



**MONOPOLY PROFITS AND THE LAW OF ONE PRICE:  
THE COST OF MISAPPLIED THEORY**

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## **ABSTRACT**

This paper discusses why the neoliberal policy package used in Uruguay during the period 1978-82 was doomed to failure, the main reason being that the underlying theoretical model assumes perfectly competitive markets whereas the crucial markets remained oligopolistic or even monopolistic during a significantly long period. The paper contends that this led to incumbent firms being able to price imported goods at prices higher than those of the domestic imperfect substitutes; in other words, the law of one price failed. The argument is modeled on the basis of assuming imperfect markets and the model is shown to correctly "predict the past."

## **RESUMEN**

Este trabajo analiza las causas por las cuales el paquete de las políticas neoliberales no tuvieron éxito en Uruguay durante el período 1978-82, principalmente debido a que el modelo teórico tratado presupone mercados competitivos perfectos, mientras que los mercados cruciales se caracterizaron por ser oligopólicos e incluso monopolísticos durante un período significativo. El trabajo afirma que esto indujo a las respectivas compañías a fijar precios de bienes importados más altos que los precios de los sustitutos imperfectos domésticos, es decir, la ley de un precio fracasó. El argumento es desarrollado mediante un modelo basado en el supuesto de mercados imperfectos que trata de "predecir el pasado" correctamente.

## I. INTRODUCTION

This paper discusses the results of the second phase of a policy package applied in Uruguay; the first phase covers the years 1974-78, and the second phase was applied during the period 1978-1982. In what follows, I will give a brief description of events before and during phase I as a needed backdrop to the discussion of phase II, which is the body of the paper.

### 1. Before the Reform<sup>0</sup>

By the late '60s, inflation was running faster in Uruguay than its trading partners on average; however, for political reasons a devaluation of the currency was ruled out. In order to stop further erosion to the competitiveness of the tradeable-goods sector, in mid-1968 the Government imposed a freeze on all prices and wages. The inflation rate dropped from 60 percent in the first semester, to 1 percent in the second.

Such a drop was largely based on the action of the Consejo de Precios, Productividad e Ingresos—COPRIN.<sup>0</sup> This body controlled the freeze while it lasted—until early 1969—and was thereafter in charge of a system of price administration. Its main function was to control every price increase in the economy, from key prices like wages, down to prices for specific goods such as “blue, short-sleeved school shirts for boys.” COPRIN could—and did—inspect the records of firms to check on the accuracy of the declaration on which they based requests for price increases.

COPRIN's intervention did have unwanted side effects, one of which was the impact of the price freeze on the quality of many industrial goods. One case in point is that of toilet paper: under the frozen price it became thinner, and when a return to the original width was mandated it became coarser. Another, and much more important, unwanted side effect was the channelling of entrepreneurs' energies and creativity away from productivity toward finding profitable ways of complying—or not complying—with the freeze.

Parallel to COPRIN's intervention were others, foreign trade uppermost among them. In the area of exchange rate policy, multiple rates existed until 1959 when a dual rate was established and a massive devaluation performed. The reform of 1959 came at the end of more than 15 years of nominal exchange rate stability and some five years of real currency appreciation. That devaluation was traumatic not only because it came after so many years of stability but also because the authorities had to devalue by approximately 200 percent in a few months to cover for

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<sup>0</sup> This section draws heavily on Mezzera and de Melo (1985).

<sup>0</sup> The Council on Prices, Productivity, and Incomes.

the very large overvaluation of the domestic currency that had accumulated over the years. Such a devaluation, in addition, had income- and wealth-distributive consequences that gave a politically bad name to the very notion of devaluation. This fact was to play a large part for decades to come.

From 1959 to 1968 the rate was again devalued several times, in each case ending a period of currency appreciation and political struggle around the exchange rate. Each such period involved increasing efforts to use tariffs and other trade barriers to reduce the impact of currency appreciation on the tradeable-goods sector.

Ranging back to 1875, tariffs and non-tariff instruments have been a part of the national landscape. However, starting in the mid-1950s, the fall in the terms of trade at the end of the Korean War set off a wave of increasingly sophisticated trade interventions, to the point that by 1972 many imports had to pay up to twelve different trade taxes. Average trade taxation was close to 100 percent (Mezzera 1980).

One instrument which was applied for the last time in 1972 was a prohibition on imports of capital goods as a measure aimed at the short-term improvement of the balance of trade. However, since the balance of trade remained ailing, the prohibition stayed in the books for a fairly long time. It combined with the peculiarities of firms' response to COPRIN to force Uruguayan industry into a long period of productivity stagnation. As long as productivity stagnated, societal claims for increased income could not be met and different interest groups managed to put on the books a variety of measures aimed at improving the group's position at the expense of others. Most of these measures, though of a distributive intent, involved increased State intervention in the generation of income and wealth.

As a result, just before the reforms Uruguay was among the most intensely interventionist mixed-economy countries in the world. Its main economic stylized facts were the very high rate of inflation—averaging over 90 percent a year in 1970-74—the stagnation of exports, which fluctuated around an average of 200 million dollars during fifteen consecutive years, and the consequently sluggish growth of 0.5 percent a year in 1970-74.

## **2. The Reforms: Phase I**

Phase I of the reform was implemented in 1974 and lasted through late 1978. It was characterized by four major features: the change in development strategy towards export-led growth, including the initial relaxation and later elimination of the ban on imports of capital goods; a coherent attempt to stop inflation, as a goal subsidiary to that of growth; a large reduction of the Government's intervention in economic affairs, of which the symbol was the elimination of COPRIN; and the liberalization of the financial sector.

To a large extent, this was a market-oriented reform implemented, as is traditional in Uruguay, through State intervention in the economy. This was symbolized by LATU, the Laboratorio de Análisis Tecnológico del Uruguay,<sup>0</sup> a body of technicians who played, *vis-à-vis* the non-traditional export sector, a role similar to that played by COPRIN in the area of price control. Non-traditional exports, defined as all those except the past mainstays of Uruguayan foreign trade (non-processed beef, wool, and hides), benefitted from a host of measures of which the *reintegro*, or cash subsidy, was paramount. Though *reintegros* were available to all non-traditional exports, their level was for LATU to decide; since their effective range was between 2 and 50 percent, LATU's role cannot be exaggerated. Entrepreneurs who had learned to deal with COPRIN were taxed to the utmost when dealing with LATU, a thoroughly scrupulous body of engineers for whose *dicta* there was no appellate court.<sup>0</sup>

Tariffs and especially non-tariff trade barriers were reduced; the exchange rate policy was a crawling peg aimed at maintaining a fairly constant real exchange rate.

During this phase, most economic results were excellent: GDP grew by 4.6 percent a year, exports by 25 percent a year, their non-traditional component grew even faster, rising from almost nothing to 60 percent of all exports, and the investment-to-GDP ratio rose from 9 to 14 percent because investment was increasing by almost 20 percent a year. However, inflation was almost constant, at a level of about 50 percent, in spite of the application of a strong closed-economy monetarist policy based on contractive monetary and fiscal policies and a massive drop in real wages.

### 3. The Reforms: Phase II

Failure to deal effectively with inflation led to Phase II; the main objective ceased to be growth and was replaced by monetary stability.<sup>0</sup>

The authorities moved in two directions. Firstly, they continued to cut down on Governmental intervention in the economy, mainly through deregulating the banking sector and cancelling intervention on behalf of manufactured exports; LATU was stripped of its powers *vis-à-vis* manufactured exports, which were now seen as something that should proceed on their own or not at all. Secondly, they changed their approach to stabilization policy by relying on the monetary approach to the balance of payments and using the exchange rate as the main anti-inflationary tool. This involved pre-announcing the exchange rate to dampen inflationary

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<sup>0</sup> The Uruguayan Laboratory for Technological Analysis.

<sup>0</sup> It may sound strange, but *actual* (as distinct from *attempted*) cases of corrupting this all-powerful body seem to have been virtually non-existent.

<sup>0</sup> It was, however, argued that, since growth was only being impeded by inflation, stability would directly lead to growth.

expectations, reducing the rate of crawl well below the difference between domestic and world inflation, and adopting a passive monetary policy in which the money supply reacted only to changes in reserves.

