A Case of a Persistent Disequilibrium Policy: Argentina since 2002 *

by Osvaldo E. Baccino

From the beginning of 2002 the Argentine economy underwent severe shocks. This was the consequence of a sharp depreciation of the currency and the legal and asymmetrical transformation of assets and liabilities from the US dollar to Argentine pesos.

These shocks produced important wealth and income effects which enhanced the economic depression that Argentina was experiencing since 1998. These effects have a serious impact in the long term behaviour of economic agents. In 2003 some recovery of economic activity was gathering momentum. In many circles there was a belief that the recovery implied a process of reverting the downward trend followed by the economy.They thought the economy was being normalised.

However, many analysts from inside and outside the country disagreed with that view. They said that the recovery was a rebound movement produced after a very sharp fall.

The present study concludes that in spite of the economic recovery that may take place for an extended period, the changes implied strong depressive modifications in the long run behaviour of economic agents. This trend exists even when the economic activity undergoes some reactivation. It reflects the long term influence of negative wealth effects.

The measurement of these wealth effects is a very difficult task. First, the corresponding wealth variable must be adequately defined and it has also to be observable. Second, the shocks under analysis are not part of a recurrent phenomenon and there are not sufficient degrees of freedom to treat it statistically.

However, in this paper the wealth effect was indirectly detected by examining the dynamic long and short term behaviour of aggregates like consumption and investment. Therefore, it seems plausible that positive income effects may coexist with a lasting negative wealth effect. This process was supported by a peculiar economic policy destined to keep a considerable undervaluation of the domestic currency. Some disequilibria were maintained through time in some parts of the economy with influences in the relative prices..

The conclusion of this paper is that the recovery did not imply a normalisation of the economy according to past standards. It was also something more than a rebound. The economy goes on reshaping itself in a different way by strengthening the exclusion of part of the productive structure. This might imply further increases in poverty, a persistent unemployment and a less diversified economy in the future.

Summing up, the dynamic behaviour of the main aggregates allows the detection of the impacts of the wealth effects. This is the main point in this study. These influences have been captured by the models constructed in this paper.

* The author is indebted to Juan Carlos de Pablo for his views about expressing the main results of this study. Any mistake remaining in the paper is the author's responsibility.

1. Brief description of the economy and policy

The economy had been suffering a persistent depression since 1998. The process under analysis started with the abandonment of the currency conversion system and the introduction of a floating exchange rate system. Initially, the price of the US$ moved from one to 1.40 pesos to the dollar. These measures took place in the middle of a considerable banking crisis and after the declaration of default of the external debt.[1]

There was also an asymmetrical transformation of the values of assets and liabilities into pesos that people held in foreign currency in Argentina. These measures were taken in a framework of frozen bank deposits already established in 2001 to prevent massive capital flights.[2] The asymmetry caused an arbitrary redistribution of wealth among economic agents.

This weakened the credibility of Argentine public institutions both inside and outside the country. These facts had negative influences on the negotiations for the restructuring of the foreign debt.

The regressive changes in the income distribution were accompanied by an increasing number of conflicts and political unrest. Often some illegal actions were not penalised. There was no clear cut division between economic and political motivations in many mobilisations of unemployed workers.

The economic policy was determined tp keep the domestic currency undervalued and established important export duties. The purpose was to induce exports and to increase fiscal revenues to strengthen the public finances. This approach insured the collection of taxes and allowed a continuous increase in foreign exchange reserves.

2. Shock and policy

This case can be analysed in terms of the Mundell-Fleming approach but including wealth effects. These effects played and still play an important role in Argentina. The depreciation of the peso modified the value of assets and liabilities mostly. Several economic agents were holding assets and had liabilities denominated in US$.[3]

By the way, the economy seriously received a gamut of diverse wealth effects that modified their consumption and saving habits.[4]

The analysis of the effect of the sharp depreciation of the peso is done in terms of the Mundell-Fleming model with the modifications on contractionary effects of the

[1] For a complete description of the instruments of economic policy applied in the period under analysis, see Juan Carlos de Pablo (2005). On the the exchange rate evolution see Baccino (2002, 2003).

[2] The ""pesoification"" and the freeze of bank deposits caused a mass of legal proceedings and a state of continuous conflict between people and the banks..

[3] Bank deposits were converted to peso at the rate of 1.40 pesos per dollar while loans were converted to the rate of one peso to the dollar. Later the price of the US currency went on rising up to a stable level supported by the monetary authority action.

[4] All these changes that affected the wealth of economic agents should be considered in block as producing wealth effects in the aggregate variables. In the analysis they should be separated from those modifications generated by current income.

depreciation of the currency. This was assumed by R.Cooper and clearly stated by Jeffrey A. Frankel in his conference in the IMF Economic Forum[5] in 2004.

Frankel thinks that a devaluation of the currency is contractionary in emergent economies. He gave some explanations about the contractionary effect as follows:

- Adverse supply shock derived from a raise in the prices of imported inputs;
- Prices of consumer inputs go up if real wage rigidity is operative and generate an adverse supply shock in the nontraded goods sector;
- If traded goods prices go up both in exported and imported goods, this affects income distribution;
- The real balance effect. The increase in prices creates a reduction in the real money supply and the result is further contraction.

While the contractionary approach applies to the case of emerging economies, the advanced economies undergo an immediate expansion of output because of the depreciation of the currency. Exports are fostered, imports are curtailed and the improvement in the trade balance expands output because of stimulated competitiveness. On the other hand, in developing countries, and Frankel referred specifically to emerging economies, the devaluation effects work in the opposite direction mainly through limitations in supply.

In the traditional analysis of balance of payments the devaluation creates shifts in the partial equilibrium curves. The IS curve shifts to the right by effect of the improvement in the trade balance. The contractionary approach behaves in the opposite direction: and the IS curve shifts to the left. Other curves shift in the same ways in both approaches.

The graphic analysis works with the usual three curves of partial equilibrium, IS (market of good and services), LM (money market) and B (foreign exchange market). It assumes that the central bank prevents any shift of the curve LM by sterilisation measures. Each curve depicts the combination between the rate of interest and income that equates demand and supply in the corresponding market. This treatment derives from the approach a several economists like Metzler, Patinkin, Mundell, Fleming and others [6].

We start at the point A in figure 1, by assuming a situation where equilibrium exists in each market. Suppose that the Government declares the default of the external debt, foreign finance is abruptly reduced and the domestic currency is strongly depreciated. As a consequence of modifying the exchange rate the curve B1 shifts to the right, that is, to B2.Under the contraction hypothesis of the devaluation the effects on the domestic prices of traded goods create a shift in the curve IS1 to IS2 because of constraining supply and demand. This is the negative effect in emerging economies.

At point B the trade balance shows a surplus and there is some flow of capital abroad and part of the surplus creates an increase in foreign exchange reserves. Suppose that the central bank decides to maintain the new exchange rate by purchasing foreign currency and contracting the loans of the banking system. This sterilisation maintains

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[5] Frankel, Jeffrey A. ,"Contractionary Currency Crashes in Developing Countries", The 5th Mundell-Fleming Lecture, IMF Annual Research Conference, November 2004, Washington D.C., U.S.A.

[6] Burstein, M.L. (1963).

the curve LM almost unchanged. Point B would be the result if no wealth effect derived from the depreciation of the currency was present.

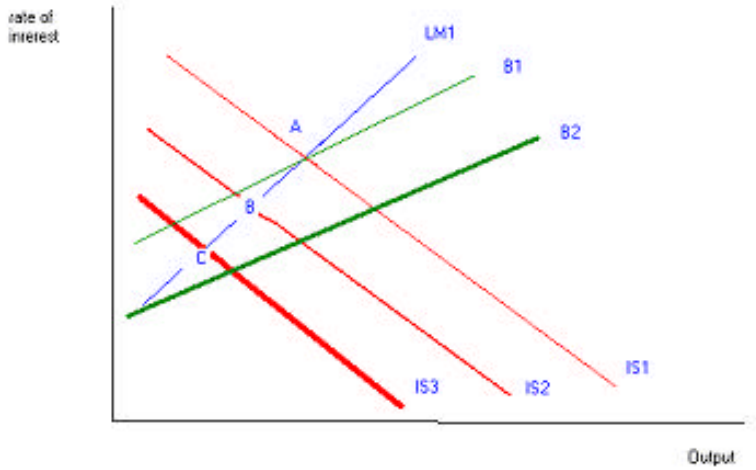

Fig. 1

At the beginning an important part of the population held assets denominated in foreign currency and so it happened with those who had liabilities. The modification of the exchange rate plus the "pesoification" - which introduced important distortions in the financial markets - greatly affected the real economy. The curve IS2 was shifted again to the left, that is, to IS3. The contractionary wealth effect leads the economy to the point C. The wealth effect also takes place in the monetary market. Demand for money shrinks and the excess supply shifts the LM curve to the right. For the sake of simplicity we assume that the sterilisation policy prevents this movement in the LM function. The new situation implies disequilibrium in the foreign exchange market. Meanwhile, the central bank continued its policy of sterilization. In this example the original contractionary effect has been reinforced by the wealth effect. All this implies tremendous political costs in the long run.

