



# STABILIZATION POLICIES IN ARGENTINA: AN ANALYSIS FROM THE PERSPECTIVE OF INFLATION UNCERTAINTY

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#### STABILIZATION POLICIES IN ARGENTINA: AN ANALYSIS FROM THE PERSPECTIVE OF INFLATION UNCERTAINTY

#### **ABSTRACT:**

In understanding the Argentinean inflationary experience, one can identify the following economic causes: (i) the structure of the economy, (ii) the fiscal deficit and (iii) the specific characteristics of the implemented stabilization programs. From 1948 until 2005, all administrations had to purse at least one stabilization program.

This paper identifies (i) the timing of the implemented programs, (ii) the main instruments used to achieve price stability and (iii) the consequences these programs had on the evolution of inflation uncertainty. The objective is to test whether inflation uncertainty rose as the inconsistencies of the stabilization programs became apparent and, thus, the programs came to an end.

The estimation of the unobservable inflation uncertainty is based on running Markov-Switching Models. This class of models can identify heteroskedastic behaviors as well as changes of the level of inflation for different states of the economy. In this paper the monthly inflation level defines the states. The initial success of the different programs tended to disappear rapidly, therefore reducing the confidence of economic agents.

**KEY WORDS:** Inflation; Inflation uncertainty; Markov-Switching models; Stabilization policies

**JEL classification codes**: E30, E31 and E63

#### **RESUMEN:**

Para comprender la experiencia inflacionista de Argentina pueden identificarse las siguientes causas económicas (i) la estructura de la economía, (ii) el déficit publico y iii) las características especificas de los programas de estabilización puestos en funcionamiento. Desde 1948 hasta 2005 todas las administraciones han implementado al menos un programa estabilizador.

Este documento identifica (i) la periodificación de los programas ,(ii) los principales instrumentos utilizados para lograr la estabilidad de precios y (iii) las consecuencias que estos programas tuvieron sobre la evolución de la incertidumbre de la inflación. El objetivo principal es comprobar si la incertidumbre de inflación aumenta cuando las inconsistencias de las políticas aplicadas se hacen evidente y, en consecuencia los programas dejan de ser efectivos.

La estimación de la incertidumbre de la inflación no observada se basa en un modelo de cadenas de Markov. Este tipo de modelo puede identificar el comportamiento heterocedástico así como los cambios en el nivel de inflación para diferentes estados de la economía. En este documento el nivel de inflación mensual define dichos estados. El éxito inicial de los diferentes programas tiende a desaparecer rápidamente además de reducir la confianza de los agentes económicos

PALABRAS CLAVES : Palabras claves: Inflación; incertidumbre de inflación; Modelos de Cadenas de Markov; Políticas de Estabilización JEL: E30, E31 y E63

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# **1. INTRODUCTION**<sup>\*</sup>

e define future inflation uncertainty or, simply, inflation uncertainty, as the unknown component of the future inflation rate and, as such, economic agents cannot forecast it. Uncertainty is, therefore, associated with how good are the predictions of future inflation. Given that this is an unobservable variable, we need to estimate it using statistical methods.

In this paper inflation uncertainty is estimated using a series of Markov Switching models. These models are able to capture heteroskedastic behavior as well as changes in the level of inflation related to different economic states; these states are defined as different levels of the monthly inflation rate. The basic data are the Consumer Price Indices published by Instituto Nacional de Estadísticas y Censos from January 1945 to December 2005. The inflation rate is the monthly rate of growth of the Consumer Price Index.

The period was chosen because during the second half of the twentieth century, Argentina experienced low and high inflation as well as hyperinflation under different economic policy regimes. After the crisis of the year 2001, the last stabilization program implemented was in the early 2002.

One way of evaluating the success in controlling inflation is to analyze the evolution of inflation uncertainty. The main objective of this paper is to find out if inflation uncertainty increased as the stabilization programs came to an end.

The second section discusses theoretical aspects of the Markov Switching models need to estimate inflation uncertainty. The third section discusses the results obtained, in particular, the evolution of inflation uncertainty. The fourth section revises the stabilization programs applied in the period. The fifth section relates inflation uncertainty with the stabilization programs. Finally, the sixth section contains the conclusions of the paper.

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## **2. MODEL SPECIFICATION**

amilton (1989) proposed a Markov Switching model that is state dependent, this model is an extension of the one proposed by Goldfeld and Quandt (1973), where they analyzed parametrical structural change in the context of an autoregressive process. This class of model allows capturing heteroskedastic behavior and changes in the inflation level for different states of the economy.<sup>1</sup>