The authorities firmly believed that purchasing power parity and interest parity would hold. Neither did: the peso-dollar interest rate gap remained very high throughout the experiment and the real exchange rate fell sharply, damaging the profitability of exports and import-competing activities (Hanson and de Melo, 1985).

During this second phase, growth had two engines: residential construction and exports to Argentina. Private investment in construction grew 45 percent in real terms in 1979 and a further 22 percent in 1980; it accounted for one-quarter of real GDP growth of these two years. Exports to Argentina increased more than 20 percent in 1979 and a further 44 percent in 1980; increases in exports to Argentina accounted for 60 percent of all the export increase in these two years. These two indicators suggest that, in 1980-81, the real revaluation of the peso damaged the profitability of producing tradeable goods, but such damage was overcompensated by Argentinian events—where the same policies were being applied, only more vigorously. Since much of the construction boom in Uruguay was financed by Argentinian capital moving abroad, it is fair to say that Uruguay benefitted from the spillover of Argentinian demand into non-tradeables in Uruguay and into Uruguayan tradeables being exported to Argentina.<sup>0</sup>

It is also worth noting that while the Argentinian peso was rapidly appreciating, the Brazilian currency was rapidly being devalued in real terms. By 1980 Uruguay was importing wheat and clothing from Brazil, two goods that are usually traded in the opposite direction; at the same time, Uruguay exported beef, automobiles, and TV sets to Argentina. When Argentina began a strong real devaluation of its currency in early 1981, the Uruguayan economy began to feel the full brunt of its own overvaluation. Growth faltered, the balance of trade became sharply negative, and capital flight took off as doubts about the sustainability of the model became widespread.

The crash of the Argentinian model in 1981 was followed, in June of 1982, by that of the Chilean version of the same experiment. By that time, agents' unease had become so widespread in Uruguay, that Gregorio Alvarez<sup>0</sup> had to go on national TV to say that "only a Martian could think of devaluing the peso." The peso was, in fact, not officially devalued; it was left to float. It almost literally sank from 13 pesos to the dollar in November 1982 to 45 in early 1983.

Explanations for this three-country collapse initially blamed the debt crisis. However, since both Argentina and Chile had abandoned the experiment before the debt crisis exploded, that explanation did not go far. The mainstream explanation is that, because of loose monetary

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<sup>0</sup> It should be born in mind that the population of Buenos Aires alone more than trebles that of Uruguay.

<sup>0</sup> A General of the Army who by then had taken over the Executive function.

and fiscal policies, the prices of non-tradeable goods continued to rise at their pre-reform rate, thus generating currency appreciation (Corbo, de Melo, and Tybout, 1986).

This paper accepts the empirical fact that inflation in non-traded goods was high, but also argues that imperfect competition in the domestic markets for relevant tradeable goods led to their prices staying well above the predictions of the theory. In other words, the law of one price (LOP) did not operate. The explanation being offered here is that there was no downward pull on prices of non-traded goods. The failure of the law of one price is at the center of the explanation of continuing inflation, and endogenous market imperfections explain the failure of the LOP. It is thus argued that a policy grounded on theory that explicitly assumes perfect competition should never have been applied in an economic environment that is basically not competitive.

## **II. THE ISSUE OF WHY DOMESTIC INFLATION DID NOT ABATE**

The first objective of this chapter is to establish that the actual behavior of prices and inflation rates differed substantially from the theoretical predictions that supported the policy package.

In the second place, I will formalize the actual behavior of those prices by adapting a model that will provide an explanation of the evolution of the market equilibrium of a relevant good. This model will show the likelihood that the law of one price may not hold for a fairly long time after imports are liberalized. I will not claim that domestic prices would *never* converge to their competition-determined levels, but that the lag in adjustment may be long enough to unleash dynamics leading to outcomes very different from those assumed by the competitive framework on which actual policy was based.

I submit that the model developed in this chapter is at least consistent with the observed facts and therefore provides one likely explanation for them that should have been taken into account by the policymakers.

### **A. Active Crawl, Cuts in Protection, and the Behavior of Different Prices**

The “prototypical policy package” outlined earlier included a variety of economic policies of which two are relevant here: a “slow crawl” and a sharp reduction in tariffs and other barriers to trade.

As stated earlier, since the early seventies, Uruguay had been using an exchange rate policy that consisted of mini-devaluations equal to the difference between domestic and world inflation. In October, 1978 the economic authorities introduced the notion of using an “active” exchange rate policy, which was characterized by mini-devaluations such that the rate of crawl

would be smaller than the differential between domestic and world inflation. This policy was implemented by pre-announcing, for up to six months in advance, the nominal exchange rate at which the Central Bank would conduct transactions in foreign currency.<sup>0</sup>

A digression: I will make two assumptions that define the scope of the discussion. Firstly, I will assume that a good proxy for  $p^*$ , the “world price” of macro models, is available. Secondly, I will assume that the major trading partners were behaving in a fashion compatible with Purchasing Power Parity (PPP) and its variants, one of which is devaluing more slowly than one would under PPP.<sup>0</sup> Both these problems are excluded from this paper.

The “active crawl” policy was accompanied by cuts in tariffs and by the completion of the dismantling of non-tariff trade barriers which had begun in 1976. Starting in early 1978, cuts in tariffs were described as a linear process aimed at nominal protection becoming, over a period of time, low and even. Given that the original structure of tariffs was very diversified—as is usually the case in semi-industrialized countries that developed under heavy protection—the impact on the landed cost of imports had to be strongly differential, with those goods that were more highly protected obviously showing the greatest falls.<sup>0</sup>

## 1. Expected Impact on the Prices of Traded Goods

Use of trade and exchange rate policies as anti-inflationary tools has a direct impact on the price of actually traded goods, and an indirect effect on the prices of non-traded goods. Since the overall inflation rate is a weighted average of the inflation rates of traded and non-traded goods, and the latter generally includes a significant inertial or “trend” component, the policymakers expected that the initial effect of the active exchange rate policy would be a reduction in the real exchange rate or, in other words, a real revaluation of the domestic currency.

However, the policymakers thought that the prices of traded goods would follow the law of one price, thus immediately adjusting their inflation rate to that signalled by the devaluation table *minus* the effect of the tariff cuts. Prices of non-traded goods would follow suit after a lag.

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<sup>0</sup> The pre-announced table was given in terms of Uruguayan pesos per dollar.

<sup>0</sup> In a previous paper (Mezzerà, 1981) I discussed the issue of a small country that finds itself faced with a situation in which two major trading partners do not follow a policy compatible with maintaining a constant PPP; on the contrary, one of those trading partners undertakes a strong real revaluation of its currency while the other does exactly the opposite. The producers of tradeable goods in the small home country thus receive conflicting signals that are not likely to last. In addition, in such a context the PPP policy becomes meaningless.

<sup>0</sup> Specifically, the objective was to achieve a flat level of tariffs equal to 35% in five years. Therefore, every year each tariff level would be reduced by one-fifth of the difference between its original level and 35%. Therefore, a good that enjoyed a 300% tariff in 1978 would find it falling by  $(1/5)(300\% - 35\%) = 53\%$  in 1979; another good enjoying a tariff of 50% in 1978 would have it reduced by 3% in 1979.



This can be expressed in several ways. It was expected that the rate of increase of traded-goods prices would slow down, *as compared to previous trend inflation*, because of the slowed-down devaluation schedule and the cuts in protection. In fact, for those goods that were most heavily protected, the inflation rate might even become negative.

Another way of making the same point is to say that the domestic prices of traded goods would fall *when measured in terms of dollars*, because of the cuts in tariffs and other barriers to trade. A third way is to say that, since the Wholesale Price Index (WPI) includes some component of non-traded goods, the “real” domestic prices of traded goods would fall *when deflated by the WPI*. Yet another expression is that, under the combined impact of the slow crawl and the cuts in protection, the “real” domestic prices of traded goods would fall even faster *when deflated by the overall domestic inflation rate, as measured by the Consumer Price Index (CPI)*, where the influence of non-traded goods is larger than in the WPI.<sup>0</sup> Finally, the largest of all falls in traded-goods prices would be recorded by *comparing them to the prices of non-traded goods*.

