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ARGENTINA'S EXPERIENCE WITH PARALLEL EXCHANGE MARKETS: 1981-1990

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## ABSTRACT

This paper surveys the development and operation of the parallel exchange market in Argentina during the 1980s, and evaluates its impact upon macroeconomic performance and policy. The historical evolution of Argentina's exchange market policies is reviewed in order to understand the government's motives for imposing exchange controls. The parallel exchange market engendered by these controls is then analyzed, and econometric methods are used to evaluate the behavior of the parallel exchange rate and its impact upon the balance of payments.

The main conclusion of the paper is that exchange controls were never effective enough in Argentina to allow the authorities to set the commercial exchange rate independently of the parallel market rate. Attempts to set the commercial exchange rate at too appreciated a level consistently prompted widespread evasion of exchange controls that undermined the government's international reserve position. Econometric evidence supports the hypothesis that important components of the balance of payments were negatively correlated with the parallel market premium during the 1980s. The evidence also confirms that the parallel market premium was influential in the determination of the commercial exchange rate.

## Argentina's Experience with Parallel Exchange Markets: 1981-1990

Steven B. Kamin<sup>1</sup>

### I. Introduction

Argentina's history of exchange controls and parallel exchange markets dates from the beginning of the 1930s and has persisted, with occasional episodes of liberalization, nearly to the present. The most recent unbroken period of exchange controls in Argentina lasted from early 1982 to the end of 1989, and coincided with one of the most turbulent periods of macroeconomic crisis in Argentina's history. Faced with balance-of-payments problems, accelerating inflation, and severe private sector indebtedness, the authorities imposed exchange controls as an alternative to a mix of real devaluation and fiscal adjustment that would have secured long-run stability, but at the cost of short-term contraction. In the absence of fundamental reforms, the macroeconomic crisis deepened, leading to the hyperinflations of mid-1989 and the first quarter of 1990. This hyperinflation, in turn, generated balance-of-payments pressures so strong as to force the abandonment of exchange controls and the floating of the currency in December 1989.

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<sup>1/</sup> This paper contributes to a World Bank project on "Macroeconomic Implications of Multiple Exchange Markets in Developing Countries". The author is a staff economist in the International Finance Division. This paper represents the views of the author and should not be interpreted as reflecting those of the Board of Governors of the Federal Reserve System or other members of its staff. I am indebted to Richard Agenor, Dale Henderson, David Howard, Deborah Lindner, Miguel Kiguel, Helen Popper, Andrew Rose, Enrique Szewach, and the staff at FIEL for their helpful comments and suggestions. Special thanks go to Neil Ericsson for his econometrics advice, Will Melick for programming various econometric procedures, Saul Lizondo for his careful comments on an earlier draft, and Stephen Thompson for providing a constant flow of news and data from Buenos Aires. Daniel Kelley provided excellent research assistance.

This paper reviews Argentina's experience with exchange controls and parallel exchange markets during the 1980s, and evaluates the impact of these institutions upon macroeconomic performance and policy. Section II provides an historical overview of this period, highlighting both the factors influencing the government's exchange market policies and the impact of those policies on the macroeconomic situation. Section III describes the structure of the parallel market during the 1980s, focusing upon the sources of supply and demand for foreign exchange, as well as the efficiency of the parallel market. In Section IV, the behavior of the parallel exchange rate is analyzed, and empirical research aimed at identifying the key determinants of that rate is presented. Section V gauges the influence of the parallel market premium over the official balance of payments. Finally, Section IV presents an evaluation of Argentina's exchange-control policy as an instrument to achieve macroeconomic stability.

Fundamentally, the rationale for exchange controls was to permit the authorities to set the commercial exchange rate at a level that would have been unsustainable without controls in order to stabilize the economy. The main conclusion of this paper is that, in the absence of fiscal discipline, exchange controls were never effective enough in Argentina to allow the authorities to set the official exchange rate independently of the "market-clearing" rate. An active parallel market in foreign exchange developed immediately in response to exchange controls. Depreciations of the parallel market rate, by causing diversions of export receipts to the parallel market and reductions in short-term capital inflows, consistently undermined the official balance of payments and led to shortfalls in the government's international

reserves. These shortfalls, in turn, inevitably led to devaluations of the official exchange rate. Efforts to contain the parallel market premium through contractionary monetary policy proved to be too costly to be effective. Hence, exchange controls served only to delay necessary adjustments of the official exchange rate, not to postpone them permanently.

Exchange controls were not merely ineffectual, but also imposed significant costs upon Argentina's economic performance. First, because they were able to offset the effects of a misaligned exchange rate, if only temporarily, exchange controls encouraged the use of short-run stabilization strategies built around fixed exchange rates to the neglect of fundamental adjustment policies. Second, because exchange controls created strong incentives for evasion, they furthered the extension of the underground economy and the breakdown of compliance with economic regulations, including tax laws.

## II. Historical Overview

### II. 1 Previous Experiences with Dual Exchange Markets: 1931-1976<sup>2</sup>

Between 1900 and 1930, the exchange market in Argentina was free and unified, alternating between a gold standard and a dirty float of the exchange rate. This regime was consistent with the basic characteristics of Argentina's political economy at that time. The relative importance of the export industry, both in the economy and in politics, precluded the deliberate setting of the exchange rate by the government at an uncompetitive level. Because of the weakness of the political constituency for an expanded government role in the economy, there was little need for exchange controls to offset macroeconomic disequilibria associated with excessive fiscal stimulus. The favorable terms of trade enjoyed by Argentina in the years prior to the Depression also helped to support the value of the currency without additional government controls. At the beginning of the 1930s, a deterioration in the terms of trade and an expansion of the fiscal deficit caused Argentina's favorable macroeconomic and balance-of-payments position to erode significantly. The government initially responded by devaluing the exchange rate, but faced with continuing capital outflows, it imposed capital controls and restrictions on current transactions in October 1931. In consequence, a black market for currency soon developed, with the black market exchange rate trading at a premium of roughly 40 percent over the official rate during 1932 and 1933. Between 1933 and 1959, when exchange controls were eliminated and the exchange market unified, controls on external

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<sup>2</sup> Much of the information about exchange controls during this period was drawn from a FIEL 1989 study, El Control de Cambios en la Argentina.

transactions were alternately tightened and loosened, depending upon the pressure on the balance of payments posed by external shocks and internal disequilibria.

Following the end of World War II, the strongest pressures derived from the escalation of aggregate demand that accompanied Argentina's industrialization under Peron. The black market premium reached a high of 400 percent in 1951 compared with an average of only 10 percent during the 1941-45 period, notwithstanding very favorable terms of trade in that year. This escalation was symptomatic of fundamental inconsistencies among the government's macroeconomic policies which were reflected in a decline in growth and increase in inflation relative to the immediate post-war years. These problems provoked a shift in policy toward economic liberalization which culminated in the elimination of exchange controls by 1959, accompanied by the lowest fiscal deficits since 1945.

By the early 1960s, the combination of resumed deficit spending plus an external debt-financed investment boom led to the threat of a new balance-of-payments crisis. This inspired a return to exchange controls and the parallel exchange markets they engendered during the 1964-67 period. However, the exchange market was unified again during 1967-1971.

Following the highly successful stabilization program launched in 1967, the fiscal and external balances began to deteriorate in 1970, leading to substantial capital flight and a balance-of-payments crisis in 1971. In response, and as in previous periods of crisis, the government re-imposed exchange controls. These were to remain in effect through November 1976, by which time the fiscal deficit exploded to over 15

percent of GDP, the inflation rate topped 400 percent (annual basis), and real GDP declined for the second year in a row; the black market premium reached over 130 percent in March 1976, when a military coup replaced Isabel Peron's civilian government and initiated the next phase in Argentina's economic policy.

Two generalizations appear applicable to Argentina's history of exchange controls. First, initial applications of exchange controls were always motivated by balance-of-payments crises. Second, these controls were not removed immediately after the crisis subsided, but only after an extended experience with these controls, which generally were accompanied by other interventionist policies, provoked a backlash by new administrations with stronger tastes for liberalization.

II. 2 Liberalization Under Martinez de Hoz: 1976-1981

Following his assumption of office in March 1976, Economy Minister Martinez de Hoz moved to dismantle controls over various sectors of the economy. In November 1976, the exchange markets were unified and the control of exchange sales for current account transactions largely liberalized. Capital controls were liberalized more slowly so as to curtail inflows of capital. Due to the liberalization of deposit interest rates in May 1977, interest rates rose substantially, leading to capital inflows that threatened the Central Bank's control of the monetary base. This was of particular concern because the inflation rate, which had declined from its peak of 444 percent in 1976 to 176.1 percent in 1977, remained steady at 175.6 percent in 1978, notwithstanding efforts to reduce inflation through deficit reduction and (more importantly) substantial reductions in the real wage.



In December 1978, the capital account was liberalized completely while the exchange rate was depreciated, according to a pre-announced scheduled, at a rate that was to gradually decline over time. It was the hope of the architects of the "tablita" ("little table", in reference to the table of pre-announced exchange rates) program that eventually the rate of price growth would converge to the declining rate of exchange rate depreciation, and that by pre-announcing the exchange rate, the reduction in inflationary expectations would be accelerated. In fact, the rate of inflation declined much more slowly than anticipated, registering 159.9 percent in 1979 and 100.8 percent in 1980, and exceeding the rate of exchange rate depreciation under the tablita.

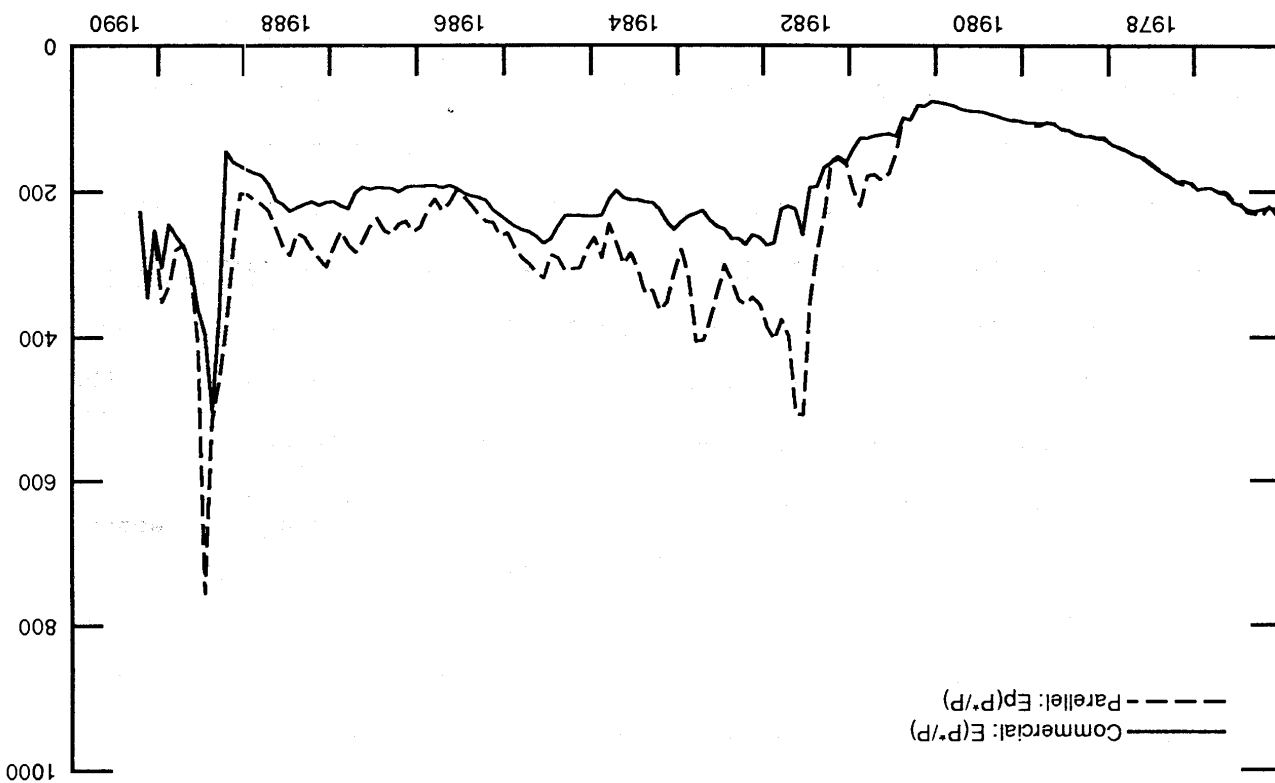
Consequently, the real exchange rate, shown in Chart 1, appreciated substantially.<sup>3</sup> Coupled with continued large fiscal deficits, this led to a turnaround in the current account balance from a \$2.1 billion surplus in 1978 to a \$4.8 billion deficit in 1980 and a \$4.7 billion deficit in 1981. These deficits were financed by a surge in capital inflows motivated by a combination of high domestic interest rates and the low rate of expected exchange rate depreciation guaranteed by the tablita.

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<sup>3/</sup> Kiguel and Liviatan (1988) attribute this appreciation to a combination of inflationary inertia and insufficient fiscal adjustment. Other analysts have argued that the real exchange rate appreciation was the result of heavy capital inflows, discussed below, and a strong balance of payments; according to this explanation, the high inflation rate was not the ultimate cause of the real appreciation, but rather another reflection of the capital inflows. (Various versions of this argument are discussed in Calvo 1986, Sjaastad 1989, and Rodriguez and Sjaastad 1979.) Connolly, Rodriguez, and Tyler (1991) embrace both explanations, arguing that an initial equilibrium appreciation reflecting capital inflows was followed by further, unsustainable appreciation induced by excessive domestic credit creation.

Real Parallel and Commercial Exchange Rate Indices  
(Monthly)

Chart 1



By 1980, however, the growing overvaluation of the real exchange rate led to expectations of a corrective devaluation, motivating the private sector to reverse its prior stance by reducing external borrowing and sending capital abroad; gross international reserves less gold declined by \$6.2 billion in 1980 and 1981 after rising approximately the same amount during 1978-79. Continued heavy borrowing during 1980-81 reflected government borrowing to maintain the overvalued exchange rate, as well as distress borrowing by firms in the tradeables sector that were adversely affected by the real appreciation of the exchange rate. Between end-1978 and end-1981, the total external debt rose from \$12.5 billion to \$35.7 billion.

Due to the deterioration in the balance of payments, in February 1981 a 10 percent devaluation was announced, accompanied by a statement that the tablita would thereafter be adhered to for an additional seven months. In April 1981, however, the new Economy Minister, Lorenzo Sigaut, announced a 23 percent devaluation and the replacement of the tablita by a series of smaller, more frequent exchange rate adjustments. Capital flight abated only temporarily, leading to another maxi-devaluation of 23 percent in June 1981, shortly before the return to exchange controls.

