current account surplus resulted in large part from Brazil's aggressive import substitution policy, most notably in the area of fuel imports. Fuel substitution reduced Brazil's dependence on the OPEC countries and contributed to this account surplus (see Graph-8). By the end of 1984, Brazil was producing 50% (500,000 Bls./day) of its oil needs. This was a significant improvement over the early 1970's when Brazil produced only 20% of its oil needs and had to import the other 80%.

Brazil's efforts at substituting alcohol-fuel for gasoline were very successful and also served to decrease Brazil's dependence on foreign oil. Due to the government's active support in the research and production of alcohol-fuel, production reached a level of 145,000 Bls./day in 1984. In the automobile production sector, 80% of the new automobiles produced in 1984 were alcohol fueled.

During this period, the government continued to reduce and or eliminate subsidies that it had previously been providing. In an attempt to try to further slow inflation, wage adjustments were partially de-indexed. Finally, the military government of President Figueiredo opened the way for a civilian president to assume the leadership of the country in 1985.

**Transition to Democracy, 1985-1987**

After 21 years of military rule Brazil elected its first civilian president, Tancredo Neves. On the eve of President Neves' inauguration he underwent emergency surgery and died
G-8 Brazilian Current Account Balance
(1970-1985)

Time (years)

Current Account (billions of $s)
before being sworn in as President. Jose Sarney, the elected Vice President, became the acting President of Brazil.\textsuperscript{41}

President Sarney had two main objectives. First, he wanted to continue Brazil's political reorganization towards a more democratic system. This included direct congressional elections in 1986, rewriting the constitution in 1986, and tentative direct presidential elections in 1988. Secondly, he redirected the government's economic focus from a policy which was traditionally oriented towards the external sector, to one that would address the country's pressing social and economic problems.\textsuperscript{42}

In order to implement his new economic policy, President Sarney appointed Dilson Funaro, an industrialist from Sao Paulo, as the new Finance Minister. Funaro included on his staff many economists from the non-Marxist left. Had the military still been in power, an action such as this one would never have been tolerated. Funaro also brought to his job a new ideology about Brazil's economy that was significantly different from the one that the previous military governments had advocated. It was characterized by an unwillingness to submit to IMF programs that would slow economic growth, and refusal to slow the inflation rate at the cost of increased unemployment. In addition, the first economic priority became the domestic economy.\textsuperscript{43} An excellent example of this new ideology was the speech that President Sarney gave at the United Nations on September 23, 1985:

\begin{quote}
Brazil will not pay its foreign debt with recession, nor with unemployment, nor with hunger... a debt paid for with poverty is an account paid for with democracy.\textsuperscript{44}
\end{quote}
the existing scenario must be re-assessed. It must be restructured. Because it is unfair. And anything that harbors the germ of injustice, of the absurd, cannot survive. 45

The resulting economic situation for 1985 was not surprising, keeping in mind the government's new priorities: inflation averaged about 200% for the year and the internal debt reached 30 billion dollars. In addition, Brazil achieved an astounding 8.3% GDP growth for the year. On the other hand, the demand for imports increased because of this high growth. 46

The year 1986 began very pessimistically for Brazil. During the first two months President Sarney's government increased fiscal spending considerably, using money that it did not have. This led to an increase in the federal budget deficit. The first two months also witnessed an increase in the real rates of interest, which caused a rapid decrease in industrial investment. Inflation reached an astronomical annual rate of 500% for January and February. During this period the United States and the other industrial countries began pressuring Brazil to adopt an IMF-backed austerity program. 47

On February 28, 1986, the Brazilian government took drastic measures to alleviate the economic situation. President Sarney announced The Cruzado Plan, an economic stabilization program. The program was divided into three main objectives: the elimination of automatic indexation, the freezing of all prices, and the replacing of the Cruzeiro with the Cruzado as the Brazilian unit of currency. This new currency, the Cruzado, was valued at 1,000 times the old currency. 48

The Cruzado Plan had a number of immediate effects on the
economy, some favorable and others, unfavorable. For the consumers, the price freezes significantly increased their purchasing power. This led to a massive spending frenzy. Compounding the consumption spree was a decrease in the real rate of interest. This encouraged people to take their money out of savings and spend it on consumer goods.49

The unexpected consumption drive brought on many internal problems. First of all, the demand for consumer goods quickly outstripped the supply. This led to increased employment, but it also created major shortages. By the middle of 1986, shortages of beef, milk and other consumer goods became commonplace.50 Secondly, many suppliers of parts, raw materials and food products began withholding their goods, instead of selling them at the depressed prices. In an attempt to discourage this type of behavior, the Sarney administration imported meat and milk from abroad; the administration also imposed a mandatory slaughter of domestic cattle. Thirdly, the price freezes, and the shortages that resulted, led to a significant rise in the "black" market for consumer goods, even at their official place of sale. To address this problem, the government published comprehensive tables listing the official prices for all consumer goods. The consumers were encouraged to "police" the prices, and report any irregularities to the government agency which was created to address this specific problem.51

Finally on November 21, 1986, the Brazilian government came out with The Cruzado Plan II, designed to work out the problems in the original plan. The new plan increased taxes and cut
federal expenditures. It also postponed investment in many of the state-owned corporations in order to decrease fiscal spending. In an attempt to stimulate trade, export incentives were re-introduced by the government, in the form of lower income taxes for exporters.\textsuperscript{52}

To rectify many of the shortage of goods, prices were re-adjusted and then re-frozen. Finally, to slow the inflation rate, the method of determining the inflation index was changed. The standard income level, that had previously been used to determine the average basket of goods, was upgraded. Therefore, an increase in the price of a good in the basket would not have as much of an effect on the index of inflation as it previously had.\textsuperscript{53}

By the end of December, however, two occurrences seemed to signal the "untimely death" of the Cruzado Plan: an average annual price increase of 70\% for the months of November and December, and the re-introduction of full indexation by the government. On the external front, the trade surplus fell from over $1 billion in July, to monthly surpluses of $100 million for November and December. To compound matters, Brazil's foreign reserves decreased substantially in these last two months of the year.\textsuperscript{54}

At present, there is growing concern among Brazilians that the government has lost control of the economy. Evidence of this is the inflation rate, which increased by 16\% during January of this year.\textsuperscript{55} Because of the deteriorating situation, the near term outlook for Brazil has quickly become very pessimistic. In addition to seeking new loans from its creditors, the government
is also considering signing what it calls a "social pact", with its citizens. This pact would entail a willing attempt by all Brazilians to help slow the inflation rate. To do this, workers would agree not to ask for wage increases and producers would in turn agree not to raise their prices. However, the government has not yet proposed a concrete plan on how it will address the current situation. 56
III. The model

A. Summary

What follows is an overview of the model used in this study. The section following this one will explain in detail the procedure used in this model and the results obtained. In the third section the data sources will be explained.

1) \[ XG_t = -18.6 + 3.5 \text{ OECD}_t + 1.4 \text{ DOL}_t + 0.005 \text{ P}_t \]

\( XG_t \) = Natural log. of exports of goods in year \( t \).
\( \text{OECD}_t \) = Natural log. of the industrial countries real GDP level in year \( t \).
\( \text{DOL}_t \) = Natural log. of the dollar exchange rate ($/SDR) in year \( t \).
\( \text{P}_t \) = Natural log. of world inflation in year \( t \).

2) \[ XS_t = 0.10 \times XG_t \]

\( XS_t \) = Exports of services in year \( t \).

3) \[ MNO_t = -5.1 + 2.3 \text{ BGDP}_t - 0.7 \text{ RA}_t + 1.4 \text{ DOL}_t - 0.9 \text{ P}_t \]

\( MNO_t \) = Natural log. of Brazilian non-oil imports in year \( t \).
\( \text{BGDP}_t \) = Natural log. of the Brazilian real level of GDP in year \( t \).
\( \text{RA}_t \) = Natural log. of the real domestic exchange rate (Cr./$) in year \( t \).
\( \text{DOL}_t \) = Natural log. of the dollar exchange rate ($/SDR) in year \( t \).
\( \text{P}_t \) = Natural log. of world inflation in year \( t \).