The transfer of property created winners and losers. The wealth effect implies additional changes in the partial equilibrium curve IS. It is likely that inside the country there must be more losers than winners. Nonetheless, the transfers of wealth and the break of confidence necessarily had a negative impact on several areas of economic activity. Consumption shrank immediately and most actions from economic agents were related to recovering losses or securing existing assets. On the other hand productive investment abruptly declined.[7]

These effects on investment, consumption and on the demand for money implied a tendency to reduce output and pushed down the rate of interest. The economy had unemployed resources before the depreciation of the currency took place. Later the unemployment worsened.

[7] The bank deposits initially declined as a consequence of the wealth impact. The lack of confidence in the banking system increased hoarding and might have established a floor for the rate of interest like a liquidity trap. This is not considered in the graphic above but the situation was likely to happenat least for some time.

The depreciation of the currency and the defaulted external debt implied reversing the situation of the balance of payments. From a deficit in current account offset by capital inflows the economy passed to have a surplus in the current account. Imports drastically fell and the capital inflows tended to disappear and foreign exchange reserves increased. For a time there could be some capital outflow at the expense of the foreign exchange reserves. The result of the default was to eliminate the foreign capital inflow. The idea of applying Cooper's approach to emerging countries seemed applicable. The risk of default offset the inducement of higher interest rates offered by the emerging country.

The previous analysis showed that the policy of sharp depreciation of the domestic currency in a depressed economy imposed a tremendous blow to the functioning of the economy. This had extensive effects on the distribution of income and in the allocation of resources. The initial impact was recorded by national accounts and business indicators. However, the recovery of economic activity that came later produced a false image that the downswing was being compensated and a future of steady growth should necessarily follow. The government justified its policies in this way.

The following empirical study on some aggregates intends to shed some light on this matter. It is not possible to measure the wealth effect on consumption and investment owing to the complexities of identifying collectively the changes in the distribution of property. In consequence, this analysis will rest on the dynamic behaviour both in the short and long term of the variables as mentioned above. Thus the incidence of the wealth effect will be appraised indirectly through the analysis of observable short and long run behaviour

Let us concentrate in private consumption, investment in equipment and in the relationship between prices and exchange rates.

3. Some Empirical Evidence

The problem of disequilibrium was stated in conceptual terms through general equilibrium theoretical framework. Nonetheless the empirical analysis cannot be performed on a general equilibrium basis. Instead, some partial problems can be detected and so different pictures of reality can be constructed.
Let us start by the examination of the aggregate economic activity in the years 2002, 2003 and 2004. Three models have been estimated with the help of the following software: Pc-Give, STATA, and EViews.

In this period the economy first suffered a sudden slowdown of economic activity but a year and a half later started a new recovery period. This recovery period maintained similar characteristics to those prevailing during the contraction phase. At first sight it shows high rates of growth but a low absorption of unemployment.

A look at the composition of the gross domestic product shows large percentage variations. The figures imply important downswing and upswing.

At first sight, there are three sectors whose performances are very interesting. They are Agriculture, Manufacturing and Construction. They underwent an important reduction in 2002 and a notorious recovery in 2003 and 2004. Agriculture had an exceptional expansion fostered by very favourable prices in the external market particularly theexports of soy. On the other hand the Manufacturing industries

expanded particularly those who had access to the external market as exporters. At first sight this performance seems to reject the contractionary approach of Frankel. However, a more detailed analysis will show quite a different picture.

Table I
Annual Growth of Economic Activity and Employment in 2002-2004 (%)

	2002	2003	2004
GDP at market prices	-10.9	8.8	9.0
Gross Value Added at producer prices	-9.3	8.4	8.4
GOODS	-11.7	14.5	10.4
1. AGRICULTURE	-1.7	7.0	-1.0
2. FISHERIES	-19.3	1.2	-19.0
3. MINING	-3.7	3.7	-0.4
4. MANUFACTURING INDUSTRIES	-11.0	16.0	11.9
5. ELECTRIC POWER, GAS AND WATER	-3.0	6.9	6.6
6. CONSTRUCTION	-33.4	34.4	29.4
SERVICES	-9.2	4.2	6.8
EMPLOYMENT	**-1.7**	**8.7**	**6.4**

Source: INDEC

The expansion in the Manufacturing sector was not uniform. While some exporting activities took advantage of an undervalued domestic currency there were many others which had higher costs. Therefore, they faced a smaller domestic market with lower profits. These contradictory experiences produced by a significant devaluation of the currency are common in the Frankel's case of contractionary devaluation.

The Construction sector declined first but then it started to expand as many people channeled their savings to real estate. This sector suffered the disruption of the financial markets in the interior of the economy and its expansin also reflected the existence of inflationary expectations for the future.

The last row of the table shows the rate of change of employment. Employment did no fall much in 2002 and later it did not increase accordingly with the change in output, particularly in 2004. On average the impact of production was damped. Perhaps, firms felt the Government pressure to postpone dismissals. Perhaps, their expectations about the future suggested waiting. Anyhow, employment was inelastic though the unemployment remained high. Unemployment was 2.8 million person in 2001; 3.2 million in 2002, and 2.5 million in 2003; and 2.0 million in 2004. It must be born in mind that the Government considers as employed also unemployed people who receive subsidies from the Government (Family-chief-programmes). These factors contribute to the inelasticity of the aggregate figures.

The general conditions of a depressive activity are present even in those years of sudden recovery. A high rate of growth is usually considered because of rebounding. On this point, one has to look at the average degree of utilization of existing plant in manufacturing There is a lack of uniformity in the degree of utilization of the idle capacity.

Table II
Average Utilization of Plant Capacity in Industry

Industry	No.	2002 %	2003 %	2004 %
Food and Beverages	1	67.2	68.2	73.1
Tobacco	2	63.9	69.1	65.6
Textile Products	3	45.9	74.1	77.9
Paper and Cardboard	4	78.1	84.1	83.7
Printing and Publishing	5	48.4	62.8	72.4
Products of Petroleum	6	83.1	87.7	88.9
Chemicals	7	62.4	72.8	77.0
Rubber and Plastic Products	8	53.6	60.0	66.3
Non-metal minerals	9	37.7	46.7	52.4
Basic Metal Industries	10	83.8	92.4	93.4
Motor Vehicles	11	20.9	21.9	33.7
Machinery	12	36.0	54.9	60.9

Source: INDEC

At first glance the utilisation of capacity in the period of recovery is not uniform within the manufacturing sector. That means that the response of the economy is not uniform. This inequality gives support to the idea of the contractionary effect of devaluation mentioned by Jeffrey Frankel.

The degree of utilization is very low in many cases. Production evolved as depicted by the industrial production index published by the National Board of Statistics (INDEC).

Table III
Production Index (1997=100)

	2001	2002	2003	2004
Food and Beverages	88.1	79.0	91.4	101.4
Tobacco	101.7	95.7	99.5	106.2
Textile Products	81.5	85.5	92.6	85.3
Paper and Cardboard	66.3	55.6	94.1	100.7
Printing and Publishing	101.7	102.0	115.2	128.3
Products of Petroleum	94.0	65.8	80.6	97.1
Chemicals	99.4	95.5	99.2	101.4
Rubber and Plastic Products	117.5	104.2	120.4	133.8
Non-metal minerals	84.1	77.9	88.8	98.2
Basic Metal Industries	78.5	63.5	80.7	94.6
Motor Vehicles	105.7	113.0	127.1	128.4
Machinery	54.3	37.0	40.2	61.6

Source: INDEC

Now clearly the recovery is not the same for anyone. We can relate the degree of

capacity utilization with production and establish the differences across branches of production. This will help to detect some winners and losers within the area of industrial production.

