

Passive money system and control of exchange rates: The case of Argentina 1976–1981

Alan G. Futerman 

Adjunct Professor of Institutional Economics, University of the Latin American Educational Center, Rosario, Argentina

Correspondence

Alan G. Futerman, Adjunct Professor of Institutional Economics, University of the Latin American Educational Center, Av. Pellegrini 1332, (S2000BUN) Rosario, Argentina.
Email: alanfuterman@catalactica.com.ar

Abstract

This paper analyses the consequences of controlling exchange rates, in the context of a passive money system. We use the administration of José Alfredo Martínez de Hoz at Argentina's Ministry of Economy in the period 1976–1981, during the last Argentine military dictatorship, as a case study. Following the work of Julio H. G. Olivera, the policies categorized under the passive money system are studied to corroborate the inconsistencies of the programme, in the context of the “trilemma” of open economies. In turn, a brief analysis of the administration in various areas is carried out, to identify its consequences. The paper finds that attempts to anchor inflation expectations in the context of a passive money system are not effective if large fiscal deficits need to be financed.

KEYWORDS

Argentina, crawling peg, exchange rates, monetary policy, passive money system

1 | INTRODUCTION¹

The tenure of José Alfredo Martínez de Hoz as Argentina's Ministry of Economy in the period 1976–1981 has been a source of major controversies (Rapoport, 2005 [2013], pp. 599–701). In the light of the negative results of this administration, it is said that the financial and monetary policies implemented had been highly distortive of the economic system. Thus, it is of the utmost importance to identify what happened, and what lessons can we learn from it.

The key of the programme (during its second half) consisted in the control of exchange rates, thus establishing a passive money system (Deleidi, 2018; Moore, 1979, 1988; Palley, 2002). The purported aim of the plan was to anchor inflation expectations, and therefore return Argentina to a path of economic growth and development. Nevertheless, the programme implemented included a series of inconsistencies that made impossible the achievement of its goals.

Moreover, the policies implemented created incentives for a series of practices that later came to be known as a mark of the period, consisting in speculative operations (primarily, a specific form of carry trade), by a group of speculators known as the “Patria Financiera.”² By explaining the inconsistencies of the programme, we can be able to identify the different mechanisms that such group of speculators³ used to gain profits. It is here where the operation, popularly known as “Bicicleta Financiera,”⁴ was born.

First, in Section I we will briefly define the theoretical framework of a passive money system. Hence, we will follow the work of Julio H. G. Olivera (2010 [1966], pp. 89–100), that will help us later see the inconsistencies within the economic structure, in the context of the “trilemma” for open economies. The burden of Section II is to understand the historical period and revise the policies implemented. Section III analyses the operation of the Central Bank, the heart of the programme. This analysis will allow us to understand the implications of the

policies implemented and see why their results were negative with respect to growth, poverty, wages, public and private debt and other indicators.

In Section 4, we will review the end of the programme. Our conclusions are in Section 5. The description and analysis of the period will help clarify the deep distortions that moulded Argentina's economy during this era and those that followed (de Pablo, 2005; Ferreres, 2005; Yeatts, 2008).

2 | PASSIVE MONEY SYSTEM: BRIEF EXPOSITION

In the context of an economy open to international trade and capital flows, the Central Bank faces a “Trilemma.”⁵ Essentially, this means that it can choose to control only two of the following three variables:

1. Stability of exchange rates
2. Determination of the money supply
3. Freedom of capital movements

If 1 and 2 are determined, 3 cannot operate. This is so because, for example, when determining the money supply, given a real demand for money, the interest rate will be affected, which will subsequently impact the relationship of the latter with respect to the foreign interest rate (due to the interest rate parity). In this context, the exchange rate will move if there is free movement of capital. Therefore, controls on these flows must be established.

If 1 and 3 are chosen, 2 will be endogenous. This is so because given a specific exchange rate, in the context of a certain demand for money and interest parity, capital movements are what determine how the Central Bank should act, by selling or buying foreign exchange in such a way as to determine the desired exchange rate. Ergo, the money supply is not actively determined.

If 2 and 3 are chosen, then 1 cannot be controlled. Given a certain money stock that the Central Bank sets, and given a real demand for money, this affects the domestic interest rate, which in turn impacts (given interest parity), the exchange rate due to capital flows. Thus, the exchange rate cannot be fixed.

In this context, we can say that the Central Bank has two degrees of freedom with respect to the three variables under consideration. However, if we are to take for granted free capital flows in a modern economy, the Central Bank would only determine 1 or 2, for which in fact it has only one degree of freedom.

Let us observe what are the variables under consideration:

$$\begin{cases} MxV = PxQ \\ i = i_e \\ P = ExPe \end{cases} \quad (1)$$

Thus, the quantity theory of money equation illustrates the factors under consideration to determine the money supply (M), given the velocity of circulation (V), the price level (P) and the product (Q). Interest parity implies that the domestic interest rate (i) must equal the foreign interest rate (i_e) to avoid inflows and outflows of capital that arbitrage the spreads of such rates. Finally, the theory of the purchasing power parity⁶ (PPP) implies that domestic prices (P) must equal foreign prices (P_e), according to the exchange rate (E).⁷

Now, given that the Central Bank can determine the money supply, M will be a factor to be controlled, while V is a function of the interest rate, $V(i)$. Here, since $i = i_e$ due to interest parity, we can say that $V(i_e)$. At the same time, because of PPP we can say that P will equal ExP_e ; hence:

$$MxV(i_e) = ExP_e x Q. \quad (2)$$

Following the analysis of Julio H.G. Olivera (2010 [1966], pp. 89–100), we can say that if the Central Bank determines \bar{M} , the exchange rate is endogenous:

$$E = \frac{\bar{M}xV(i_e)}{P_e x Q}. \quad (3)$$

This is in an active money system, determined exogenously.

On the contrary, if the Central Bank wishes to implement a specific exchange rate \bar{E} , then it is the money supply that is determined passively:

$$M = \frac{\bar{E}xP_e x Q}{V(i_e)}. \quad (4)$$

That is, we are faced with a passive money system, determined endogenously. Now that we have briefly reviewed this theoretical framework, let us analyse what happened during the period under study.

3 | THE ECONOMIC PLAN OF JOSÉ ALFREDO MARTÍNEZ DE HOZ

The military Coup d'état of March 24, 1976, and the self-proclaimed “Process of National Reorganization”⁸ led to a dramatic turn in economic policy, in addition to political and institutional changes.

The previous years showed high levels of inflation (in the period 1946–1975, 33.2% annually according to the Central Bank of the Republic of Argentina⁹) and political and economic instability, particularly since the early 1970s. In this context, the appointment of Celestino Rodrigo as Minister of Economy in 1975 by María Estela Martínez de Perón¹⁰ was followed by the application of a “stabilization” plan. It led, among other things, to a currency devaluation, fuel increase of 175%, energy 76%, transport 120% (maximum) and the invalidation of labor negotiations. The social chaos resulting from these measures, added to political instability, laid the foundation of the economic situation during the beginning of the de facto government.

José Alfredo Martínez de Hoz is appointed Minister of Economy on March 29, 1976. Then, he notes that his goals in economic matters consist in increasing productivity, making the productive system efficient, reducing inflation, ordering public finance, reduce the participation of the state with respect to GDP, and allow freedom of trade to developing those industries and sectors with “comparative advantages” at the international level. In this context, Martínez de Hoz was identified as an exponent of economic liberalism. Throughout these pages, we will analyse if its management can indeed be catalogued in that way, and if it reached its goals.

After devaluing, freezing wages, eliminating price controls and suppressing trade union activities (including the dissolution of the General Confederation of Labor of the Argentine Republic,¹¹ prohibiting the right to strike and collective bargaining), among other measures, foreign investment was deregulated and the exchange rate unified (Table 1), eliminating regulations and subsidies for exports, while reducing tariffs. The wage policy quickly led to a contraction in domestic demand, so after making these reforms more flexible, inflation rebounded, and a price control of 120 days was enacted.

At the beginning of 1977 the new “Financial Entities Regime”¹² was implemented, a reform that would be the heart of the plan and would later be portrayed as the

symbol of the period.¹³ This policy, which involved a comprehensive reform of the financial system, had different characteristics. Among these, we can mention that the centralized system of 100% reserve bank deposits was replaced by one of fractional reserves,¹⁴ deposit and lending nominal interest rates were liberalized, solvency and liquidity requirements were imposed to financial institutions, entry to the financial market was deregulated, a guarantee of deposits was established and the Central Bank was set to operate as a lender of last resort (Rapoport (2005 [2013], p. 648).

Although the goal was to establish an anti-inflationary policy (Canitrot, 1981), given that the increase in deposit rates would imply a greater incentive to place funds in financial assets (more or less liquid) that would thus stop pushing up prices in the goods market, this seriously affected the possibility of financing productive enterprises in the real economy (given the parallel increase in lending rates) (Figure 1). This happened because it modified the return required to turn *competitive* investment projects attractive in relation to financial alternatives. Thus, between 1978 and 1979, the opening of 1,197 bank and financial branches was authorized (Rapoport, 2005 [2013], p. 648), which shows that the financial business was soaring to unprecedented levels.