### II.3 Initial Dual Exchange Market: 6/1981-12/1981

By mid-1981, the authorities faced at least six key economic problems remaining as the legacy of the preceding period:

- 1.) A highly overvalued exchange rate, still 37 percent more appreciated than its December 1977 value.
- 2.) Severe capital outflows reflecting amortizations on recently acquired external debt and private capital flight motivated by expectations of continuing devaluation.

economy. In late June 1981, a fixed commercial rate was applied to all the pressures on the capital account without injury to the rest of the rate used for trade transactions with a floating exchange rate to absorb dual exchange market combining a slower real depreciation of the exchange Faced with these constraints, Sigaut's economic team opted for a

jeopardize the solvency of the highly indebted private sector. the capital flight, but it was believed that such policies would further severe fiscal adjustments and tight monetary policy might have reversed depreciation and macroeconomic instability. A complementary program of

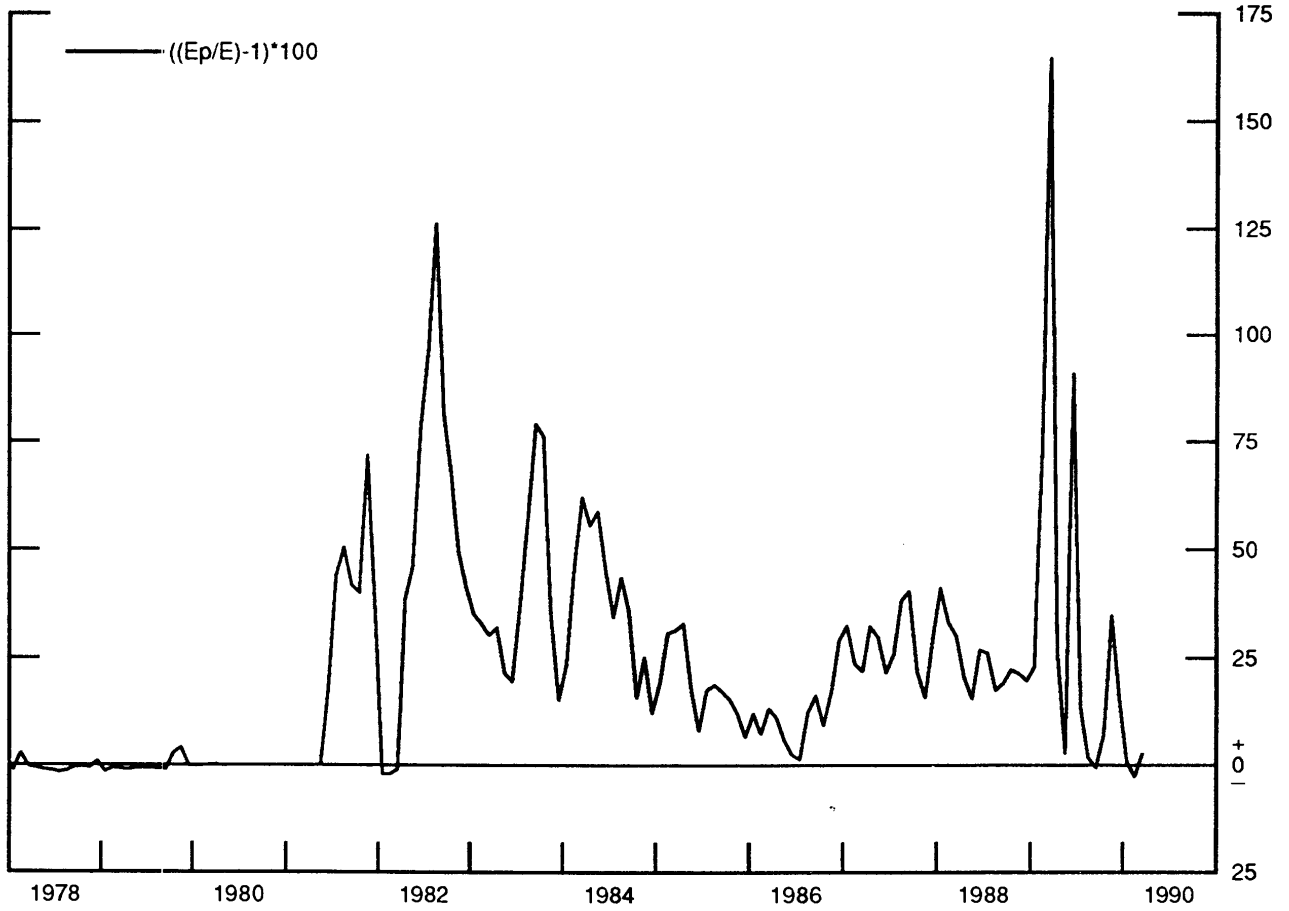
which was driven by strong anticipations of future exchange rate rate probably would not have sufficed to staunch the capital flight, devaluation to an "equilibrium" or current account-balancing exchange about widespread bankruptcy and financial instability. Moreover, a domestic currency value of external debt, it also would have brought alone would have substantially increased inflation, and by increasing the correcting the balance-of-payments problem through devaluation

measures taken in this area for the other areas of concern. payments crisis, while attempting to limit the adverse consequences of authorities was to address the most pressing problem, the balance-of- the problems listed above. Implicitly, the strategy chosen by the Obviously, no single policy package could have corrected all of

- 6.) A dangerous degree of indebtedness, both domestic and external, in both the financial system and the private non-financial sector.
- 5.) A reduction in economic activity leading to declines in real GDP of 6.2 percent in 1981 and 5.2 percent in 1982.
- 4.) An acceleration of consumer price inflation from a low of 3.4 percent (monthly basis) in August 1980 to 9.4 percent in June 1981.
- 3.) An expansion of the fiscal deficit from a recent low of 10.5 percent of GDP in 1979 to 16.7 percent of GDP in 1981.

Chart 2

The Parallel Market Premium  
(Monthly)



imports and traditional exports, 90 percent of "promoted" exports, and repayments of previously contracted external debt. All remaining transactions were to take place at the floating financial exchange rate. In addition, the authorities initiated an exchange rate guarantee program for private entities willing to reschedule their external debt. Its purpose was to relieve balance-of-payments pressures on the Central Bank, as well as to protect firms with high external debt against subsequent depreciation. (BCRA, 1981)

While reducing the risk of external debt, the guarantee program did not reduce substantially the motives for capital flight. Expectations of rising inflation, exchange rate depreciation, and macroeconomic volatility provided strong incentives to shift portfolios into foreign assets. Because the government now had stopped accommodating capital flight through the sale of international reserves, this pressure was reflected in the immediate depreciation of the floating financial exchange rate to 18 percent above the commercial rate; the premium reached a high of 72 percent in November 1981, as indicated in Chart 2.

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II.4 Unification and the Second Dual Exchange Market: 12/1981-12/1982

While exchange controls were motivated by the macroeconomic crisis of the early 1980s, they were not an inevitable response to that crisis. In December 1981, the change in administrations forced by the intensifying economic crisis resulted in Sigaut's replacement as Minister of Economy by liberal-minded Roberto Alemann. At the end of the month, he removed all exchange controls, suspended the exchange rate guarantee program, and floated the exchange rate. Upon being floated, the unified exchange rate depreciated nearly to the level of the previous financial rate, but subsequently appreciated considerably before stabilizing in

real terms. This strengthening of the peso was accompanied by, and to some degree induced by, a tightening of domestic credit growth and a slackening of inflation.

Alemann's experiment with liberalization was cut short in April 1982 with the eruption of war between Argentina and the United Kingdom in the South Atlantic. The government's suspension of payments to British banks motivated a suspension of financing to Argentina by the international financial community, as well as the imposition of trade restrictions on Argentina by the European Community. This pressure on Argentina's balance of payments was compounded by increased capital flight motivated by the surge in uncertainty concerning Argentina's general situation. At that time, the Central Bank would have liked to have contained the ensuing depreciation of the free market peso through a tightening of monetary policy. However, the crisis had led to the threat of a run on the banking system, forcing the Central Bank instead to lower reserve requirements and raise its supply of loans to domestic banks.

To limit the depreciation of the peso, exchange controls were re-imposed in April 1982; the exchange rate, while nominally still floating, was de facto controlled by the government. All foreign exchange sales not authorized by the Central Bank were suspended, while quantitative limits on different import categories were set, depending upon how essential they were considered to be. The repatriation of profits and investment income was also suspended, while the government began to pay some of its external debts with BONEX, 10-year dollar denominated government bonds. With the coming of exchange controls, foreign exchange trading on the parallel market immediately resumed. The parallel market premium averaged 54 percent in the second quarter of

1982, notwithstanding substantial real depreciation of the commercial (official) exchange rate during these months.

The end of the conflict in the South Atlantic in June 1982 left Argentina in a deeper predicament than had prevailed at the outset of the war. Pressures for capital flight were stronger, the government was substantially in arrears to external creditors, support by the international financial community had dwindled, and about \$500 million in exchange swaps entered into by the government in December 1981 were now maturing. Additionally, the change in governments that followed the war replaced the reformist Alemann with a new Minister of Economy, Jose Dagnino Pastore, less committed to liberal economic principles.

In July 1982, the legal foreign exchange rate was again split into a commercial rate pegged by the government for commercial transactions and a financial rate for other transactions that floated for a few weeks before being pegged as well. The restrictions on the sale of foreign exchange for imports, amortization, and interest payments, and interest on the external debt were liberalized but not eliminated; subsequently, these restrictions would be alternately loosened and tightened, depending upon the state of the balance of payments.

The highest priority of the economic team in mid-1982 was not the balance of payments, but the reduction of the non-financial private sector's debt burden. (BCRA, 1982. See also Dornbusch and de Pablo, 1990) The exchange rate guarantee scheme, re-initiated in July 1982, to a large degree subsidized the cost of the private sector's external debt service. To reduce the domestic debt burden, which had also grown substantially during the Martinez de Hoz era, in July 1982 the authorities imposed nominal interest rate ceilings upon both loans and



deposits at levels below the rate of inflation. This had the effect of substantially reducing the real value of the private sector's domestic debt and thereby reducing its domestic debt burden. However, it also led to an acceleration of the flight out of local currency deposits. In consequence, inflation jumped from 7.9 percent in June 1982 to 16.3 percent in July; the parallel market premium soared from 78 percent in June to a peak of 126 percent in August.

The Central Bank's annual report for 1982 argues that the dual market regime was necessitated by the ceiling on domestic interest rates; otherwise, the subsequent flight into dollars would have depreciated the commercial exchange rate with both unwanted and unnecessary effects upon inflation and trade. However, the report went on to note that during this period, substantial international reserve losses occurred as a result of export delays motivated by expectations of future exchange rate depreciation, leakages of export receipts to the financial market, and intervention by the Central Bank in support of the financial market exchange rate. (BCRA, 1982)

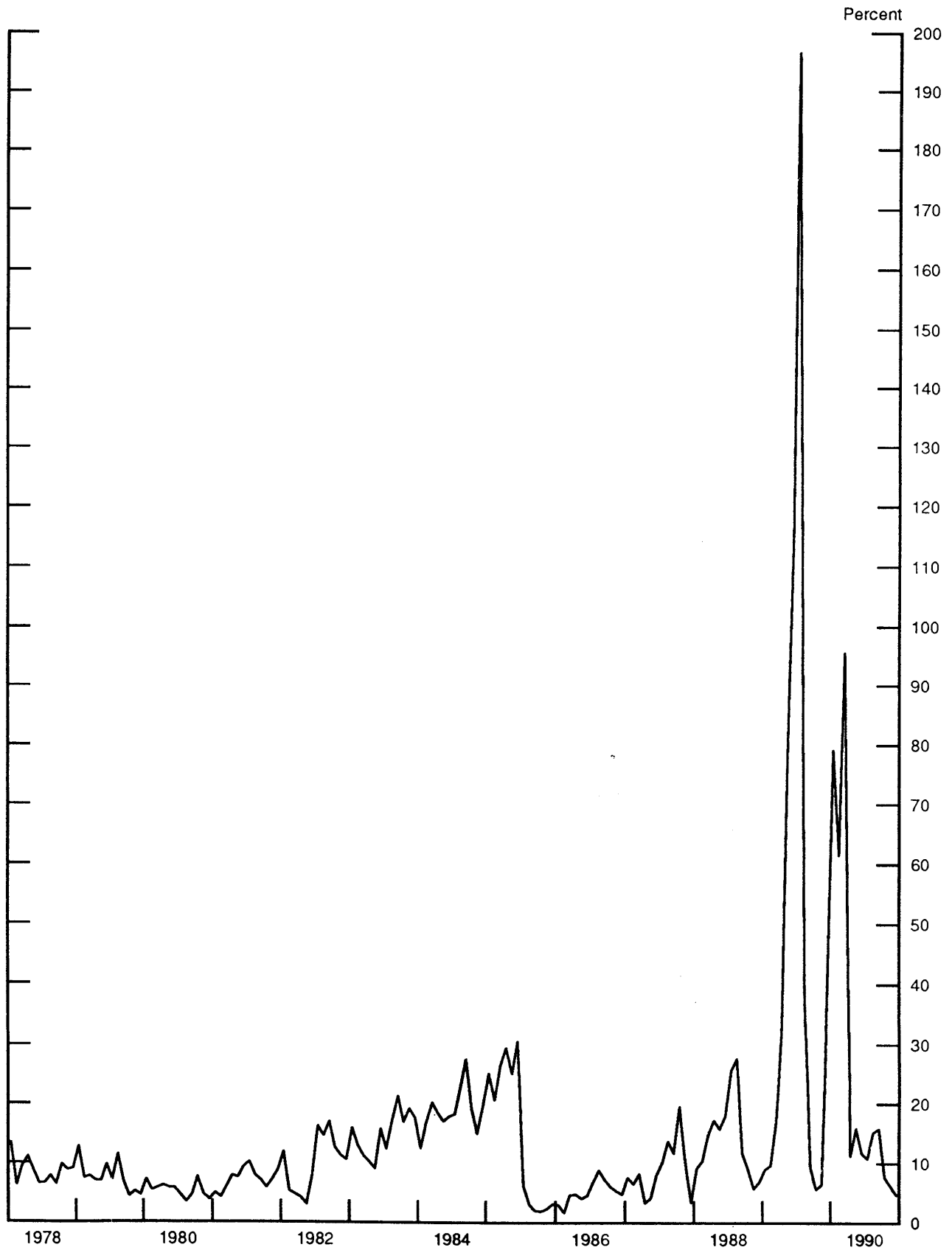
In response, the authorities began to unify the two legal markets in September 1982, both by devaluing the commercial rate while keeping the financial rate fixed and by increasing the proportion of transactions conducted in the financial market, completing the process in November 1982. Because private capital flows continued to be controlled, however, the gap between the parallel market rate and the new, unified rate continued to exceed 40 percent through the end of 1982, although it had declined considerably from its mid-year level.

II.5 The Parallel Exchange Market: 1/1983-7/1988

By the beginning of 1983, a number of important adjustments to the disequilibrium associated with the Martinez de Hoz period had been completed. First, the real exchange rate had been devalued to a level comparable to that in 1976, the beginning of the liberalization experiment. Second, the problem of private sector indebtedness, both domestic and external, largely had been eliminated through the interest rate policies of mid-1982, the exchange rate guarantee program, and the eventual nationalization of the private foreign debt. Finally, and more speculatively, to the extent that the macroeconomic crisis of the 1980s encouraged a massive portfolio shift into foreign assets by the private sector, this process may have been largely completed by 1983; various measures of capital flight declined after 1982, as did the parallel market premium.

With the reduction in the relative importance of these considerations, the role of the exchange rate in the government's anti-inflation strategy became paramount. During most of 1984, the exchange rate was deliberately depreciated at a slower pace than the inflation rate in an unsuccessful bid to reduce inflation. The use of the exchange rate as a disinflationary "nominal anchor" was made explicit in the Austral Plan, which was implemented in June 1985 in response to the continuing acceleration of inflation. In combination with wage and price freezes, the nominal value of the official exchange rate was frozen in order to achieve a swift reduction in inflation and inflationary expectations. (See Kiguel, 1989) Long-term price stability was to be secured through a reduction in the fiscal deficit.

### Consumer Price Inflation per Month (Monthly)



4/ Measures of Argentina's real multilateral exchange rate, which show the movement of Argentina's real exchange rate against a trade-weighted average of its trading partners, generally show continued depreciation following the Austral Plan. This contrasts with the real appreciation indicated by the real bilateral exchange rate with the United States, which is used in this study. The difference is accounted for by the fall of the dollar against the other major industrial-country currencies after 1985. Because of the severe deterioration in Argentina's terms of trade in 1986 and 1987, the multilateral indexes most likely overstate the competitiveness of Argentina's exchange rate during this period.

