
SHORT AND LONG RUN DETERMINANTS OF PRIVATE INVESTMENT IN ARGENTINA

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Abstract

This study provides an empirical analysis of the potential macroeconomic factors that may affect the investment decision in Argentina in a short, medium and long run perspective. Both the theory and the empirical literature for experiences in developing countries are reviewed in order to identify a private investment function for the last three decades (1970-2000). The results suggest that the investment decisions seem to be determined, in the short run, by shocks in returns (exchange rate, trade liberalization), and in aggregate demand. Besides, there is evidence of a “crowding-out” effect of public investment. But in the long run, the capital accumulation path seems to be closely dependent on both well-developed financial and credit markets, as well as on perspectives of fiscal sustainability.

JEL Classification: E22, H54, O16, O23.

Keywords: investment, macroeconomic instability, crowding-out, Argentina.

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I. Introduction

Argentina is suffering nowadays one of the worst economic crises in world history, with more than four years of recession, and after almost a decade of sustained growth. In fact, during the nineties the country experienced a process of deep economic reforms that, after forty years of closed and inflationary economy, helped to achieve macroeconomic stability, a deep trade liberalization, and the consolidation of the financial system. However, the reformist push vanished by the end of the last decade, and this, together with adverse circumstances in international markets (Russian crisis, Brazilian devaluation), the increasing external indebtedness, and serious own misperceptions in the design and execution of public policies, brought the country to the actual context of macroeconomic instability and recession.

In order to recover a sustained growth path, it is necessary, among other policies, to stimulate the investment process. In fact, the main contribution of this work is to try to elucidate which have been the main determinants of the private investment decision in Argentina.

The recent literature on the determinants of investment behavior is divided roughly in two groups: time series analyses for one or several countries, and microeconomic studies using firm level data. Between the formers, Loungani and Rush (1995), Blomstrom et al. (1996), Krishna et al. (1998), Campos and Nugent (2000), and Everhart and Sumlinski (2001) are the main recent references, while the firm level analyses include Chirinko and Schaller (1995), Bloom et al. (2001), and Butzen et al. (2002). Although the current tendency is toward the microeconomic studies with panel data at the firm level, this paper deals with the first group methodology basically due to the absence of reliable microdata.

The previous literature for the Argentinean case include Bebczuk (1994) and Grandes (1999). Comparing to the first one, this work extends the results (as it only covers up to 1993) to the post-reforms period. Besides it complements the study of Grandes (1999), which only deals with investment behavior in machinery and equipment during the nineties, with an extension of the period of analysis and by incorporating other macroeconomic variables a priori relevant, such as the external debt, the financial credit to the private sector, and the degree of trade liberalization of the economy. Finally, another interesting study, in this case for Brazil (1956-1996), is that of Ribeiro and Texeira (2001), which arrive to similar conclusions to this one, suggesting a similar behavior in the Mercosur area.

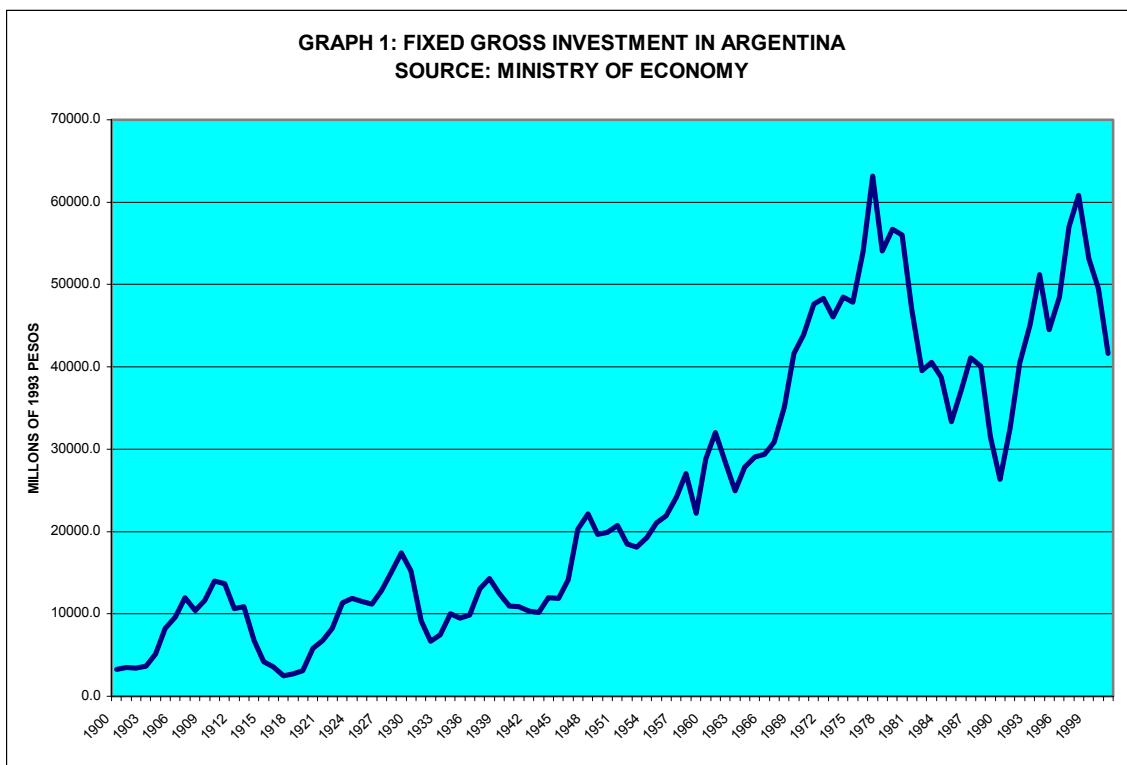
The rest of the paper is organized as follows. Section II presents the evolution and composition of the investment process in Argentina during the whole twentieth century, using data recently provided by the Secretary of Economic Policy of the Ministry of Economy¹. This section analyzes the time series behavior of the investment, and shows evidence in favor of the hypothesis of the presence of a structural change by the end of the seventies. Section III reviews the theory of the determinants of the investment decision by looking at the international experience for emergent countries. The main contribution of the paper is Section IV, where a private investment function is estimated, not only for the short run, but also for the medium and long run. The paper concludes in Section V, with brief final comments and policy recommendations.