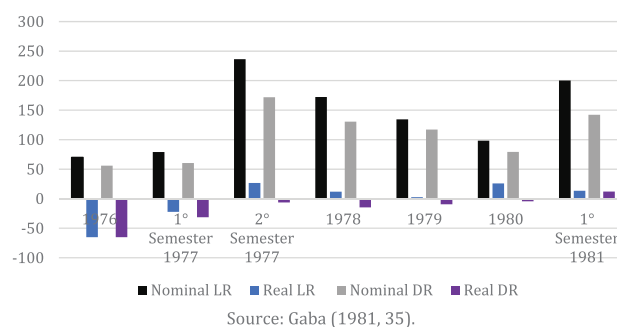


FIGURE 1 Lending (LR) and Deposit rate (DR) (%). Source: Gaba (1981, p. 35) [Colour figure can be viewed at wileyonlinelibrary.com]

TABLE 1 Exchange rates for main transaction groups—Unit (Aust)

Year	Promoted exports	Non-promoted exports	Imports	Financial transactions	Black market	Free or unified
1976	19.79	18.63	19.04	18.14	25.78	24.64
1977	40.99	40.32	40.99	40.99	42.36	40.99
1978	79.88	79.88	79.88	79.88	80.88	79.88
1979	131.99	131.99	131.99	131.99	133.44	131.99
1980	184.08	184.08	184.07	184.08	184.98	184.08
1981	442.11	442.11	444.88	568.96	610.06	—

Source: Built based on CEPAL (Office of CEPAL in Buenos Aires based on data by BCRA and Techint) (1986, pp. 387–388).

Thus, the financial sector not only became the fastest growing sector in the economy, but also acted as the *benchmark* in terms of the profitability required for investments, that in turn conditioned all the rest of the economic system. This is so because it was better, both in terms of return, risk and liquidity, to invest in financial products (for instance, a time deposit) than allocating funds in the real economy.

Although it is true that inflation was reduced at the beginning of the programme, it oscillated between 50% and 150% annually. And, at the end of the programme, began to accelerate (Figure 2).

In this context, the government even proceeded to the remuneration of bank reserves, since banking institutions argued that the cost incurred in maintaining immobilized funds¹⁵ increased the spread between lending and deposit rates (Figure 1), with negative consequences for economic activity. Thus, the “Monetary Regulation Account”¹⁶ (CRM) is created in the Central Bank to remunerating these reserves. Although the system was designed to be regulated through the collection of a tax on loanable funds, the negative balance of the CRM meant for the period June 1977–May 1982 an emission of 62 billion pesos (5% of GDP) (Rapoport, 2005 [2013], p. 649).

In order to acquire the foreign currency necessary for paying external debt (growing in these years, as we shall see), an expansion of the money supply was carried out, which subsequently had to be sterilized by the issuance of bonds. These, in turn, implied a future greater money expansion. In conjunction with the CRM, these mechanisms implied a feedback on inflation, which laid the foundation for what would be known later as quasi-fiscal deficit, a problem that would not be solved until the establishment of the Convertibility Plan in 1991.

Both the CRM and large public deficits generated a large monetary expansion, which in turn impacted on the high inflation rates (Figure 3). At the same time, the

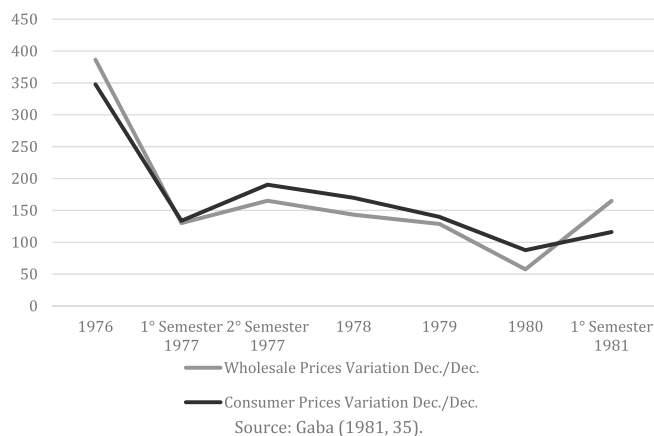


FIGURE 2 Inflation rate (%)

burden of high real interest rates on industrial sector financial costs became increasingly bigger. Thus, when in the previous periods there was an implicit subsidy from the financial sector to the industrial sector (in the form of cheap capital) covered by the government through negative real interest rates, during this process the situation reversed.¹⁷

The industrial sector was damaged by the distortions incorporated in the economy because of the monetary, financial and fiscal policies implemented, that generated that even competitive sectors of industry incurred in losses. The programme thus had negative consequences for the sector, which until today its detractors remember as its “destruction”¹⁸ (Figure 4). Moreover, GDP contracted sharply by the end of the period (Figure 5).

In this context, real wages fell. But because the economy did not encourage enough productive endeavours, the general situation at the end of the period with respect to social issues was alarming (Figure 6).

Since inflation was not reduced, and results were not as expected, a new plan was implemented at the end of 1978. An active crawling peg (Rodríguez, 1979), known popularly under the name of “Tablita,” which programmed preannounced devaluations of the peso¹⁹ at a decreasing rate with the objective (and the premise) that *eventually* the internal inflation rate would converge with the international inflation rate. The idea was that, forecasting the devaluation rate and anchoring expectations, this exchange

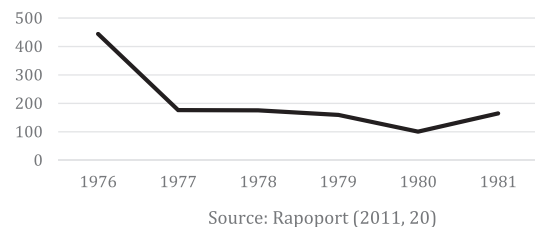


FIGURE 3 Inflation %. Source: Rapoport (2011, p. 20)

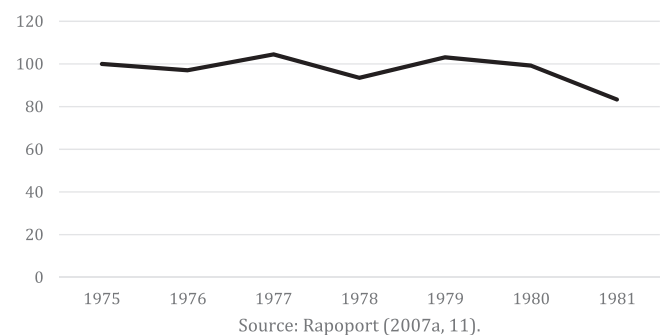


FIGURE 4 Industrial Activity (1975 = 100). Source: Rapoport et al. (2007, p. 11)

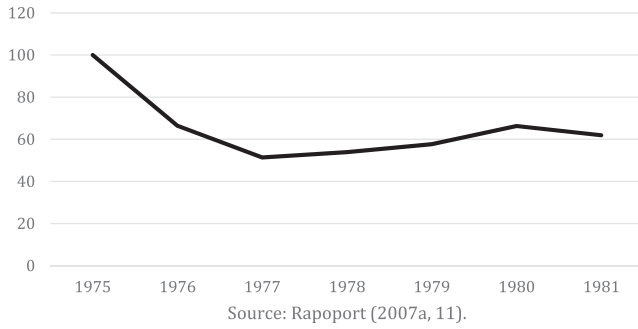


FIGURE 6 Wages (1975 = 100). Source: Rapoport et al. (2007, p. 11)

rate system would reduce the risk premium, thus the evolution of the indicators would be predictable, and reduced uncertainty would have an impact on the rate of inflation, which would begin to decline. In this context, it was also assumed that interest rates would respond to the downside, and the system would end up being balanced and converging with international indicators. Finally, according to the plan, it would arrive at a fixed exchange rate in 1981.

4 | THE OPERATION OF THE CENTRAL BANK AND MONETARY POLICY

Now, we can review the monetary policy²⁰ under Martínez de Hoz with the plan implemented in 1978, and its consequences. The core idea was that domestic inflation (π) would converge to the evolution of foreign inflation (πe):

$$\pi = \pi e. \quad (5)$$

Let us see how the operation works from the perspective of interest rate parity (Krugman, Obstfeld, & Melitz, 2012, pp. 329–516). The parity explains that the domestic interest rate (i) must be equal to the external interest rate (i_e) plus the expected depreciation rate²¹, $\left(\frac{Ei - Eo}{Eo}\right)$.²²

$$i = i_e + \left(\frac{Ei - Eo}{Eo}\right). \quad (6)$$

If we assume that the expected depreciation rate of the national currency against the foreign currency will be explained by the difference between domestic inflation and foreign inflation, then:

$$\left(\frac{Ei - Eo}{Eo}\right) = \pi - \pi e. \quad (7)$$

Thus, the difference between domestic and foreign interest rates will tend to equal the difference between the respective inflation rates:

$$i = i_e + (\pi - \pi e) \rightarrow i - i_e = \pi - \pi e. \quad (8)$$

If the domestic inflation rate decreases ($\pi \downarrow$), the domestic interest rate must also decrease ($i \downarrow$). How did the Central Bank plan to achieve this goal? As we have seen, by establishing a certain future exchange rate (through the “Tablita,” the active crawling peg programme), in such a way that it operates as an anchor for domestic inflation expectations, and that it allows the differential of domestic and foreign rates to be progressively reduced, thus complying with interest parity. Under Olivera’s theory, this implies implementing a system for determining the exchange rate, which translates to a passive money system, determined endogenously (with free capital flows).