4) \[ \text{MVO}_q = 107.9 - 1.9 Q \]

\( \text{MVO}_q \) = Volume of oil imports per quarter (\( Q \)).
\( Q \) = Time per quarter.

5) \[ MS_t = 0.24(\text{MO}_t + \text{MNO}_t) \]

\( MS_t \) = Imports of services in year \( t \).
\( \text{MO}_t \) = Value of oil imports in year \( t \).
\( \text{MNO}_t \) = Value of non-oil imports in year \( t \).

6) \[ T_t = -26.0 + 9.4 \text{ Time} \]

7) \[ \text{DFI}_t = \text{DFI}_{1985} \]

\( T_t \) = Transfer payments to Brazil in year \( t \).
\( \text{DFI}_t \) = Constant flow of direct foreign investment into Brazil.

8) \[ H_t = -2.0 + 1.1 \text{ M}_t \]

\( H_t \) = Natural log. of non-gold reserves in year \( t \).
\( \text{M}_t \) = Natural log. of total imports in year \( t \).
9) \[ I_t = (i)(f)(D_{t-1}) + (r_t + .02)[(1-f)(D_{t-1})] \]

\( I_t \) = Interest paid on the foreign debt in year \( t \).
\( f \) = Fraction of the debt at fixed interest rates.
\( i \) = Fixed interest rate charged on \( f \).
\( r_t \) = Interest rate charged on the variable int. portion of the debt in year \( t \).
\( D_t \) = Total foreign debt in year \( t \).

10) \[ a = A_{1986}/(DLT_{1985}) \]

\( a \) = Constant amortization rate.
\( A_{1986} \) = Net amortization paid on the debt in 1986.
\( DLT \) = Long term debt in 1985.

The following equations are identities:

11) \[ C_t = X_t - M_t - I_t + T_t \]

\( C_t \) = Current account balance in year \( t \).
\( X_t \) = Total exports in year \( t \).
\( M_t \) = Total imports in year \( t \).
\( I_t \) = Interest paid on the debt in year \( t \).
\( T_t \) = Transfer payments in year \( t \).

12) \[ L_t = -C_t + A_t + HC_t - DFI_t \]

\( L_t \) = Required new net lending in year \( t \).
\( C_t \) = Current account balance in year \( t \).
\( A_t \) = Net amortization payments in year \( t \).
\( HC_t \) = Change in non-gold reserves in year \( t \).
\( DFI_t \) = Direct foreign investment in year \( t \).

13) \[ D_t = (D_{t-1} - A_t) + L_t \]

\( D_t \) = Total foreign debt at the end of year \( t \).
B. Presentation

The conceptual basis of this model is derived from William Cline, *International Debt: Systemic Risk and Policy Analysis*. Cline's model forecasts the balance of payments and foreign debt of the 19 largest debtor countries. The model that follows was adapted to address Brazil's current external economic situation. The primary variables of concern are exports and imports of goods. However, a complete analysis of the Brazilian situation requires looking at all capital flows into and out of Brazil.

The model presented here includes 13 dependent variables (see Table M-1). Seven of these are derived from behavioral relationships, and three are obtained directly from identities. In addition, two of the variables are estimated as constants and one is calculated as an approximation. The results from this model will then be used to forecast Brazil's external economic situation for the years 1987 to 1991.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
<th>Equation #</th>
</tr>
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<tbody>
<tr>
<td>XG&lt;sub&gt;t&lt;/sub&gt;</td>
<td>Natural log. of exports of goods in year t.</td>
<td>1</td>
</tr>
<tr>
<td>XS&lt;sub&gt;t&lt;/sub&gt;</td>
<td>Export of services in year t.</td>
<td>2</td>
</tr>
<tr>
<td>MNO&lt;sub&gt;t&lt;/sub&gt;</td>
<td>Natural log. of non-oil imports in year t.</td>
<td>3</td>
</tr>
<tr>
<td>MVO&lt;sub&gt;q&lt;/sub&gt;</td>
<td>Volume of oil imports per quarter.</td>
<td>4</td>
</tr>
<tr>
<td>MS&lt;sub&gt;t&lt;/sub&gt;</td>
<td>Import of services in year t.</td>
<td>5</td>
</tr>
<tr>
<td>T&lt;sub&gt;t&lt;/sub&gt;</td>
<td>Transfer payments received in year t.</td>
<td>6</td>
</tr>
<tr>
<td>DFI&lt;sub&gt;t&lt;/sub&gt;</td>
<td>Direct foreign investment in year t (DFI&lt;sub&gt;1985&lt;/sub&gt;).</td>
<td>7</td>
</tr>
<tr>
<td>H&lt;sub&gt;t&lt;/sub&gt;</td>
<td>Natural log. of non-gold reserves in year t.</td>
<td>8</td>
</tr>
<tr>
<td>I&lt;sub&gt;t&lt;/sub&gt;</td>
<td>Interest payments in year t.</td>
<td>9</td>
</tr>
<tr>
<td>a</td>
<td>Constant rate of amortization.</td>
<td>10</td>
</tr>
<tr>
<td>C&lt;sub&gt;t&lt;/sub&gt;</td>
<td>Current account balance in year t.</td>
<td>11</td>
</tr>
<tr>
<td>L&lt;sub&gt;t&lt;/sub&gt;</td>
<td>Required new net lending.</td>
<td>12</td>
</tr>
<tr>
<td>D&lt;sub&gt;t&lt;/sub&gt;</td>
<td>Foreign debt in year t.</td>
<td>13</td>
</tr>
</tbody>
</table>
Exports of Goods

This equation estimates the elasticity of demand for Brazilian exports. It is assumed that the annual supply of Brazilian exports equals the demand. The elasticity of demand for Brazilian exports is a function of the industrial countries real income level, the dollar exchange rate per major currency, and the world inflation rate:

\[ X_G = f(\text{OECD}, DOL, P) \]

The demand for Brazilian exports is a function of the OECD countries real income level because the industrial countries import approximately 60% of Brazil's total exports. In addition, the OECD's real income level influences world growth and therefore indirectly affects the demand for the other 40% of Brazil's exports.

The demand for exports is also dependent on the relative purchasing power of the dollar. This is determined by the $/SDR rate. Finally, export demand is also a function of the world inflation index.

The following equation is estimated by taking the natural logarithms of both sides, and the Cochrane-Orcutt technique was used.

1) \[ X_{Gt} = -18.6 + 3.5 \text{ OECD}_t + 1.4 \text{ DOL}_t + 0.005 \text{ P}_t \]

\[ \text{SE} = \begin{array}{cccc} 3.0 & 0.8 & 0.7 & 0.003 \end{array} \]

\[ \text{DW} = 1.7 \text{ (using Corc.} = \text{Orc.)} \]

\[ F\text{-stat}(3, 21) = 51 \quad R^2 = .88 \]

\[ N = 26 \quad \text{Yrs.} = 1960-1985 \quad \text{adjR}^2 = .86 \]

\[ X_{Gt} = \text{Natural logarithm of Brazilian exports of goods in year } t. \]

\[ \text{OECD}_t = \text{Natural log. of the industrial countries' real GDP level in year } t. \]

\[ \text{DOL}_t = \text{Natural log. of the dollar exchange rate ($/SDR) in year } t. \]

\[ \text{P}_t = \text{Natural log. of world inflation in year } t. \]
In order to obtain this export equation a number of other independent variables - the real domestic exchange rate and a time trend variable - were included in the original estimation procedure. But because their t-statistics were insignificant, indicating that the parameters had no affect on exports, they were not included in the final equation.

\[ X_G = \text{exports of goods} \]

\[ \text{OECD} = \text{industrial countries' GDP level} \]

\[ \text{DOL} = \text{United States dollar exchange rate, } \$/\text{SDR} \]

\[ \text{RA} = \text{real Brazilian exchange rate (Cr./$)} \]

Table M-2

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Summary Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DW adjR²</td>
</tr>
<tr>
<td>a-1 (Cochrane-Orcutt technique)</td>
<td></td>
</tr>
<tr>
<td>OECD DOL P RA Time</td>
<td></td>
</tr>
<tr>
<td>-19.2 2.4 1.8 1.5 -.15 -.09</td>
<td>1.9 .97</td>
</tr>
<tr>
<td>(-2.1) (1.2) (3.7) (2.1) (-0.9)</td>
<td>(.07)</td>
</tr>
<tr>
<td>a-2</td>
<td></td>
</tr>
<tr>
<td>-13.0 1.0 1.9 1.1 -.15 -</td>
<td>1.9 .98</td>
</tr>
<tr>
<td>(-5.2) (2.2) (4.4) (6.5) (-0.9)</td>
<td></td>
</tr>
<tr>
<td>a-3</td>
<td></td>
</tr>
<tr>
<td>-18.6 3.5 1.4 .005 -</td>
<td>1.7 .86</td>
</tr>
<tr>
<td>(6.1) (4.1) (2.1) (1.6)</td>
<td></td>
</tr>
</tbody>
</table>

* In parenthesis are the t-statistics of the coefficients.