Now a comparison is made about the response of capacity utilisation derived from an increase in output within the manufacturing sector.

A model of panel data regression was computed on the data above relating capacity percentage to the production index,

$$K_{it} = \text{constant} + \beta P_{it} + \alpha_I + \varepsilon_{it}$$

where

K_{it} = degree of capacity utilization (in percentage) of productive branch i in period t.
P_{it} = index of industrial production of branch i in period t.
α_I = branch-specific- effect

This specification was computed for fixed and random effects and the following tests reject the hypothesis of random alphas.

(1) Breusch and Pagan Lagrangian Multiplier test for random effects,

$H_0 = Var(\alpha) = 0$; $Chi^2(1) = 18.74$ Prob. > Chi^2 = 0.0000.

(2) Hausman Specification Test

H_0 = β(fixed) - β(random) = 0, $Chi^2(1) = 21.18$ Prob. > Chi^2 = 0.0000.

This tests led to the conclusion that the model exhibits fixed effects. That means that the individual effects are correlated with the explanatory variable.

The relevant information regarding the panel data estimation is

Fixed-effects (within) regression	Number of obs = 36
Group variable (i) : industry	Number of groups = 12
R-sq: within = 0.3449	Obs per group: min = 3
between = 0.1060	avg = 3.0
overall = 0.0269	max = 3
	F(1,23) = 12.11
corr(u_I, Xb) = -0.5616	Prob > F = 0.0020
sigma_u 22.160704	
sigma_e 7.1135695	
rho .906585 (fraction of variance due to u_I)	
F test that all u_I=0: F(11, 23) = 19.93	Prob > F = 0.0000

The equation obtained is

$$K_{it} = \underset{(2.69)}{28.22664} + \underset{(3.48)}{0.3904956}\, P_{it} + \alpha_I + \varepsilon_{it} \qquad (3.1)$$

The corresponding branch-specific-effects shown below are ordered according to the size. These effects, denoted as alpha's in the equation, are time invariant and are specific of each particular branch of production. They are expressed in the same unity

as the variable K (capacity). These effects can be used as an index showing the relative easiness to put in motion existing resources across branches of production.

An increase in production does not insure that the plant should be adequately utilised. Given a certain organisation of the process of production, output can be expanded in the short run by intensifying the use of some resources while others remain idle.

Table IV
Difference in Capacity Utilization across Branches

Alpha (fixed effects)		
Branch of Manufacturing	No.	alpha
Basic Metal Industries	10	30.56
Products of Petroleum	6	26.64
Paper and Cardboard	4	21.15
Food and Beverages	1	5.89
Machinery	12	4.31
Chemicals	7	3.96
Textile Products	3	3.45
Tobacco	2	-1.26
Printing and Publishing	5	-12.00
Rubber and Plastic Products	8	-14.91
Non-metal minerals	9	-17.11
Motor Vehicles	11	-50.69

The computed regression suggests that there be an obvious direct relationship between production and intensity of utilization of productive capacity. However the degree of response of the plant utilisation is not uniform across branches of production. This result depends on specific market conditions affecting both demand and supply and they are independent of time.

At the top of the table, Basic Metal Industries, Petroleum refineries and Paper show an outstanding performance. These activities enjoy favourable market conditions and are moving towards the full employment of their resources. As we go downwards in the table the picture changes. Increases in production do not commit the use of resources to the same extent. This implies that production expands without the necessary good expectations regarding the future. The firms do not feel sufficiently comfortable to sustain the increased level of production. They are bouncing after the fall of 2002.

In the bottom of the table is the case of the Automotive industry. It is clear since it was changing the role of the plant in Argentina while transferring most of the production activities to Brazil. Therefore, the firms concentrate on producing some particular items of the motor vehicle production in Argentina. Then, capacity utilization of existing plant becomes inelastic since the factory has to be reorganised.

So far, the analysis is centred on the characteristics of physical expansion. A glance at the movement of prices in the domestic market will help to associate performance with some profit considerations.

Table V
Index of Domestic Producer's Prices (Extreme cases)

(2001Dec=100)	2002Dec	2003Dec	2004Dec
Primary Production	299.64	303.95	308.13
Crude Oil &Gas	396.18	392.05	455.99
Cattle & Milk	283.16	300.74	310.96
Beef products	260.70	280.20	274.93
*****	*****	*****	*****
Fish products	144.81	155.60	155.85
Vegetables	190.05	173.13	136.85
Manufacturing & Electr.	192.01	199.57	219.92
Electric conductors	261.26	287.09	426.20
Basic metal products	266.77	284.75	394.38
Basic Chemicals	282.57	285.11	378.51
Manufact.fibers	312.49	288.53	342.79
Plastic substances	255.08	254.93	334.49
*****	*****	*****	*****
Shoes	135.68	140.97	143.99
Other means of transport	135.83	137.82	143.05
Newspapers	123.60	130.64	141.36
Machine tools	118.54	125.82	139.41
Source:Ipim.INDEC			

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The real exchange rate was kept around three pesos to the dollar during most of the recovery period. The indexes presented in the table correspond to the extreme cases, which are those on top and those at the bottom of the ranking. The ranking was made with respect to the values of December 2004.

This table is quite consistent with the content of the previous tables. All the information gives the idea of an unequal experience in different areas of production. In addition, The movement of prices implies sharp modifications in relative prices.

This kind of reality contradicts or at least cast doubts on the aggregate rates of growth of GDP shown in the Table I. High rates of growth are consistent with heterogeneous performances at firm level. However, lasting high rates of growth are not consistent with unequal performances when they refer to aggregates like sectors, except underconditions of steady growth..

4. Investment in Fixed Capital

The behaviour of investment is analized in terms of durable equipment (both domestic and imported equipment.) instead of dealing with total gross investment. The idea is to concentrate on capital goods directly involved In production and exclude construction.

The behaviour of investment is observed in a dynamic way, trying to separate the short term from the long run.

We start from a general unrestricted dynamic equation and then we imposed some particular restrictions like the introduction of an error correction mechanism (ECM). This is similar to the so-called LSE approach which starts from an unrestricted hypothesis and then sequentially many restrictions are imposed and tested until reaching an adequate specification of the model (Cuthbertson et al. (1992)).[8]

$$I_t = \alpha_0 + \alpha_1 I_{t-1} + \beta_0 Y_t + \beta_1 Y_{t-1} + \gamma_0 IR_t + \gamma_1 IR_{t-1} + u_t \qquad (4.1)$$

This equation can be transformed into another which includes the impact on the dependent variable from itself or feedback effect, the impact of the explanatory variable and the long run response. This specification may be more convenient than the original equation.

For example, Equation (1) can be reparameterised as follows,

$$\Delta I_t = \alpha_0 + \beta_0 \Delta Y_t + \gamma_0 \Delta IR_t - (1- \alpha_1) [I_{t-1} - Y_{t-1} - IR_{t-1}] + (\alpha_1 - 1 + \gamma_0 + \gamma_1) Y_{t-1} +$$

$$+ (\alpha_1 - 1 + \gamma_0 + \gamma_1) IR_{t-1} + u_t \qquad (4.2)$$

From above, a long run static equation can be obtained for I.

$$I_t^* = \alpha_0/(1- \alpha_1) + [(\beta_0+\beta_1)/ (1- \alpha_1)] Y_t + [(\gamma_0+\gamma_1)/ (1- \alpha_1)] IR_t \qquad (4.3)$$

This equation can be substituted in (2) and we get,

$$\Delta I_t = \beta_0 \Delta Y_t + \gamma_0 \Delta IR_t -(1- \alpha_1) [I_{t-1} - \alpha_0/(1- \alpha_1) - [(\beta_0+\beta_1)/ (1- \alpha_1)]Y_{t-1} - [(\gamma_0+\gamma_1)/ (1- \alpha_1)] IR_{t-1}]$$

which is the same as,

$$\Delta I_t = \beta_0 \Delta Y_t + \gamma_0 \Delta IR_t -(1- \alpha_1) ECM_{t-1} \qquad (4.4)$$

where ECM_{t-1} is the difference between current investment and long run investment in durable equipment.