¹ See Maia and Nicholson (2001).

II. The evolution of the fixed gross investment in Argentina

During 1980 to 2000, the Argentinean economy registered an annual growth rate of 1.5%, an accumulated growth of 34.8% for the whole period, and faced five recessive episodes: the period 1981-1982 (Malvinas/Falklands War), the year 1985 (“Austral Plan”), the period 1988-1990 (Hyperinflation), 1995 (“Tequila Effect”), and the period initiated in the last quarter of 1998. The same lapse has been characterized by important adjustments in several productive sectors, that were deeply in need to remain competitive after the significative régime changes (see FIEL, 2002 and Kydland and Zarazaga, 2002). What characteristics exhibited the Argentinean economic growth in this period, and which was the role played by the capital accumulation in the growth process? In order to answer this question, it would be useful to analyze the whole historical period for which the data is available.

Graph 1 shows the evolution of Fixed Gross Investment (FGI) since 1900, using data from the Secretary of Economic Policy of the Ministry of Economy. From beginnings of the XXth century, with the reincorporation of the gold standard régime in 1903, the investment process began a strong upward escalate that was extended, except for an interruption in 1908, up to 1910. It fell just before the first world war crisis, and then registered a strong recovery, with a peak in 1929. It descended abruptly for three years during the international “Great Depression” and, after recovering in 1934, it showed erratic due to the effects of the Second World War. In 1948, a new peak is reached during Perón’s government.



Starting in the postwar period, a phase of worldwide uninterrupted growth begins. Argentina also showed a growth process in investment between 1953 and 1977, when the country reached the maximum peak in real terms for the whole series. Then, while most of the developed world continued growing, the dynamics of the investment in Argentina began to be

much more volatile, never recovering the levels reached in the peak of the import substitution phase. In fact, for the second half of the XXth century, four different periods can be clearly distinguished: two with growing investment rates and two with falling rates. The periods of growing rates in investment involve 1953 to 1977, and from 1991 until 1998². Those of falling rates include the period 1978-1990, and the last years of the nineties. Precisely, in 1977 the government liberated the interest rates and the capital account. This event should have probably produced a shock or a structural break in the investment function.

In this paper, due to data availability and informative relevance, only the determinant of investment behavior for the last three decades is studied. However, in order to sustain the hypothesis of structural change in 1977, and to justify the period of analysis of the study, it is necessary to show evidence that supports the idea that there was a change in the investment function starting in the seventies.

The strategy for testing the structural change is the following. First, the trend is analyzed. As the 1900-2001 series rejects the unit root hypothesis at a 5% level (see Table 1), it is possible to make a univariate regression to characterize the series including a trend term. Table 2 presents a univariate regression with trend of the investment time series. The LM tests of Breusch and Godfrey were performed to the residuals, and they reject the null hypothesis of autocorrelation. As can be seen, the trend is highly significant only for the period 1900-1977. For this period, the hypothesis of unit root is also rejected, even at a 10% significance level.

Table 1: ADF Statistics - Sample 1900-2001

		Critical Values		
		1%	5%	10%
Investment	Statistic	-4,05	-3,45	-3,15
FGI	-3,94	no	rejected	rejected
M&E	-4,74	rejected	rejected	rejected
Transport	-3,81	no	rejected	rejected
Housing	-3,82	no	rejected	rejected

Note: All variables expressed in logarithms.