## **2. Expected Impact on the Prices of Non-Traded Goods**

As stated earlier, trade and exchange rate policies have no direct instantaneous impact on the prices of non-traded goods; however, the policymakers expected that, after a lag, the slowdown of inflation in traded goods would indirectly influence the inflation rate of non-traded goods through the effect of relative-price changes on demand for such goods.<sup>0</sup>

As long as inflation in non-traded goods proceeded at the same trend rate observed before the policy package was introduced, overall inflation would stay above the rate of devaluation, and real revaluation of the currency—as measured against the WPI and, even more, when measured against the CPI—would take place. Therefore, to the policymakers, the crucial issue was how long would it take for the policy to indirectly reduce inflation of non-traded goods down to a level compatible with the devaluation schedule. That adjustment period was assumed to be short, at most some four quarters, and presumably less (Gil, 1980).<sup>0</sup>

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<sup>0</sup> It was also expected that reducing barriers to imports would lead to a greater share of traded goods in the economy, with previously non-traded goods in fact becoming traded as tariffs fell below prohibitive levels.

<sup>0</sup> They also expected that the slowed-down devaluation schedule would dampen overall inflationary expectations. I will later refer to the agent’s doubts as to the medium-term feasibility of the policy.

<sup>0</sup> During most of the military dictatorship, Mr. Gil was the president of the Central Bank. He was the driving force behind the adoption and later obstinate defense of the slow crawl. His article is the closest to being an official policy statement.

### 3. The Importance of Disinflation in Traded Goods

I have found no evidence suggesting that at any time did the policymakers harbor doubts on the effectiveness of the law of one price to decisively and immediately reduce the rate of inflation of traded goods (Gil, 1980).

Once that happened, the road to achieving a low rate of inflation was believed to be open, according to numerous testimonies. For instance, Corbo, de Melo, and Tybout (1986) state that:

Proponents of the new approach perceived that purchasing-power parity and interest-parity—both resulting from the forces of competition in freely operating commodity and capital markets—would obtain fairly rapidly... The law of one price holds for tradables... The economy should stabilize without undergoing the recession associated with traditional contractive measures... The policymakers believed that the rate of domestic inflation would converge rapidly to world inflation simply because of competitive pressure (pp. 6-8).

However, if for whatever reason the predicted disinflation in traded goods did not take place quickly enough, overall inflation would hardly abate and the real exchange rate would appreciate sharply. This is because, with no significant reduction in the inflation rate of traded goods, there would be no downward pull on inflation in non-traded goods, the overall inflation rate would remain largely unabated, and currency revaluation in real terms would persist

This was, in fact, what happened. Figure 1 shows the very large fall in the real exchange rate that took place in the period starting October, 1978. The real exchange rate used here is the official instrument of the Central Bank of Uruguay (BCU) and to prepare it, the nominal exchange rate is deflated by the WPI, taking into account the behavior of the WPIs and the exchange rates of the nine major trading partners, duly weighted according to volume of trade. This index is generally recognized as the best available.<sup>0</sup> However, I will later refer to the behavior of a “real” exchange rate defined simply as the ratio of the nominal rate to the CPI for two reasons: one is that it behaves very much like the real exchange rate of the Central Bank, and the other is that the public in general tends to compare the nominal exchange rate to the CPI when using the notion of “real exchange rate” in the formation of expectations.<sup>0</sup>

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<sup>0</sup> Katseli (1979 and 1980) discusses the issue of the “right” composition of the basket of foreign currencies to be used in estimating  $p^*$  and, by and large, comes to the conclusion that, in general, any proxy for  $p^*$  will be poor on theoretical and practical grounds.

<sup>0</sup> As pointed out earlier, a second route through which a slow crawl was expected to induce disinflation was through the agents’ expectations. However, when those agents perceived a sharp revaluation of the currency, their expectations became influenced by doubts as to how long that situation—hence, the policy—would last.



**TABLE 1**  
**URUGUAY: EXCHANGE RATES AND PRICES, 1978-83**

		Nominal Rate	CPI	WPI	RER of the BCU
		(a)	(b)	(c)	(d)
1978	Jan	5.45	73.8	72.2	98.0
	Apr	5.53	81.9	80.6	92.6
	Jul	6.12	89.5	86.8	99.1
	Oct	6.64	100.0	100.0	100.0
1979	Jan	7.13	112.4	116.5	93.6
	Apr	7.47	126.3	135.9	88.3
	Jul	7.83	145.8	161.5	82.7
	Oct	8.21	72.8	188.2	77.3
1980	Jan	8.56	202.1	198.8	75.2
	Apr	8.92	220.7	212.2	73.3
	Jul	9.29	249.9	229.5	76.9
	Oct	9.68	272.4	247.5	78.4
1981	Jan	10.04	284.5	256.8	80.5
	Apr	10.41	304.3	265.1	77.1
	Jul	10.79	328.7	276.7	67.9
	Oct	11.19	354.4	301.4	66.6
1982	Jan	11.64	364.0	294.2	72.7
	Apr	12.00	371.1	297.5	73.6
	Jul	12.59	389.7	315.2	67.1
	Oct	13.38	402.1	323.5	70.3
1983	Jan	30.41	501.1	458.7	115.6
	Apr	33.78	498.1	109.6	109.6
	Jul	33.68	571.2	528.7	104.1
	Oct	37.16	650.4	635.0	99.2

NOTES:

- (a) Monthly averages of daily official exchange rates, pre-announced by the Central Bank of Uruguay, six months in advance. The BCU undertook to trade at that pre-announced price any quantities of foreign exchange, thus in fact offering exchange rate insurance.
- (b) Official CPI index of the Dirección General de Estadística y Censos, with Oct 1978 = 100.
- (c) Idem for WPI.
- (d) Official WPI-deflated exchange rate of the BCU, trade-weighted according to trade with the nine major trading partners; index with Oct 1978 = 100.

It is noticeable that the real exchange rate fell precipitously through 1979, levelled off during most of 1980, undertook another large fall in 1981, and again levelled off in 1982. This latter stabilization was due to the fact that, in 1982, inflation did slow down: monthly inflation as measured by the CPI was close to 6.2 percent in 1977-81, whereas it fell to 4.4 percent in 1982. However, the size of the fall in the real exchange rate that had accumulated up to 1982 was in the order of thirty percent.

It should be clear, therefore, that the policy package did not operate smoothly, as the policymakers had expected. The data shown to this point is, however, consistent with the conventional explanation that relies on the behavior of the prices of non-traded goods. In what follows I shall picture and interpret the behavior of traded-goods prices to show they did not follow the law of one price, and provide an explanation for that phenomenon.

## **B. An Explanation for the Observed Facts**

This section will firstly show that the import increase attendant on the reforms was heavily concentrated in durable consumer goods, an outcome that was to be expected since those goods were most heavily protected. I will later argue that such markets were, precisely, those where imperfect competition was most prevalent. On the basis of the above, in section C. I will develop a model that explains why, in imperfect markets, the law of one price should not be expected to hold.

### **1. Composition of Imports and the Behavior of Their Prices**

#### **a. Concentrated Imports**

In order to begin an explanation of price behavior, it is useful to examine two points: first, which traded goods would have their prices directly affected by the policy package and, second, to what extent would the policy result in reductions in their domestic inflation rate.

Uruguay as a typical small semi-industrialized country, had become fairly proficient in the production of “light” consumer goods—e.g. wage goods such as processed food, textiles, clothing, or simple furniture—and had not gone heavily into intermediate and capital goods (Schydlofsky, 1973).<sup>0</sup> It follows that such categories were not heavily protected before the policy was introduced and that the heaviest cuts in protection fell on durable consumer goods, a line that Uruguay was then producing at very high cost behind correspondingly high barriers to

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<sup>0</sup> According to the 1978 Industrial Census, “light” industries accounted for 74% of all manufacturing jobs, for 63% of output and for 57% of value added. Most of the rest—“heavy” and intermediate industry—is accounted for by the State-owned oil refinery.

imports. Therefore, the major import increases after liberalization had to concentrate in consumer durables (Hanson and de Melo, 1985).