The Austral Plan initially was successful both in reducing the rate of inflation, which averaged only about 3 percent per month for the first six months of the program, and in reducing the black market premium, as evidenced by Chart 2. The sharp reduction in inflation associated with the program, combined with the fixing of the official exchange rate, sharply increased the rate of return on domestic assets relative to foreign assets and induced strong capital inflows; this effect was bolstered by tightenings of monetary policy in July 1985, November 1985, and July 1986 that raised interest rates substantially. While the fiscal deficit declined from roughly 10 percent of GDP in 1984 to 8 percent in 1985 and 4 percent in 1986, it was not reduced sufficiently to eliminate inflationary pressures. These pressures forced an easing of price controls and periodic devaluations of the exchange rate starting in April 1986, which led to further increases in inflation, as evident in Chart 3. Subsequent price freezes and slowdowns in the depreciation of the official exchange rate did not contain inflationary pressures. The failure to maintain macroeconomic control, along with the gradual appreciation of the real official exchange rate,<sup>4</sup> was mirrored in the black market premium, which averaged 28 percent in 1987 after declining from 38 percent in 1984 to 12 percent in 1986.

These problems, combined with a severe decline in Argentina's terms of trade during 1986 and 1987, led to a ballooning of the current account deficit in 1987 to over \$4 billion, its highest level since 1981. In October 1987, the commercial exchange rate was devalued substantially, while a new floating financial exchange rate was authorized for travel, tourism, direct foreign investment, and non-guaranteed private borrowing. The new regime largely replicated that extant during the second half of 1981 and the third quarter of 1982, but did little to change the underlying structure of the exchange markets; the new financial rate quickly depreciated to the level of the parallel market rate, reaching a premium of 42 percent over the commercial rate in January 1988 before gradually declining subsequently.

#### II.6 The Plan Primavera and Temporary Unification: 8/1988-6/1989

Following continued acceleration of inflation, the Plan Primavera ("Spring Plan") initiated in August 1988 was intended to keep inflation low through the presidential elections scheduled for May 1989 without fiscal austerity. The linch-pin of the program was an agreement with private sector leaders to keep the growth of public prices, private prices, and the official exchange rate within 4 percent per month. This was accompanied by the transfer to the free, financial market of all imports and 50 percent of industrial exports. The Central Bank was to auction foreign exchange to keep the floating financial rate within 25 percent of the official rate; because purchases of foreign exchange from exporters were to be at a more appreciated rate than the auction price, it was hoped that this multiple rate regime would generate substantial fiscal benefits. Finally, monetary policy was tightened to further support the value of the austral in the free market.

Like the Austral Plan before it, the Plan Primavera initially was successful. Capital inflows motivated by high domestic interest rates and assured low exchange rate depreciation reduced the need for Central Bank intervention in the free market, while inflation declined from 28 percent in August 1988 to 6 percent by November. However, because the inflation rate did not decline to the rate of official exchange rate depreciation, the official rate appreciated substantially in real terms by the end of the year, leading to expectations of a subsequent devaluation. These expectations were bolstered by the government's deteriorating fiscal situation. The higher interest rates needed to support the exchange rate led to higher costs of servicing the government's domestic debt; sooner or later, these higher costs would have to be financed through monetary emission. (See Szewach, 1988, 1989) Finally, it generally was believed that sometime prior to the expected electoral victory of Peronist candidate Carlos Menem, a run on the austral would occur.

These factors forced the Central Bank to intervene with increasing frequency in order to keep the financial market premium within an acceptable range. At the beginning of February 1989, faced with the loss of its entire international reserve stock, the Central Bank ceased intervention in the free market, thus floating the financial rate. This touched off the long awaited run on the austral, leading to a surge in the depreciation of the financial exchange rate, the rate of price inflation, and the financial market premium (over the commercial rate). The surrender of export receipts to the Central Bank plunged, as did the Central Bank's international reserves, forcing it to devalue continuously

and shift increasing proportions of export transactions to the floating financial rate.

In mid-April, unable to peg the exchange rate any longer, the authorities floated the commercial exchange rate, temporarily unifying the exchange market. When the exchange rate was again pegged by the government at the end of May, following the presidential elections, the black market premium jumped to 75 percent in the absence of any government strategy to resolve the economic crisis. Monthly inflation peaked at 198 percent in July 1989, due to both the collapse in money demand precipitated by the developments in the exchange market and the corrective adjustments taken by the new administration.

#### II.7 The End of Exchange Controls in Argentina: 7/89-present

Following President Menem's inauguration in July 1989, the new economic team announced a stabilization program broadly similar to the Plan Austral: a freeze on public prices, private prices, and the exchange rate, coupled with long-range plans to reduce the fiscal deficit. As in the aftermath of the Plan Primavera, inflation fell dramatically, precipitating a return of flight capital that reduced the black market premium essentially to zero.

By October, however, wage pressures had become more pronounced and the pace of fiscal reforms slowed while continued inflation had caused substantial real appreciation of the exchange rate. As expectations of a corrective devaluation developed, the parallel market premium re-emerged, leading to a marked decline in the Central Bank's international reserves; this decline was exacerbated by Central Bank intervention in the parallel market in an unsuccessful attempt to support the austral. As in the Plan Primavera, the Central Bank also tightened

monetary policy in order to contain the parallel market premium. The effect of this was, as in 1988, to raise the cost of servicing the Central Bank's debt, boost its operating losses, and thereby cause a sharp increase in monetary emission in December.

In early December, the government announced a devaluation of the official exchange rate and additional fiscal measures, hoping to salvage the stabilization program it had begun at mid-year. It also legalized the parallel market, thus creating the fourth legal dual exchange market since the Martinez de Hoz period. These policies, by departing from the government's previous commitment to keep the nominal values under its control frozen, only served to reinforce expectations that a new inflationary spiral was underway. The continued depreciation of the international reserve position, forced the Central Bank to float the commercial exchange rate and unify the markets in late December 1989. The floating of the exchange rate and unification of the exchange markets appears neither to have solved Argentina's macroeconomic problems nor to have worsened them. Largely due to marked declines in the demand for money, inflation accelerated to 95.5 percent by March 1990. Subsequently, a reduction in monetary emission made possible by government operating surpluses reduced inflation to below 5 percent by December 1990. However, a new surge of inflation in early 1991 prompted the government to fix the exchange rate, without exchange controls, in late March. It recognizes, however, that monetary/fiscal tightening rather than the choice of exchange rate regime will be the key to a sustained disinflation. As of this writing, there is no serious discussion of returning to a dual exchange market regime.



### III. The Structure of the Parallel Market in Argentina

#### III.1 Institutional Structure of the Market

Compared with many developing countries, Argentina has a well developed financial system. Foreign exchange transactions are engaged in by the Central Bank, official banks operating as agents of the Central Bank, private commercial banks, and authorized entities specializing in foreign exchange transactions. In addition to a comparatively deep spot market, a shallower market in forward transactions usually has operated, though forward transactions generally have not had maturities longer than one month, and activity in this market has dwindled when macroeconomic uncertainty has been high.

During periods of exchange controls, restrictions have been circumvented through a number of means. First, many of the same banks and exchange houses providing legal exchange services also have provided illegal services "under the counter". The authorities have been notoriously lax in their enforcement of exchange control regulations, and generally have been content to allow the parallel market to operate without interference. Second, an active market in foreign exchange has developed in neighboring Uruguay, which has been extremely accessible to many Argentine residents. Third, the secondary market for dollar-denominated government bonds (BONEX) has provided a legal mechanism for otherwise restricted capital account transactions. Generally, it has been legal to buy and sell BONEX for both domestic currency and dollars; the relative prices of BONEX in the two currencies have therefore defined an implicit black market exchange rate.

During periods when dual exchange markets have been legal, three exchange rates have been in effect: the legal commercial rate, the legal

During the exchange-control period, there have been at least three potential sources of additional supplies of foreign exchange into the market. First, there has been the diversion of export receipts from the commercial market, where exporters have been required to surrender their receipts, to the higher-priced parallel market through export underinvoicing. Table B.6 presents calculations (FIEL, 1989) that compare exports reported to Argentine authorities to imports from Argentina reported to the authorities of the importing country. It indicates that during 1982-86 (the latest year calculated) export underinvoicing totaled roughly \$4 billion, or about 10 percent of the roughly \$39 billion in reported merchandise exports in those five years. Potentially, a second source of foreign exchange supply into the black market might have been import overinvoicing; when the parallel market premium is high, importers have a motive to declare more imports than actually purchased in order to sell their excess foreign exchange at a profit in the parallel market. As indicated in Table B.6, however, in

III.2 Sources of Supply of Foreign Exchange to the Dual Market

When the financial rate, and the illegal parallel rate, has been allowed to float, as in the June-December 1981 and October 1987-April 1989 periods, it has generally traded at levels very close to the parallel rate. A priori, it is not obvious whether the legal financial rate or the illegal parallel rate should have been the more depreciated exchange rate. During the June-December 1981 period, the parallel rate usually exceeded (that is, was more depreciated than) the financial rate, but between October 1987 and April 1989, neither rate consistently exceeded the other for long. In this study, the parallel rate is focused upon as the key alternative to the legal commercial rate.

Argentina importers have been more likely to underinvoice than overinvoice their transactions, probably because the tariffs levied on imports more than offset the benefits to overinvoicing deriving from the parallel market premium.<sup>5</sup> (By contrast, the presence of export taxes on Argentine exports reinforces the incentive to underinvoice exports.)

Finally, the Central Bank on occasion has intervened in the parallel market to support the local currency, thereby representing a third source of supply into the market. This role was most important during the Plan Primavera, but also has been undertaken during other periods when the parallel rate was considered an important indicator of program credibility, such as during late 1989.

### III.3 Sources of Demand for Foreign Exchange in the Dual Market

In Argentina, it is likely that portfolio demands for foreign exchange have been more important in sustaining the parallel market than purchases of foreign exchange for purposes of importation. Sales of foreign exchange for merchandise imports have been much less tightly restricted in Argentina than, for example, in many African countries with exchange restrictions. At the end of 1981, when the premium of the financial rate over the commercial rate exceeded 60 percent, there was no rationing of foreign exchange in the commercial exchange market.<sup>6</sup> With

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<sup>5/</sup> These data mirror findings by Bhagwati, Krueger, and Wibulswasdi (1974), who applied the same methodology to a large sample of developing countries and found strong evidence of export underinvoicing but no evidence, on average, of substantial import overinvoicing.

<sup>6/</sup> There was in effect a regulation requiring importers to postpone import payments by 180 days after the purchase of merchandise. (IMF, 1981) Given the availability of supplier financing, presumably this requirement did not substantially increase the demand for foreign exchange in the dual market.

// The relative availability of foreign exchange at the official rate for imports in Argentina should not be confused with a liberal import regime. As part of its import-substitution strategy, Argentina had developed very high tariff and non-tariff barriers to imports, and these were only partially liberalized during the Martinez de Hoz period. Subsequent to the balance-of-payments crises of the early 1980s, import restrictions were tightened again.

Argentina, while in general poorly correlated with each other, tend to items. Additionally, different measures of capital flight from dollars in the purchase of automobiles, real estate, and other big-ticket ranging from the quoting of prices in dollars by retailers to the use of Argentina. There is widespread evidence of dollarization in Argentina, foreign exchange, particularly dollars, as a portfolio asset in imports, various considerations point to the increasing importance of Compared with the minor role of the parallel market in financing in the parallel market.

market, these also would have contributed to the flow demand for exchange other services were not permitted to be financed through the commercial import tariffs or quantitative barriers. During periods when tourism and financing imports deliberately hidden from the authorities to evade being financed in the parallel market. Probably, the parallel market was III.2, however, does suggest that at least some import transactions were The evidence of importer underinvoicing discussed in Section

non-tariff barriers to imports. parallel market rate was not responsive to variations in either tariff or imports.<sup>7</sup> Finally, evidence discussed in Section IV suggests that the generally was not a major source of financing of most merchandise stringent, but anecdotal evidence suggests that the parallel market the conflict in the South Atlantic, import restrictions became more

agree that during 1980, 1981, and 1982, private residents exchanged domestic assets for over \$15 billion in foreign assets. (See Appendix Table B.6) Estimates of the stock of flight capital outstanding by the end of the 1980s usually exceed \$20 billion. Most of these assets are held overseas, but it is generally believed that about \$5 billion in U.S. currency is being held in Argentina "beneath the mattress". By comparison, domestic monetary aggregates M1 and M2 (measured using the official exchange rate) totalled only \$4.5 billion and \$7.7 billion, respectively, during their mid-decade peak in December 1985.

#### III.4 The Efficiency of the Parallel Market for Foreign Exchange

The anecdotal evidence suggests that the authorities did not interfere significantly in the operation of the parallel exchange market. Given the importance of foreign assets in domestic portfolios, a well-functioning parallel market would have equated average rates of return on dollar assets to average rates of return on austral-denominated assets, assuming these assets were considered to be substitutable. To evaluate whether this was the case in Argentina, the following equation was estimated:

$$E_{t+1}^P/E_t^P = \alpha + \beta[(1 + i_t)/(1 + i_t^*)] + e_t \quad (1)$$

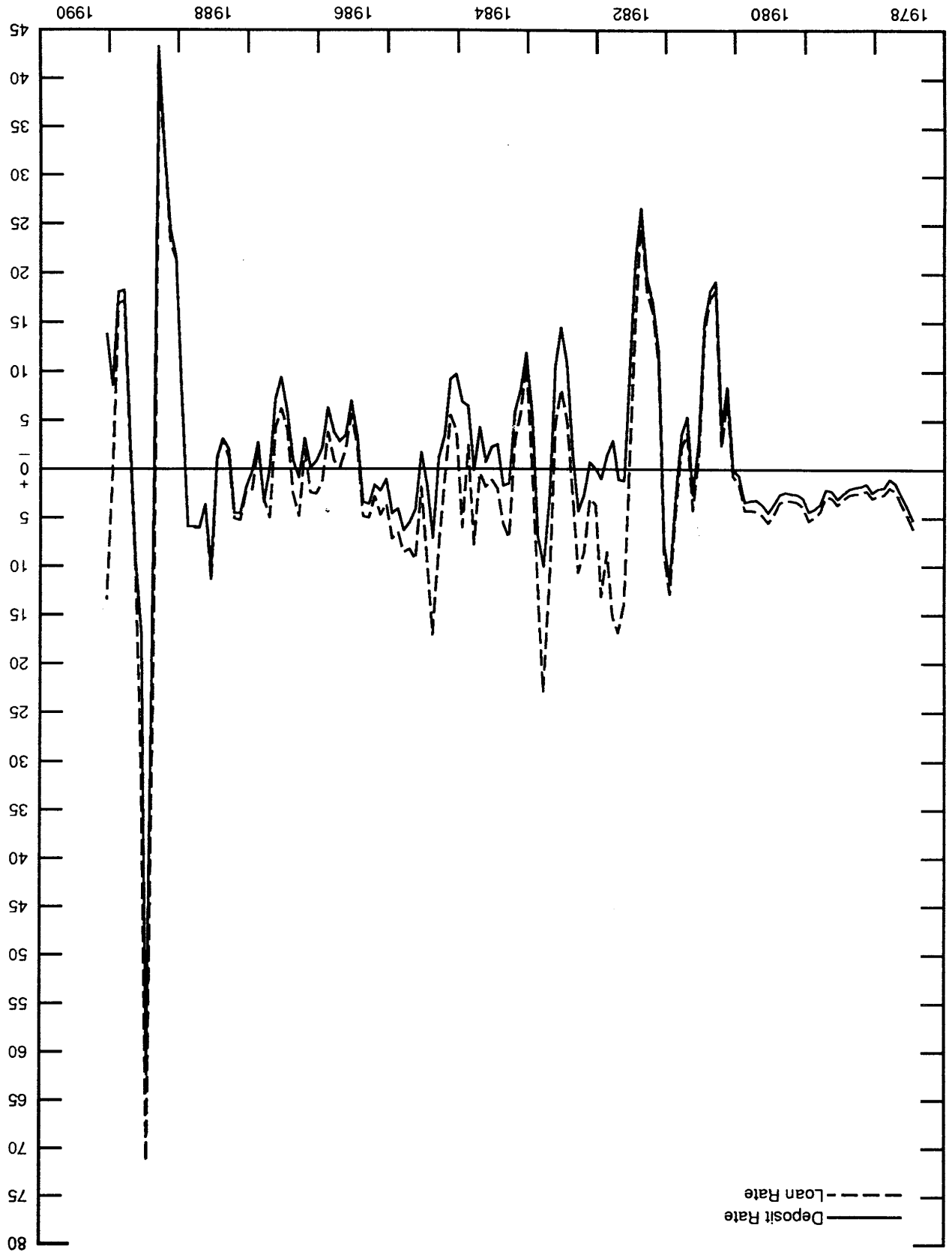
$E^P$ : parallel exchange rate (local currency per dollar)

$i$ : domestic interest rate - either deposit rate or free loan rate - (monthly basis)

$i^*$ : U.S. 1-month Treasury Bill rate - (monthly basis)

$e$ : error term

$t$ : time subscript - months



Depreciation-Adjusted Deposit and Loan Rates  
(Monthly)

The estimation sample extended from May 1982 to July 1988, the longest period of (roughly) unchanged exchange controls. Estimates are made using both the 30-day deposit rate, which was frequently controlled by the government, and the freely determined loan rate. A priori, the deposit rate represents the more appropriate candidate for a rate-of-return variable; because it was controlled, however, the loan rate might be better correlated with the rate of return to which the major players in the financial market had access. Chart 4 indicates both rates to have been closely correlated during most of the sample period.