The data sources on this subject were: The Ministry of the Economy of Argentina, Durable Capital equipment and Gross Domestic Product (Millions pesos at 1993 prices); Fundación de Investigaciones Económicas Latinoamericanas (FIEL), Nominal Active-30 days-Interest Rates. The rate of interest chosen in the regressions was a short term rate because of its sensitivity to express the movements of the market in a stage of serious problems in the financial market.[9]

(a) The unrestricted equation

[8] The method of going from general to specific modelling has been discussed by many authors. Charemza and Deadman (1992) give suggestions for further reading and briefly describe the general direction of each approach (p. 115).

[9] Of course, it does not mean that investment was financed strictly at a period of 30 days. In our regressions the rate of interest is rather an indicator of fluctuations of the market than a definite interest rate.

The unrestricted specification was estimated for the sample 1993(2)-2004(4) less 2 forecasts. It corresponds to equation (3.1) above. The figures between parenthesis are the t-statistics.

$$I_t = -2477.4 + 0.82894\ I_{t-1} + 0.11482\ Y_t - 0.091197\beta_1\ Y_{t-1} - 45.797\ IR_t + 8.4497\ IR_{t-1} + u_t \quad (4.5)$$

(-0.618) (9.521) (7.005) (-4.646) (-1.882) (0.301)

R^2 = 0.924249 F(5,39) = 95.168 [0.0000] \sigma = 1503.66 DW = 1.55
RSS = 88179057.38 for 6 variables and 45 observations

Analysis of 1-step forecasts

Date	Actual	Forecast	Y-Yhat	Forecast SE	t-value
2004 3	19441.0	18414.1	1026.86	1633.46	0.628644
2004 4	20899.0	21127.2	-228.156	1597.06	-0.142860

Tests of parameter constancy over: 2004 (3) to 2004 (4)
Forecast Chi^2(2)= 0.48939 [0.7829]
Chow F(2, 39) = 0.22217 [0.8018]

The following expression corresponds to equation (3.3) and explains the investment behaviour in the long term.

The model estimated implies a long run equation

$$I_t = -14482.2 + 0.13812\ Y_t - 218.328\ IR_t\ ; \quad (4.6)$$

(-0.636) (1.654) (-2.078)

WALD test Chi^2(2) = 12.885 [0.0016] **

Coming back to the short term equation a number of test were performed.

Tests on the significance of each variable

Variable	F-test	Value	Probability	Unit-root t-test
INVEST	F(1, 39) =	90.655	[0.0000] **	-1.9648
Constant	F(1, 39) =	0.3816	[0.5403]	
GDP	F(2, 39) =	25.292	[0.0000] **	1.312
intrate	F(2, 39) =	2.2871	[0.1150]	-1.565

Tests on the significance of each lag

Lag	F-test	Value	Probability
1	F(3, 39) =	37.996	[0.0000] **

Roots of the lag polynomials

INVEST	lags 0 - 1	
	0.8289	
GDP	lags 0 - 1	
	0.7942	
intrate	lags 0 - 1	
	0.1845	

COMFAC WALD test statistic table

Order	Chi^2df	Value	p-value	Incr.df	Value	p-value
1	2	2.1614	[0.3394]	2	2.1614	[0.3394]

Test summary:
AR 1- 4 F(4, 35) = 9.1466 [0.0000] **
ARCH 4 F(4, 31) = 1.6191 [0.1943]
Normality Chi^2(2)= 0.69919 [0.7050]
Xi^2 F(10, 28) = 0.50864 [0.8695]
Xi*Xj F(20, 18) = 0.90537 [0.5878]

RESET F(1, 38) = 1.2655 [0.2677]

The test summary shows that the absence of serially correlated residuals must be rejected. However there is no heteroscedasticity and a mis-specification of the model is rejected.

(b) equation with error correction mechanism (ECM)

This is a first attempt to specify a model for investment in capital equipment.
Next regression represents equation (3.4) above.
Modelling ΔINVEST by OLS
The present sample is: 1993 (2) to 2004 (4) less 2 forecasts

$$\Delta I_t = \underset{(-0.000)}{-1.6220e\text{-}012} + \underset{(8.694)}{0.11482}\ \Delta Y_t - \underset{(-2.002)}{45.797}\ \Delta IR_t - \underset{(-2.073)}{0.17106}\ ECM\_1 \qquad (4.7)$$

R^2 = 0.680082 F(3,41) = 29.053 [0.0000] \sigma = 1466.53 DW = 1.55
RSS = 88179057.38 for 4 variables and 45 observations

Analysis of 1-step forecasts

Date	Actual	Forecast	Y-Yhat	Forecast SE	t-value
2004 3	2087.00	1060.14	1026.86	1580.06	0.649889
2004 4	1458.00	1686.16	-228.156	1529.56	-0.149165

Tests of parameter constancy over: 2004 (3) to 2004 (4)
Forecast Chi^2(2)= 0.51448 [0.7732]
Chow F(2, 41) = 0.23452 [0.7920]

Test summary
AR 1- 4 F(4, 37) = 8.5765 [0.0001] **
ARCH 4 F(4, 33) = 1.7236 [0.1683]
Normality Chi^2(2)= 0.69919 [0.7050]
Xi^2 F(6, 34) = 0.58585 [0.7391]
Xi*Xj F(9, 31) = 0.47623 [0.8793]
RESET F(1, 40) = 13.812 [0.0006] **

This model shows serial autocorrelation and it is mis-specified as it follows from the RESET test. Then this model was discarded. Therefore another model with an AR(1) error was calculated by recursive autoregressive least squares. This was a new version for equation (3.44).

(c) Final equation with ECM and autoregressive error.

The new model was computed by autoregressive least squares (RALS). This model retains the properties of expressing impact, feedback and long term response.

The present sample is: 1993 (3) to 2004 (4) less 2 forecasts

$$\Delta I_t = \underset{(9.293)}{0.11575}\ \Delta Y_t - \underset{(-1.924)}{44.189}\ \Delta IR_t - \underset{(-2.170)}{0.25824}\ ECM\_1 + \underset{(1.625)}{0.31471}\ u_{t-1} + u_t \qquad (4.8)$$

\Sum y(t)^2 = 2.63834e+008 \sigma = 1434.09
\Phi = 82264615.32 for 3 variables and 44 observations (4 parameters)

Roots of the Error Polynomial

0.3147
Analysis of 1-step forecasts

Date	Actual	Forecast	Y-Yhat	Forecast SE	t-value
2004 3	2087.00	894.514	1192.49	1528.97	0.779928
2004 4	1458.00	2120.91	-662.907	1474.57	-0.449558

Tests of parameter constancy over: 2004 (3) to 2004 (4)
Forecast Chi^2(2)= 0.45256 [0.7975]
Chow F(2, 39) = 0.41568 [0.6628]

Test summary
ARCH 4 F(4, 33) = 1.7082 [0.1717]
Normality Chi^2(2)= 0.22675 [0.8928]
Xi^2 F(6, 34) = 0.84428 [0.5449]
Xi*Xj F(9, 31) = 0.64156 [0.7530]

This model fits much better and takes advantage of the serially correlated residuals. The residuals are normally distributed and there are no signs of heteroscedasticity.[10] Therefore, this is the specification chosen for the equation with ECM.

In the long run the most significant variable explaining the investment is the rate of interest. The variable GDP has an insignificant coefficient. This variable becomes relevant in the short run.