In fact, this was precisely what did happen. Figures 2 and 3 show that in 1979-81 there was a large increase in imports, that such increase was concentrated in consumer goods rather than in other classes of goods, and that durable consumer goods explained most of that increase. The figures are shown in Table 2. Therefore, the policy package could only directly reduce inflation in traded goods by reducing the inflation rate in those goods that were, in fact, subject to actual competition from abroad: durable consumer goods above all, other consumer goods after that.

It is noticeable in Table 2 that, to some extent, the percentage increases of imports of durable consumer goods are due to their extremely small size before the reform package was applied. This is mainly due to the extremely high and wide protection of the pre-reform years when the only imports allowed in were those that could not be domestically produced: hence, almost ninety percent of all imports were intermediates, mainly oil and industrial inputs. But it should be borne in mind that, in the short run, both oil and industrial inputs are not so price-responsive as they are output-responsive: for instance, oil imports in 1980 in dollars are very close to double what they were before the price increase of 1979, suggesting that the short-run price-elasticity was extremely low, as should be expected in a country that imports all its energy needs.

Therefore, these imports could not be affected by short-run macro policy, and the issue under discussion here—the effect of the (short-run macro) policy on imports and through them, on the domestic price level—can only proceed regarding those goods that were, indeed, directly policy-responsive in the short run. The lowest panel in Table 2 therefore shows only price-responsive, hence policy-responsive, imports. That panel shows that imports of capital goods fell from over 70 to under 50 percent in 1981—which is consistent with the fall in the profitability of domestic industry—while imports of durable consumer goods started at only 6 percent but rose to almost 40 percent in 1981, and the share of non-durables actually fell from 23 to about 15 percent of all policy-responsive imports. Therefore, the argument being made here—that the policy could only act through the imports that most grew, those of consumer durables—still holds in spite of the small initial size of consumer durables' imports.

Given that the policy package could only directly reduce inflation in traded goods by reducing the inflation rate in those goods that were, in fact, subject to actual competition from abroad, the key issue is that, for reasons to be discussed presently, there is an *a priori* likelihood that, in the special case of durable consumer goods, not competition but oligopoly would be the rule, even with liberalized imports.







**TABLE 2**  
**URUGUAY: DISAGGREGATION OF IMPORTS, 1975-82**

<b>Imports (Millions of Dollars)</b>								
<b>Consumption Goods</b>	17.5	24.5	28.7	41.5	78.6	177.8	257.4	99.5
Non-durable	13.9	18.6	19.1	26.3	49.1	74.4	68.9	46.3
Durable and semi-durable	3.5	5.9	9.6	15.2	29.5	103.4	188.4	53.2
<b>Capital Goods</b>	43.3	81.5	120.4	115.2	174.2	275.7	236.3	143.6
<b>Intermediate Goods</b>	495.7	481.1	580.8	600.7	953.5	1227.0	1158.4	814.7
Oil	175.9	186.4	200.6	201.3	230.5	420.2	447.8	415.1
Industrial inputs	229.7	193.2	252.2	276.3	478.3	536.4	461.6	284.2
Other	90.1	101.6	128.0	123.0	244.7	270.3	249.0	115.5
<b>Total Imports</b>	556.5	587.2	730.0	757.3	1206.3	1680.3	1652.1	1057.9
<b>Structure of Imports</b>								
<b>Consumption Goods</b>	3.1	4.2	3.9	5.5	6.5	10.6	15.6	9.4
Non-durable	2.5	3.2	2.6	3.5	4.1	4.4	4.2	4.4
Durable and semi-durable	0.6	1.0	1.3	2.0	2.4	6.2	11.4	5.0
<b>Capital Goods</b>	7.8	13.9	16.5	15.2	14.4	16.4	14.3	13.6
<b>Intermediate Goods</b>	89.1	81.9	79.6	79.3	79.0	73.0	70.1	77.0
Oil	31.6	31.7	27.5	26.6	19.1	25.0	27.1	39.2
Industrial inputs	41.3	32.9	34.6	36.5	39.7	31.9	27.9	26.9
Other	16.2	17.3	17.5	16.2	20.3	16.1	15.1	10.9
Total Imports	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
<b>Structure of Policy-Responsive Imports (Intermediates Excluded)</b>								
<b>Consumption Goods</b>	28.8	23.1	19.3	26.5	31.1	39.2	52.1	40.9
Non-durable	22.9	17.6	12.8	16.8	19.4	16.4	14.0	19.0
Durable and semi-durable	5.8	5.6	6.4	9.7	11.7	22.8	38.2	21.9
<b>Capital Goods</b>	71.2	76.9	80.7	73.5	68.9	60.8	47.9	59.1
<b>Total</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE: Official statistics from the Central Bank.

What might happen—and, in fact, most probably did happen—is that the domestic price of imported durable consumer goods came to be determined by reference to the domestic price of the imperfect substitute that was formerly produced at home. This basically requires a market for durable consumer goods where monopolistic competition is prevalent and a capital market that is imperfect in the sense found in Ramos (1980). The imperfection in this case is that banks will only lend for short periods—because of high and variable inflation—and, more importantly, will only lend against physical collateral. New ventures therefore tend to be self-financed.

The following is a statement of the entrepreneurial point of view on the likelihood of competition, which gives the flavor of the argument to be formalized later.

#### b. The Reverse-Pricing Argument: An Entrepreneurial View

The point was first suggested to me informally by D. M. Schydrowsky and was rephrased dramatically by a dynamic Uruguayan entrepreneur I interviewed in July of 1980 while preparing the material for Mezzera (1980). The interviewee, who happens to be an economist by training but sells stoves for a living, did not use the jargon of the profession as he accurately forecast the failure of the law of one price. The following is a loose translation of his words.

For the last ten years, I have been selling stoves and refrigerators, produced domestically, using molds that respond to the technology—and the looks—of some forty years ago, in fact the production equipment itself is of that vintage. During that time, I have built an excellent reputation because, regardless of modernity, what I sell is readily available, has an ironclad warranty and I provide excellent service.

I am now ready to start selling imported stoves and refrigerators which will merely be assembled here. I have therefore almost shut down domestic production and retained only the assembly line, the appliances are even painted at origin. My costs have gone down dramatically and I will now offer not only a better product but one that will be seen by the consumer as eminently more satisfactory because of the way it looks; in fact I will now be satisfying the need for modernity and “class” by the mere fact of offering coloured appliances with plenty of gadgets instead of the dreary old white stuff that we produced up to now.

I will therefore be able to increase prices as costs go down. The consumer does not know what my costs are; all he sees is a better and better-looking product for which he reasonably expects to pay more than for the domestic-made one.

No, I am not afraid of competition for several reasons; in the first place, everybody else who used to produce durable consumer goods is now doing the same to some extent, so they are highly unlikely to “poach” into my territory. All the funds they can obtain are being funnelled into imports of their own stuff, say vacuum-cleaners or TV sets. Secondly, whoever tries to break into the industry will have to face the fact that I am prepared to flood the market if need be, in which case we will all lose in the short run, but I will retain my market position while he, being a newcomer who has to spend God knows how many months in establishing his distribution network and a solid reputation, gets almost nowhere. Thirdly, after decades of selling stoves and refrigerators my warranty policy and service network are so solidly established, both in reality and in the minds of the consumers, that a newcomer would have to offer impossibly lower prices in order to really lure many customers away from me. Finally, even importing is a costly proposition in terms of initial capital outlay and, as you know, in this country banks

only lend for very short terms; you can be happy when you get a one-year loan, and then only if you can put up your existing firm as collateral, so newcomers are unwelcome. Frankly, I do not see who can self-finance the sort of capital outlay needed to enter the field from scratch in any significant way.

I can therefore look forward to a few years of high profits; after that, the [current trade] policy is likely to be discontinued; anybody can see that shutting down all the import-substituting industry has to be a short-lived experiment.

When re-interviewed in January of 1983 in preparation for Mezzera and de Melo (1985), the same entrepreneur was preparing to resume domestic production to reflect the great increase in the cost of imports caused by the 250 percent devaluation initiated in November of 1982 and, by then, completed. He reported that his 1980-82 profits had indeed soared to previously unknown heights but that the prospects had since become bleak because sales of appliances had been so large in the two previous years that they were bound to remain exceedingly small for a long period of time. This, he said, most likely reflected that consumers, too, had anticipated the demise of the policy and had resorted to speculative buying in refurbishing their stock of appliances.