Estimates of this equation using developed-country data generally have rejected the three implications of exchange market efficiency: a  $\beta$  equal to one, an  $\alpha$  equal to zero, and a non-serially correlated error term. (Baldwin, 1990) By contrast, the estimation results presented in Table 1 indicate that the Argentine parallel market performed relatively well in arbitraging rates of return between domestic and foreign assets.

The Durbin-Watson statistics in both regressions are low, indicating first-order serial correlation of the errors; this was confirmed by additional tests on the residuals. As noted above, however, this problem also characterizes equations applied to markets with no exchange controls. On the other hand, the estimate of  $\beta$  using the deposit rate is statistically indistinguishable from unity, and the intercept term in that regression is essentially zero. The results using the loan rate are less consistent with the efficient markets hypothesis, but still confirm the significant linkage between interest rate differentials and the depreciation of the parallel market rate in Argentina.

Table 1: Uncovered Interest Parity Equations: 1982.5-1988.7 (Monthly)

Dependent Variable: $E^p(+1)/E^p$		
(1)	.09	(.35)
(2)	.36	(1.80)
Constant		
(1+ Deposit I rate)/ (1+U.S. T-bill Rate)	.95	(4.03)
(1+Free loan I rate)/ (1+U.S. T-bill Rate)	.67	(3.80)
<hr/>		
$R^2$	.17	1.30
D.W.	1.37	1.30

(t - statistics in parentheses)



#### IV. The Parallel Market Premium

Chart 1 indicates a number of important features of the parallel market rate's behavior during the 1980s. First, the real parallel market rate has exhibited strong medium-term swings, depreciating strongly at the beginning of the exchange control period, appreciating gradually through much of the remainder of the decade, and then depreciating to record levels during the hyperinflation of 1989. Second, the parallel market rate has fluctuated sharply around these trends, exhibiting much greater volatility than the commercial exchange rate.

This behavior is consistent with a view of exchange rate dynamics that distinguishes between long-run "fundamental" determinants and short-run "portfolio" determinants of exchange rate behavior. (See Dornbusch, 1983, and Kamin, 1988, for applications of this framework to black markets for foreign exchange.) In the following pages, we derive and estimate relationships for both the long- and short-run determination of the parallel market rate.

In addition to shedding light on the parallel exchange rate's behavior, these estimations identify various means by which the government could, and did, affect the parallel market premium. In the short run, contractionary monetary policy that raised the domestic interest rate would have reduced the demand for foreign assets and appreciated the parallel rate. A more sustained reduction in the premium would have been achieved by devaluing the commercial exchange rate and/or reducing export taxes.

##### IV.1 A Simple Theoretical Model

Long-run behavior Equation (2) presents the steady-state equilibrium condition for the parallel exchange market. In equilibrium, the stock of

8/ It is assumed that no capital account transactions take place between private domestic residents and foreign entities; this was approximately true after 1981. Therefore, any change in the stock of gross foreign assets can only occur through the private current account defined in equation (2).

account balance to be exactly zero. Equation (3) below summarizes the equilibrium parallel market rate  $E^p$ , will cause the private current real output, the terms of trade, and trade policies -- a unique current account balance -- the commercial exchange rate, the price level, Given the levels of various 'fundamentals', affecting the private also have been important.

purchased in the commercial market and resold in the parallel market may have derived mainly from underinvoiced export receipts, although dollars of tariffs. The supply of dollars into the parallel market is assumed to markets, depending upon the relative price of foreign exchange inclusive choose whether to finance their imports through the commercial or dual exchange market or underinvoiced (or smuggled) to avoid tariffs and other commodities (including tourism) either not financially in the commercial The flow demand for dollars is a derived demand from imports of

S: flow supply of dollars into parallel market  
 D: flow demand for dollars in parallel market  
 F: stock of gross foreign assets (in dollars) owned by private residents

$$dF = S - D = 0 \quad (2)$$

foreign assets owned by the private sector must be constant; flow demands for dollars for current account purchases must equal flow supplies of dollars into the parallel market.<sup>8</sup>

effect of these various fundamentals on the equilibrium parallel market rate. The direction of these effects, shown in parentheses above their respective arguments, are derived from a more complete model described in Appendix A.

$$E^P = f( \overset{(+)}{E}, \overset{(+)}{P}, \overset{(?)}{Y}, \overset{(-)}{P_X^*}, \overset{(+)}{P_M^*}, \overset{(+)}{tf_M}, \overset{(-)}{t_X}, \overset{(+)}{qr_M} ) \quad (3)$$

- E: commercial exchange rate (local currency per dollar)  
P: domestic price level                      Y: real GDP  
 $P_X^*$ : dollar export price                       $P_M^*$ : dollar import price  
 $tf_M$ : import tariff rate                       $t_X$ : export tariff rate  
 $qr_M$ : level of non-tariff import barriers

The relationships indicated in equation (3) generally have straightforward intuitions. Focusing on key policy variables, a depreciation of the commercial exchange rate is likely to reduce the parallel market premium, reduce underinvoicing, lower the flow of dollars to the parallel market, and hence boost the parallel market rate. Conversely, an increase in export taxes will divert export receipts to the parallel market, thereby appreciating the parallel market rate. Increases in both import tariffs and QRs are likely to shift the demand for dollars from the commercial to the parallel market, leading to a depreciation of the parallel market rate.

Short-run behavior In practice, the actual parallel market rate  $E^P$  is likely to deviate occasionally from the equilibrium rate  $E^P$ , described in Equation 3. Out of equilibrium, it is presumed that the parallel market rate moves to equate the portfolio demand for foreign assets with the stock of these assets, which is predetermined at any point in time by the

To distinguish between the long-run and short-run exchange rate behavior described above, we take a (loose) cointegration/error-correction approach to modeling these relationships. The explanatory variables identified in equation 3, along with the actual exchange rate

#### IV.2 Empirical Results

appreciate until equilibrium is restored. on the parallel rate in equation (4), causing the parallel rate to causing foreign assets F to accumulate and, through its negative effect equilibrium rate  $E^P$ . This will lead to a current account surplus, Consider a positive deviation of the actual exchange rate  $E^P$  over the the equilibrium rate  $E^P$ , through the adjustment of foreign assets F. Theoretically, the actual parallel rate  $E^P$  should tend toward

contemporaneous parallel rate  $E^P$ . market rate depreciation, equation (4) determines the value of the stock, foreign assets, output, interest rates, and expected parallel For government-controlled or otherwise predetermined levels of the money

$\hat{E}^P_{t+1}$ : parallel exchange rate depreciation at t+1  
 expected at t

$$M/(E^P F) = m(i, i^* + \hat{E}^P_{t+1}, Y) \quad (4)$$

(+), (-), (+)

for money: the level of economic activity, which determines the transactions demand of the domestic interest rate, the rate of return on foreign assets, and for domestic money relative to foreign assets is formulated on the basis (M) and the domestic currency value of foreign assets ( $E^P F$ ). The demand allocate their wealth between a broad interest-bearing monetary aggregate previous history of the current account. Private agents are presumed to

$E^P$  , are hypothesized to form a cointegrating vector; the errors from this equation, while not necessarily serially independent, should be stationary. The variables identified in equation (4), the portfolio-based short-run equation, should form a second cointegrating vector. To the extent that this equation held at all times, its errors presumably would be serially independent as well as stationary.<sup>9</sup>

Long-run behavior Table 2 presents results for the estimation of the long-run cointegrating vector. The equations were estimated, using both monthly and quarterly data, over the period from May 1982 through July 1988, the longest period of continuous, "normal" operation of the parallel exchange market. Monthly data on import prices, export prices, trade policy variables, and real output were not available. For monthly estimation, the U.S. wholesale price level, combined with a measure of the U.S. real exchange rate vis-a-vis its major trading partners, was used as a proxy for foreign prices; implicitly, this formulation constrains the terms of trade to be constant.

In the monthly equation, the residuals were highly serially correlated, making interpretations of confidence intervals around the coefficient estimates misleading. However, as indicated by the augmented

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<sup>9/</sup> The Johansen procedure was applied to a subset of the variables of interest -- the parallel exchange rate, the commercial exchange rate, the domestic price level, and the money supply -- to determine the appropriateness of our modelling approach. The tests supported the hypothesis that two cointegrating vectors linked the variables in question. They also failed to reject the joint hypothesis that (1) the elasticities of the parallel rate with respect to the commercial rate and the domestic price level summed to unity (homogeneity), and (2) there was a unit elasticity of the parallel rate with respect to the money supply. These findings bolster the view that distinct "fundamental" and "portfolio" relationships act to influence the parallel rate. See Melick (1990) for an almost comprehensible description of the Johansen procedure.

Table 2: Parallel Exchange Rate Equations: Long-Run "Fundamental" Relationship

Dependent Variable: Log (E<sup>P</sup>)

May 1982-July 1988

	Monthly		Quarterly	
Log (E)	.50	(3.71)	.22	(.96)
Log (P)	.43	(3.23)	.73	(3.12)
Log (P <sup>us</sup> )	3.17	(4.47)		
Log (E <sup>us</sup> )	-.28	(-2.97)		
Log (P <sup>x</sup> )	.47	(1.92)	.43	(2.05)
Log (P <sup>m</sup> )	.27	(.47)	.44	(1.18)
Log (Y)	-1.37	(-2.89)	-1.35	(-3.15)
tf <sub>m</sub>	.02	(.02)		
t <sub>x</sub>	-1.33	(-1.88)	-1.37	(-2.40)
qr <sub>m</sub>	-.12	(-.46)		
Standard Error of Regression	0.10		.07	
R <sup>2</sup>	.99		1.00	
D.W.	.78		1.97	
A.D.F. of Residuals	-6.16		-3.68	
(t - statistics in parentheses)				

Dickey-Fuller statistic for the residuals from this equation, the errors are stationary, suggesting that the variables do indeed form a cointegrating vector. In the quarterly equations, the errors are not only stationary, but apparently are serially independent as well.

Turning to the coefficient estimates themselves, note that in both the monthly and quarterly equations, the coefficients on the logs of the commercial exchange rate and the domestic price level sum to close to unity; formal F-tests failed to reject this restriction. This implies that equal growth rates of the price level and the commercial exchange rate will generate proportionate depreciations of the parallel rate, which is an appealing homogeneity result. A further implication is that an increase in either the price level or the commercial exchange rate, by itself, will generate a less than proportionate increase in the parallel market rate. Hence, real devaluations of the official exchange rate will generate less than proportionate devaluations of the parallel rate, thus reducing the premium.

The quarterly regressions enable us to evaluate the impact of different trade policy instruments. The export tax rate apparently had a significant negative impact on the parallel market rate; presumably, and consistently with our predictions, increases in the export tax rate increased export underinvoicing, diverting additional flows of dollars into the parallel market and driving down their price. Conversely, neither import tariffs nor QRs on imports significantly affected the parallel market rate. This is consistent with other evidence that the flow demand for foreign exchange was not an important factor in the parallel market.

$$\log(E_D^t) = \frac{1}{1+\beta} \log(M^t) - \frac{1}{1+\beta} \log(F^t) + \alpha \left( \frac{1}{1+\beta} \right) e^t + \frac{\beta}{1+\beta} \log(Y^t) + \left( \frac{\lambda}{1+\beta} \right) \log(E_D^{t+1}) - \left( \frac{\lambda}{1+\beta} \right) \log(E_D^t) \quad (9)$$

proxy for its expected value:

rational expectations assumption to use the actual value of  $E_D^{t+1}$  as a parallel market rate appears on the right-hand side, invoking the the equation. We collect terms so that only the future value of the foreign interest rate  $i^*$  is dropped, to conserve degrees of freedom, from dwarfed in both size and variability by the domestic interest rate, the Here,  $e^t$  is assumed to be a white-noise error term. Because it is

$$\log(E_D^t) = \log(M^t) - \log(F^t) - \alpha i^t + \beta \left[ \log(E_D^{t+1}) - \log(E_D^t) \right] - \lambda \log(Y^t) + e^t \quad (5)$$

market rate, we first log-linearize equation (4) above:

Short-run behavior To estimate the short-run behavior of the parallel relationship between these variables. estimation interval was not sufficiently long to reveal the true long-run domestic variables during the 1980s. It is also possible that the level of variation of the foreign price variables relative to nominal exports has the wrong sign. These inconsistencies may reflect the minute marginally significant, at best, while the coefficient on the price of the quarterly regressions, where the import price appears to be only predicted impact on the parallel market rate. This is most evident in Disconcertingly, the foreign price variables do not have their



No data are available on  $F$ , the foreign assets held by the private sector. However, the residuals from the long-run cointegrating regressions described above and presented in Table 2, which we denote  $u_t$ , provide an estimate of  $[\log(E^P) - \log(E^{P'})]$ , the deviation between the actual and equilibrium exchange rates. We posit in equation (7) below a log-linear approximation of the relationship between the private current account surplus and this deviation:

$$\log(F_t) - \log(F_{t-1}) = \eta[\log(E_t^P) - \log(E_t^{P'})] \approx \eta u_t \quad (7)$$

$\eta$  : elasticity of current account balance with respect to deviation of exchange rate from equilibrium

Hence,  $u'$ , the cumulative sum of these residuals, should be proportional to the level of private foreign assets outstanding:

$$\begin{aligned} u'_t = \sum_{i=0}^{\infty} (u_{t-i}) &= \sum_{i=0}^{\infty} [\log(E_{t-i}^P) - \log(E_{t-i}^{P'})] \\ &= (1/\eta) \sum_{i=0}^{\infty} [\log(F_{t-i}) - \log(F_{t-i-1})] \\ &= (1/\eta) \log(F_t) - (1/\eta) \log(F_0) \end{aligned} \quad (8)$$

We substitute  $u'_{t-1}$  for  $\log(F)$  in the actual equation estimated:<sup>10</sup>

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<sup>10/</sup> The lagged value of  $u'$  is used, since the contemporaneous value will include in its computation the dependent variable itself, and hence lead to simultaneity bias. In a loose sense,  $u'$  plays the same role in this equation as the residual  $u_t$  from the cointegrating regression would play in a more conventional error-correction equation; it links short-run dynamics to long-run behavior, forcing the dependent variable to move toward its long-run equilibrium value.

$$\log(E_t^r) = (1/(1+\beta)) \log(M_t^r) - (1/(1+\beta)) \eta_{t-1}^r + (a/(1+\beta)) I_t^r + (\beta/(1+\beta)) \log(E_{t+1}^r) - (\lambda/(1+\beta)) \log(X_t^r) + v_t^r \quad (9)$$

$$v_t^r: (1/(1+\beta)) e_t^r - (1/(1+\beta)) \log(F_t^0)$$

Tables 3A and 3B present the results for estimations of equation (9) using monthly and quarterly data, respectively. In addition to OLS estimation, instrumental variables (IV) estimation was used to correct for bias resulting from measurement error in the proxy for exchange rate expectations, as well as from the endogeneity of the interest rate, which was government-controlled during only part of the estimation interval. Finally, to reflect the likelihood of a lagged response of the black market current account and hence foreign asset holdings to the residuals from the long-run cointegrating regression, various lags of the  $v_t^r$  term were incorporated into the equations.