On the other hand, and applying the same methodology, for the period 1950-2001 the series don't reject the unit root hypothesis (see Table 3). Consequently, the Perron (1989) test can be applied assuming a break in 1997. The following equation was estimated:

$$y_t = \alpha_0 + \mu_1 D_L + \mu_2 D_P + \alpha_2 t + \alpha_1 y_{t-1} + \sum_{i=1}^k \beta_i \Delta y_{t-1} + \varepsilon_t$$

$$H_0 : \alpha_1 = 1; \alpha_2 = 0; \mu_1 = 0$$

$$H_1 : \alpha_1 < 1; \mu_2 = 0$$

Where y_t is the logarithm of the investment, D_L it is a dummy variable that takes the value zero up to 1977 and one starting from 1978, D_P is another dummy that takes the value zero in every year except in 1978, and t it is the trend term. The null hypothesis describes a behavior of a

² This is the period studied by Grandes (1999).

"random walk", while the alternative one suggests an autoregressive stationary series with deterministic trend. Under the null hypothesis, the shock is permanent, but under the alternative one, the behavior is that of a structural change with change in the mean.

Table 2: Fixed Gross Investment

Variables	Sample			
	1900-2001	1900-1977	1978-2001	1978-2001
Constant	1,507 (4,013)	1,587 (3,673)	3,054 (2,244)	3,288 (2,561)
FGI(t-1)	1,299 (14,333)	1,317 (12,872)	1,028 (5,108)	1,046 (5,327)
FGI(t-2)	-0,473 (-5,237)	-0,504 (-4,936)	-0,334 (-1,673)	-0,354 (-1,826)
Trend	0,004 (3,263)	0,006 (3,225)	0,002 (0,601)	- -
R2	0,963	0,953	0,695	0,689
P-Value BG	0,122	0,122	0,327	0,404

Notes: All variables expressed in logarithms.

T-statistics between brackets.

The Breusch and Godfrey test was performed with 2 lags. P-Value BG is the significance level for rejecting the nulle hipotesis of no serial correlation in the disturbances up to second order.

Table 3: ADF Statistics - Sample: 1950-2001

	Statistic	Critical Values		
		1%	5%	10%
Investment		-3,56	-2,92	-2,60
FGI	-1,98	no	no	no
M&E	-2,25	no	no	no
Transport	-2,42	no	no	no
Housing	-2,23	no	no	no

Note: All variable expressed in logarithms.

The results of the Perron test for structural change are shown in Table 4. The FGI rejects the unit root hypothesis, supporting the idea of a structural change with a permanent fall in the intercept. If each component is analyzed separately, this would also be the case for investment in machinery and equipment (M&E). On the other hand, the other components of private investment don't present evidence of structural change (at 5% significance level), hence rejecting the presence of a "shock". This supports the idea that the causes behind the several forms of investment are quite different, or that the impact is not the same, with evidence that the trade liberalization and the economic reforms that replaced the import substitution regime discouraged the investment in machinery and equipment.

The following sections analyze the theory of the investment determinants in emergent countries, and present estimations for the Argentinean case in the last three decades. The usual methodology in the estimation of the investment function calls for separating private from public

investment, as they respond to different behaviors. This paper only deals with the determinants of the private investment in Argentina. Although for the period 1950-2001 is not possible to make this distinction in origin by just using the data from the Secretary of Economic Policy, annual data of public and private investment (machinery and equipment, transport equipment, and housing) is estimated in Everhart and Sumlinski (2001) for the period 1970-2000, and this is used in the present study.

**Table 4: Perron Test for Structural Change
Sample 1950-2001**

Dependent Variable	FGI	M&E	Transport	Housing
Constant	1,498 (2,170)	1,336 (2,124)	0,697 (1,740)	1,653 (2,404)
DL	-0,153 (-2.12)	-0,180 (-2,219)	-0,285 (-1,424)	-0,111 (-1,666)
DP	-0,022 (-0.16)	-0,206 (-1,405)	-0,022 (-0,068)	0,100 (0,818)
Trend	0,007 (2,210)	0,007 (2,092)	0,013 (1,466)	0,005 (1,913)
FGI(t-1)	0,816 (10,370)	0,806 (9,386)	0,813 (10,199)	0,793 (9,804)
dFGI(t-1)	0,165 (1,170)	0,116 (0,941)	0,137 (1,042)	0,179 (1,248)
D-W	1,83	1,72	2,01	1,96

Note: t-statistics between brackets.

III. The theory of the determinants of private investment.

The literature has proposed several hypotheses for evaluating the impact or the explanatory power of key macroeconomic variables as decisive factors of the private investment in a country.

A first candidate is the activity level. Samuelson stressed the reciprocal relationship between investment and production, proposing the hypothesis of the “accelerator”. Moreover, in Jorgenson (1963), the value of the desired capital stock for a typical firm depends positively on the demand level. The output of the country (GDP) would be a reasonable proxy to the aggregate demand as determinant of the private investment in a country (see Long and Summers, 1991 and Blomstrom et al., 1996).

Another possible determinant is the return rate of the investment. The literature usually approaches it through a real interest rate as a representative of the cost of capital. Here, it's worth to make two distinctions: the interest rate would have a negative impact in the level of private investment made by domestic agents if the investment is financed in the local credit market. However, an increment in interest rate could have a positive effect in the capital flow from abroad, like it usually happens in emergent markets. Hence, the sign of the final impact is not fully predictable, just as suggested by Agosin (1995).