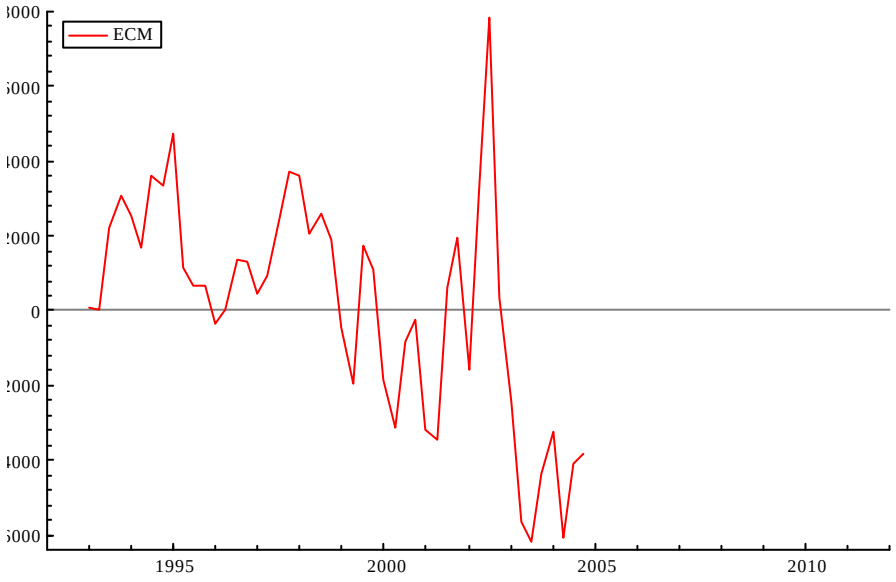


Fig.2

The year 2002 shows a huge fall in investment and particularly in investment in equipment. In this year the financial mechanism suffered a real breakdown. The effect of "pesoification", the freeze of bank deposits (corralito-corralón), the lack of external finance, en the diminished confidence on the banking system had tremendous impact in the credit system. The rates of interest climbed in a market without operations and

[10] This version has similar coefficients to the ones of the discarded version. The coefficient of ECM_1 is higher in absolute value because it is affected by the behaviour of the errors.

the rise in the price of the US$ (it reached the peak of 4 pesos to the US dollar) led the investment process to a halt..

After the shock, the investment started a slowly rising path. Current investment grew less than the levels suggested by the long run investment function. This behaviour implied that economic expansion was realised on the basic of existing idle capacity. The current levels kept behind the long term requirements of capitalj expansion.

In the diagram is clear the impact of the economic depression which reduced the investment in fixed capital by keeping its seasonal pattern through time. Until the end of 2001, the actual investment in equipment moved around the corresponding levels of the long term function. However, since the beginnings of 2002 the amplitude of fluctuations increased amazingly. The peak of the ECM series in figure 2 was created by a sharp decline in the long run function while the current investment fell much less. Since then the current investment was below the amounts determined by the long run function.

This cumulative departure of the economic requirements in the long term is a sign of concern and shows the the adjustment to new equilibrium situation at a lowe level. In this case, it implies the existence of a hidden long run equation generated by the wealth effect. Unfortunately, he data is not sufficiently large to allow the estimation of a new investment model. Anyway, it is interesting to note that the investment levels do not return to the long term function.

5. Private Consumption

Another component of aggregate expenditure that shows a persistent gap between short term and long term behaviour is private consumption.

A short run consumption function was estimated as follows

Sample: 1993(3)-2004(4) less two forecasts

$$Cons_t = -7521.6 + 0.82934 Cons_{t-1} + 0.55891 Y_t - 0.33178 Y_{t-1} - 0.082516 Y_{t-2} \quad (5.1)$$
$$(-1.607) \quad (9.400) \quad (26.891) \quad (-5.788) \quad (-3.397)$$

R^2 = 0.984128 F(4,39) = 604.55 [0.0000] \sigma = 1906.88 DW = 2.02
RSS = 141811702.1 for 5 variables and 44 observations
Tests of parameter constancy over: 2004 (3) to 2004 (4)
Forecast Chi^2(2)= 0.5116 [0.7743]
Chow F(2, 39) = 0.17594 [0.8393]

The static long run equation is

$$Cons_t = -44074.1 + 0.847426\ Y_t \quad (5.2)$$
$$(-1.540) \quad (7.832)$$

WALD test Chi^2(1) = 61.356 [0.0000] **

In reference to the short run equation some other aspects have been tested;

COMFAC WALD test statistic table

Order	Chi^2df	Value	p-value	Incr.df	Value	p-value
1	1	2.9899	[0.0838]	1	2.9899	[0.0838]

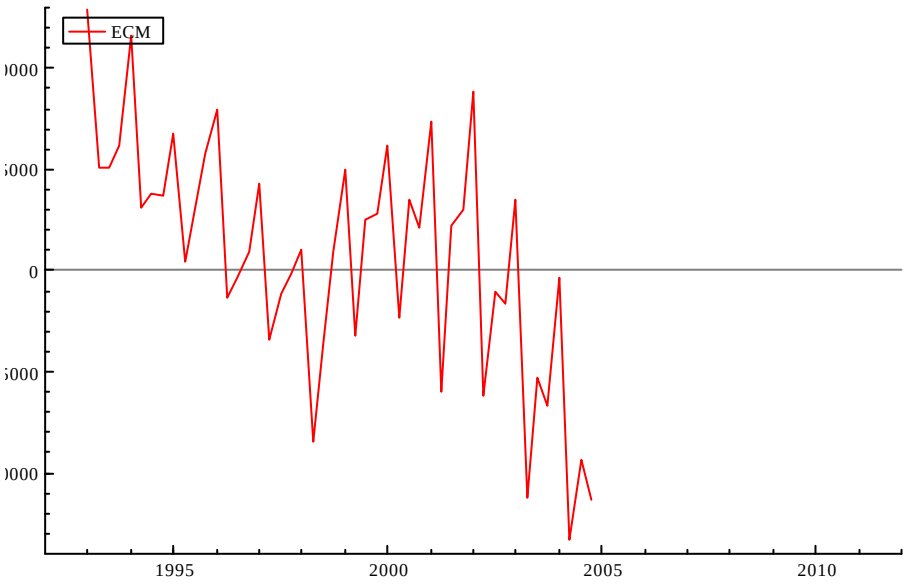
Test summary

AR 1- 3 F(3, 36) = 1.1608 [0.3381] (autocorrelation)
ARCH 3 F(3, 33) = 2.9254 [0.0482] * (conditional heteroscedasticity)
Normality Chi^2(2)= 0.046297 [0.9771] (normal distribution)
Xi^2 F(8, 30) = 0.34414 [0.9411] heteroscedasticity (White)
Xi*Xj F(14, 24) = 0.36983 [0.9715] heteroscedasticity (cross products)
RESET F(1, 38) = 0.25943 [0.6135] (functional form mis -specification)

The COMFAC WALD test gives the following result: the null hypothesis is rejected for the unrestricted model. It implies that there is no common factor and the unrestricted equation is the appropriate model. Therefore the estimation by ordinary least squares is correct.

The rest of the tests accept the null hypothesis with the exception of the test of autoregressive conditional heteroscedasticity. This result might be important to study the volatility of consumption but this is outside the scope of this paper.

It is interesting to examine the short term consumption in relation to the long term function
to visualize some peculiarities of the dynamic adjustment. The error correction mechanism expresses the dynamic evolution of the difference between short term investment in equipment and long run consumption measured in millions of pesos of 1993.



Fig, 3

Let us have a look at ECM since 2002. A sudden contraction in activity reduced incomes and the expenditure in consumption goods declined less than the long term level corresponding to those incomes. This produced a peak of ECM in the first quarter of 2002. The second quarter showed an excess of long term over short term consumption. This happened even before income started to rise. This implies that the reduction in current consumption went down beyond the long term level. Next, the recovery in income expands current consumption less than long term consumption. The cycle repeats itself but with a declining trend. This implies that the movement of adjustment of current and long term consumption is taking place around a different long

term consumption function. The latter necessarily has a lower marginal propensity to consume. This justifies the increasing gap of Fig. 3.

There must be a downward shift in the long term consumption function generated exclusively by the negative wealth effect with which the 2002 economic policy started. This reasoning can be clearly seen in Fig. 4. At the beginning there is a long run consumption consistent with a wealth distribution denoted by W1. The short run consumption behaviour is expressed by a set of functions which intercetpt the long run curve. Each short term curve is less steeper than the long run curve. Start from a position P1 where current consumption is adjusted to the long run levels. If the level of income declines from Y1 to Y2, C moves to P2. Then short term consumption falls less than long run consumption. Then the consumers correct their decisions and adjust the current consumption to the long term C(W1). He does so by moving to the point P3.