Now, let us analyse the exchange rate. This, as we have seen, is explained by PPP:

$$P = ExPe \rightarrow E = \frac{P}{Pe}. \quad (9)$$

Hence, the ratio of domestic and foreign prices explains the exchange rate. Continuing the analysis, P is explained, in turn, by the relationship between the money supply and the real demand for money (L) (that depends positively on the level of income [Y] and negatively on the domestic interest rate):

$$P = \frac{M}{L(Y, i)}. \quad (10)$$

In this context, the exchange rate will be determined by the relationship between the real supply and demand of domestic money and the real supply (M_e) and demand (L_e) of foreign money:

$$E = \frac{\frac{M}{L(Y, i)}}{\frac{M_e}{L_e(Y_e, i_e)}} \rightarrow E = \frac{M}{M_e} \times \frac{L_e(Y_e, i_e)}{L(Y, i)}. \quad (11)$$

Since we assume that $\frac{M_e}{L_e(Y_e, i_e)}$ is constant, then any domestic change in the demand for money or the money supply will affect the price level.

This being the case, let us go back to Martínez de Hoz. Foreign debt (Figure 7) was used in order to finance

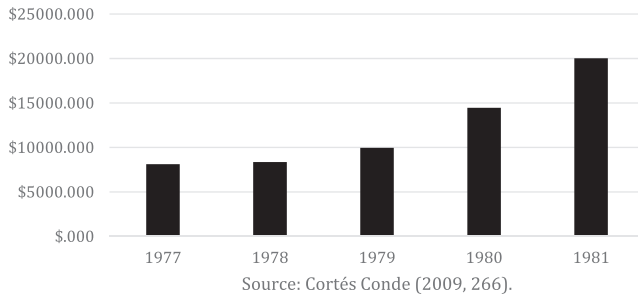


FIGURE 7 Evolution of foreign public debt (millions USD).
Source: Cortés Conde (2009, p. 266)

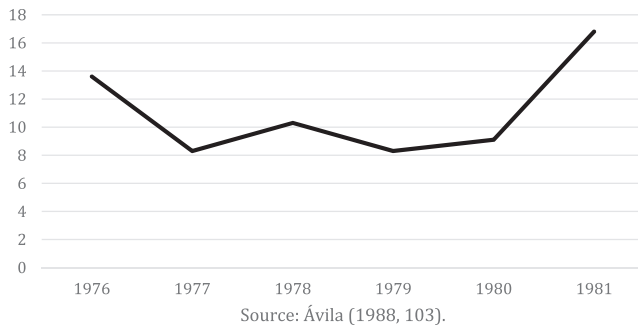


FIGURE 8 Fiscal deficit (% GDP). Source: Ávila (1988, p. 103)

fiscal deficits (Figure 8) (Canitrot, 1980) on the part of the Treasury. Also, the Central Bank intervened by increasing the money supply (either directly financing the treasury by monetizing debt or through the buying of US dollars that flowed in as debt, then trying or not to sterilize) (Figure 9).

Hence, in the context of the liberalization of interest rates (that reduces the demand for money) and a less than proportional increase in income (Y) that does not compensate for the latter ($\hat{i} > \hat{Y} \rightarrow \downarrow L$), coupled with an increase in M , it is obvious that P must increase. Hence, domestic inflation will increase and, as long as this monetary inconsistency persists, will increasingly diverge from international inflation.

$$P \uparrow = \frac{M \uparrow}{L(Y+, i-)} \rightarrow \pi > \pi_e. \quad (12)$$

Therefore, inflation will tend to increase²³. This implies that, in the context of a passive money system, the intervention of the Central Bank (forced by fiscal deficits) implies a fundamental inconsistency. Therefore, as long as this inconsistency persists, the exchange rate set by the crawling peg programme (E_t) will be different from the expected exchange rate $E = \frac{M \uparrow}{L(Y+, i-)} \frac{M_e}{L_e(Y_e+, i_e-)}$ (constantly

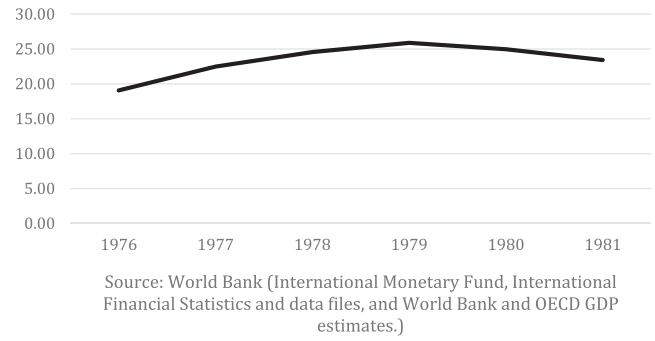


FIGURE 9 Broad money (% GDP). Source: World Bank (International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates.)

affected by a growing money supply, and a real demand for money).

Moreover, the monetary inconsistency assures that effective domestic inflation (π) will be higher to that expected by the Central Bank (π_e) (which was included in the exchange rate determined by the crawling peg programme):

$$\left(\frac{E_i - E_o}{E_o} \right) = \pi_e \rightarrow \left(\frac{E_i - E_o}{E_o} \right) - \pi < 0. \quad (13)$$

In other words, the expected depreciation of the exchange rate will not compensate for inflation, so the interest parity will not be met, and the inconsistency of the system will increase:

$$i \neq i_e + \left(\frac{E_i - E_o}{E_o} \right) \rightarrow i > i_e + \left(\frac{E_i - E_o}{E_o} \right). \quad (14)$$

Carry trade operations make sense in this context, because the relevant variable to identify if the operation will be profitable is not domestic inflation ex post (that shows if interest rates were positive in real terms), but the exchange rate. This is so because as long as the rate of devaluation is below the rate of inflation, an agent can convert the capital and interest earned domestically to the foreign currency and account for a profit.

Let us now summarize the analysis above. The system for determining the exchange rate, under a liberalization of interest rates, assumed that domestic inflation would converge with foreign inflation, thus finally complying with the interest rate parity condition. The anchor of inflationary expectations²⁴ would be the crawling peg programme (“Tablita”) with its preannounced devaluations of the currency, implying a guide for the future operation of this variable. Thus, the money supply was determined endogenously.

Moreover, the increase in interest rates (in fact, its return to the natural trend, since Argentina was coming from long periods with negative real interest rates) was expected to signal a future decrease in inflation and in inflation expectations (as the demand for domestic assets increased). However, the uncontrollable dynamics of the fiscal deficit (Fernández, 1984) (Figure 10) implied an increase in the money supply²⁵ that made effective and expected inflation (implicit in the exchange rates of the “Tablita”) inconsistent²⁶ (Figure 11).

Then, as prices increased without being reflected by the nominal exchange rate (the variable controlled by the Central Bank), the real exchange rate decreased²⁷, promoting a deficit in the current account of the Balance of Payments. Likewise, the interest rate differential, which was not covered by the interest parity condition (because of the control of the exchange rate by the Central Bank), implied a higher real domestic interest rate that promoted a series of carry trade operations that contributed to the depleting of Central Bank reserves. Even considering that government debt was said to be justified to “maintain the stability of the system,” the reality was

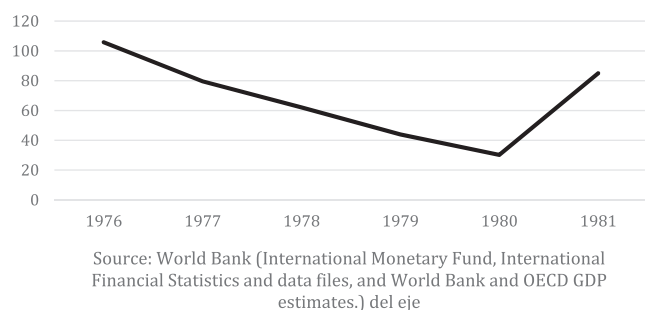


FIGURE 10 Claims on Central Government (Annual Growth as % of Broad Money). *Source:* World Bank (International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates.)

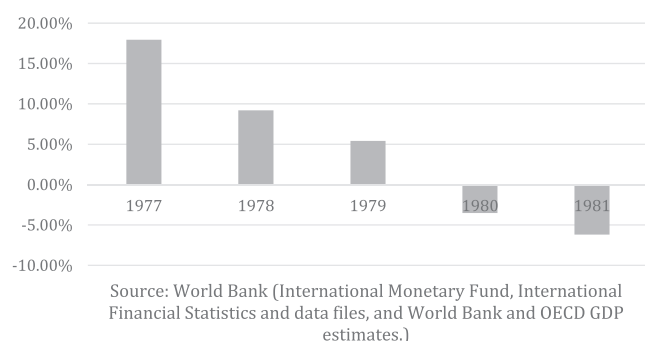


FIGURE 11 Broad money (% GPD) y/y Change %. *Source:* World Bank (International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates.)

finally different, since “the outflows of foreign currency represented, then, more than 60% of the increase in the new debt contracted”²⁸ (Rapoport, 2005 [2013], p. 661). That is, a large part of foreign capital inflows originating in government debt contributed to increasing net foreign assets (i.e., ended up as capital flight).