The natural logarithm of exports was regressed on the natural logarithms of the following independent variables: the OECD countries' GDP level, the dollar exchange rate ($/SDR), the world inflation index, the Brazilian real exchange rate, and a term to test for time trends. Because the t-statistic for the independent variable time was -0.7 with 21 degrees of freedom (a
50% level of significance) there was not enough evidence to refute the null hypothesis that time had no affect on exports. Time was therefore dropped from equation (a-1) and the export equation was re-estimated (eqn. a-2).

In equation (a-2) the real Brazilian exchange rate (Cr./$) did not produce enough evidence, a t-statistic equal to -0.9 with 22 degrees of freedom (a 40% significance level), to refute the null hypothesis that the Brazilian exchange rate had no affect on exports. Although, intuitively, the Brazilian exchange rate should have had an affect on exports, in Brazil's case, domestic inflation increased faster than the currency devaluations. The currency therefore appreciated consistently throughout the years in question (see Appendix Table A-1); this prevented the Cruzeiro/Dollar exchange rate from having a significant affect on increasing the level of exports.

The independent variable, Brazilian domestic exchange rate, was dropped from equation (a-2) and the export equation was then re-estimated. The final result was equation (a-3), which is also equation #1.

In the absence of changes in the independent variables, exports will decrease by 18.6% annually. On the other hand, real growth in the OECD countries will cause a 3.5% increase in Brazilian exports for each percentage point increase in the real GDP level. This variable has the most significant affect on the demand for Brazilian exports.

The results show that world inflation will have a very small affect on Brazilian exports: 0.005% for every one percent increase in world inflation. However, the affect of changes in
the dollar exchange rate ($/SDR) will outweigh the changes in the
world inflation rate and produce a significant change in exports.
An increase in the dollar exchange rate ratio ($/SDR) means that
the dollar is depreciating. In Brazil's case, a 1% dollar
depreciation will increase the export level by 1.4%. This
coefficient provides an indication of the dollars relative
purchasing power and the geographical distribution of exports.
If the dollar depreciates, Americans will import less from
abroad; yet for the Europeans, Japanese, and Canadians, among
others, it will become relatively cheaper to purchase Brazilian
goods. Each percentage point depreciation will lead to a 1.4%
increase in exports. This suggests that the demand for exports
as a function of the United States dollar is elastic.

In the next part of this paper, certain assumptions about
the future world economic situation will be made. These
assumptions will be inputted into the demand elasticity equation
in order to forecast the percentage change in exports over the
next five years. To then convert the resulting percentage change
into a level of exports, the following equation will be used:

\[ G_t = G_{t-1}(1+XG_t) \]

Where:

- \( G_t \) = resulting level of exports in year \( t \).
- \( G_{t-1} \) = the level of exports in the year \( t-1 \).
- \( XG_t \) = the percentage change in exports in year \( t \).
Exports of Services

2) \( X_{St} = .10 \ X_{Gt} \)

Yrs. = 1970-1983  N = 14

\( X_{St} \) = Exports of services in year \( t \).
\( X_{Gt} \) = Exports of goods in year \( t \).

Exports of services can be generalized as a fixed proportion of the level of goods exported due to the predominance of transportation, shipping, and other service expenditures; these expenditures are directly related to the annual level of exports (see Appendix Table A-2). This equation was adapted from a model used by Carlos von Doellinger. In his model, von Doellinger calculates the net payment of services as a fixed proportion of trade over time. However, this model estimates the exports and imports of services separately. This simplifies the presentation of the model and of the forecasts.

Imports of Goods

This equation estimates the Brazilian elasticity of demand for non-oil imports. It is assumed that the demand for imports always equals the supply. The demand for non-oil imports is a function of the Brazilian real income level, the real domestic exchange rate, the dollar exchange rate ($/SDR), and the world inflation index:

\[ M = f(BGDP, RA, DOL, P) \]

The demand for imports is dependent upon the domestic real income level. It is also influenced by the relative purchasing power of the Cruzeiro (or now the Cruzado) with respect to the dollar. In addition, demand for imports will also be influenced by the relative value of the dollar with respect to the other major
currencies. Finally, demand is also a function of the world inflation index.

3) \( \text{MNO}_t = -5.1 + 2.3 \text{BGDP}_t - 0.7 \text{RA}_t + 1.4 \text{DOL}_t - 0.9 \text{P}_t \)

\[
\begin{array}{cccc}
\text{SE} & 3.4 & 0.4 & 0.2 & 0.7 & 0.3 \\
\text{DW} & 1.6 \text{(using Corc.-Orc.)} \\
\text{N} & 23 \\
\text{Yrs.} & 1963-1985 \\
\text{F-stat}(4,17) & 111.5 \\
\text{R}^2 & 0.96 \\
\text{adjR}^2 & 0.95 \\
\end{array}
\]

\( \text{MNO}_t \) = Natural log. of Brazilian non-oil imports in year \( t \).
\( \text{BGDP}_t \) = Natural log. of Brazilian real level of GDP in year \( t \).
\( \text{RA}_t \) = Natural log. of the real domestic exchange rate (Cr./$) in year \( t \).
\( \text{DOL}_t \) = Natural log. of the dollar exchange rate ($/SDR) in year \( t \).
\( \text{P}_t \) = Natural log. of world inflation in year \( t \).

This equation was estimated taking the natural logarithms of both sides and using the Cochrane-Orcutt technique.

If there are no changes in the right hand variables, imports will decrease by 5.1% annually. This occurs because the Brazilian government aggressively promotes import substitution through domestic protectionism and import substitution programs. An example of the first is the protection granted to Brazil's computer industry; an example of the latter is the government subsidies provided for alcohol-fuel production.

Each percentage point increase in the real Brazilian GDP level increases imports by 2.3%. Therefore, domestic GDP growth of less than two percentage points will not increase the total level of imports; this is due to the substitution factor of -5.1% per year. On the other hand, real domestic GDP growth of a magnitude greater than 2.2% will require a positive increase in imports. Imports are elastic with respect to growth because of the need to import technologically advanced and capital-intensive goods in order to sustain growth.

Because the Brazilian currency appreciated, in real terms,
throughout the estimation period (see Appendix Table A-1), the independent variable real domestic exchange rate (RA) had a significant affect on increasing the demand for imports. The real exchange rate, the Cruzeiro/Dollar ratio, takes into account the domestic inflation rate; increases in this ratio denote a depreciation of the currency. If the Brazilian currency depreciates by 1%, the demand for imports will fall by 0.7%. This means that the relative dollar price of foreign goods to the Brazilians has decreased, all other things remaining constant. Yet, if the currency appreciates (the Cruzeiro/Dollar ratio decreases), the demand for imports will increase because Brazilians will now be able to purchase more foreign goods.

Similar to exports, dollar devaluations (increases in the Dollar/SDR ratio) will increase Brazil's demand for imports, 1.4% for every 1% devaluation. Dollar devaluations indicate the relative purchasing power that the dollar has in the world markets. Therefore, if the dollar exchange rate depreciates, Brazil's demand for imports will increase.