The theory of the investment irreversibility suggests that the cost of investing in machinery and equipment is usually not recovered by a future resale. This “sector-specific” characteristic of the investment would imply that the higher degree of "uncertainty" that usually prevails in emergent countries is relevant in the investment decision in these nations, since any abrupt fall in aggregate demand would generate an excess in installed capacity very difficult to sustain (see Caballero, 1991, Caballero and Pindyck, 1996, and Bloom et al., 2001). In several papers, the inflation rate is used as a reasonable proxy for the uncertainty level in the economy (Beaudry et al., 2001), since stable prices improve the informative content of the price system, favoring a good allocation of resources (the best opportunities are easily identifiable)³.

The restrictions to investment financing are a problem broadly documented in the literature on the investment determinants. Just as suggested in Loungani and Rush (1995), the basic idea is that some agents, typically SMEs, are unable to get financing directly through open market debt. Hence, these agents are strongly dependent on bank credit, a market that is usually characterized by imperfections coming from asymmetric information between lenders and borrowers. In developing countries like Argentina, this problem of access to credit is critical by the absence of future markets and the poor access to long term financing. Hence, the evolution of the credits amounts destined to the private sector would be a good indicator of the restrictions operating in the domestic financing of investment.

On the other hand, the external debt level (as a share of GDP), is a variable that represents the restrictions of the external credit in the investment financing in emergent countries (an example is the decade of the eighties for most of Latin American countries). In turn, a higher level of external debt would be a strong indicator of the viability and sustainability of the current macroeconomic policies in the long term, impacting negatively in the investors expectatives due to the increment in the degree of uncertainty. For this reason, it is included in the analysis, just as in Chirinko and Schaller (1995).

The real exchange rate can also affect the evolution of private investment. On one hand, just as suggested in Froot and Stein (1991), not only a devaluation would reactivate the exportable sector of the economy, but it would be also favorable for the acquisition of local assets by foreign companies at a much smaller price. Other authors like McCulloch (1989) reject this link between investment and exchange rate, suggesting that the price of a domestic asset should not care, but only the rate of return. When the currency of a country is depreciated in real terms, not only the asset price falls, but also the nominal gain of the investment. This effect becomes particularly relevant in sectors producers of non-exportable goods.

Another variable that is usually included is the degree of trade liberalization of an economy. Here, a priori, an ambiguous effect can be expected. On one hand, an economy highly integrated to the world is expected to attract investments in tradable sectors in order to increase productivity and competitiveness (Balasubramanyam et al., 1996). However, an abrupt increment in the exposure to external competition in certain sectors can make them less attractive as a destination of new capital flows (Serven, 2002). The relationship between exports plus imports as a share of GDP (trade liberalization coefficient) is used in this study.

Finally, is also interesting to distinguish between public and private investment. The changes in the economic environment usually affect in a different way the investment decisions for both companies and workers that move in markets with different regulation types, or for several

³ Other variables related to the uncertainty level in the economy where used in previous studies. For example in Campos and Nugent (2000), a socio-political index of instability is used as a proxy variable for uncertainty, and was

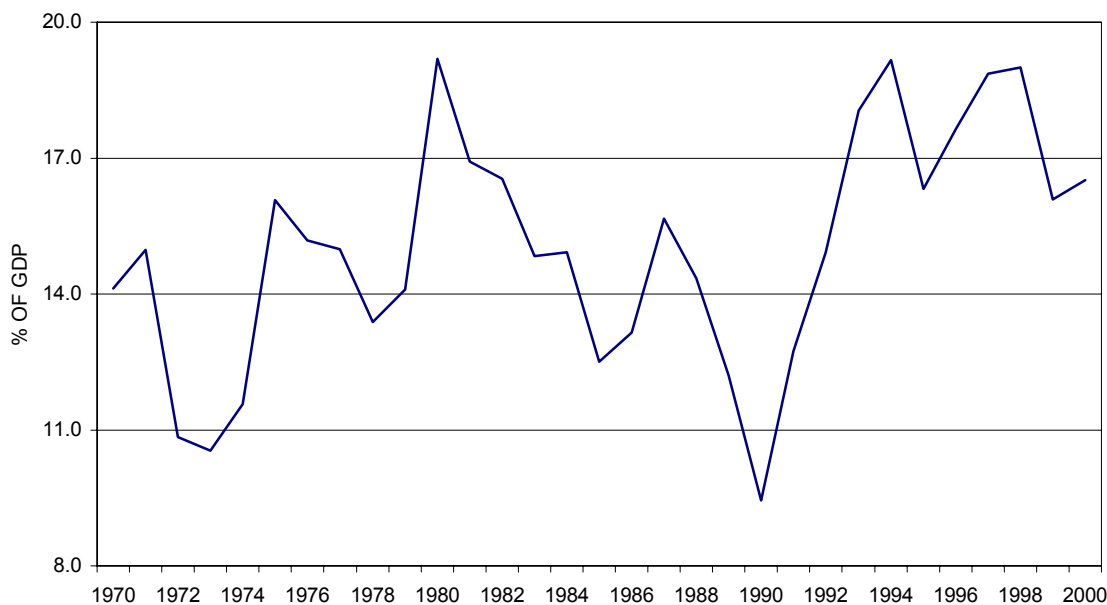
government levels whose decisions are taken in normative environments outside of the market mechanisms. Here, the public investment can also have differential impacts, and one of the following effects is expected to arise: the "crowding out" effect, where the state displaces the private sector when the public investment increases in a country, as competes for the appropriation of scarce (physical and financial) resources; and the "crowding in" effect that emphasizes the positive externalities (as investments in infrastructure, anticyclical policies, public goods provision) and the complementarity that the public investment has by inducing more levels of private investment (sees Everhart and Sumlinski, 2001).