5 | THE END OF THE PROGRAMME

Due to the fundamental problem of the system, where the control of the exchange rate was inconsistent with the intervention in the money market that the Central Bank was forced to make due to the fiscal deficit, thus altering expectations and effective inflation (that differed with the implicit inflation in the preannounced exchange rate of the crawling peg programme), it promoted fostering carry trade and a current account imbalance. Let us now remember the Balance of Payments equation, where:

$$\text{Current Account} + \text{Capital Account} = \text{Variation in International Reserves.} \quad (15)$$

Facing a reduction in foreign capital inflows (known as a *sudden stop*; Calvo, 1998; Edwards, 2004; Reinhart & Calvo, 2000), there is a decrease in the current account deficit and/or a reduction in international reserves (Figure 12). In any case, this situation puts upward pressure on the exchange rate. Thus, the collapse of the system was precipitated by an increase in international interest rates, when Paul Volcker hiked interest rates as chairman of the Federal Reserve during the end of the Carter administration in the United States (Figure 13).

This event reversed the trend of cheap capital that existed since the beginning of the decade. Hence, the fragile internal situation resulting from the policies

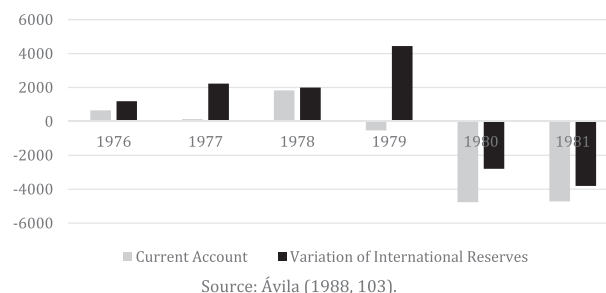


FIGURE 12 Current account and international reserves (millions USD). *Source:* Ávila (1988, p. 103)

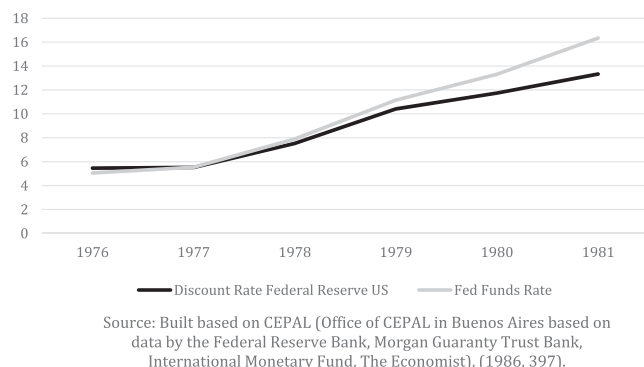


FIGURE 13 Interest rates on dollar assets (%). *Source:* Built based on CEPAL (Office of CEPAL in Buenos Aires based on data by the Federal Reserve Bank, Morgan Guaranty Trust Bank, International Monetary Fund, The Economist), (1986, p. 397)

implemented was complemented by the international context, leading to a new financial crisis in Argentina.

The latter occurred when, after the reduction of the government's guarantee on deposits in November 1979, the BIR (Banco de Intercambio Regional²⁹) suddenly closed in March 1980. This event affected 350,000 small and medium savers, that constituted 12.7% of the deposits of the banking system (and 21% of the *total* of private banks) (Rapoport, 2005 [2013], p. 670). A bank run immediately ensued and depositors rushed to buy US dollars, which in turn had an impact on the exchange rate and affected the situation of international reserves in the BCRA. Other banks closed, and the situation worsened.

Facing this problem, the administration decided to implement the "Financial Adjustment Index" through the Central Bank Notice 1,050³⁰. This implied an indexation of mortgage loan instalments, which subsequently became a reference index for the entire economy. This policy badly affected debtors, and many lost their properties due to the impossibility of paying their updated instalments. At the same time, a lucrative business was generated to liquidate these properties (due to distressed sales problems).

Thus, the monetary, financial and fiscal policies implemented were taking the country to an increasingly desperate situation. Far away were the results from the intentions raised at the beginning of the economic programme.

In the context of exchange rate controls, Ávila (1988, pp. 112–113) describes the situation of the period as a whole:

"The double market was continued until the November 1976 unification. Covert devaluations were practiced during the interval (the

gap averaged 80%). After the unification, restrictions on import payments were eliminated, authorizing transfers of obligations for profits and repatriation of capital, and the possibility of buying up to US\$ 1,000 per person without a sworn statement was opened. In 1977, the minimum term for contracting external loans was established in 1 year, and after a short time the term was extended to 2 years. In 1978 the compulsory deposit in national currency and without receiving payment of interest, of 20% of the loans contracted abroad was arranged. At the end of that year, the restriction policy on funds inflows was reversed (being fully liberalized in 1980), and the acquisition of foreign currency was carried to US\$ 20,000 per person without a sworn statement: also, the liquidation periods for exports were extended, and the requirements for external financing of imports were reduced. From the unification until December 1978, a passive crawling peg was implemented, and then, until April 1981, an active crawling peg (the *tablita*). In June 1981, the double market was reinstated. From the unification to the double market, the gap was zero."³¹

As we can see, different exchange rate regimes and exchange regulations were implemented throughout the period. Being this a critical variable in the economy, its effects run through the entire system, deepening the inconsistencies of the model and contributing to the distortion of relative prices.

With the increase in international rates, a *sudden stop* was triggered in Argentina, since interest parity implied that the real foreign interest rate exceeded the real domestic interest rate, ceasing carry trade profitability and encouraging capital outflows that, added to the previous imbalance, pushed to an inevitable devaluation and exit from the exchange rate control system.

It must be considered that, under a passive money system, it is not that the Central Bank does not create money, but that it does not determine the money supply (Deleidi, 2018; Moore, 1979, 1988; Palley, 2002). That is, the creation of money is determined by the system, endogenously, since the Central Bank does *determine* the exchange rate (or the rate of interest). In this context, the axis of the entire economic model of Martínez de Hoz during its last part was the control of the exchange rate. Integrated with the rest of the variables under consideration, moved by the fiscal deficit, the model was inconsistent.

Moreover, the programme implemented was designed based on the Monetary Approach of the Balance of Payments (J. A. Frenkel & Johnson, 1976). According to this perspective, the *aggregate* income and expense of the country tend to balance the accounts by means of the external balance. Specifically, any excess supply of money would impact on the price of domestic products, that become more expensive compared to imports, which causes the latter to increase and therefore push down domestic prices (or moderate its rise, thus reducing inflation). Hence, the reduction of tariffs constitutes an anti-inflationary policy (these reached a complete reduction for products that were not manufactured in the country by 1980). At the same time, if the case is the opposite, that is, if the demand for money exceeds supply, domestic prices are more attractive than foreign prices, thus promoting exports and a trade surplus. Hence, inflation in an open economy would become a factor basically regulated by foreign trade.

What this perspective does not consider, and that finally led to the collapse of the system in the case under study, is that there is a big difference between *tradable* and *non-tradable* goods in this context³². Thus, while liberalization of foreign trade³³ implies a reduction in the price of domestic tradable goods, non-tradable goods, by not having to face external competition, continue their increase at the rate of domestic inflation. Then, production costs of the tradable goods sector increase (in relation to their consumption of non-tradable), while their prices not only cannot increase at the same rate but must also even decrease in some cases (to face external competition). Thus, the profitability of the tradable sector decreases while many industries go bankrupt and must close. This was the situation at the end of the period under study.

In this context, although exports increased, imports did so even more, leading to a negative trade balance between 1980 and 1981 (in conjunction with the Variation in International Reserves, among other indicators) (Figure 14). And all of this happened *while* an improvement in the terms of trade³⁴ existed until 1981 (Figure 15).

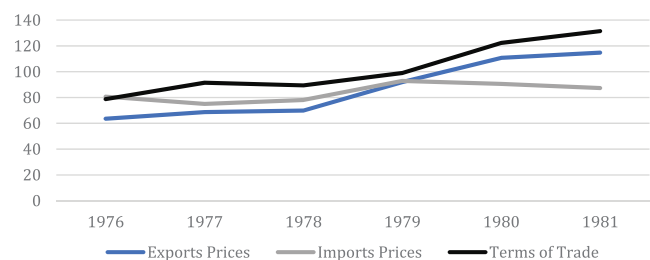
Hence, the current account showed a deficit since 1979 (Figure 12). This primacy of imports (promoted by the policies implemented) could only be financed by means of capital inflows as recorded in the capital and financial account of the Balance of Payments. These flows originated, essentially, in government debt.

But, as we have seen, these funds also ended up increasing the formation of net foreign assets. That is, capital flight that originated in different mechanisms. In this period, according to Jorge Ávila (1988, p. 121): “Under-invoicing averaged [...] 44% in 1979 and valleys



Source: Coremberg, A. et al. (2007, 78).

FIGURE 14 Foreign trade (1993 millions USD). *Source:* Coremberg, A. et al. (2007, p. 78)



Source: Coremberg, A. et al. (2007, 78).