The general formulation of a Markov Switching model with mean and variance autoregressive processes of order p and m states is:

$$(y_{t} - \mu_{St}) = \phi_{1}(y_{t-1} - \mu_{St-1}) + \dots + \phi_{p}(y_{t-p} - \mu_{St-p}) + \sum \beta_{\xi}\xi_{t} + \varepsilon_{t}, \quad t = 1, 2, \dots, T$$
(1)

$$\varepsilon_{t} \sim \operatorname{Nii}\left(0, \ \sigma_{s_{t}}^{2}\right), \tag{2}$$

$$\mu_{St} = \mu_1 S_{1t} + \mu_2 S_{2t} + \dots + \mu_m S_{mt}, \tag{3}$$

$$\sigma_{s_t}^2 = -\frac{2}{1}$$
  $S_{1t}$   $+\frac{2}{-2}$   $S_{2t}$   $+$  ...  $+$   $-\frac{2}{m}$   $S_{mt}$ ,  
(4)

$$S_{it} = 1$$
, if  $S_t = j$ , and  $S_{it} = 0$ , if  $S_t \neq j$  for  $j = 1, 2, ...m$ , (5)

$$\xi_t = 1 \text{ for } t = t_j, y \quad \xi_t = 0 \text{ for } t \neq t_j$$
(6)

where: yt is the monthly inflation rate, with  $\mu^{s_t} = \mu_1$  if  $S_t = 1$ ,  $\mu_2$  if  $S_t = 2$ , ...,  $\mu_m$  if  $S_t = m$ , and  $\sigma_{s_t}^2 = \sigma_1^2$  if  $S_t = 1$ ,  $\sigma_2^2$  if  $S_t = 2$ , ...,  $\sigma_m^2$  if  $S_t = m$ .

In this model the timing of a structural change is endogenous, therefore,  $S_t,\ t$  = 1, 2, ..., T, is an unobservable variable. In this case, it is assumed that the evolution of the discreet variable  $S_t \in \{1,\ \ldots,\ M\}$  follows a first order discreet Markov stochastic process defined by transition probabilities represented by the following matrix P:

p <sub>11</sub>	$p_{21} \\$	 $p_{m1} \\$	
p <sub>12</sub>	$p_{22}$	 $p_{m2} \\$	
.	•		
l p <sub>1m</sub>	$p_{2m} \\$	 $p_{mm} \\$	_

<sup>1</sup> Krolzig (1997) and Kim and Nelson (1999) discuss this class of models.



where 
$$p_{ij} = Pr[S_t = j | S_{t-1} = i], \sum_{j=1}^{m} p_{ij} = 1 \forall i$$

Each element in the probability matrix indicates the probability that being the economy in state "*i*" in period "t-1" it will move to a new state "*j*" in the next period, "*t*". The elements along the principal diagonal of P show the probability that the economy being at state "*i*" it will remain at state "*i*". For example, p<sub>12</sub> shows the probability that the economy being in state 1 at time "t-1" will shift to state 2 in period "*t*", while, p<sub>22</sub> shows the probability that the economy will remain at state 2 in the next period.

Equation (1) allows the introduction of outliers,  $\xi_t$ , there use avoids the selection of fictitious regimes and insures a normally distributed error term. In all cases, the dummy variable takes the form of an impulse, as indicated by equation (6).<sup>2</sup>

The statistical inference problem of a Markov Switching model consists

of 1) to estimate the parameters of the model,  $\phi_1$ , ...,  $\phi_p$ ,  $\beta_{\xi}$ ,  $\sigma_{s_t}^2$ ,  $\mu^{s_t}$  and the transition probabilities through the maximization of a likelihood function and 2) to conduct the statistical inferences regarding  $S_t$ , t = 1, 2, ..., T. Inferences regarding the state of the economy at time t, are based on filtered as well as smoothed probabilities.

Traditionally, the variance of the error term was calculated using the smoothed probabilities and estimated parameters, following Kim *et al.* (1998) criterion:

 $E\left(\frac{2}{s_{t}} \mid y_{T}\right) = \frac{\ddot{\sigma}_{1}^{2}}{B}E[S_{t} = 1|\Psi_{T}] + \frac{\ddot{\sigma}_{2}^{2}}{B}E[S_{t} = 2|\Psi_{T}] + \dots + \frac{\ddot{\sigma}_{m}^{2}}{B}E[S_{t} = m|\Psi_{T}]$ (7)

This criterion uses the entire sample information - from the first to the last observation -,  $\Psi_T$ , to estimate the variance of the error term. This is the case because smoothed probabilities are calculated using the whole sample period, i.e., their inference about the state of the economy at time T is based on a probability estimated the whole sample period.

However, the information set available to economic agents at time t is only  $\Psi_t$ . Therefore, the appropriate estimation of the variance of the error term is the same as (7), but substituting filtered for smoothed probabilities. Filtered probabilities give an inference on the state of the economy at time t based on the information available at time t.

 $<sup>^2</sup>$  Kim and Nelson (1999, 80) incorporate an outlier in their estimation of Hamilton's model (1989) to capture the impact of a structural change on GDP average growth.



With the filtered probabilities and estimated parameters inflation uncertainty is:

$$E(\frac{2}{s_{t}}|y_{t}) = \ddot{\Theta}_{1}^{2}E[S_{t} = 1|\Psi_{t}] + \ddot{\Theta}_{2}^{2}E[S_{t} = 2|\Psi_{t}] + ... + \ddot{\Theta}_{m}^{2}E[S_{t} = m|\Psi_{t}]$$
(8)

Given the general specification of Markov Switching model in mean and variance of an underlying autoregressive process of order p and m states, one proceeds to choose the data generating process for each of the five periods here considered.