IV. Estimations and results

In order to proceed with the estimates of the determinants of the investment flows, it was necessary to establish the timing of the analysis. For the availability of investment data classified according to their origin (public or private), it was decided to cover only the period 1970-2000.

It is interesting to show the private investment behavior in the country during this period. As can be seen in the Graph 2, the general trend is upward in the seventies, but falling in the eighties, and starting again in 1990 an upward cycle during the period of reforms. In fact, while the private investment as a share of GDP fall 2% annually between 1970 and 1990, during the period 1991-1999 the trend was reverted by growing yearly at a 3% rate. What is more: the privatizations and the macroeconomic stability the "Convertibility" plan attracted foreign capitals, the main component of this increase, and this was reflected by an increment in foreign direct investment as a share of GDP of 8.2% annually between 1991 and 1998.⁴

GRAPH 2: PRIVATE INVESTMENT IN ARGENTINA
SOURCE: EVENHART AND SUMLINSKI (2001)



⁴ Source: World Bank Development Indicators.

Table 5 shows the evolution of the fixed gross investment in their different components and origins. As can be observed, the increase in FGI during the nineties is explained mainly by a remarkable increment in the private investment during the period 1990-1994 (28.4% per year), especially in machinery and transport equipment of foreign origin. This acceleration stops by the end of the decade, when total investment falls 0.5% and private investment 0.8% annually.

Table 5 - Evolution of Investment in Argentina: 1970-2000

	Annual Growth Rate									
	GDP	Total Inv.	M&E	Trans. Equip.	Hous.	NonRes. Const.	Nat. Comp.	Foreign Comp.	Public Invest.	Private Invest.
1970-1977	2,9	5,9	8,6	4,8	2,0	6,4	5,6	13,0	9,1	3,8
1977-1983	0,3	-4,0	-10,8	-10,0	-4,1	-6,0	-3,6	-13,1	-10,8	0,1
1983-1990	-0,9	-6,4	-3,7	-7,4	-7,5	-5,9	-6,4	-5,2	-4,8	-7,1
1990-1994	7,6	17,5	17,1	36,5	19,9	11,3	12,9	79,0	-30,4	28,4
1994-2000	1,7	-0,5	0,3	-3,1	-2,5	2,1	-1,4	2,9	5,5	-0,8

Source: Ministry of Economy - IMF - Everhart and Sumlinski (2001)

Note: Total Investment include Change in Inventories

Concerning the estimates of the investment functions at a short, medium and long term, the series used were the public and private investment as a share of the GDP, the GDP level, the external debt (% GDP), the trade liberalization coefficient ($X+M / GDP$), the real exchange rate (nominal exchange rate multiplied by the ratio between the producers price index of US and the consumers price index of Argentina), and the inflation rate (change in CPI). The source of all annual data on national accounts and prices is IMF (International Financial Statistics), the total of credits to the private sector and the external debt come from the World Bank (World Development Indicators), and the data on public investment is the estimated by Evenhart and Sumlinski (2001) for the World Bank.

Just as in Bebczuk (1994), in this study the real interest rate is not used as a potential relevant variable for the private investment decision, mainly because all along the XXth century in Argentina (and especially in the last decades) successive regulatory and inflationary episodes caused that in several periods the real interest rate of the economy became negative. For this reason, it was excluded from the analysis.

Before starting with the estimation of the investment functions, it was necessary to analyze the behavior of all the macroeconomic variables in order to determine their stationarity condition (to avoid spurious OLS estimates in presence of unit root series). With this purpose, the Augmented Dickey-Fuller tests for unit root were applied to each variable used in the analysis (Table 6)⁵. To determine the inclusion or not of a trend, and the optimal number of lags, the Schwarz Information Criterion (SIC) as a selection method was used⁶.