#### c. The Issue of Imperfect Competition

Behind the entrepreneurial point of view lies a clear conception of his market as imperfect, indeed monopolistic. This is highly likely to have been a fairly frequent situation in a small economy such as Uruguay, whose total GNP then was less than 5 billion dollars (at 1980 prices), with about one-fifth of it being in industry.

Data on concentration ratios for Uruguayan industry is scanty; however, Buxedas and Rocca (1987) report that in 1978 the largest 100 manufacturing firms accounted for 39 percent of all industrial output in Uruguay, as compared to 27 percent in Brazil and 34 percent in the U.S.<sup>0</sup> The same study reports that in ISIC groups 3832 (including radios, TV sets, etc), 3833 (including electrical appliances and household goods), and 3843 (manufacture of motor vehicles), the four largest firms account for 62, 66, and 56 percent, respectively, of total output.<sup>0</sup>

In typically "light" consumer goods industries, such as the four-digit components of ISIC group 321 (textiles, apparel, and leather products), four-firm concentration ratios are reported to be between 19 (for clothing) and 40 percent (for knitting mills); likewise, they are 15 percent for wooden furniture (ISIC group 3320) and 32 percent for ISIC group 3240 (leather footwear).

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<sup>0</sup> The source states that Brazilian data refer to some 90 thousand firms that paid taxes in the late '70s. U.S. figures are shares in manufacturing value added. Data for Uruguay were calculated on the basis of the 1978 industrial census.

<sup>0</sup> The study does not report on ISIC group 3812, which includes the manufacture of stoves among many other metal fixtures for household, office, etc.

Several *a priori* reasons explain such high concentration ratios. The original point is the small size of the market, leading to unrealized economies of scale for even one firm; only one firm or at most a few could exist as long as “made-to-measure” protective barriers were very high. This argument is clear in the case of durable consumer goods and relatively less valid with respect to the production of “light” consumer goods, because there exist fairly efficient technologies to produce these goods at lower output levels than in the durable consumer goods industries; unsurprisingly, the highest level of protection was indeed found in the durable consumer goods industries.

A connected point is that formal capital markets in developing countries tend to be virtually non-existent, and even more so where—as in Uruguay—traditional inflation levels are high, leading the banking sector into short-term lending alone. Hence, investment funds have to be generated out of non-distributed profits of existing firms, or come from abroad. With a very small market and no feasible commercial integration with larger neighbors, foreign direct investment has always been negligible in Uruguay. Thus, domestic outsiders were unlikely to be able to enter sectors that were generating large profits; the entrepreneur’s expression was especially clear in this respect.

In the third place, efficient anti-trust policies are virtually absent, with not a single case having been brought to court in recorded history.<sup>0</sup> Groups are known to form conglomerates including land-ownership, industry, commerce and banking; and firms requiring credit—if only for working capital—fare especially well in closely-linked banks.

Most of these effects can, indeed, be traced back to protectionist policies, and industry concentration would be much lower were it not for several decades of import substitution. But the elimination of barriers to trade does not necessarily entail the simultaneous elimination of market imperfections and, as in any second-best approach, does not necessarily lead to gains in welfare (Lancaster and Lipsey, 1965).

#### d. Composite Goods and Imperfect Competition

The entrepreneurial view reported above suggests that, in ways that are inseparable from the consideration of imperfect markets, from the point of view of the consumer many durable consumer goods may have been a composite good made up of the good itself, its attraction for novelty reasons, and the ability of the seller to distribute and service it over its lifetime. Should that be so, demand for these goods would depend not only on price but on the reputation for

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<sup>0</sup> This is spite of open declarations like the following, by a leading producer and importer of durable consumer goods: “until 1979 he had an unspoken agreement with the competition, and they acted as joint monopolists. In 1980 he opened several price wars to push the competition out of the market. Success in these actions has largely been responsible for the firm’s performance” (Mezzera and de Melo, 1985, page 199).

good procurement, distribution, and service that each supplier has—or has not—built beforehand.

Empirical support for this hypothesis is furnished by the evidence in Figures 4 through 6, which show the evolution of prices of different types of imported goods: durable goods in Figure 4, semi-durables (such as clothing) in Figure 5, and non-durables in Figure 6.

Figure 4 shows prices of the some typical durable consumer goods: stoves, refrigerators and TV sets, and those prices are given as the ratio of the domestic price to the nominal exchange rate, i.e., the domestic price in current dollars. Thus defined, if the law of one price held, these prices should have fallen because tariffs were being cut by no less than 20 percent each year. On the contrary, as from early 1979 these prices increased strongly and, in the case of both stoves and refrigerators, by 1981 they were some 70 percent above their 1978 average. It must be pointed out that precisely these goods were the leaders among those in which the import increases were concentrated.

Figure 5 shows prices of semi-durables, in this case outer clothing, where the same behavior is observable. In this case, the accent of the argument must lie on the importance of reliability and on the distribution network rather than on servicing.<sup>0</sup>

Figure 6 shows the case of imported Scotch whisky, and compares it to a non-imported imperfect substitute (beer).<sup>0</sup> Indeed, for whisky, the law of one price worked, and its price fell, in terms of dollars, by almost 40 percent in three years.<sup>0</sup> The compound rate of change—a yearly fall of 16 percent—is quite close to the tariff reduction of the period. It is also interesting to note that the initial impact of the policy package is a sharp price increase—from October of 1978 through mid-1979—as the CPI began to include a larger proportion of Scotch whisky, which was more expensive than the domestic brand. Since the distribution-and-service argument does not apply to non-durable consumer goods, domestic supply of the import increased very rapidly—as witnessed by the import figures—through multiple importers; price fell as predicted by the theory.

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<sup>0</sup> Imported clothing, for example, may be attractive but low-quality; as long as it was untested, doubts about the quality of the good might loom large in the mind of the consumer. One way to circumvent this problem would be for the consumer to place faith in a well-known distributor of clothing who, while selling domestic clothing before imports were allowed in, had built a trustworthy reputation. Many micro models of imperfect competition under uncertainty use similar assumptions.

<sup>0</sup> Mostly owing to high transport costs, and also to the good quality of the domestic product, beer was not imported to any significant extent.

<sup>0</sup> Since whisky is not in the CPI—from where the other price data come—its price was obtained from a local importer; dates on the figures obtained did not coincide with those for the CPI. The consequent smoothing out accounts for the regular fall in dollar-prices of whisky. However, the dollar-price of beer, which does come from the CPI, exhibits a similar regularity, suggesting the smoothing-out did not introduce significant bias.

figure 4

figure 5

figure 6



On the other hand, the dollar-price of beer rose very quickly with the domestic currency revaluation and tumbled rather than fell with the devaluation in November, 1982; the end result of the period is that, as from early 1983, relative prices again stood at their pre-reform level.

One word of caution: I am not arguing that traded-goods prices led price increases. As shown in Figure 7, inflation remained highest in non-traded goods.<sup>0</sup> No doubt, this is explained by the conventional approach that says that the prices of non-traded goods were high because loose fiscal and monetary policies so allowed.

However, my point remains valid because only the “well-behaved” traded goods approximate the behavior assumed by the theory. The prices of “mis-behaved” goods—the average of all imported durable goods for which prices are available—stay well above the predictions of the theory, and thus exert no downward pull on the prices of non-traded goods. Had there been a downward pull, through cross-elasticities of demand effects, the prices of non-traded goods would have had to follow suit at some stage, regardless of fiscal and monetary policy, and the policy package would have worked.

## 2. Effective Barriers to Entry

### a. The Doubtful Profitability of “Poaching”

The above facts strongly suggest that markets were indeed imperfect, and that the previous existence of a distribution-and-service network played an important role in determining which markets became competitive after the reform and, very particularly, at what speed this happened.

In what follows I will provide a very simple model to explain such stylized facts. I will start out from a situation where a monopoly existed under trade barriers; when such trade barriers are dramatically reduced, a potential competitor carries out his calculation of the profitability of poaching into the monopolist’s territory.