Finally, increases in world inflation will cause a decrease in the demand for imports (-0.9% for each 1.0% increase in world inflation). World inflation will increase the price that Brazil has to pay for its foreign goods, making it necessary to either manufacture some of the goods domestically or to decrease the level of imports.

In order to forecast the future levels of non-oil imports, certain economic assumptions will be made in the following section. The import demand equation, developed here, will be
used to determine the percentage change in non-oil imports during the next five years. To convert this percentage change into an annual level, the following equation will be used:

\[ M_t = M_{t-1} [1 + \text{MNO}_t] \]

Where:

- \( M_t \) = the resulting level of non-oil imports in year \( t \)
- \( M_{t-1} \) = the level of non-oil imports in year \( t-1 \)
- \( \text{MNO}_t \) = the percentage change in imports in year \( t \).

**Oil Imports**

4) \( \text{MVO}_q = 107.9 - 1.9Q \)

\[
\begin{align*}
\text{SE} &= 2.7 & \text{R}^2 &= .85 & \text{adjR}^2 &= .84 \\
\text{DW} &= 1.7 \text{ (using Corc.-Orc)} & \text{F-stat}(1,25) &= 140.3 \\
\text{Yrs.} &= 1979-1985 \text{ (quarterly)} & N &= 28
\end{align*}
\]

\( \text{MVO}_q \) = Volume of oil imports (in millions of barrels) per quarter.

\( Q \) = Time (per quarter).

Cline's model does not take into account the affect that a change in oil price will have upon the import level. The volume of oil imported is therefore estimated first, and from this the value of oil imports is then calculated. This allows different assumptions about future oil prices to be tested.

In the absence of data on the volume of Brazilian oil imports, the assumption is made that Brazil buys all of its oil and oil by-products at the official Saudi Arabian petroleum price per barrel. This assumption is probably an accurate predictor of the actual situation, because Saudi Arabia is the price setter in the oil market. Therefore, the price that Brazil pays for oil will either be the Saudi price or one that varies simultaneously with it. The quarterly dollar value of oil imports is divided by the average dollar price per barrel of petroleum, and the result
is the number of petroleum barrels imported per quarter from 1979-1985 (see Appendix Table A-3).

1979 was chosen as the first year of this estimation because the volume of oil imported by Brazil reached a peak that year and has since consistently decreased. As the oil import volume equation indicates, there has been a definite reduction in oil imports during the last seven years. The results show that on average oil imports decreased by 1.9 million barrels per quarter (see Graph-9). This is due to increased domestic production of oil, and the successful alcohol-fuel program.

To forecast the value of future oil imports the following equation was used:

\[ M_0_t = M_0 V_0_t * P_B \]

\( M_0_t \) = Value of oil imports in year \( t \).

\( M_0 V_0_t \) = Volume of oil imported in year \( t \).

\( P_B \) = Forecasted dollar (price per barrel) of oil in year \( t \).

The value of oil imports in year \( t \) will therefore be equal to the volume of oil imported in year \( t \) multiplied by the forecasted price of oil in that year. This equation is used to test different assumptions about future oil prices.

**Imports of Services**

5) \( M_S_t = 0.24(M_0_t + M_N O_t) \)

\( M_S_t \) = Value of services imported in year \( t \).

\( M_0_t \) = Value of oil imports in year \( t \).

\( M_N O_t \) = Value of non-oil imports in year \( t \).

This equation is very similar to that of exports of services, and is also adapted from von Doellinger's model. Similar to the export of services, imports of services can be generalized as a constant proportion of the import level due to the predominance of transportation, shipping, and other service
G-9 Volume of Oil Imports
(1979–1985)
expenditures that are directly dependent upon the annual level of imports (see Appendix Table A-2).

**Transfer Payments**

6) \( T_t = -26.0 + 9.4 \) Time  
\( \text{SE}= 28.5 \quad \text{2.9} \)  
\( \text{DW}=2.0 \quad \text{F-stat}(1,15)=11.3 \quad R^2=.43 \quad \text{adj}R^2=.39 \)  
\( N=17 \quad \text{Yrs.}=1969-1985 \)

\( T_t = \) Transfer payments to Brazil (in millions of dollars) in year \( t \).  
\( \text{Time}= \) Year.

Transfers are payments that are made to Brazil from individuals living abroad or from foreign organizations. Examples of this are payments made by expatriates to relatives in Brazil and money sent by an organization, such as the Mormon Church, to Brazil. Transfer payments to Brazil increase by 9.4 million dollars annually. Although transfer payments will affect the balance of payments situation only slightly (the average annual level of transfer payments from 1980 to 1985 was only $130 million)\(^6\), they are included in order to give a complete forecast of capital flows into Brazil.

The data suggested that some type of positive trend existed to transfer payments over time. Transfer payments were therefore originally regressed over the time period 1960-1985. The results were as follows:

\( T_t = 4.8 + 3.7 \) Time  
\( \text{SE}= 34.9 \quad \text{2.2} \)  
\( \text{DW}=2.0 \quad \text{(using Corc.-Orcl.) F-stat}(1,23)=3.0 \quad R^2=.11 \quad \text{adj}R^2=.08 \)  
\( N=26 \quad \text{Yrs.}=1960-1985 \)

Because of the poorness of fit to this line (\( \text{adj}R^2=.08 \)) and the small t-statistic for the time coefficient (\( t=1.7 \)), this equation
was not used. An estimation was then made using the data for the years 1969-1985 which seemed to indicate a more conclusive trend. The results for this period showed a more definite and conclusive trend. The later years were therefore used for this model. Since the ultimate purpose of this model is to forecast, data closer to the present should provide a better representation of the current situation than data from earlier years.

Direct Foreign Investment

\[ DFI_t = \text{Direct foreign investment (in millions of dollars) in year } t. \]

7) \[ DFI_t = 1,267 \]

Direct foreign investment into Brazil was regressed over the period 1969 to 1985, but the results were inconclusive in terms of predicting DFI:

\[ DFI_t = 789.2 + 63.5 \text{ Time} \]

\[ \text{SE} = (669.3) (57.1) \]

\[ \text{DW} = 2.0 \text{ (using Corc.-Orc.) } \]

\[ F-\text{stat}(1,14) = 1.2 \quad R^2 = .08 \quad \text{adj}R^2 = .02 \]

Therefore in the absence of better results, direct foreign investment for 1985 (1,267 million dollars) is used as level of DFI. It is assumed that DFI stays at this level throughout the period being forecasted.
Non-Gold Reserves

8) $H_t = -2.0 + 1.1 M_t$

SE = 2.3 0.3


\[ \begin{array}{ll}
\text{DW}=1.6 \text{ (using Corc.-Orc.)} & \text{F-stat(1,23)= 17.8} \\
N=26 & \text{R}^2 = .44 \\
\text{Yrs.}=1960-1985 & \text{adjR}^2 = .41
\end{array} \]

$H_t = \text{Natural log. of non-gold reserves in year } t.$

$M_t = \text{Natural log. of total imports in year } t.$

To estimate the affect that changes in the import level had on the level of non-gold reserves, the natural logarithm of non-gold reserves was regressed on the natural logarithm of imports. Typically a country will increase the level of reserves that it maintains as its imports increase. This provides the country with foreign capital that is used to purchase imports. Alternatively, if imports decrease a country will generally decrease its non-gold reserve level. The results suggest that Brazil will increase non-gold reserves by 1.1% for every 1% increase in imports. If imports do not change reserves will decrease by 2% per year; also for every 1% decrease in imports, reserves will decrease by 1.1% in addition to this original 2% decrease.