⁵ These tests are based on regressions of the following form:

$$\Delta u_t = a + bt + cu_{t-1} + \sum_{i=1}^p d_i \Delta u_{t-i} + v_t$$

Table 6: ADF Tests
Sample: 1970-2000

<i>Variable</i>	<i>Description</i>	<i>ADF</i>	<i>Crit. Val. 5%</i>	<i>Lags - Trend</i>
PrivInv	Private Investment (% GDP)	-2,677	-2,992	2
GDP	GDP (constant \$)	-2,005	-3,584	1 - Trend
ExtDebt	External Debt (% GDP)	-1,386	-2,989	1
Inflation	CPI (%)	-3.822*	-2,989	1
RER	Real Exchange Rate (Index)	-3,278	-2,989	1
Credit	Credit to Private Sector (%GDP)	-2,768	-2,989	1
TradeLib	Exports + Imports (% GDP)	-1,890	-2,989	1
PubInv	Public Investment (% GDP)	-2,655	-3,584	1 - Trend

* Reject Unit Root

Notes: All variables in logarithms except Inflation

For each variable, in the election of lags/trend the Schwarz criterion was minimized.

As can be observed, all the series present unit roots (at 5 % significance level), except the inflation rate. In a second stage, the order of integration of the non-stationary variables was performed, proceeding in the same way by means of DFA tests applied to series in difference based on models that minimize SIC. All present I(1) behavior at 5% significance level, i.e., the first differences are stationary.

The next step is to estimate the long term investment function by using the Cointegration technique of Engle and Granger to the I(1) variables. The hypothesis of long term relationship for the variables is the following one, which also includes a dummy variable dummy that takes the value of 1 in the period of reforms (after 1991):

$$\lg \text{privinv}_t = \alpha_0 + \alpha_1 \lg \text{gdp}_t + \alpha_2 \lg \text{extdebt}_t + \alpha_3 \lg \text{tradelib}_t + \alpha_4 \lg \text{pubinv}_t + \alpha_5 \lg \text{rer}_t + \alpha_6 \lg \text{credit}_t + d1991_t + \varepsilon_t$$

The results are shown in Table 7. Using the methodology “from general to particular”, it is concluded that the private investment flows seem to be positively cointegrated with the output (a long term elasticity of 1.5%), the real exchange rate (0.2%), and the domestic financing disponibilities (0.3%), while it registers a long term negative impact of the external debt level and the degree of trade liberalization of the economy. The cointegration model is validated

Where u_t in the variable of interest, t is the trend, and p the number of lags. The estimation strategy consists on a “t” test to the OLS estimation of c , where the null hypothesis is that the series are I(1).

⁶ The Schwarz information criterion (SIC) minimizes

$$SIC = T \log|\hat{\Sigma}| + f \log(T)$$

where f is the total number of parameters in the model, T is the number of observations, and Σ is the variance-covariance disturbances matrix.

since the residuals are stationary, applying DFA to the preferred specification according to the SIC approach (without trend and with one lag).

Table 7: Private Investment - Cointegration

Variables	Model 1	Model 2
lggdp	1.261** (0.384)	1.500** (0.294)
lgpubinv	0.081 (0.079)	
lgradelib	-0.403** (0.145)	-0.357** (0.140)
lgextdebt	-0.234** (0.084)	-0.264** (0.077)
lgrer	0.213** (0.093)	0.203** (0.087)
lgcredit	0.334** (0.116)	0.282** (0.103)
d1991	0.209 (0.160)	
constant	-13.048** (4.542)	-15.604 (3.629)
Observations	31	31
R2	0.656	0.631
F	6.27	8.53
DFA error (1 lag)	-	-4.623
Crit.Val. 5%	-	-2.989

Note: Standard errors between brackets.

** Significant at 5%

* Significant at 10%

These estimates confirm most of the empiric results found in the literature: the perspectives of growth (output), profitability (exchange rate, trade liberalization), and viability (domestic financing , external debt level) of the economic system are the main variables that guide the investment decision in the long run. The profitability of the investment that is not approached in this study by means of an interest rate, seems to be captured indirectly through the positive impact of a devaluation (sectors producing exportable goods), and through the negative impact of a deep trade liberalization (non-exportables).

Once obtained the long term relationship, is interesting to estimate a partial adjustment model (or a short term relationship) between the private investment and its main determinants. The Distributed Lags (ADL) specification proposed combines variables with lags of these variables, including for the dependent one. The general form of these models is the following:

$$\Delta y_t = \beta_0 + A(L)\Delta y_{t-1} + B(L)\Delta q_t + \eta_t$$

Where y_t represents the private investment, q_t the vector of independent variables, and n_t the error term. In particular, the considered hypothesis of short term behavior is the following one:

$$\begin{aligned} \Delta \lg \text{privinv}_t = & \alpha_0 + \alpha_1 \Delta \lg \text{privinv}_{t-1} + \alpha_2 \Delta \lg \text{privinv}_{t-2} + \alpha_3 \Delta \lg \text{gdp}_t + \alpha_4 \Delta \lg \text{gdp}_{t-1} \\ & + \alpha_5 \Delta \lg \text{pubinv}_t + \alpha_6 \Delta \lg \text{pubinv}_{t-1} + \alpha_7 \Delta \lg \text{tradelib}_t + \alpha_8 \Delta \lg \text{tradelib}_{t-1} + \alpha_9 \Delta \lg \text{rer}_t \\ & + \alpha_{10} \Delta \lg \text{rer}_{t-1} + \alpha_{11} \Delta \lg \text{extdebt}_t + \alpha_{12} \Delta \lg \text{extdebt}_{t-1} + \alpha_{13} \inf l_t + \alpha_{14} \Delta \inf l_t \\ & + \alpha_{15} \Delta \inf l_{t-1} + \alpha_{16} \Delta \lg \text{credit}_t + \alpha_{17} \Delta \lg \text{credit}_{t-1} + d1991_t + \eta_t \end{aligned}$$