Figure 8 shows the case of a potential competitor, labeled Firm 2, attempting to enter the market for the composite durable consumer good (“well-serviced refrigerators”) where Firm 1 is a monopolist<sup>0</sup> owing to the fact that, before liberalization, it was the only domestic producer of the hardware involved. The demand curve for each firm is as follows:

$$Q_i = (a + PS) - bP_i,$$

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<sup>0</sup> The data representing non-traded goods prices in Figure 7 are an average of the corresponding goods and services in the CPI.

<sup>0</sup> Or a group of independent firms that act collusively. For ease of presentation, I shall use the term monopolist to include both cases, with no loss of generality. See Varian (1978) or Helpman and Krugman (1985).

figure 7

figure 8

where  $a$  is the intercept for a newcomer,  $PS$  is the integral of past sales intended to capture the effect of the advantages of the incumbent firm in terms of having achieved consumer confidence, a non-negative number, and the derivative of  $Q$  with respect to the relative price is, as usual, negative.

The effect of  $PS$  is that, as shown in Figure 8, demand for Firm 2 is much lower than for Firm 1, and this situation remains for a long period, while Firm 2 establishes its network and builds up its reputation (i.e., develops its own  $PS$ ). In other words, the demand curve for Firm 2 drifts up slowly, over a number of years, at the end of which it catches up with Firm 1.<sup>0</sup>

In principle, Firm 2 should also be expected to undergo some learning process on the cost side; however, to keep the diagram uncluttered, the cost curves of both firms are drawn as identical.

Even so, Firm 2 is seen to make almost no profits during a long period which in this particular case includes establishing, in the minds of consumers, an image of reliability in service. There a long period during which demand for the output of Firm 2—a “well-serviced refrigerator”—is slowly converging to that of Firm 1. Assume there is such a Firm 2 which is willing to withstand the situation until, in year  $n$ , its demand curve becomes identical to that of Firm 1.<sup>0</sup>

Sharing total demand in halves is the best outcome that Firm 2 can hope for, assuming the leader takes no action to prevent the newcomer from doing so. Even in that case, total profits are much smaller than those reaped initially by Firm 1. It follows that Firm 2 will not have a strong incentive to enter this market. In particular, if Firm 2 is an oligopolist in the market for a different durable consumer good, defending that market from “poachers” there is a much sounder proposition than striving to compete away Firm 1’s monopolistic position.

The following was reported after a round of interviews with firms, held just after the November, 1982 devaluation:

Three firms (out of five producers of consumer durables) undertook imports of the same type of goods they produced. One was the automobile assembler... The other two were the appliance producer and the non-wool textile producer. The first firm gave as its main reasons his previous contact with foreign sellers and the capacity to perform maintenance services. The other two added to those reasons an even greater stress on the fact that by importing they increased their elbow-room in determining prices to their own (domestic) production...a heavy weight was attached to the distributing and servicing mechanisms. All in all, *the possibility of taking advantage of lower barriers to imports depended significantly on having earlier been active in similar production, particularly in durable consumer goods.* A big part of the reduction in barriers was captured by the importer rather than by the consumer. After decades of fairly drab national production, the consumer was so eager about having access to novel foreign

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<sup>0</sup> The goods supplied by Firm 1 and Firm 2 are seen as imperfect substitutes by the consumers.

<sup>0</sup> For simplicity, it is assumed that Firm 1 does not react to Firm 2’s entry by changing its price except to reflect the progressive shrinking of demand for its good. This is unrealistic, of course, but diagrammatically convenient.

goods that price-consciousness was severely diminished (Mezzera and de Melo, 1985, page 201, emphasis added).

Very similar expressions are found in Corbo and Sanchez (1985) for Chile and in Petrei and de Melo (1985) for Argentina.

Thus, a situation where each oligopolist ponders the possibility of “poaching” into its neighbor’s territory but is dissuaded from doing so by a calculation like that presented in Figure 8.

The example given above is a simplification on three counts. In the first place, it assumes that the newcomer would not have to incur in fixed costs; in the second place, it assumes Cournot behavior<sup>0</sup> which is not necessarily the best assumption. In the third place, it implicitly assumes that the policy package would remain in place in the long run. Let me introduce all three arguments.

In the first place, should there be fixed costs to be incurred in by Firm 2—as is likely—then this firm would have to count on making significant losses during a rather long period, instead of making “small profits” as stated above. In terms of Figure 8, average total costs of Firm 2 might well be above the 200-mark for initially small sales, its price being in the neighborhood of 150.<sup>0</sup>

In the second place, the calculation of Firm 2, as presented above, assumes that Firm 1 will passively accept that its monopoly is whittled down by the newcomer. This is the Cournot assumption, often used in oligopoly theory, but it is not a reasonable assumption. A more likely event is that Firm 1 would adopt a highly aggressive pricing policy to keep the potential competitor out. Turning to Figure 8 once more, the monopoly price of 300 which was being charged might be reduced to any level above 100—the monopolist’s marginal cost—thus vastly reducing Firm 2’s possibilities of expanding its share of the market.<sup>0</sup>

In the third place, if the policy package were to remain in place forever—the assumption underlying the “steady-state” solutions of macro theory—short-run losses might be recouped in the long run. But agents’ expectations, as reported here, were that the demise of the policy was to be expected fairly quickly. Therefore, any investment decision had to be founded on quick results; which were unattainable by “poaching” into the grounds of existing monopolies. I turn to that issue in the following section.

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<sup>0</sup> The Cournot assumption is that Firm 1—in the present case, the incumbent monopolist—will not change its behavior as a result of the actions of Firm 2, in this case that firm that attempts to enter the market.

<sup>0</sup> The ATC curve for Firm 2 is not drawn in, to avoid excessively cluttering the diagram.

<sup>0</sup> This is, precisely, what the monopolistic stove-seller said he might do to stave off competition.

#### b. Expectations About the Duration of the Policy

An equally important issue is that of expectations about a potential demise of the policy, expressed so forcefully by the entrepreneur cited above.

Mezzerà and de Melo (1985) report abundant evidence, from a variety of entrepreneurs in different activities, that they considered this policy to be largely untenable in the medium term. Expressions like “anyone can perceive that shutting down the industry has to be a short-lived experiment” cropped up consistently.

The basis for such expressions was the entrepreneurial perception that inflation—contrary to theory—was not being significantly reduced, that currency overvaluation was to be expected to increase rather than fall, that continued existence of a domestic industry was not compatible with such massive overvaluation, and that the policy was not going to be maintained once the economic authorities realized the cost of the experiment.

The interviews held in early 1983 led us to sum up the point as follows:

The interviews confirmed that, during 1974-78...interviewees...perceived the set of incentives provided by the reforms to be credible at the time... But interviewees responded overwhelmingly that the anti-inflationary program was not credible and that they “retrenched awaiting better days” during 1979-82. This attitude was reinforced by the increased uncertainty that resulted from several policy reversals (Mezzerà and de Melo, 1985, page 203).

And also:

Thus, even though firms believed *that the real appreciation of the exchange rate was untenable in the medium run*, they had to adjust in the short run... (Mezzerà and de Melo, 1985, page 190, emphasis added).

The outcome during 1979-80 was a slowdown in investment in sectors producing durable goods, voiced in those same interviews as based on extreme uncertainty as to the future course of prices—including the exchange rate—and as to comparative advantage by sectors. The outcome during 1981 and particularly 1982 was a concerted attack on the level of reserves of the Central Bank, which was made in anticipation of a devaluation and, as such moves are wont to do, became a self-fulfilling prophecy (Krugman, 1979; Connally and Taylor, 1984).

As regards the situation described here, and specifically the prevalence of monopolistic supply in the midst of imports, beyond doubt uncertainty provided a powerful argument against carrying out the investments needed to import, distribute, and service durable consumer goods.

#### c. Monopoly in Imports

It was thus likely that domestic producers of the imperfect substitute of the imported hardware would retain their pre-reform oligopolistic positions. In that case, the liberalization effort

would induce large increases in imports of durable consumer goods but very little fall in their domestic prices, as the former producers of the domestic imperfect substitute now turned to importing the hardware.