Interest Payments

9) $I_t = (i)(f)(D_{t-1})+(r_t\%+2.0\%)[(1-f)(D_{t-1})]$

$I_t = \text{Interest paid on the foreign debt in year } t.$

$f= .21, \text{ Constant fraction of the debt at fixed interest rates.}$

$i=11.4, \text{ Fixed interest rate charged on } f.$

$r_t = \text{LIBOR, Interest rate charged on the variable interest portion of the debt in year } t.$

$D_t = \text{Total foreign debt in year } t.$

This equation is an identity that William Cline devised to calculate the interest owed on the foreign debt by a country in time period $t$. The foreign debt is not divided into its short
term and long term components, as Cline had done, for the sake of simplicity. In addition, Cline subtracted from this equation the interest received from Brazil's non-gold reserves. This term (interest on non-gold reserves) was not included because it was not clear how to determine the interest received on reserves during a given year.

The interest owed on the foreign debt is a function of the previous year's debt multiplied by the current year's London Interbank Offer Rate (LIBOR), plus a 2% point spread. The LIBOR rate is used because it is the international lending rate, and the rate that determines the interest owed on 79% \((1-f)\) of Brazil's foreign debt. In Brazil's case the spread, over and above the official lending rate, is approximately 2% points.\(^{64}\) Originally this lending spread was determined as a function of the degree of risk that a loan posed; currently, it is more a function of a bank's minimum operating costs.

Twenty-one percent \((f)\) of Brazil's foreign debt, determined in the base year 1985, is quoted at fixed rates of interest.\(^{65}\) These are loans that were made to Brazil at predetermined interest rates and that do not change as the international interest rate changes. Both for the sake of simplicity and in the absence of comprehensive data on Brazil's foreign debt, it is assumed that all of the debt at fixed interest rates is quoted at 11.4%. This is the average interest rate charged on Brazil's foreign debt according to the World Bank.\(^{66}\)
Amortization Rate

10) \( a = A_{1986} / (D LT_{1985}) \)
\( a = 0.01 \)

\( a = 0.01 \), Constant net amortization rate.
\( A_{1986} = \$954 \) million, net amortization paid on the debt in 1986.
\( D LT = \$95,857 \) million, long term debt at the end of 1985.

To estimate the average amortization rate \((\alpha)\) Cline uses the above equation. The net amortization paid on the debt in 1986 is divided by the long term debt at the end of 1985 \((A_{1986}/D LT_{1985})\), in order to determine the average rate paid. To then forecast the amortization payments, the previous year's long term debt is multiplied by the amortization rate \((\alpha)\). It is assumed for the forecasts that the amortization rate \((\alpha)\) stays the same during the forecasting period.

Identities Used For Forecasting

Current Account Balance

11) \( C_t = X_t - M_t - I_t + T_t \)

\( C_t = \) Current account balance in year \( t \).
\( X_t = \) Total exports in year \( t \).
\( M_t = \) Total imports in year \( t \).
\( I_t = \) Interest paid on the debt in year \( t \).
\( T_t = \) Transfer payments to Brazil in year \( t \).

The current account balance measures the flow of dollars into and out of the country. It is equal to total exports minus total imports (trade balance). Interest payments are then subtracted because they involve capital outflows. Finally, transfer payments are added back to this equation because they are capital inflows.
**Required New Lending**

12) \( L_t = -C_t + A_t + HC_t - DFI_t \)

- \( L_t \): Required new lending in year \( t \).
- \( A_t \): Net amortization in year \( t \).
- \( HC_t \): Change in non-gold reserves in year \( t \).
- \( DFI_t \): Direct foreign investment in year \( t \).

New lending is a function of the current account deficit, if one exists, plus the amortization paid on the debt. The change in reserves is added to the current account balance because decreases in the reserve level will decrease the account deficit, assuming one exits. Finally, the level of direct foreign investment is subtracted, also decreasing the current account deficit.

It is assumed that if a balance of payments deficit occurs, Brazil will be able to borrow the necessary capital to keep its payments in balance. If the right hand side of the above equation turns out to be zero, or a negative value, the assumption is made that new lending will be zero. It should be noted that although Cline neglected to include amortization payments in this equation, it is included here because it represents an important source of capital outflows that should not be overlooked in determining capital flows.

**Foreign Debt**

13) \( D_t = (D_{t-1} - A_t) + L_t \)

- \( D_t \): Total foreign debt in year \( t \).
- \( A_t \): Net amortization payments in year \( t \).
- \( L_t \): New lending in year \( t \).

The debt at the end of year \( t \) will equal the previous years debt, less the net amortization paid out, plus any new lending. Cline also neglects to take into account the fact that
amortization payments reduce a country's foreign debt. Net amortization payments were thus included in this equation \( A_t \) to better estimate Brazil's future foreign debt.

C. Data Sources

For the most part, the data used in this study came from the International Monetary Fund, *IFS Yearbook 1986*. Data was also gathered from the specific sources cited in the tables and footnotes of this paper. Additional sources were the OECD's, *National Accounts 1960-1984* (for the industrial countries real GDP level), and assorted monthly issues of the *IFS* (for the levels of direct foreign investment into Brazil). Also, the Wharton Econometric Forecasting Associates, *Latin American Economic Outlook, Fall 1986*, provided updated GDP data, and world economic forecasts. The data for the graphs in this paper came from the following sources:

   World Bank, *World Debt Tables 1985-1986*
   Brazilian Economic Department, *Brazilian Economic Program*, (Aug. 1986)

2) G-2 IMF, *IFS Yearbook 1986*
   Wharton Econometric Forecasting Associates, *Latin American Economic Outlook, Fall 1986*

3) G-3, G-5, G-6, G-7, G-8:
   IMF, *IFS Yearbook 1986*


The model developed in the previous section is used to forecast Brazil's external economic situation under three alternative sets of assumptions about the next five years, 1987 to 1991. The year 1986 is also forecasted, because updated data is not yet available, and for purposes of continuity in the forecasting. The results are three different sets of forecasts, each based upon different assumptions about the future domestic and world economic situation.

In the first forecast, the base case, the domestic and world economic projections made by Wharton Econometric Forecasting Associates are used to estimate Brazil's balance of payments situation. The results obtained under the base case scenario provide the best estimation of what the actual balance of payments situation will be during the next five years.

The second and third projection scenarios are hypothetical situations. The second is a pessimistic case, modeled after the recession years of the early 1980's. The third is an optimistic case which simulates conditions of steady world growth.

The forecasts are designed not only to predict Brazil's future external economic situation, but also to study the sensitivity of the balance of payments to specific economic changes. This will be accomplished by comparing the resulting forecasts from the two extreme scenarios (the pessimistic and the optimistic) to the base case forecasts. Finally, the implications of these forecasts to the domestic economy will be examined.

For reasons that were explained in the model section, the
estimation of three of the dependent variables will not change as the projections change. They are transfer payments, direct foreign investment (DFI), and the volume of imported oil.

However, while the volume of oil imported will decrease at a constant rate, the value of oil imports will change as the forecasted price of oil (per barrel) changes.

A. Three Scenarios

1. Base Case

The assumptions used in the base case come from the economic projections made by the Wharton Econometric Forecasting Associates. As Table F-1 illustrates, the assumptions are favorable. Industrial country growth and Brazilian growth will be high. While world inflation and international interest rates will remain fairly stable. In addition, the price of oil (per barrel) will increase slowly over the forecasted period.

Table F-1
Base Case Assumptions

<table>
<thead>
<tr>
<th>YEAR</th>
<th>OECD Growth % ch.</th>
<th>Br. GDP % ch.</th>
<th>Br. ex. rate % ch.</th>
<th>Dollar(^1) per SDR % ch.</th>
<th>World(^1) Infl. % ch.</th>
<th>LIBOR lending rate, %</th>
<th>Price of oil ($'s/BBL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>2.5</td>
<td>6.4</td>
<td>-10.1</td>
<td>10.0</td>
<td>9.0</td>
<td>6.5</td>
<td>13.79</td>
</tr>
<tr>
<td>1987</td>
<td>3.0</td>
<td>5.4</td>
<td>-17.3</td>
<td>5.0</td>
<td>7.0</td>
<td>6.5</td>
<td>14.75</td>
</tr>
<tr>
<td>1988</td>
<td>2.9</td>
<td>4.6</td>
<td>-0.8</td>
<td>6.0</td>
<td>7.0</td>
<td>7.3</td>
<td>16.74</td>
</tr>
<tr>
<td>1989</td>
<td>2.3</td>
<td>4.8</td>
<td>3.4</td>
<td>-0.8</td>
<td>7.0</td>
<td>8.3</td>
<td>18.63</td>
</tr>
<tr>
<td>1990</td>
<td>3.8</td>
<td>5.7</td>
<td>2.4</td>
<td>-1.4</td>
<td>7.0</td>
<td>7.8</td>
<td>21.03</td>
</tr>
<tr>
<td>1991</td>
<td>3.4</td>
<td>4.7</td>
<td>3.1</td>
<td>2.0</td>
<td>7.0</td>
<td>7.5</td>
<td>23.65</td>
</tr>
</tbody>
</table>


\(^1\)Hypothetical data.