FIGURE 15 Import and export prices and terms of trade (index 1993 = 100). *Source:* Coremberg, A. et al. (2007, p. 78)
[Colour figure can be viewed at wileyonlinelibrary.com]

of 1, 6, and 7% in 1975, 1976 and 1977. Two basic reasons are seen in this sense: on the one hand, the clear incentive to avoid surcharges, tariffs and excessive customs barriers and, on the other, that on this hidden movement of funds operate the same incentives that affect global flows of capital³⁵.

The restructuring of the economy from the tradable to the non-tradable sector, in particular financial services, occurred only because the government intervened through the series of monetary and financial policies described above. However, the reason why the system did not balance is because the equilibrium in public accounts was never achieved throughout the period. In this sense, fiscal deficit operated as a factor that *prevented* the reduction of inflation and interest rates. The financing of public spending demanded that a large part of available domestic funds be allocated to the government (Figure 10), while also using foreign debt to this end.

In this context, there was a classic crowding out effect of the private sector by the public sector, to obtain financing. Although some data can be used to justify that a part of this expenditure was allocated to public works and capital investment, the political instability of the period prevents us from identifying which part of these funds were due to overpricing mechanisms, what has been the

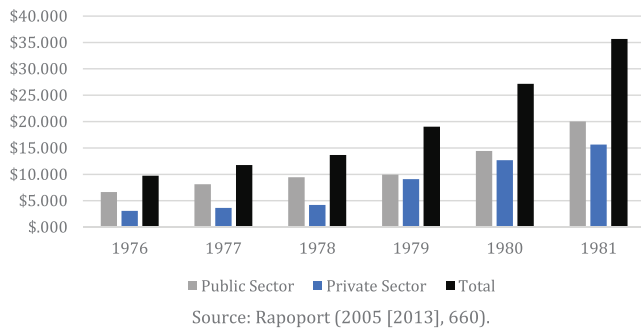


FIGURE 16 Foreign debt (Millions USD). *Source:* Rapoport (2005 [2013], p. 660) [Colour figure can be viewed at wileyonlinelibrary.com]

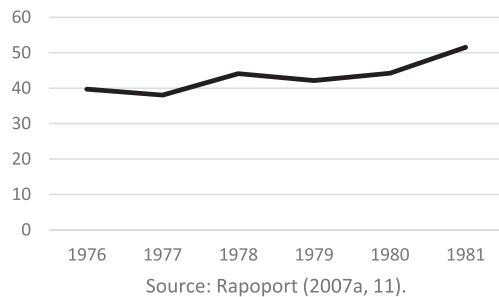


FIGURE 17 Public spending (% GDP). *Source:* Rapoport (2007, p. 11)

efficiency in spending, and how effective this has been for its goals.

As we can see in Figure 16, external (government) debt increased steadily since 1976 (Figure 7), getting US\$ 20 billion by the end of 1981³⁶. Moreover, public debt exceeded private debt every year. Likewise, the Variation of International Reserves (Figure 12) was negative between 1980 and 1981. In this context it is relevant to remark that public spending *never* stopped increasing and went from 39.71% with respect to GDP in 1976 to approximately 50% by the end of 1981 (Figure 17).

The debt/exports ratio increased from 210% in 1976 to 390% in 1981 (Figure 18), and in this regard foreign interests in relation to exports increased from 11.9 to 32.4% in the same period (Figure 19). This is a key indicator, since the source to pay foreign debt and interests is exports (whenever debt cannot be indefinitely rolled over).

Those who defend this administration (Martínez de Hoz, 1981; 1991) usually point out that the problem is not the growth of debt in general, but its relationship with exports (which also increased, and operate as a source of foreign currency for the payment of the former) but compared to the general picture this is insufficient. As we can see, the debt interests/GDP ratio increased from 2.02 to 9.75% in the same period (Figure 20).

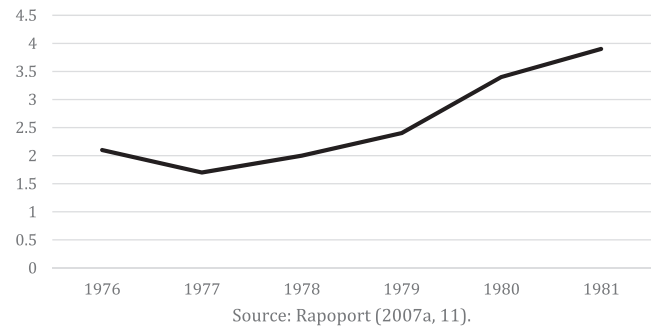


FIGURE 18 Debt/Exports. *Source:* Rapoport (2007, p. 11)

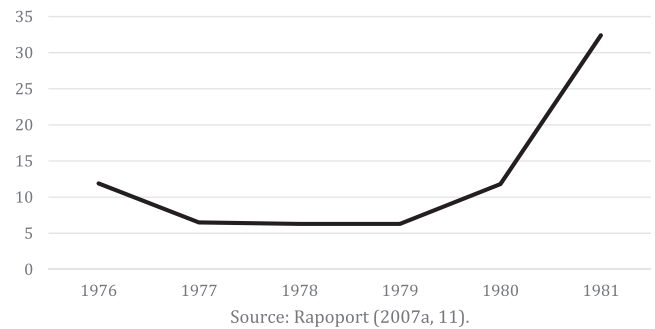


FIGURE 19 Foreign interests (% Exports). *Source:* Rapoport (2007, p. 11)

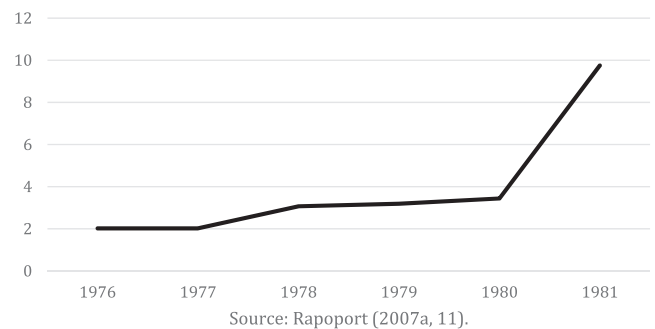


FIGURE 20 Debt interests (% GDP). *Source:* Rapoport (2007, p. 11)

Another of the mechanisms through which government debt was authorized consisted in the borrowing by public companies. Thus, the government indebted, among others, ENTEL (telephone company), Aerolíneas Argentinas (airline), Agua y Energía (water and energy), Gas del Estado (gas) and YPF³⁷ (oil) (Rapoport, 2005 [2013], p. 662).

The alleged attempt to give efficiency to the public sector consisted only in a reduction of the number of state employees and their salaries, while global spending not only did not decrease, but expanded. The fiscal deficit followed the same path, never achieving a balanced

budget, and even though in the middle of the administration it was possible to reduce it, by the end it was above the initial period (Figure 8).

To this, we must also add the controversies surrounding debt, which exceed this work. It suffices as an example that the government incurred in the accounting of the debts of the private sector. In the words of Martínez de Hoz (1981, pp. 220–221):

“For this reason, during the 1976/80 period, net Argentine external debt grew in absolute terms as the use of foreign loans to finance our evolution and economic development became possible again. Despite this growth and as a demonstration that it was not excessive, at the same time it decreased in relation to the gross product and the country's ability to pay due to export revenues³⁸.

“The growth of foreign debt in absolute terms is evident in all the available series. However, the one usually published in the country, which arises from routine surveys conducted by the Central Bank of the Argentine Republic, contains methodological differences that do not allow a simple and strict comparison between its amount as of 12/31/75 and the end of 1980. Foreign debt at the beginning of 1976 is underestimated compared to the results of surveys carried out since 1978, because since then the Central Bank *has broadened the concepts surveyed by incorporating all the debt to less than a year, including the commercial and the accountant between subsidiaries in the country of international companies and their parent companies*.

“On the other hand, debt towards the end of 1980 includes statements of credits already canceled but not reported as such to the Central Bank. According to official estimates of September 1981, the resulting overestimation amounts to 4 billion dollars (See “Argentina's Economic Situation and Outlook”—Ministerio de Economía, Hacienda y Finanzas—September 1981), which represent almost half of the 8,564 million of dollars that, according to the data of the Central Bank, would have been the net increase of the debt declared by the private sector in 1979/80³⁹” (emphasis added by present author).

By the end of the period of analysis, poverty increased along with the growth in public spending, external debt

and public deficits. The origin of this situation lies in the monetary and financial policies implemented, which together with the fiscal deficit, acted to avoid any equilibrium in the economy, to the detriment of development and growth. This, we may add, occurred despite the growth of the agricultural sector, historically the main sector of the Argentine economy with clear comparative advantages.

To this, we must add the increase in tax pressure (Figure 21), reaching historical highs during the period. In this context, we can easily infer that even when there were unprecedented public resources in terms of tax collection, and external resources never seen before in terms of foreign debt (Figures 22 and 23), public accounts were not ordered, and the fiscal deficit worked as an extremely negative factor that prevented the success of the goals initially proposed by the administration.