As long as no other firms enter the market, a firm like Firm 1 in Figure 8 would retain its monopoly power over the market for the composite consumer good and have two sources of supply: the domestic good and its imported imperfect substitute.

In what follows, I will use a model that explains the consequent market equilibrium.

### C. The Market for Durable Consumer Goods

#### 1. Market Equilibrium

The situation is one where the firm that used to monopolize the domestic market before the reform, by selling and distributing a domestically produced consumer good, now remains a monopolist but can choose from two sources of procurement: the domestic source, labeled good D, and an imperfect substitute, labeled I, which is imported.

I will follow Cheng (1988), Dixit (1988), Levy and Nolan (1989) and others in assuming a separable utility function like:

$$(1) \quad U^{\sim}(I,D,z) = z + U(I,D),$$

where I and D are as described *supra* while z is a bundle of all other goods consumed, with fixed relative prices among them, which also serves as a numeraire.

What is new here is, firstly, that consumers derive different utility levels from the consumption of either I and D, or from a combination of both.<sup>0</sup> Secondly, only one monopolistic firm supplies both I and D; this monopolist may—and did—successfully charge different prices for them, as they are imperfect substitutes, and may choose from different sources of procurement.

Still following the literature, I assume that both the average and the marginal cost of producing D are constant over the relevant range, while the cost of I is constant in terms of foreign currency since it is the CIF price; it will later be affected by changes in both the real exchange rate and tariffs.

Likewise, as in Levy and Nolan (1989), I assume that the subfunction U(x,y) takes the form:

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<sup>0</sup> It is not necessarily the case that consumers will demand one unit of these goods per period: one house often contains more than one TV set, owners of second homes will use two refrigerators, and many families own more than one car.

$$(2) \quad U(D,I) = a_D D - (b_D/2)D^2 + a_I I - (b_I/2)I^2 - kDI, \quad 0$$

where  $k$  and all  $a$ 's,  $b$ 's  $> 0$ , and we define  $H = (b_I b_D - k^2) > 0$ .

This functional structure allows me to derive demand functions for both  $D$  and  $I$  which are independent of  $z$ , but  $z$  remains as a numeraire and an index of the rest of the goods demanded; also,  $k$  gives an indication of the substitutability between  $D$  and  $I$  (Levy and Nolan, 1989). Finally, as a useful shortcut to consumer surplus, the utility function implies that the income elasticity of demand is zero, thus allowing me to calculate consumer surplus in a simple fashion.

Maximizing consumer utility subject to the budget constraint leads to the inverse demand functions:

$$(3a) \quad p_D = (a_D - kI) - b_D D$$

$$(3b) \quad p_I = (a_I - kD) - b_I I$$

And also:

$$(3c) \quad D = (1/b_D)(a_D - kI - p_D)$$

$$(3d) \quad I = (1/b_I)(a_I - kD - p_I)$$

On the production side, we find a monopolist who can choose from two independent constant-cost sources of supply, one for each imperfect substitute,  $D$  and  $I$ ; therefore, in either case he faces a constant marginal-cost curve. His total profit function is the sum of profits made by selling  $D$  and profits made by selling  $I$ , in each case facing a downward-sloping demand curve with an associated marginal-revenue curve. Such demand and marginal revenue curves are interdependent through the effect of the substitutability coefficient  $k$ .

$$(4) \quad \pi = \pi_D + \pi_I = p_D D - c_D D + p_I I - c_I I$$

By substituting (3a) and (3b) into (4) I can write:

$$(5) \quad \pi = (a_D - kI - b_D D)D - c_D D + (a_I - kD - b_I I)I - c_I I$$

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<sup>0</sup> Results from this functional structure turn out to have particular qualities. Mezzera (1990) shows a more general functional structure which essentially leads to the same results.



Taking derivatives with respect to both imperfect substitutes I find the first-order conditions to be:

$$(6a) \quad / D = a_D - 2kI - 2b_D D - c_D = 0$$

$$(6b) \quad / I = a_I - 2kD - 2b_I I - c_I = 0$$

After some manipulation this leads to the equilibrium quantities:

$$(7a) \quad D = [b_I (a_D - c_D) - k(a_I - c_I)] / 2H$$

$$(7b) \quad I = [b_D (a_I - c_I) - k(a_D - c_D)] / 2H,$$

where, as defined earlier,  $H = (b_D b_I - k^2) > 0$ .

Expressions (7) bear a close conceptual similarity to those that show up in the usual equilibrium condition for a monopolist selling a single good, the difference with the usual case being given by the interaction between the demand curves.

From equations (3) and (7) I can derive the equilibrium prices, which turn out to be the familiar expressions:

$$(8a) \quad p_D = (a_D + c_D) / 2$$

$$(8b) \quad p_I = (a_I + c_I) / 2,$$

implying that the profit-maximizing prices are found as in the usual cases of monopoly, regardless of the value of  $k$ , the shift parameter linking the demand curves.

The comparative statics of the solution (which are only shown for the domestic good, those for  $I$  being parallel) are quite straightforward:

$$(9a) \quad D / c_D = - b_I / 2H < 0$$

$$(9b) \quad D / c_I = k / 2H > 0$$

$$(9c) \quad p_D / c_D = 1/2$$

$$(9d) \quad p_D / c_I = 0$$

Please note that, as usual, own-cost reductions are only partially reflected in price cuts, since the monopolist manages to retain one-half of the improvement; whereas changes in the cost of one good do not affect the equilibrium price of the other good.

In both cases, the first derivative of the equilibrium quantity with respect to own-cost is negative (an increase in own-cost will lead to lesser output), whereas the first derivative with respect to the other good's cost is positive (an increase in one good's cost will lead to larger output of the other good).

All second derivatives with respect to either cost are zero, since costs are linear.

## 2. Market Equilibrium in the Specific Context of the Reforms in Uruguay

Now consider that  $c_I = P^{CIF} * (\text{REER})$ , where REER represents the real effective exchange rate, i.e. that which takes into account the effect of changes in tariff levels. Given that  $c_I / (\text{REER}) > 0$ , a cut in the real effective exchange rate will involve, according to equations (8), no change in the price of the domestic good and a fall in its sales equivalent to  $(k/2)(b_D b_I - k^2)$  times the cut in the REER. Notice that, if  $b_D b_I \gg k^2$ , then  $k/2H$  is likely to be very large.<sup>0</sup>

It useful at this stage to look at the (policy-induced) limits within which  $c_I$  can move and still have competition between  $c_D$  and  $c_I$  in the domestic market. In (7a), by making  $D = 0$ , I find the lower bound of  $c_I$  below which the imported good alone is sold in the market. Likewise, by making  $I = 0$  in (7b), I find the upper bound of  $c_I$  above which the domestic good alone is sold:

$$(10a) \quad c_I^{\min} = a_I - (b_I / k)(a_D - c_D)$$

$$(10b) \quad c_I^{\max} = a_I - (k/b_D)(a_D - c_D)$$

$$(10c) \quad c_I^{\max} - c_I^{\min} = (H/kb_D)(a_D - c_D)$$

It seems clear that, before the reform, protection against imports was prohibitive in the sense that  $P^{CIF} * (\text{REER}) > c_I^{\max}$ , thus resulting in domestic consumption of D alone.

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<sup>0</sup> The slope of the inverse demand function,  $b_D$ , is the reduction in the price of D that results from selling one more unit of D;  $k$  is the reduction in the price of D that results from selling one more unit of I; therefore, it is likely that both slopes are not very different and that  $k$  is close to the same figure. In that case,  $H = b_D b_I - k^2$  would be small.

It is also worth noting that the space for competition as shown in (10c) may well be a narrow band if  $H$  is small. Should that be so, further cuts in protection need not be very large before they involved the result  $c_I < c_I^{\min}$ , then  $D = 0$ .

The process can now be simulated with figures made to fit the actual evolution of quantities sold and prices charged for two imperfect substitutes—a domestic stove and an imported one—where the perceived quality is higher for the imported brand, and the landed cost of it falls over time as protection is reduced and the real exchange rate falls.