*positive (negative) changes in the exchange rate indicate currency devaluations (appreciations).

Based upon these assumptions, the forecast for Brazil is optimistic (see Table F-2). Due to a sustained high level of
exports and a stable level of imports, Brazil will experience large trade surpluses. Also contributing to this surplus will be the decrease in oil imports.

Sizable annual trade surpluses, coupled with stable interest rates will allow the country to pay the interest and principal on the foreign debt during 1987, 1988 and 1989. However, in the last two years of the forecast, 1990 and 1991, Brazil will require small sums of new lending (approximately $250 million annually) to continue servicing its foreign debt. Nonetheless, the foreign debt will decrease approximately $4.5 billion dollars over the next five years.

Table F-2
BASE CASE RESULTS
(in millions of $'s)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EXPORTS:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goods</td>
<td>26,715</td>
<td>26,430</td>
<td>26,426</td>
<td>23,351</td>
<td>21,664</td>
<td>20,827</td>
</tr>
<tr>
<td>%ch.</td>
<td>4.2</td>
<td>(1.1)</td>
<td>(0.0)</td>
<td>(11.6)</td>
<td>(7.2)</td>
<td>(3.9)</td>
</tr>
<tr>
<td>Services</td>
<td>2,671</td>
<td>2,643</td>
<td>2,643</td>
<td>2,335</td>
<td>2,166</td>
<td>2,083</td>
</tr>
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</tr>
<tr>
<td>Goods</td>
<td>8,538</td>
<td>10,257</td>
<td>11,092</td>
<td>10,664</td>
<td>10,458</td>
<td>10,462</td>
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<td>%ch.</td>
<td>23.0</td>
<td>20.1</td>
<td>8.1</td>
<td>(3.9)</td>
<td>(1.9)</td>
<td>0.0</td>
</tr>
<tr>
<td>Oil</td>
<td>2,755</td>
<td>2,499</td>
<td>2,327</td>
<td>2,023</td>
<td>1,645</td>
<td>1,130</td>
</tr>
<tr>
<td>Services</td>
<td>2,710</td>
<td>3,061</td>
<td>3,221</td>
<td>3,045</td>
<td>2,905</td>
<td>2,782</td>
</tr>
<tr>
<td>TRADE BALANCE:</td>
<td>15,383</td>
<td>13,256</td>
<td>12,429</td>
<td>9,954</td>
<td>8,822</td>
<td>8,536</td>
</tr>
<tr>
<td>Transfers</td>
<td>143</td>
<td>153</td>
<td>162</td>
<td>171</td>
<td>181</td>
<td>190</td>
</tr>
<tr>
<td>DFI</td>
<td>1,267</td>
<td>1,267</td>
<td>1,267</td>
<td>1,267</td>
<td>1,267</td>
<td>1,267</td>
</tr>
<tr>
<td>Non-gold Reserves</td>
<td>8,206</td>
<td>9,362</td>
<td>9,858</td>
<td>8,867</td>
<td>8,120</td>
<td>7,502</td>
</tr>
<tr>
<td>FOREIGN LIABILITIES:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Int. Payments</td>
<td>9,576</td>
<td>9,480</td>
<td>10,037</td>
<td>10,742</td>
<td>10,236</td>
<td>9,919</td>
</tr>
<tr>
<td>Amort. Payments</td>
<td>1,051</td>
<td>1,041</td>
<td>1,030</td>
<td>1,020</td>
<td>1,010</td>
<td>1,002</td>
</tr>
<tr>
<td>Foreign Debt</td>
<td>104,075</td>
<td>103,034</td>
<td>102,004</td>
<td>100,984</td>
<td>100,201</td>
<td>99,510</td>
</tr>
<tr>
<td>CURRENT ACCOUNT:</td>
<td>5,949</td>
<td>3,928</td>
<td>2,555</td>
<td>(616)</td>
<td>(1,232)</td>
<td>(1,194)</td>
</tr>
<tr>
<td>Net new lending</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>227</td>
<td>311</td>
</tr>
</tbody>
</table>
2. Pessimistic Case

Under this scenario, the assumption is made that the Industrial Countries (the OECD countries) experience a recessionary period along with high interest rates (see Table F-3). It is assumed that the world recession precipitates a Brazilian recession. To make matters worse, the Brazilian currency will appreciate (this increases imports). In addition, world oil prices will increase substantially, and the dollar will consistently appreciate relative to the other major currencies.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>OECD Growth % ch.</th>
<th>Br. GDP %ch.</th>
<th>Br. ex.rate %ch.</th>
<th>Dollar per SDR % ch.</th>
<th>World Infl. % ch.</th>
<th>LIBOR lending rate, %</th>
<th>Price of oil ($/BBL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>2.5</td>
<td>6.4</td>
<td>-10.1</td>
<td>10.0</td>
<td>9.0</td>
<td>6.50</td>
<td>13.79</td>
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<tr>
<td>1987</td>
<td>1.5</td>
<td>0.9</td>
<td>-9.0</td>
<td>7.0</td>
<td>13.1</td>
<td>9.20</td>
<td>18.00</td>
</tr>
<tr>
<td>1988</td>
<td>-0.2</td>
<td>-3.2</td>
<td>-12.0</td>
<td>-9.0</td>
<td>15.2</td>
<td>12.15</td>
<td>22.00</td>
</tr>
<tr>
<td>1989</td>
<td>1.0</td>
<td>-1.5</td>
<td>-11.0</td>
<td>-5.0</td>
<td>12.7</td>
<td>14.03</td>
<td>27.00</td>
</tr>
<tr>
<td>1990</td>
<td>0.8</td>
<td>0.2</td>
<td>-2.0</td>
<td>-2.0</td>
<td>11.8</td>
<td>16.72</td>
<td>29.00</td>
</tr>
<tr>
<td>1991</td>
<td>1.2</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>13.4</td>
<td>13.60</td>
<td>33.00</td>
</tr>
</tbody>
</table>

Source: Hypothetical data.
*positive (negative) changes in the exchange rate indicate currency devaluations (appreciations).

The forecasts under this scenario are shown in Table F-4. The OECD recession will decrease the demand for Brazilian exports from $20 billion in 1987 to $7 billion in 1991. Nevertheless, Brazil will continue to experience small trade surpluses because of a $4 billion decrease in non-oil imports over the next five years. The domestic recession will cause this decrease in imports.

Due to a significant increase in the international interest
rate, and the small trade surpluses, Brazil will experience sizable current account deficits. This will force Brazil to take out new loans, increasing the foreign debt by approximately $44 billion over the next five years. The burden of servicing the debt will be compounded by the increase in the interest rates and by the increase in the level of the debt.