Two restrictions of the basic model were estimated. In Restricted Model #1, the coefficient on the log of the money supply is restricted to equal one minus that on the led exchange rate, as implied by equation (9) above; this reflects the unit elasticity of the exchange rate with respect to the money supply initially specified in equation (5). In Restricted Model #2, additionally, the coefficient on the interest rate is restricted to be the negative of that on the led exchange rate, implying that the interest rate differential is the key determinant of relative asset demands; this hypothesis is consistent with the unit coefficient on the deposit rate term in the interest rate parity

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11/ In the estimated equation, the  $1/(1+\beta) \log(F_t^0)$  term will be picked up by the constant, so the errors from this equation will continue to be white noise.

Table 3A: Parallel Rate Equations; Short-Run "Portfolio" Relationship

Dependent Variable:  $\text{Log}(E^P)$

Monthly Data: August 1982 to July 1988

	Unrestricted Model		Restricted Model #1		Restricted Model #2	
	(OLS)	(IV) <sup>a</sup>	(OLS)	(IV) <sup>a</sup>	(OLS)	(IV) <sup>a</sup>
Log (M2)	.12 (2.32)	-.03 (-.37)	1-.88 (--)	1-.92 (--)	1-.91 (--)	1-.95 (--)
Deposit Rate $i$	-.59 (-2.93)	-1.03 (-3.92)	-.59 (-3.53)	-.72 (-3.84)	-.91 (--)	-.95 (--)
Log ( $E^P_{+1}$ )	.88 (15.18)	1.04 (13.51)	.88 (24.58)	.92 (23.48)	.91 (29.10)	.95 (28.65)
$u'_{-1}$	.70 (6.08)	.69 (5.67)	.70 (6.22)	.65 (5.77)	.67 (5.89)	.64 (5.54)
$u'_{-2}$	-.87 (-4.52)	-.84 (-4.13)	-.87 (-4.57)	-.82 (-4.26)	-.84 (-4.33)	-.80 (-4.07)
$u'_{-3}$	.28 (2.50)	.29 (2.47)	.28 (2.57)	.25 (2.31)	.26 (2.36)	.24 (2.15)

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Standard Error of Regression	.06	.07	.06	.06	.06	.07
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$\overline{R^2}$	1.00	1.00	.94	.94	.94	.94
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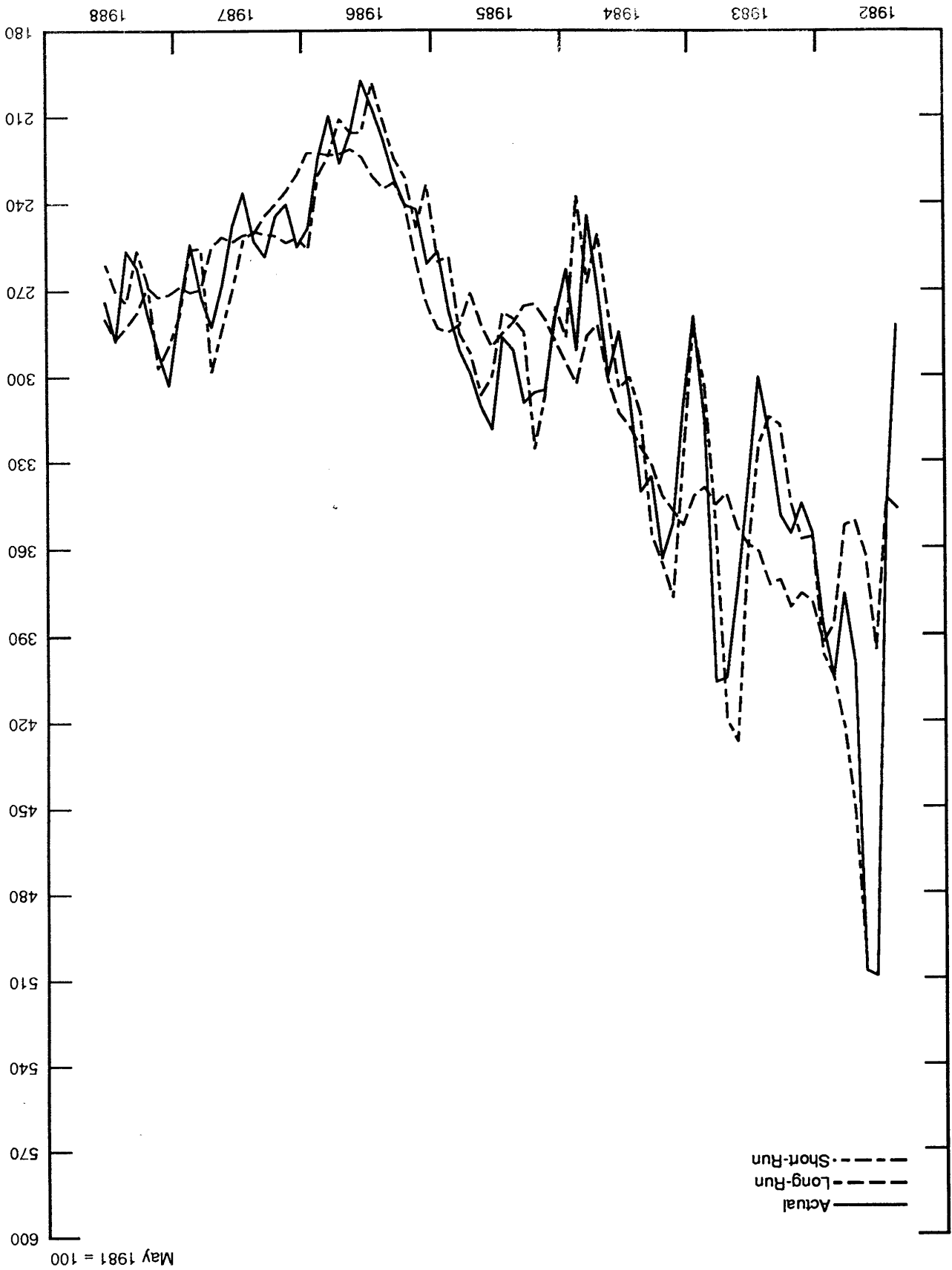
D.W.	2.12	2.14	2.12	2.12	2.04	2.04
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A.D.F. of Residuals	-8.79	-8.96	-8.79	-8.94	-8.6	-8.77
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<sup>a</sup>Instruments:  $\text{Log}(M2)$ ,  $\text{Log}(M2_{-1})$ ,  $\text{Log}(M2_{-2})$ ,  $i_{-1}$ ,  $i_{-2}$ ,  $i_{-3}$ ,  $u'_{-1}$ ,  $u'_{-2}$ ,  $u'_{-3}$ ,  $\Delta \text{log}(P)$ ,  $\Delta \text{log}(P_{-1})$ ,  $\text{Log}(E^P_{-1})$ ,  $\text{Log}(E^P_{-2})$ ,  $\text{Log}(E^P_{-3})$ ,  $\text{Log}(E^P_{-4})$ ,  $\text{Log}(E^P_{-5})$ ,  $\text{Log}(E)$ ,  $\text{Log}(E_{-1})$ ,  $\text{Log}(E_{-2})$ , constant

(t - statistics in parentheses)

Real Parallel ER: Actual vs. Long & Short Run Fitted Values  
(Monthly)



equation estimated in Section III. F-tests failed to reject the restrictions underlying either of these models.

The monthly estimation results shown in Table 3A strongly affirm the importance of portfolio factors and expectations in the determination of the parallel market rate. The standard error of these regression are considerably lower than that of the "fundamentals" equation shown in Table 2; analysis of the residuals of these equations indicated them to be serially independent as well as stationary. Chart 5a compares the fitted values from the IV estimate of Restricted Model #2, transformed into real exchange rates, to those from the fundamentals equation presented in Table 2 and to the historical data. It is evident that while the fundamentals explain most of the broad swings in the real parallel rate, portfolio variables capture the short-run dynamics more accurately.

Turning to the coefficient estimates themselves, note that the coefficient on the led exchange rate is estimated at .95 in the IV estimation of Restricted Model #2. Therefore, the elasticity of the black market rate with respect to the differential between the deposit rate and the expected rate of depreciation, the original  $\beta$  (and therefore  $\alpha$ ) in equation (5), is calculated 19.00. This is an extremely high elasticity, and implies that in the short run, the government could influence the parallel market rate considerably through its influence on monetary conditions and the domestic interest rate. It also implies that the parallel market rate was extremely sensitive to expectations about the future rate, as most anecdotal evidence will confirm.

The estimation results using quarterly data, shown in Table 3B, broadly resemble those based on monthly data. Given the relatively few

observations available on a quarterly basis, however, they should be considered less reliable than the monthly estimations. The coefficient on the log of real GDP implies an elasticity of money demand with respect to output of about 1.2, well within the usual range. The coefficient on the led exchange rate in the IV estimate of Restricted Model #2 is only .57; this implies a semi-elasticity of the parallel exchange rate with respect to the interest rate differential of only 1.3, well below that implied by the monthly regression. The discrepancy between the results using monthly and quarterly data may reflect a poor correlation between the led quarterly exchange rate and actual exchange rate expectations, resulting in measurement error and a downward bias in the coefficient from the quarterly equation. This poor correlation could also account for the relatively poor fit of the equation, relative to the long-run cointegrating equation, as indicated in Chart 5b.

Table 3B: Parallel Rate Equations: Short-Run "Portfolio" Relationship

Dependent Variable:  $\text{Log}(E^P)$

Quarterly Data: 1983 I to 1988 II

	Unrestricted Model		Restricted Model #1		Restricted Model #2	
	(OLS)	(IV) <sup>a</sup>	(OLS)	(IV) <sup>a</sup>	(OLS)	(IV) <sup>a</sup>
Log (Y)	-1.79 (-3.60)	-1.83 (-3.56)	-1.90 (-3.84)	-1.86 (-3.73)	-1.89 (-4.22)	-1.90 (-4.16)
Log (M2)	.57 (3.52)	.46 (2.60)	1-.58 (--)	1-.59 (--)	1-.59 (--)	1-.57 (--)
Deposit Rate $i$	.12 (.15)	-.47 (-.50)	-.54 (-.80)	-.72 (-1.05)	-.59 (--)	-.57 (--)
Log ( $E^P_{+1}$ )	.41 (2.36)	.53 (2.77)	.58 (5.26)	.59 (5.36)	.59 (9.40)	.57 (9.29)
$u'_{-1}$	-.04 (-.07)	-.06 (-.12)	.17 (.37)	-.02 (-.04)	.18 (.42)	-.05 (-.11)
$u'_{-2}$	-.83 (-1.90)	-.89 (-1.98)	-.75 (-1.71)	-.88 (-1.99)	-.76 (-1.90)	-.84 (-2.11)

Standard Error of  
Regression

.09      .09      .09      .09      .09      .09

$\overline{R^2}$

1.00      1.00      .86      .87      .87      .88

D.W.

1.90      1.85      2.22      1.95      2.23      1.92

A.D.F. of Residuals

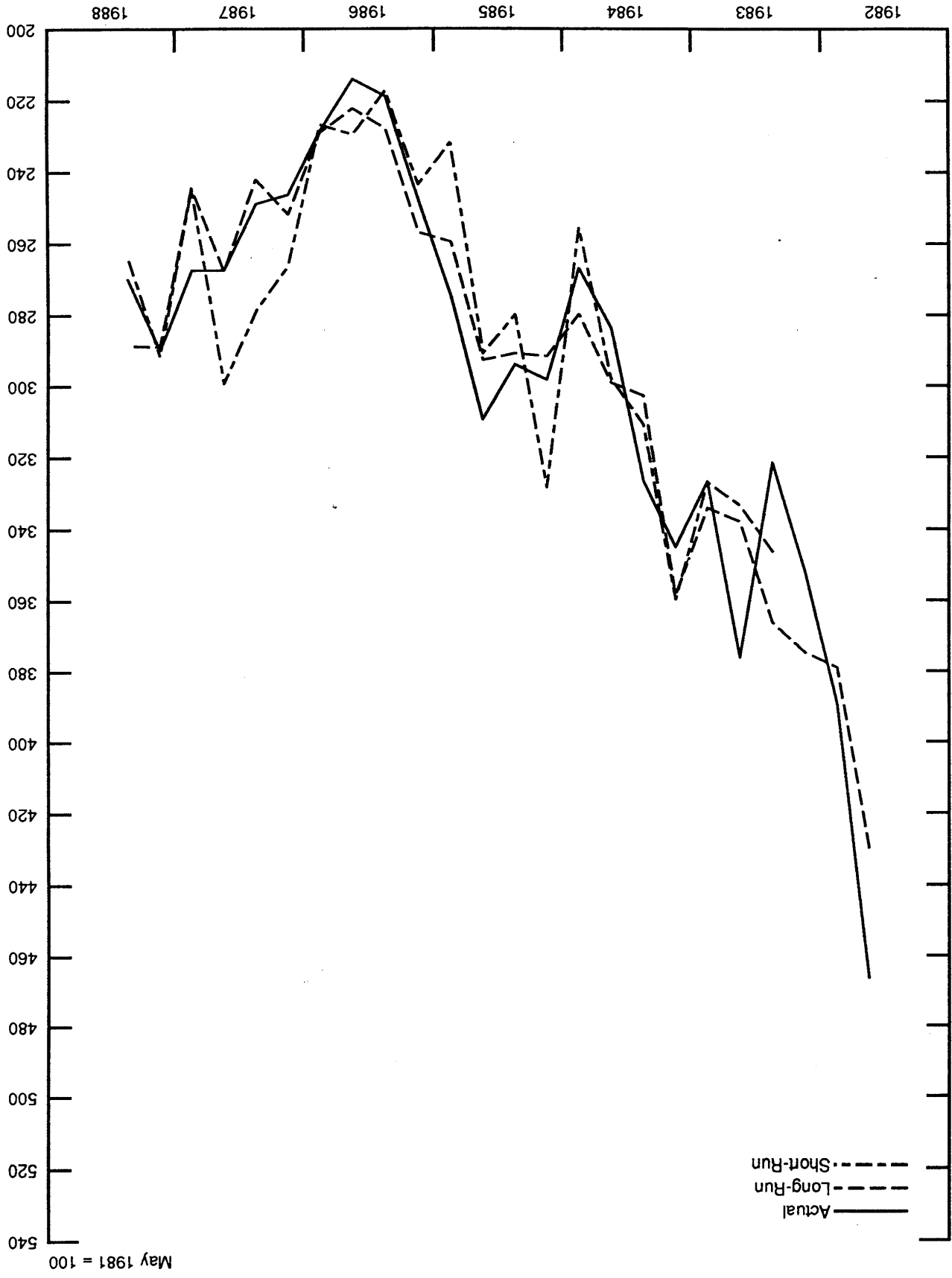
-3.17      -3.13      -3.78      -3.34      -3.79      -3.32

<sup>a</sup>Instruments:  $\text{Log}(M2)$ ,  $\text{Log}(M2_{-1})$ ,  $\text{Log}(M2_{-2})$ ,  $i_{-1}$ ,  $i_{-2}$ ,  $i_{-3}$ ,  $u'_{-1}$ ,  $u'_{-2}$ ,  $u'_{-3}$ ,  $\Delta \text{log}(P)$ ,  $\Delta \text{log}(P_{-1})$ ,  $\text{Log}(E^P_{-1})$ ,  $\text{Log}(E^P_{-2})$ ,  $\text{Log}(E^P_{-3})$ ,  $\text{Log}(E^P_{-4})$ ,  $\text{Log}(E^P_{-5})$ ,  $\text{Log}(E)$ ,  $\text{Log}(E_{-1})$ ,  $\text{Log}(E_{-2})$ , constant.