The programme ended, as we have mentioned, in the context of the financial crisis unleashed in the mid-1980s and intensified with the measures adopted. In this regard Jorge Ávila (1988), pp. 107–108) points out: “The 1981 crisis had little to envy to that of 1975 and could be explained, basically, for a couple of reasons: the exorbitant consolidated fiscal deficit of almost 17% of GDP—historical record (1948: 15.6%, 1975: 16.1%)—and the

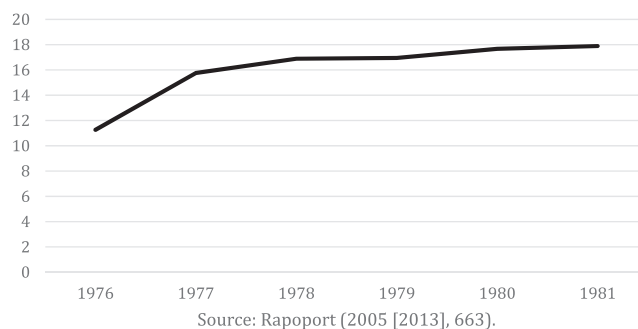


FIGURE 21 Tax collection/GDP %. Source: Rapoport (2005 [2013], p. 663)

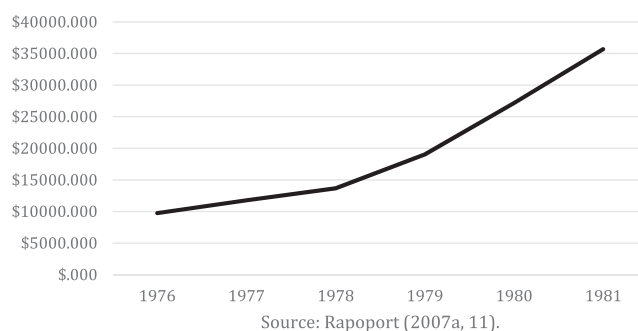


FIGURE 22 Foreign debt (US\$ Millions). Source: Rapoport (2007, p. 11)

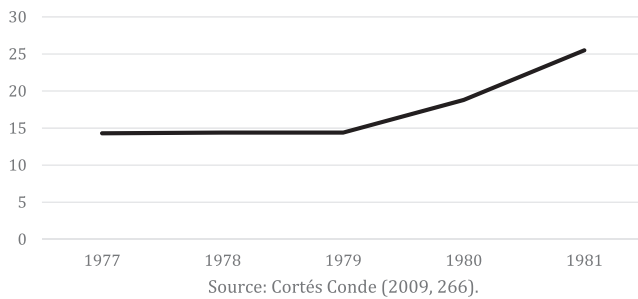


FIGURE 23 Evolution of foreign public debt (% GDP).
Source: Cortés Conde (2009, p. 266)

widespread expectation that the new government would seek to satisfy sectoral claims. In February 1981 the outgoing Administration produced a 10% devaluation off the schedule and designed a new scale of devaluations—less ambitious—until next August.”⁴⁰

José Alfredo Martínez de Hoz ends his term as head of the Ministry of Economy on March 31, 1981, along with the rest of the administration, being succeeded by Lorenzo Sigaut.

6 | CONCLUSIONS

We can now reach several conclusions. First, we can see that the intervention in several key economic variables, added to the expansion of the size and scale of the government, implied a series of distortions in the economy.

Moreover, as we have seen, there was an increase in public debt and deficit, and in several ratios, such as public spending/GDP, public debt/GDP, interests/GDP, and tax pressure, among others. All this proves that the government did not shrink, but rather expanded.

Then, even though foreign trade was indeed liberalized, it is important to note that not all products saw their tariffs reduced in the same proportion. At the same time, liberalizing foreign trade *in the context* of the financial, monetary and fiscal policies implemented was highly negative for the country's industry, and therefore did not achieve the goals predicted by the theory regarding the development and expansion of those sectors with comparative advantages.

In turn, the impact of inflation on the non-tradable sector generated an increase in costs for the tradable sector that, added to the competition of foreign products (not subject to the national tax pressure, the inflationary context or the high financial cost), implied a loss of competitiveness for the sector as a whole.

The programme implemented promoted inflation through monetary expansion and increased the fiscal deficit. During the second half of the administration, this

was particularly inconsistent with the implementation of the active crawling peg (essentially, a price fixing mechanism of the exchange rate). Moreover, granting the role of lender of last resort to the Central Bank (together with the guarantee of deposits) encouraged the moral hazard that operated to provide feedback on financial speculation.

The increase in tax pressure added to the growing interest rates implied an exponential increase in costs for the productive sectors in the real economy that faced dramatic losses. In this context, the government operated as a distorting factor in the economy. Interest rates affected by the direct and indirect intervention of Central Bank operations, public indebtedness and other government interventions, implied a distortion of relative prices that altered investment signals. In this context, there were even nationalizations of companies, such as the Compañía Ítalo-Argentina de Electricidad (energy), which can hardly be combined with the privatization process that, it is alleged, occurred in parallel.

Monetary and financial policies, the core of the programme, were also the reason for its failure. As an example, regarding the Monetary Regulation Account (CRM) and the remuneration of bank reserves, the fundamental error behind this policy is that in a fractional reserve system banks must consider the convenience between expanding credit and maintaining reserves in case of withdrawals. Therefore, the *opportunity cost* of maintaining reserves is what they earn by lending money. But not what they receive from a Central Bank by *not* lending it, in which case the operation of the system is perverted. Then, this process creates perverse incentives given that it alters the very foundation of fractional reserves, where the rate paid by the Central Bank competes with the lending rate of the banks.

Finally, the programme of the Martínez de Hoz administration promoted an environment that fostered speculation and a distortion of such magnitude that it ended in a resounding failure. The general categorization of the policies of the period as the application of market-oriented policies is mistaken. We can even see that, in cases where liberalization was made, due to the context of the policies studied in the present work, they were found to be negative. In the words of Ávila (1988, p. 147) “... the attempts of exchange liberalization isolated from the *rest* of economic policy (case 1979/1980, for example) failed miserably, and only gave rise to short term speculative movements”⁴¹ (emphasis added by present author).

In sum, during the second half of the programme, the policy of controlled exchange rates⁴², determining a passive money system, was inconsistent with the fiscal situation⁴³, which would eventually generate imbalances leading to the bankruptcy of the model.

As a final remark (although a truism), we can conclude that in order to control a variable, in the context of the trilemma, it is essential to check that no inconsistencies take place. Otherwise, the model applied irremediably fails. Such was the case of the model under study.

DATA AVAILABILITY STATEMENT

All data is included in the reference section.

ORCID

Alan G. Futerman  <https://orcid.org/0000-0002-7702-8875>

ENDNOTES

- ¹ The author wishes to thank Diego Marcos, Guillermo Rossi and an anonymous referee for their valuable comments, and Jorge Ávila for his permission to use a translation from the original in Spanish of parts of his work in Ávila (1988). Of course, the author is responsible for all errors.
- ² “Financial Homeland.” See Escudé (2006, p. 44).
- ³ Although every economic action is, by definition, speculative and conjectural in the sense that action is performed given that it is expected to obtain benefits by arbitrating market prices above costs (financial, production, etc.), here we mean “speculative” in the sense that profits will be obtained, not because of actions that properly pertain to a market economy, but due to taking advantage of artificial distortions produced by specific government policies.
- ⁴ “Financial Bicycle.” A simple model of this mechanism can be seen in Annex A.
- ⁵ For an analysis of the “Trilemma” see Obstfeld, Shambaugh, and Taylor (2005), Obstfeld and Taylor (1998), and Oxelheim (1990).
- ⁶ For an analysis of flexible exchange rates and the effects of various monetary and fiscal policies in the short and long term (under PPP), see Dornbusch (1975).
- ⁷ We must remark that, although not all these factors are met (for example, PPP), it is relevant to take them into account in the context of this theoretical analysis, that will operate as a basis for the general interpretation of the prevailing system under the administration of Martínez de Hoz and thus determine its consistency, or lack of thereof. On the factors that prevent the PPP from being perfectly fulfilled, see Rogoff (1996). On exchange rates and PPP in the long run, see Taylor and Taylor (2004).
- ⁸ “Proceso de Reorganización Nacional.”
- ⁹ BCRA. See Escudé (2006, p. 39).
- ¹⁰ Replaced Juan Domingo Perón as President after the decease of the latter on July 1, 1974, until March 24, 1976, the day of the coup d’état.
- ¹¹ The “Confederación General del Trabajo de la República Argentina” (CGT) is the biggest traditional labour union federation in Argentina.
- ¹² “Régimen de Entidades Financieras.”
- ¹³ For a monetary and financial analysis of the period, see Arnaudo (1987, pp. 105–121).