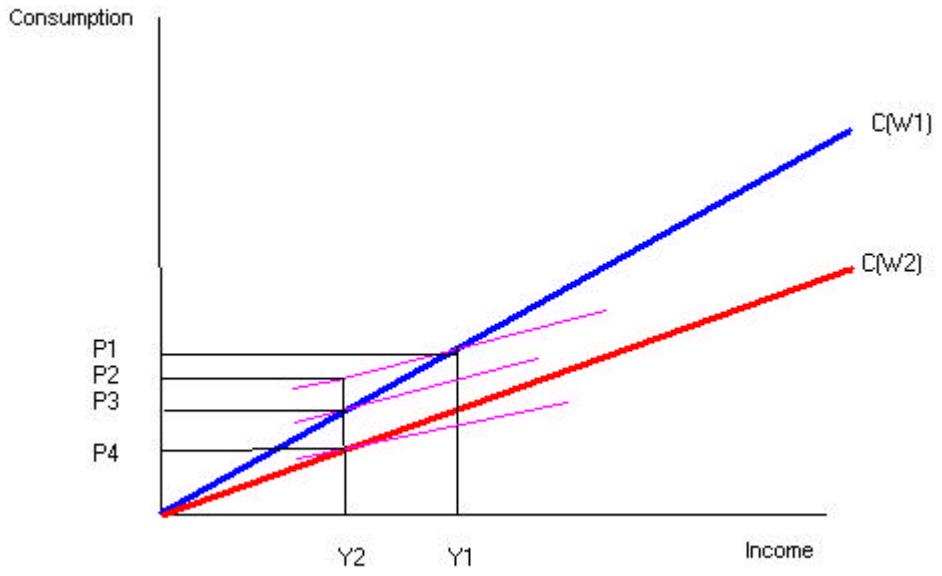


Fig.4

If income rises later, he will move along the short term curve and finally jumps to the long run function C(W1). However, this is so if the long run function remains invariable. In our case, the adjustment to the long run consumption is done with respect to the curve C(W2). The latter is the unobserved long term function which was shifted because of the wealth effect (from W1 to W2).

The estimates shown above reflect the movement of aggregates with respect to the original long term consumption function. So the long term adjustments are always below the long run levels. This is the picture given by the error correction mechanism.

When the incomes were expanding in the recovery the current levels were adjusted to the new long run consumption function which is located below the function estimated by the model and which cannot be completely detected on the basis of the sample. On

this respect, it must be taken into account that the long term equation is computed over data from 1993-2004. However, the dynamic behaviour of current consumption indicates the existence of the hidden function and thus it shows the operation of the wealth effect. This wealth effect affects behaviour in the long term.

This long term reduction of the size of the economy is part of the future cost derived from a shock. This is aggravated by the persistent disequilibrium produced by the Government's policy.

6. Prices and Exchange Rate

Another issue is what can one expect about the dynamics of prices and exchange through time. Given a series of devaluation of the currency, what are the impacts in domestic prices. Conversely, given certain movements in prices, is it likely that the exchange rate adjusts itself in the same direction? to what extent?

The relationship between the spot exchange rate and the prices will be examined through the relationship between the spot rate and the parity rate. Though very similar is not the same as testing the validity of the purchasing power parity theory. Here the parity theory is used as a device to reflect a mechanism of reciprocal influence between prices and exchange rates. The parity rate reflects full correspondence between prices and nominal rate of exchange.

We separate the approach into two parts:

1. the relationship between exchange rates and prices will be tested for Argentina in the past in order to know how they actually behaved. The sample covers the period 1959-1992. The knowledge about the past is essential in featuring the functioning of the economy of Argentina in this respect.
2. The relationship in the period 2000-2004 and the effect of economic policy that produced disequilibrium in the economy. An a priori view of the facts shows that evolution of prices and exchange rates is influencing the process of adjustment of certain markets.

The Past (Sample 1): January 1959-December 1992

The series involved in the computation were the spot foreign exchange defined as the price of one US dollar in terms of domestic currency. The rate was built upon the basis of the implicit prices of Argentina, the wholesale price index of the U.S.A. and the base year is 1970. The nominal exchange rate was 3.77E-11 Arg$ per US$.[11]

The interconnections between rate of exchange and prices were tested upon the operation of the puchasing power parity theory, both in their relative and absolute forms.

The Short Term

(a) Relative Form:

$$\Delta \ln S_t = \underset{(37.19)}{0.977837}\ \Delta \ln PPP_t + \varepsilon t \qquad (6.1)$$

[11] The purchasing-power-parity rate data used in this sample was gently provided by Juan Carlos de Pablo from Depabloconsult.

R^2 = 0.7146 F(1, 406) = 1383.19 Prob[0.0000] DW = 1.76 Obs = 407

where
S_t = monthly spot exchange rate
PPP_t = monthly ppp exchange rate
ε_t = random disturbance

The relative version states that the rate of change is regulated by the rate of change in the purchasing power of money. The regression shows a good fitting. The β coefficient is highly significant and denotes the elasticity between S_t/S_{t-1} and the monthly variation in the ppp rate.

Next we apply the Wald Test: under H_0 : $\beta = 1$;.
F-statistic = 0.710559 Prob(0.399755)
Chi^2 = 0.710559 Prob(0.399258)

The Null Hipótesis that $\beta = 1$ cannot be rejected. The regression verifies the theory's conclusions in Argentina for the period Jan. 1950-Dec. 1992.

(b) Absolute Form:

$$\ln S_t = -0.177049 + 0.996509 \ln PPP_t + \varepsilon_t \qquad (6.2)$$
$$(-5.94) \quad (651.05)$$

R^2 = 0.999 DW = 0.0699

This regression shows similar results to those obtained in the previous equation, however de DW statistic is very low and there is important serial autocorrelation. Therefore, we are compelled to start of a more general specification, such as $a(L) \ln S_t = b(L) \ln PPP_t + \eta_t$ and test for Common Factors (see Hendry and Mizon)

$$\ln S_t = -0.018865 + 0.95976 \ln S_{t-1} + 1.0290 \ln PPP_t - 0.98937 \ln PPP_{t-1} + \eta_t \qquad (6.3)$$
$$(-1.816) \quad (67.337) \quad (28.710) \quad (-29.961)$$

R^2 = 0.9999
COMFAC WALD test statistic table:

Order	Chi^2 df	Value	p-value	Incr.df	Value	p-value
1	1	0.85292	[0.3557]	1	0.85292	[0.3557]

The null hypothesis that there is a common factor cannot be rejected. Then the model can be reparameterised as a static regression with an AR(1) error. The final specification was estimated by Recursive Autoregressive Least Squares and is the following:

$$\ln S_t = -0.29514 + 0.99240 \ln PPP_t + 0.96503 u_{t-1} + \varepsilon_t \qquad (6.4)$$
$$(-1.560) \quad (99.027) \quad (72.195)$$

Sum y(t)^2 = 26929. sigma = 0.0661866
Phi = 1.769789135 for 2 variables and 407 observations (3 parameters)
Roots of the Error Polynomial 0.9650

Then the Wald Test under H_0 : β =1 gives the following resuts:
F-statistic = 0.574783 Prob(0.448806)
Chi^2 = 0.574783 Prob(0.448364)

Once again, the hypothesis that $\beta = 1$ cannot be rejected. The PPP theory holds apart of random disturbances.

The Long Term

The next step is to extend the conclusions to the long term. It will be assumed that the relationship is valid in the long run if the variables involved are cointegrated.

Let's start by verifying that $\ln S_t$ and $\ln PPP_t$ are each I(1). We adopt a similar assumption to the case depicted by James D. Hamilton (1994) which assumes the average rate of inflation to be positive and the null hypothesis considers the price variable as a unit root process with a positive drift. The opposite case the variable is stationary around a deterministic trend.[12] In the period under analysis there was inflation most of the time. In this paper, the Augmented Dickey Fuller is calculated for the logs of the nominal exchange rate and the log of the ppp-rate. Since there is autocorrelation in the series, the ADF´s were computed for k = 12 (lags).

Variable $\ln S_t$

Augmented Dickey-Fuller test for unit root Number of obs = 395

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		---------- Interpolated Dickey-Fuller ---------		
Z(t)	-1.515	-3.984	-3.424	-3.130

* MacKinnon approximate p-value for Z(t) = 0.8230

Dickey-Fuller test indicates that the hypothesis of unit root cannot be rejected. The variable has a random walk process with a drift. The order of integration is unity.

$$\ln S_t \sim I(1)$$

The next step is to determine the order of integration of the log of the parity-exchange-rate.