(t - statistics in parentheses)

Real Parallel ER: Actual vs. Long & Short Run Fitted Values  
(Quarterly)

Chart 5b





V. The Parallel Market Premium and its Impact on the Balance of Payments

In this section, we evaluate the hypothesis that increases in the parallel market premium led to significant deteriorations in the balance of payments in Argentina. Equation (10) summarizes Argentina's official balance of payments:

$$dR = OX - OI + PXF + PMF + NSBAL + KA \quad (10)$$

R: gross international reserves held by Central Bank

OX: official exports

OI: official imports

PXF: pre-export financing

PMF: post-import financing

NSBAL: net services balance

KA: capital account balance

Based (in part) on the discussion in Section III, there have been three main points of linkage between the official balance-of-payments and the parallel market in Argentina: diversion of export receipts from the commercial to the parallel market, diversion of import financing from the commercial to the parallel market, and conversion of profits earned on pre-export financing through the parallel market (see below). The following sections describe attempts to determine whether those linkages can be discerned in the time series data. To summarize the results of the analysis, increases in the parallel market premium appear to have been associated with strong reductions in both official

exports and pre-export financing, but were not correlated with variations

in official imports.

V.1 Exporter Underinvoicing

Equation (11) indicates that official export receipts -- those

surrendered in the commercial exchange market -- depend positively on the volume of total exports and negatively on the degree of under-invoicing:

$$OX = (1 - \phi) X P_X^* \quad (11)$$

OX: official export receipts in dollars

X: volume of merchandise exports

$\phi$ : under-invoicing ratio

$P_X^*$ : dollar export price index

Total exports should respond positively to both the parallel

market rate and the tax-adjusted commercial rate, but export

underinvoicing should respond negatively to the tax-adjusted

parallel premium. Therefore, real official exports are assumed to be

determined as shown in equation (12):

$$OX/P_X^* = \alpha (E(1-t_X) P_X^*/P, E^P/E(1-t_X), Y, Y^*) \quad (12)$$

$\alpha$  ( ) : supply of real, official exports

$Y^*$  : GDP of OECD countries

**Table 4: Merchandise Export Equation**  
(Quarterly Data): 1978/IV-1988/II

Dependent Variable:  $\text{LOG}(\text{OX}/\text{P}_x^*)$

	<u>(OLS)</u>	<u>(IV)<sup>a</sup></u>
Constant	-6.06 (-1.16)	-1.10 (-.17)
Log $(\text{E}(1-t_x)\text{P}^{\text{us}}/\text{P})$	.28 (2.60)	.23 (1.74)
Log $(\text{E}^{\text{P}}/\text{E}(1-t_x))$	-.27 (-1.99)	-.39 (-2.06)
Log (Y)	-.38 (-.65)	-1.24 (-1.46)
Log $(\text{Y}^*)$	.57 (1.67)	.78 (1.97)
DUMQ2	.27 (5.68)	.29 (5.66)
DUMQ3	.20 (3.85)	.22 (3.84)
DUMQ4	-.08 (-1.30)	-.02 (-.25)
<hr/>		
Standard Error of Regression	.10	.10
$\overline{\text{R}}_2$	.74	.72
D.W.	1.91	1.88

<sup>a</sup>Instruments:  $\text{Log}(\text{EP}_m^*/\text{P})$ ,  $\text{Log}(\text{E}(1-t_x)\text{P}^{\text{us}}/\text{P})$ ,  $\text{Log}(\text{E}^{\text{P}}/\text{E})_{-1}$ ,  $\text{Log}(Y)$ ,  $t_x$ ,  $tf_m$ ,  $qr_m$ ,  $\text{Log}(Y^*)$ ,  $\text{Log}(\text{OI}/\text{P}_m^*)_{-1}$ ,  $\text{Log}(\text{OX}/\text{P}_x^*)_{-1}$ ,  $i_{-1}$ , DUMQ2, DUMQ3, DUMQ4, constant.

(t - statistics in parentheses)

$$OI = (1+\delta)IP^M$$

(13)

and the degree of overinvoicing:  
to depend positively upon both the volume of legal merchandise imports  
Equation (13) indicates the amount of legally registered imports

V.2 Importer Over-invoicing

percent of official export receipts in those periods.  
mid-1982, and early 1989, indicating export receipt losses exceeding 24  
have been more marked; the premium rose above 60 percent in late 1981,  
percent over that period. During periods of crisis, this effect would  
average loss of export receipts in the commercial market of roughly 13  
during the period of exchange controls in the 1980s, this implies an  
calculation, considering that the parallel premium averaged 32 percent  
.4, which is quite substantial. As a rough back-of-the-envelope  
official exports with respect to the parallel market premium of about  
quarterly data. The IV regression indicates a negative elasticity of  
Table 4 presents the estimation results for this equation using  
used in addition to OLS to estimate the equation.  
because the premium is itself an endogenous variable, IV estimation was  
incorporates a set of quarterly seasonal dummy variables. Finally,  
estimation results reported in Table 3. The estimated equation also  
measure; this measure --  $E(1-t^x)P_{US}^x/P$  -- was used instead in the  
well than a measure using the U.S. WPI as a proxy for the export price  
explicit measure of Argentine dollar export prices, fit the data less  
tax-adjusted official exchange rate shown in equation (14), which uses an  
In developing the equation, it was determined that the real,

Table 5: Merchandise Import Equation  
(Quarterly Data): 1978/IV-1988/II

Dependent Variable:  $\text{LOG}(\text{OI}/\text{P}_m^*)$

	<u>(OLS)</u>	<u>(IV)<sup>a</sup></u>
Constant	-4.28 (-.87)	-7.73 (-1.14)
Log ( $\text{EP}_m^*/\text{P}$ )	-.48 (-3.40)	-.40 (-2.35)
Log ( $\text{E}^{\text{P}}/\text{E}$ )	.04 (.31)	.01 (.09)
Log (Y)	1.07 (2.33)	1.36 (2.16)
$\text{tf}_m$	.15 (.36)	.02 (.05)
$\text{qr}_m$	-.13 (-1.27)	-.12 (-1.26)
$\text{LOG}(\text{OI}/\text{P}_m^*)_{-1}$	.42 (3.96)	.46 (3.93)
DUMQ2	.13 (2.90)	.12 (2.74)
DUMQ3	.19 (4.19)	.19 (4.02)
DUMQ4	-.10 (1.90)	.08 (1.34)

---

Standard Error  
of Regression

.09

.09

$\overline{\text{R}}_2$

.92

.92

D.W.

2.12

2.20

<sup>a</sup>Instruments:  $\text{Log}(\text{EP}_m^*/\text{P})$ ,  $\text{Log}(\text{E}(1-\text{tx})\text{P}^{\text{US}}/\text{P})$ ,  $\text{Log}(\text{E}^{\text{P}}/\text{E})_{-1}$ ,  $\text{Log}(Y)$ ,  
 $\text{t}_x$ ,  $\text{tf}_m$ ,  $\text{qr}_m$ ,  $\text{Log}(Y^*)$ ,  $\text{Log}(\text{OI}/\text{P}_m^*)_{-1}$ ,  $\text{Log}(\text{OX}/\text{P}_x^*)_{-1}$ ,  $i_{-1}$ ,  
DUMQ2, DUMQ3, DUMQ4, constant.

(t - statistics in parentheses)

OI: officially registered merchandise imports in dollars

I: actual legal merchandise import volume

δ: import over-invoicing ratio

$P_M^*$ : import dollar price index

The volume of legal, registered imports should respond

negatively to the real commercial exchange rate, as well as to increases in both tariff and non-tariff barriers. Conversely, an increase in the

parallel market premium could lead to an increase in import over-invoicing to sell the exchange on the parallel market, and also could induce

importers financing through the parallel market in order to avoid tariffs to switch back to financing in the commercial market. These

considerations suggest a relationship such as equation (14):<sup>12</sup>

$$OI/P_M^* = \alpha_1(EI/P_M^*, EI^*/P, Y, \tau_M, \tau_M^*, \delta) \quad (14)$$

α<sub>1</sub> ( ) : real, official merchandise imports

Table 5 presents the results from estimating equation (14) in a manner analogous to the estimation of the export equation. While the coefficients on both the real commercial exchange rate and real GDP are of the expected sign and significantly different from zero, the

12/ Import tariffs are entered separately from the commercial exchange rate in the equation. Unlike the export tax, which was administered at the point of surrender of foreign exchange by the exporter, import tariffs were collected separately from foreign exchange transactions, and asymmetric responses of importers to the commercial exchange rate and import tariffs are likely.

coefficient on the premium is small and not significantly different from zero. To some degree, this is consistent with the evidence on the lack of import overinvoicing discussed in Section III. It suggests that official sales of foreign exchange were not an important source of supply to the parallel market.

### V.3 Pre-export Financing

The pre-export financing facility has represented an important source of short-term capital inflows for Argentina. The services provided by the facility have often been changed during the period of study, and generally have included the provision of subsidized credit by the Central Bank to exporters of specific merchandise categories.<sup>13</sup> In addition, users of this facility have been allowed to borrow foreign exchange from external sources, convert them at the official exchange rate up to 540 days before the time of export, use the local currency proceeds to pay export expenses, and repay the external loan with the proceeds of the exports rather than surrender them to the Central Bank or its agents.

During periods when the domestic interest rate has been high relative to the expected rate of exchange rate depreciation, the pre-export financing facility has been an attractive method of legally repatriating capital with the assurance that it can legally be withdrawn again through sale of exports abroad. Of course, any profits earned through domestic financial investment of the pre-export inflows would have had to be re-converted into dollars through the parallel market.

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<sup>13/</sup> These subsidies have been estimated at over \$5 billion for the 1980-1989 period, or roughly 0.5 percent of GDP annually. (See Maia, 1990)

Theoretically, the rate of return defined above should be compared to the rate of return on foreign assets,  $i^*$ , which should exert a negative effect on pre-export financing; in practice, the foreign rate is too small and unvarying, relative to the domestic interest rate, to make an appreciable difference, and this was confirmed by preliminary

$E_P^{t+1}$ : expectation of  $R_P^{t+1}$  at time  $t$

RRPXF: rate of return to pre-export financing  
 $t$ : date at which pre-export financing initiated  
 $t+1$ : date of export (PXF arrangement unwound)

$$- (E_t/E_P^t)(E_P^t/E_P^{t+1})(1+i)$$

$$RRPXF = E_t(1+i)/(E_P^{t+1}) \quad (15)$$

market rate:  
 market premium, and the lower the expected depreciation of the parallel attractive, the higher the domestic interest rate, the lower the parallel it is evident that the investor will find pre-export financing more multiplying the first expression in equation (15) by the parallel rate, Argentina at the commercial exchange rate, invested in domestic-currency deposits, and returned abroad through the parallel market. Dividing and dollar in excess of actual export-financing requirements is brought into pre-export financing arrangement. It is assumed, for simplicity, that a Equation (15) defines the dollar rate of return to engaging in a



regression analysis. Finally, increases in the real commercial exchange rate, by increasing the profitability of future exportation, are likely to lead to increases in the amount of pre-export financing drawn into the country for "legitimate" or commercial reasons. Based on these considerations, and transforming the variables slightly, a reduced form for the quantity of pre-export financing is derived:

$$PXF = PXF \left( \overset{(+)}{EP^*/P}, \overset{(-)}{E_t^P/E_t}, i, \overset{(-)}{E_{t+1}^P/E_t^P} \right) \quad (16)$$

Table 6 presents estimation results for the pre-export financing equation. Because the equation is expressed in logs, the raw quantity of pre-export financing cannot be used, since it varies between being positive and negative over the length of the sample. Therefore, the quantity of pre-export financing is added to merchandise exports and then expressed as a ratio to those exports before being converted to logs.<sup>14</sup> Three of the four explanatory variables are endogenous -- the parallel premium, the domestic interest rate, and the expected depreciation of the parallel market rate<sup>15</sup> -- so IV estimation was used in addition to OLS to estimate the equation.

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14/ Considering that asset demands usually are modelled as demands for stocks of assets, it may appear inappropriate to model the flow of pre-export financing. However, much of this financing was self-liquidating, since export receipts were used to cancel the original pre-export loans. In consequence, maintaining a given stock of austral assets required repeated pre-export financing over time, generating a correlation between the flow of pre-export financing and the relative expected rate of return.

15/ To use the depreciation rate most consistent with the 30-day deposit rate, this was calculated as the average of the three led monthly rates of exchange rate depreciation.

Table 6: Pre-Export Financing Equation  
 (Quarterly Data): 1978/IV-1988/II  
 Dependent Variable:  $\text{LOG}((\text{OX}+\text{PXF})/\text{OX})$

	(OLS)	(IV) <sup>a</sup>
Constant	-1.56 (-2.02)	-1.61 (-1.85)
$\text{Log}(E(1-t^x)P_{us}^x/P)$	.19 (2.08)	.19 (1.89)
$\text{Log}(E^p/E)$	-.38 (-2.21)	-.41 (-1.81)
Deposit Rate $i$	.98 (1.66)	1.16 (1.71)
Quarterly Average of $\text{Log}(E^p/E^{p+1})$	-.54 (-1.70)	-.60 (-1.65)
DUMQ2	-.05 (-.76)	-.04 (-.57)
DUMQ3	-.17 (-2.55)	-.16 (-2.22)
DUMQ4	-.08 (-1.22)	-.06 (-.83)

Standard Error  
 of Regression

$R^2$

D.W.

.14  
 .30  
 2.27

.14  
 .32  
 2.27

<sup>a</sup>Instruments:  $\text{Log}(E(1-t^x)P_{us}^x/P)$ ,  $\text{Log}(E(1-t^x)P_{us}^x/P)^{-1}$ ,  $\text{Log}(E^p/E)^{-2}$ ,  $\text{Log}(E^p/E)^{-3}$ ,  $\text{Log}(E^p/E)^{-1}$ ,  $\text{Log}(E^p/E)^{-2}$ ,  $\text{Log}(E^p/E)^{-3}$ ,  $i^*$ ,  $i^{-2}$ ,  $i^{-3}$ ,  $i^{-1}$ ,  $\text{Log}((\text{OX}+\text{PXF})/\text{OX})^{-1}$ ,  $\text{Log}((\text{OX}+\text{PXF})/\text{OX})^{-2}$ ,  $\Delta \text{Log}(P)$ ,  $\Delta \text{Log}(P)^{-1}$ ,  $\Delta \text{Log}(P)^{-2}$ , constant.

(t - statistics in parentheses)

The estimations indicate that variations in the parallel market premium had a substantial and significant (at the 5 percent level using OLS, at the 10 percent level using IV) effect upon the volume of pre-export financing. The interpretation of the coefficient on the parallel market premium, using either equation, is that an increase of 1 percentage point in the parallel market premium generated a reduction in pre-export financing equal to roughly .4 percent of merchandise exports in that quarter. Given that the premium frequently changed by as much as 20 percent from quarter to quarter, its movements most likely contributed to the substantial volatility of pre-export financing.

## VI. An Evaluation of Exchange Controls in Argentina

The following pages evaluate the costs and benefits of exchange

controls, and the parallel market for foreign exchange they engendered, in Argentina during the 1980s. To summarize, the controls offered few benefits, were largely ineffectual, and encouraged both poor policymaking by the government and poor legal compliance by the populace.

### VI.1 Benefits to the Exchange Control Regime

Fiscal benefits It has been argued (Pinto, 1988) that dual exchange

markets confer a fiscal benefit to the government: if the government has foreign-currency obligations that exceed foreign currency revenue

sources, suppressing the exchange rate below its appropriate level will

reduce the domestic currency cost of its foreign obligations. This

argument applies to Argentina, where external debt service obligations of the Argentine government amounted to over 5 percent of GDP per year

during the 1980s. To calculate the magnitude of the fiscal benefit,

assume that without exchange controls, the commercial exchange rate would

have been 30 percent more depreciated than its actual level, or about

equal to the prevailing parallel market rate. Then the absence of

exchange controls would have meant additional (local currency) debt

service payments equal to about 1 1/2 percent of GDP annually, compared

with a fiscal deficit ranging between 5 percent and 10 percent of GDP

during the period.