<table>
<thead>
<tr>
<th>Table F-4</th>
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</thead>
<tbody>
<tr>
<td><strong>Pessimistic Case Results</strong></td>
</tr>
<tr>
<td>(in millions of U.S. $'s)</td>
</tr>
<tr>
<td><strong>Exports:</strong></td>
</tr>
<tr>
<td>Goods</td>
</tr>
<tr>
<td>%ch.</td>
</tr>
<tr>
<td>Services</td>
</tr>
<tr>
<td><strong>Imports:</strong></td>
</tr>
<tr>
<td>Goods</td>
</tr>
<tr>
<td>%ch.</td>
</tr>
<tr>
<td>Oil</td>
</tr>
<tr>
<td>Services</td>
</tr>
<tr>
<td><strong>Trade Balance:</strong></td>
</tr>
<tr>
<td>Transfers</td>
</tr>
<tr>
<td>DFI</td>
</tr>
<tr>
<td>Non-gold Reserves</td>
</tr>
<tr>
<td><strong>Foreign Liabilities:</strong></td>
</tr>
<tr>
<td>Int. Payments</td>
</tr>
<tr>
<td>Amort. Payments</td>
</tr>
<tr>
<td>Foreign Debt</td>
</tr>
<tr>
<td><strong>Current Account:</strong></td>
</tr>
</tbody>
</table>
| Net new lending | 5,949|(1,374)|(8,229)|(12,615)|(17,328)|(16,480)
3. Optimistic Case

Table F-5
OPTIMISTIC CASE ASSUMPTIONS

<table>
<thead>
<tr>
<th>YEAR</th>
<th>OECD Growth % ch.</th>
<th>Br. GDP % ch.</th>
<th>Br. ex. rate % ch.</th>
<th>Dollar per SDR % ch.</th>
<th>World Infl. % ch.</th>
<th>LIBOR lending rate, %</th>
<th>Price of oil ($/BBL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>2.5</td>
<td>6.4</td>
<td>-10.1</td>
<td>10.0</td>
<td>9.0</td>
<td>6.5</td>
<td>13.79</td>
</tr>
<tr>
<td>1987</td>
<td>4.0</td>
<td>9.0</td>
<td>3.5</td>
<td>3.0</td>
<td>10.0</td>
<td>6.0</td>
<td>13.00</td>
</tr>
<tr>
<td>1988</td>
<td>4.5</td>
<td>10.8</td>
<td>4.0</td>
<td>2.0</td>
<td>10.5</td>
<td>5.9</td>
<td>12.80</td>
</tr>
<tr>
<td>1989</td>
<td>4.5</td>
<td>8.7</td>
<td>6.0</td>
<td>-1.0</td>
<td>8.9</td>
<td>5.5</td>
<td>13.20</td>
</tr>
<tr>
<td>1990</td>
<td>4.8</td>
<td>8.8</td>
<td>7.0</td>
<td>2.0</td>
<td>9.0</td>
<td>6.2</td>
<td>12.50</td>
</tr>
<tr>
<td>1991</td>
<td>4.3</td>
<td>8.5</td>
<td>9.0</td>
<td>0.8</td>
<td>10.0</td>
<td>5.8</td>
<td>13.00</td>
</tr>
</tbody>
</table>

Source: Hypothetical data.

*positive (negative) changes in the exchange rate indicate currency devaluations (appreciations).

The assumptions made in this case are similar to those made in the base case (see Table F-5). Industrial country growth will be in the range of 4.5%, and Brazilian growth will average about 9%. Interest rates will remain stable, while oil prices will decrease slightly. In addition, world inflation will remain fairly constant, and the Brazilian currency will devaluate consistently over the forecasted period.

The results are presented in Table F-6. The forecast under this scenario is very auspicious for Brazil. Exports will average about $26 billion per year, while imports will remain at approximately $10.5 billion. This will produce annual trade surpluses of over $13 billion.

Stable interest rates will decrease the cost of servicing the foreign debt and permit Brazil to amortize a portion of its debt. This will decrease the level of the debt by $6 billion over the next five years. In addition, Brazil will experience current account surpluses in the range of $5 billion. This will
provide the country with extra capital to invest in the domestic economy.

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EXPORTS:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goods</td>
<td>26,715</td>
<td>26,621</td>
<td>26,622</td>
<td>25,502</td>
<td>25,769</td>
<td>25,155</td>
</tr>
<tr>
<td>%ch.</td>
<td>4.2</td>
<td>(0.4)</td>
<td>0.0</td>
<td>(4.2)</td>
<td>1.0</td>
<td>(2.4)</td>
</tr>
<tr>
<td>Services</td>
<td>2,672</td>
<td>2,662</td>
<td>2,662</td>
<td>2,550</td>
<td>2,577</td>
<td>2,516</td>
</tr>
<tr>
<td><strong>IMPORTS:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goods</td>
<td>8,538</td>
<td>9,251</td>
<td>10,203</td>
<td>10,336</td>
<td>10,847</td>
<td>10,876</td>
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<tr>
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<td>23.0</td>
<td>8.4</td>
<td>10.3</td>
<td>1.3</td>
<td>4.9</td>
<td>0.3</td>
</tr>
<tr>
<td>Oil</td>
<td>2,755</td>
<td>2,202</td>
<td>1,779</td>
<td>1,434</td>
<td>978</td>
<td>621</td>
</tr>
<tr>
<td>Services</td>
<td>2,710</td>
<td>2,749</td>
<td>2,876</td>
<td>2,825</td>
<td>2,838</td>
<td>2,759</td>
</tr>
<tr>
<td><strong>TRADE BALANCE:</strong></td>
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<td>15,081</td>
<td>14,427</td>
<td>13,457</td>
<td>13,683</td>
<td>13,414</td>
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<tr>
<td>Transfers</td>
<td>143</td>
<td>153</td>
<td>162</td>
<td>171</td>
<td>181</td>
<td>190</td>
</tr>
<tr>
<td>DFI</td>
<td>1,267</td>
<td>1,267</td>
<td>1,267</td>
<td>1,267</td>
<td>1,267</td>
<td>1,267</td>
</tr>
<tr>
<td>Non-gold Reserves</td>
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<td>8,187</td>
<td>8,499</td>
<td>8,130</td>
<td>8,016</td>
<td>7,568</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Int. Payments</td>
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<td>9,069</td>
<td>8,897</td>
<td>8,486</td>
<td>8,959</td>
<td>8,554</td>
</tr>
<tr>
<td>Amort. Payments</td>
<td>1,051</td>
<td>1,041</td>
<td>1,030</td>
<td>1,020</td>
<td>1,010</td>
<td>1,000</td>
</tr>
<tr>
<td>Foreign Debt</td>
<td>104,075</td>
<td>103,034</td>
<td>102,004</td>
<td>100,984</td>
<td>99,974</td>
<td>98,974</td>
</tr>
<tr>
<td><strong>CURRENT ACCOUNT:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net new lending</td>
<td>5,949</td>
<td>6,164</td>
<td>5,691</td>
<td>5,144</td>
<td>4,905</td>
<td>5,051</td>
</tr>
</tbody>
</table>
B. Sensitivity Analysis

What follows is an analysis of the sensitivity of Brazil's balance of payments to changes in economic conditions. This is accomplished by comparing the optimistic forecast and pessimistic forecast to the base case forecast. The specific world factors that will be analyzed are world interest rates, world oil prices and changes in the industrial countries income level. The domestic changes that will be discussed are the Brazilian GDP level and changes in the Cruzeiro-Dollar exchange rate. The effects of changes in these factors on the balance of payments will then be contrasted with their consequences to the domestic economy. It is important to keep in mind that economic circumstances which improve Brazil's balance of payments do not necessarily also improve the domestic economic situation. In fact, tradeoffs between these two situations usually result.

Brazil's trade balance will be most influenced by changes in the industrial countries income level. As is evidenced by the optimistic case, steady world growth will produce the largest trade surpluses of the three scenarios due to the increased demand for Brazilian goods. The implications to the domestic economy of steady world growth are favorable. The increased demand for Brazilian exports will stimulate the economy; this will increase employment and increase the overall income level. The drawback to this is that domestic growth will also increase the demand for imports, thus reducing the trade surplus.

Since 79% of Brazil's debt is quoted at a variable interest rate, changes in the LIBOR will have a significant impact on
Brazil's future current account and debt level. I estimate that each percentage point increase in the LIBOR will cost Brazil $840 million in additional interest payments. If the interest rate increases to levels similar to those of the early eighties, the interest owed on the foreign debt will approximately double in the next five years. This represents an annual difference of up to $10 billion (see interest payments in Table F-4).