- ¹⁴ That, although at the beginning would require a 45% reserve for financial institutions, later would be reduced to 15% (Rapoport (2005 [2013], p. 648), increasing the problems that we will see below.
- ¹⁵ The reserve requirements set by the new fractional reserve system.
- ¹⁶ “Cuenta de Regulación Monetaria.”
- ¹⁷ This is so because before this administration (and for the most part of the last 70 years, see de Pablo, 2005; Ferreres, 2005) the government used to intervene in the financial system to assure negative real interest rates with the purpose of subsidizing the industrial sector in general and import substitution industries in particular. Now, real interest rates implied that the financial sector would be profitable but industry, and especially import substitution industries, would suffer (both because of liberalizing foreign trade without reducing the costs from the scope and scale of government, and because of the upward financial costs).
- ¹⁸ Also defined by these as “Process of Deindustrialization,” see Rapoport (2005 [2013], p. 679).
- ¹⁹ Domestic currency.
- ²⁰ The BCRA was directed by Alfredo G. Cassino (March 24, 1976–April 2, 1976) and Adolfo C. Diz (April 2, 1976, to March 27, 1981) under the Martínez de Hoz administration at the Ministry of Economy.
- ²¹ On the influence of expectations on the variation of exchange rates, see J. A. Frenkel and Mussa (1980).
- ²² Where E_1 is the future exchange rate and E_0 is the spot exchange rate. Also, it is usually added to the right side of the equation the internal risk premium (δ) $\rightarrow i = ie + \left(\frac{E_1 - E_0}{E_0}\right) + \delta$.
- ²³ In this context, even if the demand for money would have increased (given free upward domestic interest rates), if the growth in M is above that of L , then P would have still increased: $L(\dot{Y}, i) \uparrow < \dot{M} \uparrow$.
- ²⁴ On the subject of capital flows and exchange rates expectations, see R. Frenkel (1983).
- ²⁵ Money supply increases and its effects can be analysed from different lights, according to if they are done in small or big, open or closed economies (Khemraj, 2018).
- ²⁶ Although broad money as % of GDP was marginally reduced in 1980 and 1981, we must remember that there is a time lag in inflation (Batini & Nelson, 2001). Moreover, as we will see below, money demand increasingly reduced at the end of the period (causing a flight to the US dollar). Hence, inflation accelerated at the end of the programme. Also, if we follow Ocampo (2018), we can see that high interest rates and a reduced money growth are useless to fight inflation as long as large fiscal deficits need to be financed.
- ²⁷ Since the real exchange rate (E_r) is given by $E_r = \frac{E \cdot P_f}{P_h}$, so if $P \uparrow$ and E does not follow such increase in the same proportion, then $E_r \downarrow$. See also Rodríguez and Sjaastad (1979).
- ²⁸ Translated from the original in Spanish by the present author.
- ²⁹ A relevant bank in the context of the financial system at the time.
- ³⁰ “Circular 1050.”
- ³¹ Translated from the original in Spanish by the present author.

- ³² For a brief exposition of the Tradable – Non Tradable Model, see Sachs & Larraín (2013, pp. 645–688).
- ³³ On an analysis of liberalization policies in South America during this period, see Blejer (1983).
- ³⁴ On terms of trade and its relation with the other variables under discussion in this paper, see Cline and Vernengo (2016).
- ³⁵ Translated from the original in Spanish by the present author.
- ³⁶ Although Martínez de Hoz leaves office on March 31, 1981, it is relevant to analyse the debt trajectory towards the end of the year under consideration. In turn, debt accounting methodology has been a source of controversy.
- ³⁷ Yacimientos Petrolíferos Fiscales S. A.
- ³⁸ We must clarify that this point depends on the methodology of accounting adopted, and contradicts the data presented above. However, even if it is true, it does not affect the rest of the analysis in the context of the administration and the results of the adopted policies.
- ³⁹ Translated from the original in Spanish by the present author.
- ⁴⁰ Translated from the original in Spanish by the present author.
- ⁴¹ Translated from the original in Spanish by the present author.
- ⁴² For a study on exchange rates (fixed and flexible), and monetary and fiscal policies see Mundell (1963, 1968).
- ⁴³ The economic model implemented was heavily criticized, among others, by Armando P. Ribas (Ocampo, 2018).
- ⁴⁴ The theoretical definition of arbitrage is the gaining of risk-free profits.
- ⁴⁵ Given that one of the factors included in interest rates is the inflation rate.
- ⁴⁶ Or foreigners that intend to profit from the rates spread.
- ⁴⁷ Which would give rise to a “self-borrowing” operation. See Escudé (2006, 41).
- ⁴⁸ Formulas of financial mathematics for compound interest (Cícero, 2013a, 2013b):

$$\text{Interest } I = C \times [(1 + i)^n - 1]$$

$$\text{Amount } M = C \times (1 + i)^n$$

$$n = \text{Periods}$$

$$\text{Capital } C = \frac{M}{(1 + i)^n}$$

$$\text{Interest rate } i = \frac{I}{C}$$

$$\text{Interest } C \times i = I$$

$$\text{Present value formula } PV = N \times (1 + i)^{-n} = \frac{N}{(1 + i)^n}$$
- ⁴⁹ To simplify the analysis, we take the bid-ask spread of the exchange rate for the NC to be zero.
- ⁵⁰ We assume, for simplicity purposes, that the foreign and domestic discount rates to actualize final amounts are, in this case, equal to i_e and i_n , respectively.
- ⁵¹ Again, this is a purely theoretical exercise to illustrate the comparative return of the carry trade operation. Of course, the proper discount rate to use for emerging markets is not the one that exists in developed countries. For an analysis of this subject, see Godfrey and Espinosa (1996).
- ⁵² As in the case of Argentina during the period under study. This would in turn partially explain the interest rates spread $i_n - i_e$ (although this factor could also be added to the risk premium δ).
- ⁵³ Given that $[(E_2 E_1)/E_1] < (\pi_2 - \pi_1)$.

⁵⁴ Translated from the original in Spanish by the present author.

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ANNEX A.

The “Financial Bicycle”: A carry trade model

Investments in high return assets, financed by low return assets, is known in the world as a carry trade strategy. Be it in bonds, currencies or others, the mechanism basically implies obtaining profits through arbitrating spreads between different instruments involved in the operation⁴⁴.

In Argentina, as we have seen throughout this work, this mechanism has been known as the “Financial Bicycle.” We will now briefly review this strategy.

Here, we assume the existence of an active crawling peg, that is, a programme of predetermined devaluation of the national currency, at a decreasing rate. What is easily seen is that if such devaluation programme is inferior to the domestic inflation rate (π), then deposit interest rates of commercial banks (ignoring here what occurs with bonds, stocks, etc.) will tend to be set at a higher level than the devaluation rate⁴⁵. In this context, it is likely that carry trade operations will take place, because interest parity conditions do not apply.

More specifically, there is an incentive here for any economic agent⁴⁶ to borrow money abroad at a rate lower than the domestic rate (with or without a deposit in the foreign bank secured as collateral⁴⁷) and transfer such amount to the country to gain a higher interest in a national bank. Later, it would proceed to take the capital (C), plus interests (I), and convert these to the rate of exchange determined by the crawling peg programme and send it back abroad, to pay the principal plus interest to the foreign bank, and account for a profit. In this context, the process would be repeated as many times as possible to continue arbitrating interest and exchange rate spreads.

Let us see an example, where we know the exchange rate of the national currency (NC) with respect to the foreign currency (FC) at the beginning of the period (E_1) and at the end (E_2); plus, the domestic and foreign interest rates (that we assume do not change in the period t)⁴⁸:

$$E_1 NC/FC = 1$$

$$E_2 NC/FC = 1.1$$

$$i_n \text{ (Domestic Deposit Interest Rate)} = 40\%.$$

$$i_e \text{ (Foreign Lending Interest Rate)} = 5\%. \quad (A1a)$$

A credit is acquired at a foreign bank, of 100 FC , and 105 FC must be returned at the end of the period.

$$100 FC \times (1 + 0.05)^1 = 105 FC$$

$$C = 100 FC. \quad (A1b)$$

The funds enter the country and are converted to the rate E_1 , to be later on invested at the domestic deposit interest rate i_n .

$$C \times E_1 = 100 NC$$

$$100 NC \times (1 + 0.4)^1 = 140 NC. \quad (A1c)$$

Once the period ended, with a result of 140 NC , such amount is converted to the rate E_2 and is sent abroad to pay the original credit plus interest, thus gaining a profit of 22.27 FC , with a return of 22.27% in FC . Also, this represents a profit of 24.5 NC , with a return of 24.5% in such currency⁴⁹.

$$\frac{140 NC}{E_2} = 127.27 FC$$

$$127.27 FC - 105 FC = 22.27 FC \text{ (Profit in FC)}$$

$$I = \frac{22.27 FC - 5 FC}{100 FC} = 0.2227 \times 100 = 22.27\% \text{ (Return in FC)}$$

$$22.27 FC \times E_2 = 24.5 NC \text{ (profit in NC)}. \quad (A1d)$$

Hence, we can see that there will be an incentive to follow this strategy always that the following condition applies:

$$\frac{C \times E_1 \times (1 + i_n)^n}{E_2} - [C \times (1 + i_e)^n] > 0. \quad (A2a)$$

On the other hand, if the opposite case applies, the strategy would be made in reversed direction, that is, borrowing nationally and lending internationally:

$$\frac{C \times E_1 \times (1 + i_n)^n}{E_2} - [C \times (1 + i_e)^n] < 0. \quad (A2b)$$