Table 3 shows the evolution of  $c_D$  and  $c_I$ , both before the reforms—when a made-to-measure protection level is assumed—and during three periods after the reforms were initiated. The costs are given in CPI-deflated terms, and the cost of  $D$  is assumed to rise as the CPI; therefore, in the table, its costs are shown as constant.

Table 3 is built on the basis of reasonable linear demand functions. Demand for the import has a higher intercept, reflecting the consumers' eagerness for it before import barriers were lowered; and a steeper slope, reflecting that price consciousness is relatively scarce among eager customers of the novelty good. The cost of  $D$  remains constant in terms of the CPI—in other words, it increases just like average inflation—whereas that of  $I$  reflects a constant CIF price, the fall in the nominal exchange rate as deflated by the CPI—to maintain consistency with the cost of  $D$ -, and the fall in tariffs as it actually occurred. Assuming a value of unity for  $k$ , the table shows levels of sales, prices and profits accruing to the monopolist as protection was progressively reduced.

The table shows that the share of the domestic good falls from an initial 100 percent—when protection was prohibitive—to only one third in five periods—which, as defined, closely correspond to calendar years 1978-82 and are so labeled. Accordingly, its profitability falls significantly.

The average price of “a consumer durable” as registered in the CPI, i.e. by using the weighted average of artifacts actually bought at different prices by the representative consumer, rises sharply at the beginning and then diminishes very slowly in “real” terms—i.e. as deflated by the CPI-, thus mimicking the evolution of the official price index.

However, when perfect competition is assumed, in the lower panel of the table, we see that sales rise to double what they were under monopoly—as is logical because now the demand curve and not the marginal revenue curve are made equal to cost. Market losses by the former domestic monopolist are just as large as before. Under perfect competition, total expenditure in this consumer durable is less than one third of what it was under monopoly, a pure price effect since sales are twice as big under competition, while the price falls, actually plummets, as imports flow in; which is what the law of one price would predict in competitive markets.

TABLE 3

**THE MARKET FOR DOMESTIC AND IMPORTED CONSUMER DURABLES:  
RESULTS UNDER DIFFERENT MARKET STRUCTURES**

	1978	1979	1980	1981	1982	Annual Rate of Change
<b>1. Values of the parameters</b>						
ad	125	125	125	125	125	
bd	3	3	3	3	3	
cd	20	20	20	20	20	
ai	250	250	250	250	250	
bi	5	5	5	5	5	
ci	135	86.5	47.0	29.2	17.8	
k	1	1	1	1	1	
<b>2. Results under monopoly</b>						
D	14.6	12.9	11.5	10.9	10.5	-6.5
I	0.0	13.8	18.0	19.9	21.1	11.3 <sup>a</sup>
D+I	14.6	26.7	29.5	30.8	31.6	16.6
% D/(D+I)	100.0	48.4	39.0	35.3	33.1	-19.8
pd	72.5	72.5	72.5	72.5	72.5	0.0
pi	192.5	168.3	148.5	139.6	133.9	-7.0
P, average	72.5	121.9	118.9	115.9	113.6	9.4
TED	1061.6	936.0	833.6	787.7	758.2	-6.5
TEI	0.0	2316.4	2673.3	1388.6	1533.9	5.1 <sup>a</sup>
TE	1061.6	3252.4	3506.9	3566.6	3587.2	27.6
Profits D	768.8	677.8	603.7	570.4	549.1	-6.5
Profits I	0.0	1125.4	1827.9	2197.1	2452.2	21.5 <sup>a</sup>
Profits, total	768.8	1803.2	2431.5	2767.5	3001.3	31.3
<b>3. Results under perfect competition</b>						
D	22.0	25.8	23.0	21.7	20.9	-1.0
I	0.0	27.5	36.0	39.8	42.2	11.3 <sup>a</sup>
D+I	22.0	53.4	59.0	61.5	63.2	23.5
% D/(D+I)	100.0	48.4	39.0	35.3	33.1	-19.8
pd	72.5	20.0	20.0	20.0	20.0	-22.7
pi	228.0	86.5	47.0	29.2	17.8	-39.9
P, average	72.5	54.3	36.5	26.0	18.6	-23.9
TED	1595.0	516.4	459.9	434.6	418.3	-23.5
TEI	0.0	2381.9	1690.9	1163.7	753.6	-25.0 <sup>a</sup>
TE	1595.0	2898.4	2150.8	1598.3	1171.9	-6.0
Profits D	1155.0	0.0	0.0	0.0	0.0	-99.9
Profits I	0.0	0.0	0.0	0.0	0.0	0.0
Profits, total	1155.0	0.0	0.0	0.0	0.0	-99.9

NOTE: The CIF price of I is assumed to be 15; pre-reform, a prohibitive protection level sets it to a level where I=0; the initial cuts in protection imply eliminating non-tariff barriers and reducing tariff barriers, such that in Period 1 tariff is still 125 percent; in periods 2 and 3

tariffs continue to be cut as scheduled and the real exchange rate falls at the rate it did when deflated by the CPI to be consistent with the cost of  $c_D$ .

This point is a formalization of the argument voiced by many industrialists, who claimed that there was, in actual fact, no “water” in the tariff once real revaluation of the currency took place.<sup>0</sup> Their claim cannot have been totally groundless, given the behavior of industrial GNP as shown in Table 4.

**TABLE 4**

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**URUGUAY: BEHAVIOUR OF SOME AGGREGATE VARIABLES  
(yearly growth rates)**

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	1975-78	1979	1980	1981	1982	1983
<b>GNP:</b>						
<b>Total</b>	3.5	6.2	6.0	1.9	-9.5	-5.8
<b>Industrial</b>	4.6	7.1	2.4	-4.6	-16.9	-3.0
<b>Other Tradeables</b>	-0.6	-0.4	16.2	5.5	-7.3	2.1
<b>Non-Tradeables</b>	3.8	7.0	5.8	3.7	-7.4	-6.9
<b>Investment</b>	17.4	23.9	5.4	-8.9	-18.2	-36.6
<b>Priv. Cons.</b>	0.2	5.4	8.6	2.4	-9.7	-9.6

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SOURCE: Banco Central del Uruguay, *Boletín Estadístico*.

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Though the disastrous falls of 1982-83 are the result of the debt crisis, two things should be pointed out: that the economic policy of 1978-82 led to large increases in indebtedness that had significant effects on the size of the debt crisis for Uruguay, and that manufacturing output slowed down in 1980 when the rest of the economy was still doing very well, decreased in 1981 when total GNP was still managing to grow, and thereafter fell much faster than the aggregate.

### III. Conclusion

This paper has described a case in which protection is cut through elimination of non-tariff barriers, reductions in tariffs, and a slow crawl that lets the exchange rate increase by less than any measure of the differential between domestic and foreign inflation.

The policymakers who implemented such a policy package expected that the law of one price would hold instantaneously for all tradeable goods; the consequent reduction in the inflation rate for tradeables would exert a downward pull on the inflation rate for non-tradeables; after a

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<sup>0</sup> The industrialist whose expressions are reported *supra* informed that he had in fact shut down domestic production.

short adjustment period, domestic inflation would converge to international levels with little if any reduction in domestic output.

This paper developed a theoretical framework where those goods most affected by cuts in protection are sold in markets where competition is imperfect. As a consequence, the model shows that the law of one price does not hold in the imperfect market.

In addition, the model detects a large increase in sales of the imported good, consistently with the large increases in total imports—and, even more so, in imports of consumer durables—during the period.

In the third place, the model detects a very large fall in sales of the domestic good, thus accurately depicting the large reduction in industrial output observed during the period, contrary to the theoretical claims of the policymakers.

In the fourth place, given the way the CPI is estimated, the model closely parallels the evolution of the official price index.

When the same model assumes perfect competition, then the results predicted by the law of one price hold; therefore, we can conclude that the structure of market had a great deal to do with the actual outcome.

I do not claim that these behaviors would hold for all time; but that, lasting as long as they did—over four years—they unleashed the dynamics that are discussed in Mezzera (1990) as leading to the demise of the policy before it could produce the beneficial results predicted by the theory.

Finally, I do not claim that my model accurately represents reality; however, I do submit that this model is consistent with a number of observed, and crucial, facts—something that the theoretical model used by the policymakers cannot claim to do.

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