Variable $\ln PPP_t$

Augmented Dickey-Fuller test for unit root Number of obs = 395

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		---------- Interpolated Dickey-Fuller ---------		
Z(t)	-1.635	-3.984	-3.424	-3.130

* MacKinnon approximate p-value for Z(t) = 0.7776

This test does not permit to reject the null hypothesis. Therefore, $\ln PPP_t \sim I(1)$

Variable $z = \ln S_t - \ln PPP_t$

[12] J.D.Hamilton (1994) p. 583.

The purchasing power parity theory requires a cointegrating vector with $\alpha = 0$ and $\beta = 1$. On the basis of these elements z is defined.

This variable z was considered without a trend since z is also the log of the real exchange rate. See Hamilton (1994).

The Augmented Dickey-Fuller test rejects the null hypothesis of unit root at the level of significance of 5% but not at the level of 1%. Number of obs = 395

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		---------- Interpolated Dickey-Fuller ---------		
Z(t)	-3.164	-3.448	-2.874	-2.570

* MacKinnon approximate p-value for Z(t) = 0.0222

At the 5% significance level the variables are I(1) and they are cointegrated. The cointegrating vector **a =** (1, -1).

The residuals z are stationary so the spot exchange rate and the ppp exchange rate are cointegrated. And The Purchasing Power parity Theory is verified in the long term for Argentina in the period 1959-1992.

Another way to reach this conclusion test that the elasticity equals 1 is to start from a general autoregressive distributed lag model and look for a reparemeterisation. For example, start from equation (3) and perform a reparameterisation into an error-correction-mechanism-model like the following:

$$\Delta \ln S_t = \alpha_0 + \beta_0 \Delta \ln PPP_t - (1-\alpha_1)(\ln S_{t-1} - \ln PPP_{t-1}) + \gamma \ln PPP_{t-1} + u_t \qquad (6.5)$$

where $\gamma = \alpha_1 + \beta_0 + \beta_1 - 1$

This reparameterisation was calculated through PCGIVE

$$\Delta \ln S_t = 6.8944e\text{-}009 + 1.0290 \Delta \ln PPP_t + 2.0827e\text{-}010 \ln PPP_{t-1} - 0.040240 ECM\_1 + u_t \qquad (6.6)$$

(0.000) (28.710) (0.000) (-2.823)

The present sample is: 1959 (2) to 1992 (12)
R^2 = 0.720378 F(3,403) = 346.08 [0.0000] \sigma = 0.0661757 DW = 1.74
RSS = 1.764828092 for 4 variables and 407 observations

ADF(on the residuals and k = 1) = 0 –13.515. The critical values 5% = 1.94 and 1% = 2.571. The ADF statistic rejects the unit-root hypothesis. The model residuals are stationary.

The coefficient of $\ln PPP_{t-1}$ and the constant are not significantly different from zero. The coefficients obtained are consistent with the ones of the equation (3) in satisfying the restrictions imposed in the equation (5). Therefore, the nominal exchange rate and the purchasing power parity exchange rate are cointegrated.

Now, the real exchange rate is computed for the sample and its evolution depicts the behaviour through time of the reciprocal influence between prices and nominal exchange rates.

The variable realer in Fig.5 denotes the real exchange rate which is defined as the ratio of current spot rate to the current ppp-exchange-rate. The average of the RER over the whole period under consideration is 0.919 and the standard deviation is 0.221. The Jarque-Bera statistic is 248.85 and this rejects the hypothesis of normality for the series.

The trend of the series is depicted by the red curve resulting from the application of the Hodrick-Prescott filter. The Argentine peso experienced longer periods of appreciation than of depreciation. The periods of appreciation were followed by shorter periods of depreciation of the currency. The highest spikes at the end of the 80´s correspond to the hyperinflationary process of 1989-90.

Real Exchange Rate and Hodrick-Prescott Trend
1959(1) – 1992(12)

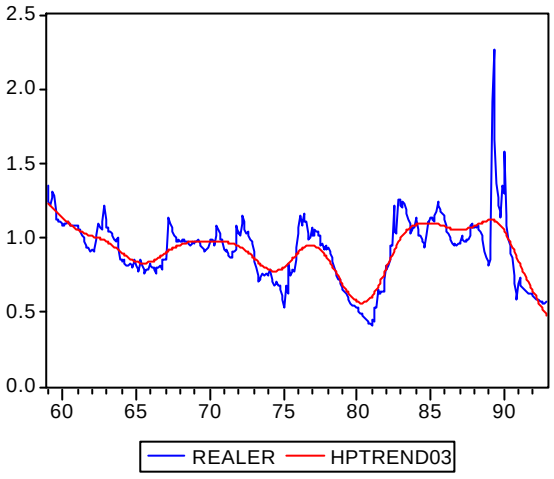


Fig. 5

This asymmetry in the length and amplitude of departures from the ppp level may result from the peculiarities of the Argentine economy. Within the Sample Argentina suffered from two broad types of inflationary behaviour. There was a persistent moderate inflation until 1975. Then there was a systematic acceleration of inflation up to the hyperinflation of 1989-1990. A year later inflation disappeared. Within the sample, most of the time there were attempts to keep the exchange rate stable and this produced long periods of appreciated currency.

The conclusion of this analysis is that the ppp exchange rate operates as a moving level around which the spot rate wanders. The forces towards equilibrium played their role independently from the policies carried out. Under flexible exchange rates the hypothesis of ppp seems reasonable for Argentina. Its past history supports this statement.

Now the attention can be put in the period on which this paper is concentrated.

<u>The Recent Case (Sample 2): January 2000 - September 2004</u>

This sample covers the period . 2000(1) – 2004(9). The PPP series was built out from the Real Exchange Rate published by the Statistical Appendix of the Quarterly Economic Report published by the Ministry of the Economy. The real exchange chosen considers the US producer prices and the Argentine wholesale prices (IPIM). The ppp

rates were calculated by division of the nominal exchange rate by the real exchange rate. The base year 1991 was substituted for the 2001 base from the official publication . In other words, the base parity rate was the average of year 1991

$$\Delta \ln S_t = 1.520714\ \Delta \ln PPP_t + \varepsilon t \qquad (6.7)$$
$$(9.61)$$

$R^2 = = 0.6268$ F(1, 56) = 92.38 Prob[0.0000] DW = 1.006104 Obs = 56

The relative form showed that the exchange rate measured in domestic currency on the average increased significantly more than the purchasing power parity rate. By applying the test to Equation (6) it can be concluded that the observed behaviour did no happen by chance.

Wald Test: under $H_0 : \beta = 1$;.

F-statistic 10.83076 Prob(0.001747)
Chi-square 10.83076 Prob(0.000998)
The null hypothesis is rejected.

Similar results can be obtained with the regression on its levels:

$$\ln S_t = = -0.2213021 + 1.539255\ \ln PPP_t + \varepsilon_t \qquad (6.8)$$
$$(-6.62) \qquad (29.75)$$

$R^2 = 0.9415$ F(1, 55) = 885 Prob[0.0000] DW = 0.1280148 Obs = 57
Wald Test: under $H_0 : \beta = 1$;.
F-statistic 108.6 Prob(0.000000)
Chi-square 108.6 Prob(0.000000) The null hypothesis is also rejected here. The model presents the peculiarity that the currency is undervalued and the prices ar sticky to respond. This rigidity is produced by measures of economic policy as mentioned in previous part of this work. Some other attempts to change the specification of the model were unsuccessful.[13]

The real exchange rate series in Fig. 6 show a very interesting picture. The situation after the first days of 2002 is characterised by a undervalued currency with a RER which wanders around a 20% over the parity level. Before 2002 the situation is a mirror image. The currency is appreciated the prices rose gradually and the RER kept a 20%

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[13] An unrestricted form of the relationship was also estimated. However this specification had to be discarded.

$$\ln St = -0.020025 + 0.83141\ \ln St\text{-}1 + 1.9955\ \ln PPPt - 1.7801\ \ln PPPt\text{-}1 + \eta t \qquad (6.9)$$
$$(-0.803) \quad (10.046) \quad (7.004) \quad (-9.339)$$

R2 = 0.993732 F(3,52) = 2748.2 Prob[0.0000] DW = 1.14 Obs= 56
COMFAC WALD test statistic table

Order	Chi^2df	Value	p-value	Incr.df	Value	p-value
1	1	2.1595	[0.1417]	1	2.1595	[0.1417]

AR 1- 4 F(4, 48) = 5.129 [0.0016] **
ARCH 4 F(4, 44) = 3.3293 [0.0182] *
Normality Chi^2(2) = 24.114 [0.0000] **
Xi^2 F(6, 45) = 24.488 [0.0000] **
Xi*Xj F(9, 42) = 26.306 [0.0000] **
RESET F(1, 51) = 17.277 [0.0001] **
All H_0's were rejected except that concerning to a common factor!!!

below parity. Then a question arises: are both disequilibrium situations? Yes, they presumably are but they seem to be of quite different nature.