Using the methodology “from general to particular”, the results of the complete and the preferred models are shown in Table 8. The tests concerning the behavior of the errors n_t are also included. The hypothesis of serial correlation in the error terms, that would lead to biased estimates due to the presence of lags of the dependent variable in the right hand side of the equation, is rejected (Breusch-Godfrey Test). Similarly, both the heteroskedasticity (Breusch-Pagan Test) and of non-normality (Jarque-Bera Test) hypotheses are rejected, so the estimates are both consistent and efficient.

The preferred specification (2) shows that there is evidence of partial adjustment in the private investment in Argentina (only the first lag of the difference is significant at 5% level). On the other hand, other variables influence the short term behavior of the private investment. The output, for example, impacts with an elasticity of 1.99%, showing evidence that agrees with the accelerator hypothesis (Samuelson).

There is also evidence that supports the theory of a "crowding-out" effect of the public investment (an increment of 1% reduces the private investment in 0.17%). As the cointegration model shows, in the long term this effect vanishes and there is no longer a relationship between the public and private investment. This suggests that there is a sort of competition by resources dedicated to the investment between the public and the private sector, at least in the short run.

The expected return rates levels are also important determinants of the private investment in the short run. The real exchange rate is again important: a devaluation seems to increase investment substantially (0.21%). While the trade liberalization of the nineties seemed to have had an adverse effect on short term investment, affecting mainly the sectors most exposed to foreign competition (non-exportables), evidence that goes against the presence of a productivity adjustment in the production process in these industries during this period.

It is important to stress that both the short and long term results are close to those founded in the study of Ribeiro and Texeira (2001) for the Brazilian case. In that paper, the evolution of the private investment process is analyzed for the period 1956-1996, showing a short term output elasticity of 1.42%, of 0.75% for the long run, and a partial adjustment of the investment of 0.492. The long term private investment is also cointegrated with the real exchange rate (0.23%), and with the credit to the private sector (0.17%). Moreover, the authors also found that the first differences of the real exchange rate (0.43%) are significant in the short run, just as it happens in the present study. These similarities suggest a similar behavior in the Mercosur area.⁷

⁷ It is important to notice that in contrast to the present study, Ribeiro and Texeira (2001) don't find evidence of "crowding-in" or "crowding-out" of the public investment. While in the short run, the inflation rate and the credit to the private sector are both relevant.

Table 8: Private Investment - Distributed Lags

Variables	Model 1	Model 2
dlgprivinv(t-1)	-0.038 (0.299)	0.229* (0.133)
dlgprivinv(t-2)	0.081 (0.268)	
dlggdp(t)	2.223** (0.832)	1.987** (0.490)
dlggdp(t-1)	1.014 (1.055)	
dlgpubinv(t)	-0.088 (0.106)	-0.168** (0.066)
dlgpubinv(t-1)	0.063 (0.098)	
dlgtradelib(t)	-0.286 (0.240)	-0.390** (0.126)
dlgtradelib(t-1)	-0.291 (0.331)	
dlgrer(t)	0.182 (0.111)	0.214** (0.062)
dlgrer(t-1)	0.011 (0.134)	
dlgextdebt(t)	0.005 (0.243)	
dlgextdebt(t-1)	-0.051 (0.172)	
infl(t)	0.002 (0.006)	
dinfl(t)	-0.002 (0.010)	
dinfl(t-1)	-0.004 (0.007)	
dlgcredit(t)	-0.075 (0.234)	
dlgcredit(t-1)	0.047 (0.183)	
d1991	-0.037 (0.058)	
constant	-0.030 (0.048)	-0.035 (0.021)
Observations	28	29
R2	0.818	0.669
F	2.25	9.29
Jarque-Bera (Crit.Val. 5.99)	-	0.70
Breusch-Pagan (Crit.Val. 9.49)	-	1.22
Breusch-Godfrey (Crit.Val. 3.84)	-	1.59

Note: Standard errors between brackets

** Significant at 5%

* Significant at 10%

Finally, it would be interesting to compile in a single model both the determinants of short and long term of private investment. For that, an Error Correction specification can be used, taking into account the speed of adjustment to the long run trend of the series. This type of models helps to correct the potential biases in the estimation of the coefficients in models in differences that don't take into account the cointegration relationships; when these long term restrictions between the variables are ignored, there could be a problem of omitted variables bias.