This fiscal benefit, however, does not by itself justify the

exchange control regime. The dual rate system imposed an implicit tax

upon exporters, due to the unwillingness of the government to collect

broad-based income or consumption taxes. This implicit tax, combined

with explicit export taxes, contributed to the poor performance of the

export sector in Argentina during the past decade, and also helped postpone the government's fundamental need to increase explicit tax collections.

Protection of firms with external debt One of the chief concerns of the economic team at the beginning of the exchange control period was the effect of devaluation on private sector firms with high external liabilities. These firms may have been aided to some extent by the combination of lower devaluation rates coupled with exchange controls, but not by much. Notwithstanding the exchange controls, substantial real devaluation occurred during 1981 and 1982. Moreover, the government eventually assumed the private sector's foreign currency exposure anyway, first through the exchange rate guarantee programs of 1981 and 1982, and second, when the government could not finance up-coming maturities under the program, by the takeover of the private sector's guaranteed external debt at the end of 1982.

Reduction of capital flight There are two basic rationales for reducing capital flight: first, to protect international reserves, and second, to prevent a leakage of capital abroad that otherwise would have been invested productively within the country. As noted in Section III, most measures of capital flight show a substantial decline in capital flight after 1982, when the government stopped selling dollars without restriction to the private sector. In this sense, the former objective was certainly achieved; if the government had maintained the identical exchange rate policy without exchange controls, reserves would have disappeared.

However, there is no evidence that exchange controls helped to maintain private investment levels. During 1981, when capital flight was

high as measured by any measure, private fixed investment was 11.5 percent of GDP; in 1986, when capital flight is estimated as being negative (that is, there were capital inflows), this figure had dropped to 7 percent of GDP. In their study of capital flight in developing countries, Gordon and Levine (1988) also find no correlation between investment and capital flight in Argentina, nor in most of the other countries in their sample. The imposition of exchange controls ended the financing of capital flight by the Central Bank, but did not raise the incentives for domestic investment.

Reduction of Inflation During the 1980s, the key rationale for the setting of an exchange rate that did not clear the market, supported by exchange controls, was the containment of inflation. The Plan Austral in June 1985, the Plan Primavera in August 1988, and the Plan BB (so-called after the Argentine firm of Bunge y Born, which provided the key personnel for President Menem's first economic team) in July 1989 were all built around a combination of exchange rate and price freezes, and all initially were quite successful in reducing the rate of inflation. In all three cases, however, the presence of strong inflationary inertia and the lack of complementary fiscal adjustment resulted in an appreciation of the real commercial exchange rate, an eventual widening of the parallel market premium, and balance-of-payments shortfalls. These factors, in turn, led to subsequent devaluations of the commercial exchange rate, abandonments of the "nominal anchor" program, and renewals of the inflationary spiral. Hence, in the medium and long term, the use of the exchange rate as a nominal anchor, supported by exchange controls to maintain balance-of-payments viability, has not been effective.

## VI.2 Exchange Rate Unsustainability

Fundamentally, the rationale for exchange controls was to permit the authorities to set the commercial exchange rate at a level that would have been unsustainable without controls in order to stabilize the economy. However, as pointed out above, in the absence of fiscal balance, exchange controls could provide only temporary support for misaligned exchange rates. Eventually, increases in the parallel market premium would undermine the balance of payments and reduce the level of foreign reserves.

As noted in Section IV, the government faced with this situation had two options. First, it could tighten monetary policy to raise the domestic interest rate, appreciate the parallel market rate and reduce the premium, as it did in late 1988 and late 1989. However, in both cases this led to increased costs of servicing the government's domestic debt, a widening of the fiscal deficit, and subsequently, higher rates of monetary emission and parallel exchange rate depreciation than would have been the case without the initial monetary contraction. Unsuccessful attempts to use monetary policy to reduce the premium consistently led the government to exercise its second option, a devaluation of the commercial exchange rate. Hence, exchange controls served only to delay official devaluations, not to postpone them indefinitely.

The parallel market's influence over the commercial exchange rate is supported by the results of a simple regression shown in Table 7. The authorities are assumed to devalue the commercial exchange rate to achieve a particular target level of the real exchange rate; hence, a high level of the real exchange rate should lead to reduced exchange rate depreciation, while high domestic price growth should increase the rate

Table 7: Commercial Exchange Rate Determination  
 May 1982 - July 1988  
 Dependent Variable:  $\Delta \log(E)$

	Monthly	Quarterly
Constant	1.89 (3.04)	6.87 (3.01)
$\log(E_{P^{US}}^{-1}/P^{-1})$	-.21 (3.05)	-.76 (3.02)
$\Delta \log(P^{-1}/P_{US}^{-1})$	.89 (7.19)	.85 (5.29)
$\log(E_P^{-1}/E^{-1})$	.12 (2.36)	.58 (3.27)
Standard Error of Regression	.06	.12
$R^2$	.50	.67
D.W.	2.20	1.79

(t - statistics in parentheses)



of devaluation. Additionally, a high parallel market premium is hypothesized to induce the authorities to step up the rate of commercial devaluation in order to reduce that gap. (Lagged values of these explanatory variables are used to avoid simultaneity problems.) The estimation results support all three hypotheses. They suggest that the parallel market premium, which averaged 32 percent during the exchange control period, induced an additional 3 to 6 percent of commercial exchange rate depreciation per month, depending upon whether estimates from the monthly or quarterly regressions are used.

#### VI.3 Costs of the Exchange Control Regime

Distortion of economic policy Exchange controls were not merely ineffectual. By allowing the commercial exchange rate to be set independently of economic realities, albeit only temporarily, exchange controls encouraged policymakers with short time horizons to adopt "nominal anchor" strategies -- such as fixed exchange rates -- at the cost of neglecting more difficult fiscal adjustments. In this sense, exchange controls were part of a larger package of instruments, which included price and interest-rate controls, that allowed the authorities the illusion of targeting nominal variables without addressing the fundamental causes of inflation and balance-of-payments problems.

Because such stabilizations were inherently unsustainable without complementary fiscal measures, periods of disinflation inevitably gave way to periods of accelerating inflation, accounting for the "stop-go" pattern of inflation observed in Argentina during the 1980s (see Chart 3). Exchange controls also permitted the government to maintain an exchange rate long after it had become overvalued, thereby adding to the needed magnitude of the devaluation when it finally was implemented.

This effect often was reinforced by initial unsuccessful attempts to raise interest rates to reduce the parallel market premium, since these led to higher domestic debt service costs, a larger fiscal deficit, and subsequent additional monetary emission. The resultant maxi-devaluations tended to accentuate the sharpness of accelerations in inflation, which disrupted economic activity, reduced investment, and seriously eroded the credibility of the government.

Deterioration of legal compliance In Argentina, a proliferation of regulations affecting most areas of economic life, coupled with very poor enforcement, has led to a high degree of non-compliance with these regulations. (See Guissari, 1989) Argentina's parallel exchange market is an important example of this phenomenon. The imposition of exchange controls created strong incentives for their evasion, leading to the creation of a parallel market which, in the absence of effective legal suppression, further undermined the exchange regime. In consequence, Argentina's exchange policies created the impetus for a major extension of the underground economy.

Non-compliance in one area of economic life is likely to spill over into other areas. Currently, the reduction of tax evasion represents Argentina's main challenge in its bid to achieve fiscal balance. However, the procedures developed to hide external transactions from the Customs and the Central Bank also serve to hide them from the tax collection agency. Moreover, the relaxed attitude toward compliance engendered by lax enforcement of exchange controls also is likely to undermine the public's commitment to comply with the tax laws.

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Appendix A : The Equilibrium Parallel Exchange Rate

This appendix provides additional detail on the model of the equilibrium parallel market rate discussed in Section IV.1. Equation (A.1) reproduces the steady-state equilibrium condition shown on page 27 in the text.

$$dF = S - D = 0 \quad (A.1)$$

S: flow supply of dollars into parallel market  
 D: flow demand for dollars in parallel market  
 F: stock of gross foreign assets (in dollars) owned by private residents

The supply of dollars into the parallel market is assumed to derive from underinvoiced export receipts, as well as dollars purchased in the commercial market but sold in the parallel market:

$$S = \phi X P_X^* + \delta I P_M^* \quad (A.2)$$

X: volume of merchandise exports  
 $\phi$ : under-invoicing ratio  
 I: volume of legal merchandise imports  
 $\delta$ : financed overinvoicing as a fraction of legal merchandise imports financed in the commercial market  
 $P_X^*$ : dollar export price  
 $P_M^*$ : dollar import price

Total merchandise export volumes depend upon the average of the parallel and commercial exchange rates, weighted by the fraction of receipts sold in each market, as well as export taxes, relative prices, and the level of total output:

$$X = X(\overset{(+)}{\phi E^P} + (1-\phi)E(1-t_X)) , \quad P , \overset{(-)}{P_X^*} , \overset{(+)}{Y} \quad (A.3)$$

$t_X$ : export tax rate  
 P : domestic price level  
 Y : real GDP

The underinvoicing ratio is presumed to depend only upon the parallel market premium and the export tax rate:

$$\phi = \phi(\overset{(+)}{E^P / E(1-t_X)}) \quad (A.4)$$

The quantity of legal (not overinvoiced) imports financed in the commercial exchange market is presumed to depend upon the official exchange rate, relative prices, the level of economic activity, the import tariff rate, and the number of prohibited import categories:

The impact of a devaluation of the commercial exchange rate on the parallel market rate also is ambiguous. A devaluation of the

Some of the indeterminacies evident in equation (A.8) can be resolved if we assume that import misinvoicing plays a relatively small role relative to export misinvoicing. Then, the sign on domestic prices becomes unambiguously positive, as is intuitive, and the sign on dollar import prices becomes unambiguously positive if we also assume that demands for imports are of less than unit elasticity.

$$E_P' = "F"(E, P, P^*, P^*_L, Y, X, t^*_M, q^*_M) \quad (A.8)$$

(+) (+) (?) (?) (-) (-) (-) (-)

Based on the above considerations, a very general reduced form linking the equilibrium parallel market rate to the following set of "fundamental" determinants can be written:

$$D = D(E_P, P, P^*, P^*_L, Y, X, t^*_M, q^*_M) \quad (A.7)$$

(-) (-) (+) (+) (-) (+) (+) (+)

D ( ) : demand function for real (deflated by  $P^*_X$ ) prohibited imports

Note that for a sufficiently high tariff rate, the premium could become negative, motivating import underinvoicing rather than overinvoicing; dollars to finance the underinvoiced imports would have to be purchased in the parallel market. This would reduce  $S$ , which should be interpreted as a net supply of dollars to the parallel market, below total underinvoiced export receipts  $\phi X P^*_X$ ; alternatively, it may be thought of as increasing the flow demand for dollars  $D$  above that needed to finance prohibited imports, described below.

The flow demand for dollars  $D$  is a derived demand from imports of commodities (including tourism) not financeable in the commercial exchange market or otherwise prohibited. It depends on the parallel market rate, relative prices, the level of economic activity, and the extent of non-tariff barriers to imports.

$$\delta = \delta(E_P/E(1+t^*_M)) \quad (A.6)$$

(+)

Finally, the import-overinvoicing share is modeled as varying positively with the dual market premium, inclusive of the tariff rate:

$$I = I(E, P, P^*, P^*_L, Y, X, t^*_M, q^*_M) \quad (A.5)$$

(-) (-) (+) (+) (-) (-) (-) (-)

I ( ) : demand function for real legal imports  
 $t^*_M$  : import tariff rate  
 $q^*_M$  : level of non-tariff import barriers

official exchange rate should lower export underinvoicing and reduce supplies to the parallel market, forcing up the parallel market rate. However, this effect can be reversed if the devaluation induces a sufficiently large export volume response. Most evidence (see Kamin, 1988, Edwards, 1989) supports the former story, and so a positive effect of the official rate on the parallel market rate is assumed in the text.

Similar reasoning applies to the effect of export taxes. Increases in export taxes should divert receipts to the parallel market, thus appreciating the parallel market rate, but also should reduce total exports, thus depreciating the rate. Assuming, as above, that the export volume response is weaker than the invoicing response, we assume a negative impact of export taxes on the parallel rate.

Finally, the impact of real output on the parallel exchange rate also is ambiguous. Increases in output associated with increased aggregate demand should raise import demands and depreciate the parallel market rate; conversely, increases linked to higher productivity or favorable weather conditions may be associated with higher exports and an appreciated exchange rate. As disentangling these effects is beyond the scope of this paper, we retain the ambiguity of this variable's effect.

Equation (A.9), reproduced as equation (3) in the text, incorporates the assumptions described above.

$$E^P = "f"( E, P, P_T^*, P_M^*, Y, \tau_X, \tau_M^f, q\tau_M ) \quad (A.9)$$

APPENDIX TABLE B.1 : EXCHANGE RATES AND TERMS OF TRADE  
QUARTERLY AVERAGES

YEAR	COMMERCIAL	PARALLEL	NOMINAL EXCHANGE RATES (1)		REAL EXCHANGE RATES-MAY 1981=100 (2)		DOLLAR PRICES-1970=100		TERMS OF TRADE
			PARALLEL	PREMIUM	COMMERCIAL	PARALLEL	EXPORT	IMPORT	
1977	I II III IV	.03 .04 .05 .07	.03 .04 .05 .07	2.18 .62 -1.15 -.07	222.98 223.13 206.91 196.16	227.86 224.54 204.51 196.03	192.50 201.10 197.50 181.70	194.70 206.40 212.60 215.30	98.87 97.43 92.90 85.59
1978	I II III IV	.08 .09 .11 .12	.08 .09 .11 .12	-.99 -1.18 -1.05 -.91	173.05 154.55 140.36 127.47	187.92 172.27 152.71 126.13	191.10 194.10 201.00 207.80	215.50 207.60 223.50 214.90	88.68 93.50 89.93 96.70
1979	I II III IV	.11 .12 .14 .16	.11 .12 .14 .16	-1.05 -.91 -.90 2.28	121.58 110.54 106.79 102.67	120.47 109.55 109.23 102.60	240.90 260.40 288.30 311.10	219.70 243.40 282.50 257.80	106.05 98.97 92.18 111.83
1980	I II III IV	.17 .18 .19 .20	.17 .18 .19 .20	-.07 -.00 .00 .00	94.50 89.46 80.93 81.37	94.50 89.46 80.93 81.37	286.10 286.40 329.40 354.50	264.50 267.20 245.80 247.50	108.17 107.19 136.01 126.43
1981	I II III IV	.22 .36 .51 .68	.22 .36 .51 .68	.00 6.08 45.50 50.12	109.20 123.06 132.71 159.69	116.78 179.04 198.68 156.93	310.50 294.20 295.30 301.30	245.60 248.50 259.20 250.40	134.23 143.56 118.39 113.93
1982	I II III IV	1.03 1.37 2.45 3.93	1.01 2.13 4.91 5.94	101.55 52.91 32.80 24.44	234.31 255.96 264.86 259.86	471.97 388.99 351.67 323.59	242.70 231.00 238.60 229.20	238.20 237.60 230.00 232.30	100.00 101.89 103.74 98.67
1983	I II III IV	7.83 10.76 17.82 27.84	9.71 17.13 24.66 40.45	57.36 43.27 43.91 53.36	237.78 235.50 239.22 213.96	372.62 333.92 342.51 328.22	225.50 239.00 250.30 254.20	223.50 228.50 226.40 215.90	100.89 104.60 110.56 117.74
1984	I II III IV	41.18 69.32 133.21 249.98	62.93 95.66 156.64 320.06	37.96 17.83 17.23 19.71	206.60 225.88 233.17 248.27	285.06 266.26 296.66 295.88	245.70 227.40 217.70 212.60	223.20 226.60 220.20 229.80	110.08 110.35 98.86 92.52
1985	I II III IV	801.00 801.00 801.00 801.00	892.60 11.44 11.07 11.44	17.95 11.44 11.07 11.44	262.65 246.71 223.29 205.49	309.80 275.10 247.93 219.11	216.50 237.00 198.80 191.00	236.10 239.30 236.50 242.10	91.70 99.04 84.06 78.89
1986	I II III IV	850.34 973.05 1152.45 1405.66	905.68 1074.55 1370.92 1768.54	6.59 10.06 18.62 26.11	193.78 192.00 195.64 197.29	213.24 227.79 246.60 249.33	188.70 200.50 186.20 180.00	241.00 241.70 246.90 270.60	78.30 82.95 75.42 66.52
1987	I II III IV	1612.66 2155.56 3429.43	2060.80 2920.90 4198.76	27.99 34.90 22.41	194.79 197.20 218.57	266.07 267.41	193.60 186.70	281.20 272.60	68.85 68.49