Real Exchange Rate. 2000(1)-2004(4)

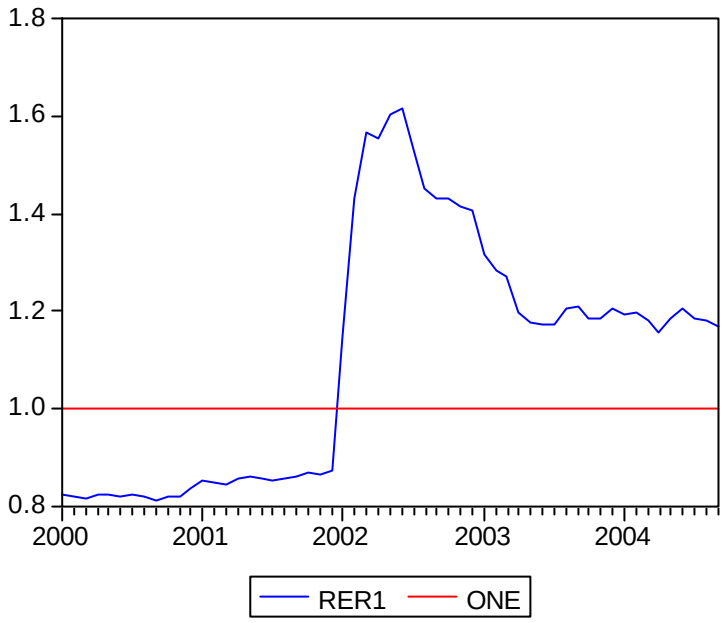

Fig. 6

Under conditions of the currency conversion sytem prevailing in Argentina, the US$ was the real money and the peso was a sheer token. The operation of that system required full flexibility about prices. The adjustment towards equilibrium relied entirely on the price mechanism. In fact an appreciated currency resulted. The effective level of the real exchange rate depended on the market mechanism. The utilization of foreign saving for a long period may produce structural weaknesses if the domestic sources of saving are not stregrhened in order to replace the foreign savings when the moment comes. In the short term, the inflow of foreign capital produced equilibrium an appreciation of the currency.

It is known that a persistent current account deficit balanced by capital inflows leads to an overall equilibrium in the balance of payments but this situation will not be sustainable in the long run. The country's net wealth is gradually reduced by the inflow of foreign capital. In the late nineties Hernán Büchi from Chile gave a Conference at the Stock Exchange in Buenos Aires. He then warned about the dangers of relying entirely on foreign savings while expanding the public expenditure. He recommended to consolidate the domestic savings in spite of the existing pressures to expand the public expenditure.

On the other hand, since the beginnings of 2002 the currency conversion system ended. The Argentine peso was depreciated and there was a definite policy to prevent the RER to go down through US$ purchases by the central bank. Therefore, the disequilibrium was maintained in the exchange market by means of the intervention of the central bank. This resulted in continuous increases in the foreign exchange reserves. If the central bank quits there is an excess supply in the exchange market and the domestic currency necessarily appreciates. The Government wishes to sustain the level of undervaluation and in doing this it detrmines an artificial level of relative

prices in different axctivities inside the economy. The disequilibrium exists since these exchange rate and relative prices will change if intervention is removed.

Until 2002 the most important effects in the process of adjustment were particularly price and income effects,as it follows of most theoretical models. After 2002 modifications those effects coexisted with important wealth effects derived from valuation od assets and libilities after the change of exchange regimes and monetary system. This situation took place in the middle of a serious economic depression and then the implementation of an unortthodox economic policy gave shape to the particular evolution tof the economy now.

So far, the economy was operating under conditions of forced regulation. Of course this behaviour may have important consequences on the allocation of resources. By the way, the economy works in a irregular way. There are activities which expand because they receive a subsidy of a depreciated currency. On the other hand there are other activities which find difficult to replace capital goods and the domestic market and so the find important obstacles to expand.

The policy of keeping a high price of the US$ in terms of domestic currency cannot be maintained for long. The present disequilibrium will move the exchange rate down or the domestic prices will have to rise. This already happened in the period 1959-92 as it was said above.

7. Concluding Remarks

The effect of devaluation of the currency had important contractionary effects. This ocurred despite of the recovery that took place since 2003. This is so because the wealth effects involved in the drastic change in the distribution of wealth modified the conditions of long term aggregate demand both in consumption and investment. This situation was later aggravated by preventing the rate of exchange to find its equilibrium value. So the experience of Argentina followed the lines advanced by Jeffrey Frankel.

The analysis of the dynamic behaviour of consumption showed that the market acted as if the long run consumption function was shifted downwards for each level of income. The average propensity to consume necessarily fell. This reduction of consumption in the long term obeyed to the negative influence of the changes in the property distribution.

One important feature of the dynamics of consumption is that the departure from the observed long run function increases through time. This means that the wealth effect is not bounded and keeps strong in time. The exchange rate policy carried out by the Government may have extended the operation of the wealth effect started in 2002.

The present analysis states that the consumption expenditures are accommodating themselves to a smaller consumption pattern. The recovery will be unable to go back to the past at least for a long period. The shift of long term consumption is perceived even without treating explicitly the variable distribution of wealth. This process works underneath the expansion of the recovery phase which reflects the short run behaviour.

The investment considered in terms of capital equipment behaved in a similar fashion. The long run response of current investment had the correct signs but the dynamic evolution showed that investment is not adjusted to the computed long run levels. It lagged behind. This presupposed the existence of an unobservable long run

investment function. It is unobservable because the lack of sufficient degrees of freedom for the statistical analysis.

These results suggest the following question: Why are there positive income effects in the recovery while there are still long run pressures in the opposite direction?

The answer rmight be that in the period under analysis Argentina is not paying her financial commitments for the public debt yet, and the economy in the short run reacts as whether those payments did not exist. However, they affect the expectations about the future and this influences the decision about the future. A good example is the sluggish investment.

When the external debt commitments were normally paid and the tributation requirements adapt to the financial requirements, the impact on the present economic structure may be stronger.

Another aspect of the study is that the economic policy forces disequilibrium in the foreign exchange market. This goes in favour of ciertain activities in the economy and for the fiscal revenue. This situation favours some branches of production whose output is exported. On the other hand it forces a number of other activities to contraction, high costs and low profitability. Under these conditions unemployment persists and poverty expands.

The economic policy in operation is subsidizing part of the economy at expenses of the rest.[14] The experience of Argentina says that the periods of undervaluation of the peso do not last. They are followed by longer periods of appreciation.

The existence of a recovery with less investment, reduced long run consumption and a search for short run profits cannot be considered as a lasting achievement. Actually the economy had no definite picture of the future. This stubborn exchange rate policy is gradually exacerbating interest conflicts in the economy which will make less manageable future economic policy and necessarily will affect the economic structure..

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[14] In economic policy the main mistake was to expect that the real exchange rate can be fixed voluntarily in the long term. Better opportunities to export only obey to two factors: improvements of labour productivity or lower costs of production. These are the genuine real incentives to export. Manipulations of the exchange rate are transitory and in the long term become artificial incentives. The latter may foster exports for a time but introduce costs in the economy derived from misallocation of resources and redistribution of profits. There is no clear process leading to improve efficiency and the threat of new difficulties is still present.

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