The proposed specification that includes both the preferred short and long term models is the following one:

$$\Delta \lg \text{privinv}_t = \alpha_0 + \gamma [\lg \text{privinv}_{t-1} + 15.604 - 1.500 \lg \text{gdp}_{t-1} + 0.357 \lg \text{tradelib}_{t-1} - 0.203 \lg \text{rer}_{t-1} + 0.264 \lg \text{extdebt}_{t-1} - 0.282 \lg \text{credit}_{t-1}] + \alpha_1 \Delta \lg \text{privinv}_{t-1} + \alpha_2 \Delta \lg \text{gdp}_t + \alpha_3 \Delta \lg \text{pubinv}_t + \alpha_4 \Delta \lg \text{tradelib}_t + \alpha_5 \Delta \lg \text{rer}_t + \mu_t$$

The results of the Error Correction model are presented in Table 9. The variable $elp(t-1)$ is the deviation (or gap) from the long term trend in the previous period, and γ represents the long term speed of adjustment coefficient. As it can be observed, due to an increment in the private investment above the long term trend, the preferred model predicts that almost two thirds of the gap (63.3%) is closed in one year.

Variables	Model
elp(t-1)	-0.633** (0,163)
dlgprivinv(t-1)	0.285** (0,106)
dlggdp(t)	2.086** (0,387)
dpubinv(t)	-0.129** (0,053)
dlgtradelib(t)	-0.267** (0,104)
dlgrer(t)	0.211** (0,049)
constant	-0.039** (0,017)
Observations	29
R2	0,803
F	14,97
Jarque-Bera (Crit.Val. 5.99)	2,41
Breusch-Pagan (Crit.Val.11.07)	6,52
Breusch-Godfrey (Crit.Val. 3.84)	1,05

Note: Standard Errors between brackets.

** Significant at 5%

* Significant at 10%

All the short term results remain. This "medium term" model predicts a bigger partial adjustment of the investment to the previous period that in the previous model (0.285 against 0.229), since now it is corrected by incorporating the deviation from the long term trend. The same happens with the output elasticity (2.09% vs 1.99%). In this model, it is also perceived that the "crowding-out" effect prevails to the "crowding-in", although with by a smaller amount (-0.13% vs. -0.17%).

Finally, the trade liberalization and the real exchange rate also impact in the "medium term", although in this case the effect is attenuated with respect to the short term coefficients.

All these results should be taken with caution, as these are estimates subject to traditional measurement errors. It's also encouraged (as soon as the availability of information allows it) the extension of this study to microeconomic estimations for analyzing the determinants of the investment at the firm level.

V. Final Comments

In this paper, the main stylized facts of the investment in the Argentina has been revisited, in order to elucidate which have been the main characteristics of the capital accumulation process in the country. The results suggest a structural change in the investment trend for the last decades, in fact starting during the last military régime. In spite of the turnover of the first half of the last decade, the country has not been able yet to recover the capital incorporation flows of the import substitution era.

Moreover, an exploration of the determinants of the private investment for the last three decades reflects that the rhythm of capital accumulation from the private sector seems to have been determined mainly, in the short term, by conjunctural reasons, both by yield (exchange rate, trade liberalization), as well as by shocks in the demand level. Controlling for other variables, the analysis shows a clear evidence of a displacement effect coming ("crowding out") from the government investment decisions, by competing for productive resources that could have been assigned by the private sector. The similar results with studies treating the case of Brazil (Ribeiro and Texeira, 2001), suggests a similar behavior in the Mercosur area.

Meantime, among the factors that seem to have determined the growth path of the economy (long term), the external debt level and the degree of restrictions that usually operates in the domestic credit market are found to be relevant. The poor operativeness of the financial credit system seems to have been an important obstacle to the economic growth. On the other hand, the study presents evidence that the capital incorporation form part of the private sector is intimately bound to the perspectives of long term sustainability of the country: the debt position with the rest of the world is a variable that fully impacts in the expectatives of the investors, since it determines the sustainability on time of the economic policies that a government undertakes. These presumptions of fragility of the whole economic system from part of the investors were largely justified by the subsequent episodes that led the country to the serious economic crisis of these days, mainly due to the deep crisis in the financial system and by the spectacular (and conditionant) public indebtedness originated in the last decades.

In synthesis, in order to shade light and contribute to find an end to the current economic crisis that the country is suffering, the results are encouragingly in the sense that it is expected that the trust and the flows of private investment will return to the country, if both the economic growth and the perspectives of sustainability in time also come back. In the short run, the reactivation seems to come through an exchange rate policy that stimulate the exports and generate a import substitution process. In the long run, however, it doesn't seem to be a good substitute for a responsible policy in public finance, an improvement in the business environment, an end to abrupt reversions regarding economic policies, and a recovery of the trust in the domestic financial institutions. These seem to be the keys to unchain a virtuous circle of growth that will help the country to recover past levels of development and wealth.

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