	NOMINAL EXCHANGE RATES (1)		REAL EXCHANGE RATES-MAY 1981=100 (2)		DOLLAR PRICES-1970=100		TERMS OF TRADE
	COMMERCIAL	PARALLEL	COMMERCIAL	PARALLEL	EXPORT	IMPORT	
1988	I	4353.71	215.73	290.98	213.00	279.20	76.29
	II	6851.14	221.93	268.77	218.50	284.70	76.75
	III	11217.77	206.25	249.78	206.10	310.60	66.36
	IV	12674.87	173.97	210.91	234.80	297.60	78.90
1989	I	14483.43	156.55	287.88	234.70	306.30	76.62
	II	*****	421.98	577.76	232.80	306.00	76.08
	III	*****	311.17	328.48	223.50	310.90	71.89
	IV	*****	269.81	320.21	225.70	298.20	75.69
1990	I	*****	275.20	274.66			

(1) THOUSANDTHS OF AUSTRALS PER DOLLAR  
(2) (EXCHANGE RATE \* U.S. PPI)/ARGENTINE CPI

APPENDIX TABLE B.2 : MONTHLY RATES OF CHANGE

IN PERCENT

	CONSUMER PRICE INDEX	COMMERCIAL EXCHANGE RATE	PARALLEL EXCHANGE RATE	U.S. P.P.I.	M2
1977	I	6.72	5.39	.87	16.13
	III	9.00	6.02	.43	9.44
	IV	9.61	8.25	.52	11.25
1978	I	9.68	6.69	.93	8.55
	II	8.75	3.86	.95	11.14
	III	6.93	2.69	.44	8.01
	IV	9.20	4.88	.77	9.01
1979	I	9.32	4.88	1.40	8.66
	II	7.87	4.49	.99	10.45
	III	8.48	3.90	1.22	8.62
	IV	4.67	3.26	1.05	10.67
1980	I	6.12	2.67	1.58	5.95
	II	5.90	2.10	.47	3.82
	III	4.18	1.49	1.11	5.81
	IV	5.37	1.03	.74	5.83
1981	I	5.02	5.67	1.12	.56
	II	8.23	32.50	.53	5.75
	III	8.44	8.30	.10	8.19
	IV	7.28	12.33	.00	9.44
1982	I	7.31	11.88	.24	5.64
	II	5.05	11.89	.14	7.07
	III	16.00	22.91	.00	5.45
	IV	11.55	20.11	.17	12.41
1983	I	13.42	13.36	-.03	11.34
	II	17.02	12.55	.21	12.38
	III	17.97	20.63	.34	12.33
	IV	17.99	24.51	.07	22.31
1984	I	16.59	13.04	.54	16.94
	II	17.83	15.57	.03	14.40
	III	22.89	20.55	.20	15.14
	IV	17.99	24.51	.03	19.15
1985	I	24.10	23.99	-.10	17.98
	II	28.37	34.04	.03	32.36
	III	3.75	2.91	.37	9.87
	IV	2.50	.00	.47	8.28
1986	I	3.12	.00	1.07	4.77
	II	4.44	2.94	.14	6.13
	III	7.59	6.36	.14	4.88
	IV	5.36	4.91	.10	10.39
1987	I	7.42	8.33	.48	5.30
	II	5.18	3.50	.61	6.88
	III	11.84	12.95	.20	7.73
	IV	11.07	13.64	.17	12.97
1988	I	11.42	11.21	.23	10.72
	II	16.97	18.42	.72	15.07
	III	21.65	14.63	.29	20.45
	IV	7.18	3.04	.29	14.81
1989	I	11.84	5.23	.75	12.10
	II	75.44	148.91	.43	65.91
	III	81.28	61.76	.15	51.90
	IV	17.40	24.54	.15	10.95
1990	I	78.77	65.79	.37	-

APPENDIX TABLE B.3 : RATE OF ECONOMIC ACTIVITY  
(IN PERCENT)

		GROWTH OF REAL GDP FROM YEAR EARLIER	CAPACITY UTILIZATION RATE
1977	I		74.00
	II		75.00
	III		77.00
	IV		65.00
1978	I	-4.66	64.00
	II	-5.18	71.00
	III	-4.34	76.00
	IV	1.32	71.00
1979	I	8.47	72.00
	II	8.66	73.00
	III	5.10	72.00
	IV	6.01	72.00
1980	I	1.78	72.00
	II	-1.99	71.00
	III	2.54	75.00
	IV	3.46	73.00
1981	I	-.60	70.00
	II	-1.71	62.00
	III	-11.44	60.00
	IV	-11.91	63.00
1982	I	-7.49	62.00
	II	-10.53	60.00
	III	-2.95	67.00
	IV	1.53	68.00
1983	I	1.05	68.00
	II	4.49	71.00
	III	4.44	72.00
	IV	2.18	73.00
1984	I	1.91	69.00
	II	4.53	76.00
	III	1.21	77.00
	IV	2.94	72.00
1985	I	-.80	64.00
	II	-4.82	63.00
	III	-8.65	64.00
	IV	-3.14	67.00
1986	I	.70	68.00
	II	6.29	74.00
	III	11.87	76.00
	IV	4.03	76.00
1987	I	3.01	67.00
	II	2.98	73.00
	III	.82	72.00
	IV	1.88	71.00
1988	I	2.81	73.00
	II	-.72	69.00
	III	-5.57	68.00
	IV	-6.89	66.00
1989	I	-4.18	65.00
	II	-9.52	57.00
	III	-5.63	61.00
	IV	-	61.00
1990	I		53.00

APPENDIX TABLE B.4 : RATES OF RETURN (MONTHLY BASIS)

(IN PERCENT)

DEPRECIATION -ADJUSTED U.S. TREASURY BILL RATE	FREE LOAN RATE	DEPOSIT INTEREST RATE	
6.53			1977 I
4.68			II
7.81			III
8.16			IV
6.84			I
2.73			II
4.57	7.53	6.63	III
5.55	7.55	6.72	IV
5.60	7.20	6.50	I
5.21	7.18	6.53	II
5.74	7.94	7.22	III
3.02	7.31	6.43	IV
3.64	6.10	5.26	I
2.73	5.70	4.78	II
2.03	5.23	5.12	III
2.27	5.69	4.79	IV
17.27	8.23	6.79	I
33.42	9.75	8.55	II
9.00	11.67	9.82	III
7.44	8.54	7.09	IV
22.04	8.38	7.08	I
43.77	10.95	7.15	II
5.05	19.03	5.69	III
11.37	22.67	7.99	IV
11.55	15.03	10.16	I
12.18	15.87	9.63	II
26.68	20.63	12.10	III
7.94	23.30	14.50	IV
22.33	13.03	10.50	I
12.42	18.30	13.00	II
18.71	19.63	15.50	III
26.78	27.07	17.00	IV
30.88	24.47	18.50	I
22.21	34.20	23.33	II
- .07	7.37	3.50	III
- .25	5.50	3.10	IV
1.47	5.20	3.10	I
10.26	6.37	4.37	II
13.18	8.60	5.33	III
6.55	7.33	4.83	IV
6.04	8.40	5.13	I
19.01	13.63	9.33	II
12.05	12.40	11.60	III
8.82	14.63	14.03	IV
21.54	18.10	17.67	I
7.86	14.63	14.20	II
4.66	10.67	10.57	III
57.47	18.57	17.57	IV
126.04	116.23	99.00	I
3.59	24.37	18.03	II
35.02	29.57	23.67	III
			IV
			I
			1990

## APPENDIX TABLE B.5 : BALANCE-OF-PAYMENTS COMPONENTS

(\$ MILLIONS)

	MERCHANDISE EXPORTS	MERCHANDISE IMPORTS	CURRENT ACCOUNT	PRE-EXPORT FINANCING	IMPORT FINANCING	
1977	I					
	II					
	III					
	IV					
1978	I	1330.00	858.00	267.00	317.00	89.40
	II	1808.00	871.00	652.00	193.30	-101.80
	III	1966.00	1046.00	739.00	-484.20	94.20
	IV	1294.00	1059.00	32.00	-73.40	-24.80
1979	I	1549.00	1199.00	-68.00	332.80	110.50
	II	2383.00	1380.00	456.00	368.60	77.40
	III	2161.00	1913.00	-76.00	-120.20	355.80
	IV	1717.00	2220.00	-898.00	160.80	201.70
1980	I	2059.00	2282.00	-767.00	143.20	347.30
	II	1924.00	2286.00	-1003.00	58.50	35.50
	III	2036.00	2782.00	-1151.00	37.50	318.00
	IV	2002.00	3190.00	-1870.00	-358.90	471.10
1981	I	1990.00	2614.00	-2080.00	-124.40	-176.30
	II	2848.00	2622.00	-909.00	-429.50	-5.40
	III	2719.00	2195.00	-212.00	-830.90	-435.80
	IV	1586.00	1999.00	-1491.00	-246.50	-175.10
1982	I	2170.00	1484.00	-309.00	216.00	-159.50
	II	2346.00	1333.00	-316.00	-619.40	323.20
	III	1624.00	1217.00	-624.00	-64.80	-465.00
	IV	1483.00	1303.00	-1143.00	-74.50	395.90
1983	I	1934.00	977.00	-607.00	225.80	-338.40
	II	2107.00	1185.00	-485.00	402.20	81.90
	III	2003.00	1210.00	-792.00	-98.10	-216.10
	IV	1793.00	1133.00	-592.00	-266.20	812.30
1984	I	2159.00	865.00	-200.00	6.80	-56.80
	II	2449.00	1099.00	-136.00	182.40	-117.00
	III	2081.00	1326.00	-750.00	-91.60	120.50
	IV	1418.00	1294.00	-1307.00	579.70	209.30
1985	I	1803.00	977.00	-778.00	-31.70	-79.50
	II	2570.00	927.00	185.00	401.60	-300.20
	III	2310.00	979.00	109.00	-254.40	153.60
	IV	1713.00	931.00	-471.00	42.60	85.40
1986	I	1513.00	921.00	-803.00	53.60	24.20
	II	1968.00	1154.00	-455.00	255.00	147.50
	III	1897.00	1356.00	-511.00	-442.10	232.10
	IV	1474.00	1293.00	-1092.00	76.40	62.70
1987	I	1441.00	1200.00	-1018.00	539.10	-27.40
	II	1741.00	1379.00	-795.00	-281.20	135.60
	III	1618.00	1633.00	-1096.00	-456.00	351.30
	IV	1560.00	1608.00	-1321.00	309.10	33.10
1988	I	1713.00	1165.00	-851.00	-11.80	-371.20
	II	2304.00	1407.00	-427.00	294.30	-33.10
	III	2673.00	1458.00	2.00	468.60	256.00
	IV	2444.00	1294.00	-339.00	276.10	-18.10
1989	I	2117.00	1168.00	-822.00	5.90	-202.70
	II	2546.00	1034.00	-125.00	-845.40	162.20
	III	2870.00	1090.00	203.00	-20.90	61.10
	IV					
1990	I					

Appendix Table B.6: Measures of Mis-invoicing and Capital Flight  
( \$ millions)

Measures of Capital Flight:

	<u>Export Underinvoicing</u> <sup>1</sup>	<u>Import Overinvoicing</u> <sup>1</sup>	<u>World Bank</u> <sup>2</sup>	<u>Federal Reserve Board</u> <sup>3</sup>	<u>Cuddington</u> <sup>2</sup>
1977	630	-287	940		-618
1978	703	-1,055	1,852		1,497
1979	626	-2,917	3,128		-1,693
1980	400	-2,097	5,036		2,301
1981	661	-876	5,751	9,800	8,680
1982	852	-617	8,455	6,100	5,210
1983	942	-1,568	2,615	1,700	1,955
1984	1,028	-1,160	-2,617	-400	-1,635
1985	1,097	-526		500	
1986	65	-568		-1,200	

1/ Source: FIEL, 1988.

2/ Source: Cumby & Levich, 1987.

3/ Source: Kamin, Kahn, and Levine, 1989.

Appendix Table B.7: Measures of the Public Sector Deficit<sup>1</sup>  
(% of GDP)

	<u>Cavallo-Pena</u> <sup>2</sup>	<u>Rodriguez</u> <sup>3</sup>	<u>World Bank</u> <sup>4</sup>
1977	11.8	4.7	4.7
1978	13.6	6.5	6.5
1979	10.5	6.5	6.5
1980	13.0	7.5	7.5
1981	16.7	13.3	13.3
1982	16.4	15.1	15.1
1983	19.6	15.2	16.1
1984		11.9	12.6
1985		6.0	6.1
1986		4.7	4.3
1987		5.5	7.4
1988		7.4	

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1/ Balance of non-financial public sector.

2/ Reproduced in di Tella and Dornbusch, 1989.

3/ Rodriguez, 1991.

4/ World Bank, 1990.

Appendix C: Data Used in Regression Analysis

- E<sup>d</sup>**: Parallel market rate against the dollar - quarterly average of monthly rates, which are averages of daily rates.  
 Source: FIEL Database
- E**: Commercial exchange rate against the dollar - quarterly average of monthly rates, which are averages of daily rates.  
 Source: FIEL Database
- I**: (1) Interest rate (monthly basis) on 30-day time deposits at Argentine banks - quarterly average of monthly levels, which are averages of daily rates.  
 Source: Various World Bank and IMF publications; Carta Economica
- (2) Interest rate on loans (monthly basis) not controlled by government. During interest rate control periods, equals inter-firm rate for BONEX backed loans - quarterly average of monthly levels, which are averages of daily rates.  
 Source: Various World Bank and IMF publications; Carta Economica
- I\***: Interest rate (monthly basis) on U.S. Treasury Bills - quarterly average of monthly rates  
 Source: International Financial Statistics
- P**: Argentine Consumer Price Index - quarterly average of monthly levels, which are averages for the month.  
 Source: FIEL Database
- P\***: U.S. Producer Price Index used as proxy - quarterly average of monthly levels, which are averages for the month.  
 Source: International Financial Statistics
- P<sub>I</sub>\***: Index of dollar import prices.  
 Source: CEPAL, Indicadores Macroeconomicos de Argentina, June 1990
- P<sub>X</sub>\***: Index of dollar export prices.  
 Source: CEPAL, Indicadores Macroeconomicos de Argentina, June 1990
- O1**: Official dollar merchandise imports, Balance-of-Payments basis.  
 Source: FIEL Database
- OX**: Official dollar merchandise exports, Balance-of-Payments basis.  
 Source: FIEL Database



PXF: Pre-export financing inflows in dollars. Calculated as CX-OX, where CX is merchandise exports, Exchange-Balance (Balance Cambiaria) basis (i.e., actual receipts by exporters, including pre-export financing).  
Source: FIEL Database

qr<sub>M</sub>: Percentage of all tariff code positions subject to quantitative restrictions.  
Source: World Bank staff

t<sub>X</sub>: average tax rate on exports.  
Source: World Bank staff

tf<sub>M</sub>: average tariff rate on imports.  
Source: World Bank staff

Y : Real Gross Domestic Product of Argentina - quarterly.  
Source: FIEL Database

Y\* : Real Gross Domestic Product of the OECD countries - quarterly.  
Source: OECD

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