Changes in the world oil prices will not have a significant influence on the balance of payments during the next five years. In the pessimistic case, the price of oil increased significantly over the five years, while in the base case the price increased only modestly. Yet the difference in the level of oil imports between these two scenarios is small in terms of its overall effect on the balance of payments, not more than $900 million. Even though low world oil prices will benefit the balance of payments situation somewhat, the tradeoff is that they will discourage domestic fuel production.

On the domestic side of the balance of payments situation, a slowdown in the Brazilian growth rate will benefit Brazil by decreasing the demand for imports. However, the implications for the domestic economy will be very adverse: a decrease in employment, a decrease in the general standard of living, and a limit on future economic growth. Changes in the Brazilian income level present the most significant tradeoff between the balance of payments and the domestic economy. Nonetheless, a comparison of the second and third scenarios indicates that it would be preferable for the overall economic situation if both imports and exports increase rather than for both to decrease.
Brazilian currency devaluations will also produce a tradeoff. In the short run, a government imposed currency devaluation will decrease the level of imports and possibly increase the level of exports. This will increase the trade surplus. The problem is that currency devaluations will cause domestic inflation. This inflation will in turn appreciate the currency relative to the dollar, thus eliminating any trade benefits from the original devaluation. In addition, the original gains to the balance of payments will have to be contrasted with the costs to the domestic economy of higher inflation.

It is clear from this set of simulations that certain future economic conditions will be more beneficial to both the external and internal economic situations than others will be. It is also clear that certain combinations of these factors will alleviate Brazil's foreign debt and balance of payments situation, while other factors will adversely affect the future situation. A comparison of the sensitivity of Brazil's balance of payments to specific changes illustrates the complexity of the situation and the often contrasting implications for the country's future domestic economy. However, the most beneficial circumstances for both the balance of payments and the domestic economy will be high and sustained industrial country growth rates, together with low international interest rates, and steady Brazilian growth.
V. Conclusion

This study illustrates that Brazil's future balance of payments and foreign debt situation are very dependent upon world economic conditions. The two most important factors affecting the situation will be the industrial countries real income level and world interest rates. If interest rates remain low and growth high, Brazil will experience considerable trade surpluses over the next five years. This will lead to an impressive improvement in its foreign debt. If on the other hand interest rates increase, and a world recession ensues, Brazil's debt will increase substantially.

A separate conclusion of this paper is that oil imports will have a very minor influence on the balance of trade in the next five years, regardless of changes in the price of oil. Although the medium term outlook was not specifically examined in this paper, the trend in oil imports suggests that it might be possible for Brazil to become energy self-sufficient. This represents an important break with the seventies and early eighties when Brazil was almost entirely dependent on foreign oil and when changes in oil prices substantially increased the country's foreign debt.

A number of positive steps have been taken in addressing the Latin American nations balance of payments and foreign debt situation. The first is a new overall awareness of the Latin American nations' problem. Two examples of this are the Baker Plan and the Bradley Plan. Although they advocate very different methods for improving the situation, both show a good understanding of the problem. Nonetheless, a full understanding
of the costs that the monetary policies pursued by the industrialized countries, in particular the United States, have on the Latin American balance of payments and foreign debt situation is still lacking. For example, this study indicates that each percentage point increase in the LIBOR will cost Brazil approximately $840 million dollars in additional interest payments. Factors such as this one must be taken into account when the industrialized countries' governments take fiscal and monetary action.

The second important initiative is the Paris Club, an informal organization created to provide a forum in which a debtor country's government can negotiate its liabilities with the creditor banks' governments. If this is successful, it will provide a broader economic and political framework for renegotiating foreign debts. The Paris Club also seems to signify a shift away from defining the debt problem as simply a conflict of interests between debtor countries and creditors, to an issue with much broader world implications.

On the domestic front, the Brazilian government must continue to emphasize import substitution in order to improve its balance of trade. In addition, the country must suppress nationalistic pride and aggressively seek out new foreign investment. This will provide new inflows of foreign capital, and it will stimulate the domestic economy. The government should also seriously consider swapping equity in some of the state-owned corporations for portions of the foreign debt; this is a new practice known as debt-equity swapping.
In order for democracy to be successful in Brazil, a number of very pressing problems will have to be addressed by the Brazilian government. The first is the rapidly deteriorating economy; the government's first priority should be to bring the economy under control. Second, various pressing social problems will have to be dealt with in the near future. They include a high rate of unemployment, a high rate of illiteracy, a high level of malnutrition, and a widening income gap. The success of democracy in Brazil will be dependent upon the government's ability to manage both the domestic situation and at the same time, the balance of payments (including the foreign debt) situation. To accomplish this, Brazil will need all the political and economic support that the industrialized countries, especially the United States, are able to provide.
Table A-1
Brazilian Exchange Rate

<table>
<thead>
<tr>
<th>Year</th>
<th>Exchange Rate (Cr/$) per. avg.</th>
<th>Exchange Rate index (1980=100)</th>
<th>Brazilian Wholesale Price index (1980=100)</th>
<th>Real Exch. Rate Index (1980=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>0.19</td>
<td>0.4</td>
<td>0.1</td>
<td>296</td>
</tr>
<tr>
<td>1961</td>
<td>0.27</td>
<td>0.5</td>
<td>0.2</td>
<td>301</td>
</tr>
<tr>
<td>1962</td>
<td>0.39</td>
<td>0.7</td>
<td>0.3</td>
<td>283</td>
</tr>
<tr>
<td>1963</td>
<td>0.58</td>
<td>1.1</td>
<td>0.5</td>
<td>242</td>
</tr>
<tr>
<td>1964</td>
<td>1.25</td>
<td>2.4</td>
<td>1.0</td>
<td>238</td>
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<tr>
<td>1965</td>
<td>1.90</td>
<td>3.6</td>
<td>1.0</td>
<td>360</td>
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<td>1966</td>
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<td>6.4</td>
<td>3.0</td>
<td>215</td>
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<tr>
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Format: UN, ESLAC.
Sources: IMF, *IFS Yearbook 1986*.
# Table A-2
Exports and Imports of Services

## Exports of Services

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<tr>
<th>YEAR</th>
<th>Exports of Services (billions of $'s)</th>
<th>Exports of Goods (billions of $'s)</th>
<th>Services as Fraction of Goods</th>
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## Imports of Services

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Sources: IMF, IFS Yearbook 1986.
UN, ESLAC, assorted editions.
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<th>Year</th>
<th>Value of Oil Imports (in millions of $'s)</th>
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Source: IMF, IFS, assorted monthly editions.
Footnotes

1Brazilian Economic Department, *Brazilian Economic Program* (Brasilia: Brazilian Economic Department, August 1986).


6Ibid.

7Werner Baer, p. 119.


9Werner Baer, p. 119.

10Ibid., p. 122.

11Ibid., p. 123.

12International Monetary Fund, *IFS Yearbook 1986*.

13Werner Baer, p. 124.

14Ibid.

15Ibid., p. 126.

16Ibid., p. 127.

17Ibid., p. 128.

18Ibid., p. 131.


20Werner Baer, p. 132.

21Ibid., p. 133.

23Baer, p. 133.
25Baer, p. 137.
26Ibid., p. 143.
27Ibid., p. 146.
28Ibid., p. 148.
30Ibid., p. 64.
31Ibid.
32Ibid., p. 65.
33Ibid., p. 66.
34Ibid., p. 63.
36IMF, IFS Yearbook 1986.
37Sergio, Amaral, p. 634.
38Ibid., p. 636.
39Ibid.
40Ibid., p. 634.
42Ibid., p. 22.
43Ibid.
44Ibid.
46Ibid.
48Ibid.
49 Ibid.
50 Ibid., p. 13.
51 Ibid., p. 15.
53 Ibid.
60 Ibid.
63 Brazilian Economic Department, Brazilian Economic Program (Brasilia: August 1986), p. 93.
65 Brazilian Economic Department.
67 Brazilian Economic Department, p. 91.
Christian Science Monitor, 1 August 1986.
Bibliography