Therefore, we can see that given i_e , that the Central Bank cannot affect, the incentive of making this strategy could be avoided by the determination of an exchange rate that would neutralize the spread expected from the operation. In this context, the rate of exchange will be an equilibrium (E_{2e}). Let us see what happens using the same example:

$$\frac{100 FC \times 1 \times (1 + 0.4)^1}{E2} - [100 FC \times (1 + 0.05)^1] = 0 \quad (A3a)$$

$$\frac{140}{E2} - 105 = 0$$

$$140 = 105 \times E2 \quad (A3b)$$

$$\frac{140}{105} = E2 = 1.3 \rightarrow E2e \text{ (Equilibrium Exchange Rate in } t_2\text{)}. \quad (A3c)$$

Thus, $E2e$ is above the current $E2$ ($E2e > E2$), being the cause of the differential. Hence:

$$E2e = \frac{Cx E1 \times (1 + in)^n}{Cx (1 + ie)^n}. \quad (A4)$$

We can see that the spread between $E2$ and $E2e$ implies a cause of disequilibrium, which in turn incentivizes carry trade. The spread percentage here is approximately 21.21% between both exchange rates:

$$E2e - E2 = Spread$$

$$\frac{E2e - E2}{E2} \times 100 = Spread\%$$

$$\frac{1.3 MN - 1.1 MN}{1.1 MN} = 0.2121 \times 100 = 21.21\%. \quad (A5)$$

Capital inflow from these operations must, in theory, press the deposit interest rate lower, thus equilibrating the rates spread (even when exchange rates do not). However, this may not happen because of several reasons, among which we could mention domestic inflation (that pushes domestic interest rates upward) and the risk premium (due to a chronic fiscal deficit, banks situation, sovereign default risks, etc.). If these spreads do not normalize, the incentive for carry trade will still hold (given that arbitrage is possible).

Net returns are a fundamental subject on this regard, since the existence of this type of market operations, presented and identified as alternative investments, end up *competing* with the rest of investment opportunities available. Hence, every agent with the capability of making this operation will analyse the profitability of alternative investments. And, at the same time, any attractive investment project in an economy such as this one, will have to present a return equal or above that of the strategy to be viable. Therefore, the net return (considering

the amount of final interest obtained) in FC and NC will be:

$$I = \frac{\frac{Cx E1 \times (1 + in)^n}{E2} - [Cx (1 + ie)^n]}{C} \times 100 = \text{Net Return}\%FC$$

$$I = \frac{\frac{Cx E1 \times (1 + in)^n}{E2} - [Cx (1 + ie)^n]}{C} \times E2 \times 100 = \text{Net Return}\%NC. \quad (A6)$$

Now, we can make the following analysis (a purely theoretical exercise) in order to appreciate the relevance of the operation in the total context of the economy. In this sense, if such operation could be sold in its entirety in the market as an investment asset, we would see that its present value would be different if we would consider the domestic interest rate (giving rise to the Domestic Present Value, PV_n), or foreign interest rate (giving rise to the Foreign Present Value, PV_e), in NC and FC :

$$\frac{(Cx E1) + \left\{ \left[\frac{Cx E1 \times (1 + in)^n}{E2} - [Cx (1 + ie)^n] \right] \times E2 \right\}}{(1 + in)^n}$$

$$= PV_n NC \rightarrow \frac{PV_n NC}{E1} = PV_n FC$$

$$\frac{C + \left[\frac{Cx E1 \times (1 + in)^n}{E2} - [Cx (1 + ie)^n] \right]}{(1 + ie)^n} = PV_e FC. \quad (A7)$$

Thus, “purchasing” the investment asset internally and selling it abroad would imply a return such that it would constitute an instantaneous profit (or instant capitalization of the amount allocated in the operation):

$$PV_e FC - PV_n NC = \text{Result of Sale FC} \quad (A8)$$

$$I \text{ Instantaneous} = \frac{PV_e FC - PV_n NC}{C}$$

$$\rightarrow I \text{ Instantaneous} \times 100 = \text{Instantaneous Return FC}. \quad (A9)$$

In our example:

$$\frac{100 NC + (22.27 NC \times 1.1)}{\frac{1.4}{1}} = \frac{124.5 NC}{1.4} = 88.93 NC$$

$$\rightarrow \frac{88.93 NC}{1} = 88.93 = PV_n FC. \quad (A10)$$

Logically, given the spread between i_n and i_e , the present value of the final amount in NC discounted by (1

+ i_n) is below the original capital. If we calculate the PV_e^{50} and we compare it to PV_n , we see that a profit is obtained of 27.52 FC, or a profitability of 27.52% if we wish to “sell” it abroad:

$$\frac{100 FC + 22.27 FC}{1.05} = \frac{122.27 FC}{1.05} = 116.45 NC \rightarrow PV_e FC \quad (A11a)$$

$$116.45 FC - 88.93 FC = 27.52 FC \text{ (Result of Operation)} \quad (A11b)$$

$$I \text{ Instantaneous} = \frac{27.52 FC}{100 FC} \rightarrow 0.2752 \times 100 = 27.52\% \quad (A11c)$$

invest 100 FC in an operation that has a present value of 88.93 FC. Since the initial capital is 100 FC, then we can say that actually 16.45 FC is obtained through the operation, because it is “bought”⁵¹ domestically at 100 FC and sold at the PV_e FC of 116.45 FC:

$$116.45 FC - 100 FC = 16.45 FC \text{ (Result of Operation)}$$

$$I \text{ Instantaneous} = \frac{16.45 FC}{100 FC} \rightarrow 0.1645 \times 100 = 16.45\% \quad (A11d)$$

We can also analyse the role of the domestic interest rate (which in relation to the foreign interest rate is the one effectively promoting the return of the operation). Hence, we can identify what the domestic bank deposit rate of equilibrium would be. Continuing with the example:

$$\frac{100 FC \times 1 \times (1 + i_n)^1}{1.1} - [100 FC \times (1 + 0.05)^1] = 0$$

$$100 NC \times (1 + i_n) = 105 FC \times 1.1 \quad (A12a)$$

$$1 + i_n = \frac{115.5 NC}{100 NC} \rightarrow i_n = 1.155 - 1 = 0.155 \\ \rightarrow 0.155 \times 100 = 15.5\% i_n e$$

$$\text{(Domestic Deposit Interest Rate of Equilibrium)} \quad (A12b)$$

Therefore, the domestic deposit interest rate of equilibrium would be 15.5%, where the spread is 2,450 basis points below to the rate present in the market.

$$i_n - i_n e = 0.4 - 0.155 = 0.245 \rightarrow 0.245 \times 100 = 24.5\% \quad (A13)$$

The formula for calculating the domestic deposit interest rate of equilibrium would then be:

$$i_n e = \sqrt[n]{\frac{[C \times (1 + i_e)^n] \times E_2}{C \times E_1}} - 1. \quad (A14)$$

However, we could easily see that the setting of a lower interest rate would not only have consequences with respect to the neutralization of this kind of carry trade operations, but would also promote, in this case, the result of a probable negative real interest rate (given the inflation rate⁵²), inflationary consequences (due to its impact in the demand for money), decrease of deposits, increase in exchange rates (official and in the black market), so on. To understand the interest rate policy isolated from the rest of economic measures would be as mistaken as those policies that created this situation in the first place.

As we can see, this active crawling peg programme promotes fundamental economic distortions if the scheduled devaluation rate is inferior to the effective inflation rate. Not only by affecting the financial and monetary systems and promoting short-run capital inflows and outflows with speculative purposes, but also by distorting the relative returns of investment projects available in the market (thus affecting relative prices) and sentencing projects of a lower return (but productive in the real economy) to stillness due to their inability to outperform the profits gained through carry trade operations. This also promotes the growth of the financial sector at the expense of the real economy (and not as tool for its support), thus deepening possible structural problems (fiscal deficit, exchange rates far from equilibrium, etc.).

The main point of this analysis is that when these profit opportunities appear, by arbitrating interest and exchange rates, the returns implicit in the operation may be above any other investment in the economy (or equalling those of the highest returns, but being the former the most liquid), thus promoting capital to allocate there (to short-run speculative arbitrages), instead of productive endeavours (Schvarzer, 1982).

After this analysis, we can now conclude that capital flight (CF) (Table 2) by this mechanism is a function of the spreads between i_n and i_e (di), E_1 and E_2 (dE),⁵³ and n :

$$CF = CF(n, di, dE) \quad (A15a)$$

$$\frac{\partial CF}{\partial n} > 0 \quad \frac{\partial CF}{\partial di} > 0$$

$$\frac{\partial CF}{\partial dE} < 0. \quad (A15b)$$

TABLE 2 Capital flight (US\$ current millions)

Year	Export under-invoicing	Import under-invoicing	Net balance	Cuddington	World Bank method	Dooley
1976	309	−193	116	355	−21	−441
1977	630	−287	343	872	857	2,066
1978	703	−1,055	−352	1,172	2,574	−458
1979	626	−2,917	−2.29	−3,966	496	−6,136
1980	400	−2,097	−1.697	560	5,199	4,781
1981	661	−876	−215	8,546	8.314	7,713
Total 1976–1981	3,329	−7,425	−4,096	7,539	17,419	7,525

Note: The negative sign indicates capital inflows. For the same information in June 1988 dollars see Ávila (1988, p. 120). The indicated values have been adjusted by the over- and under-invoicing of imports and exports.

Source: Ávila (1988, p. 119).

Source: FIEL, elaboration of the author based on the bibliography and sources of the Balance of Payments.⁵⁴