## **3. EMPIRICAL ANALYSIS**

The period was chosen because during the second half of the twentieth century, Argentina experienced low and high inflation as well as hyperinflation under different economic policy regimes. We have divided the sample period in five sub periods: the first from January, 1945 to December, 1960, the second from January, 1961 to December, 1974, the third from January, 1975 to December, 1988, the fourth from January, 1989 to December, 1993 and the fifth from January, 1994 to December, 2005. The period of high inflation ended in 1994, while during 1999, 2000, and, 2001 the country experienced deflation.

The justification for this periodization lies on the levels of inflation: the average inflation was different in each period and possibly followed different data generating processes. Graph 1 and Table 1 depict the evolution of inflation in the sample period and its main descriptive statistics.

Model selection is a difficult task, mainly due to the selection of the right number of states of the economy within each period. Here we followed the procedure suggested by Krolzig (1997) of selecting a number of states not superior to four and then choosing the estimation with the lowest number of states as suggested by the statistical significance of the autoregressive parameters, equality of means and equality of variances, in this order.

The chosen models are those with lowest Akaike (AIC) and Hannan Quinn  $(HQ)^3$  criterion and they satisfy the following conditions: (i) the polinomial roots are outside the unit circle, (ii) the standardized residuals are normally distributed with mean zero and constant variance and, therefore, (iii) no autoregressive heteroskedastic variance.

<sup>&</sup>lt;sup>3</sup> See Akaike (1981) and Hannan and Quinn (1979).







Source: author's calculation

Period		N⁰ Observations Minim.		Maxim.	Mean	Std. Dev.	
All Period:	1945-2000	672	-6.07	196.63	5.26	12.09	
1º Period:	1945-1960	192	-4.20	17.76	1.95	2.88	
2º Period:	1961-1974	168	-6.07	12.66	2.15	3.10	
3º Period:	1975-1988	168	1.70	37.57	10.80	7.07	
4º Period:	1989-1993	60	-0.01	196.63	16.37	33.96	
5º Period:	1994-2005	144	-0.75	10.39	0.41	1.16	

	TABLE	1.	
<b>Monthly Inflation</b>	Rate:	Descriptive	Statistics

Note: Minimum values: April, 1953 (-4.20%), January, 1961 (-6.07%), February, 1986 (1.70%), December, 1993 (-0.01%), March, 1999 (-0.75%). Maximum values: January, 1959 (17.76%), December, 1974 (12.66%), March, 1976 (37.57%), July, 1989 (196.63%), April, 2002 (10.39%).

Source: author's calculations



The estimations for each of the five periods use the program *MSVAR* for Ox developed by Krolzig (1998)<sup>4</sup>. (See Table 2). Markov Switching models generate a reasonable estimation of inflation uncertainty in the periods considered.

Plugging the estimates of the filtered probabilities and of the parameters into equation (8), we obtain a metric for inflation uncertainty. Graph 2 shows the square root of this measure.<sup>5</sup>



GRAPH 2. Square Root of Estimated Inflation Uncertainty. 1945:01-2005:12

Note: In order to avoid problems of scale, in this graph the metric of inflation uncertainty is the square root of the variance estimated using Markov Switching models.

Source: author's calculations

<sup>4</sup> "MSVAR for OX" uses programming language Ox, developed by Doornik (1998). It allows the interaction with GiveWin. In order to optimize the maximum likelihood function, we use the algorithm Expectation-Maximization, EM, by Dempster et al. (1977).



<sup>&</sup>lt;sup>5</sup> See Fellinger (2004) for the uncertainty series and its characteristics.

	1º) 1945:01	-1960:12	2º) 1961:0	)1-1974:12	3º) 1975:0	)1-1988:12	4º) 1989:01-1993:12		5°) 1994:01-2005:12	
Parameters	Coefficients	t-student	Coefficients	t-student	Coefficients	t-student	Coefficients	t-student	Coefficients	t-student
μ1	0.3367	2.3751	0.6571	4.1388	6.2783	7.5675	0.5897	6.0849	-0.0051	-0.137
μ2	2 .3121	5.3147	3.1393	10.8490	10.3540	11.4920	6.5684	5.8202	0.6653	6.685
μ3					17.2970	12.6520	31.8590	2.7169	3.2376	14.311
<b>φ</b> 1	0.1712	2.4793	-0.3991	-8.2007	0.6145	16.3980	0.4078	20.2260		
¢2			-0.1421	-3.0838			-0.0411	-8.7859		
φ4	0.1009	2.9698					0.0217	9.0655	0.0904	2.340
<b>¢</b> 6									0.0588	1.845
<b>φ</b> 12									0.0529	2.123
β1	16.2650	13.8620	7.8779	18.2210	19.2360	3.1625	152.2100	73.5320	1.1284	3.359
β2			5.5432	3.3832			2.1659	4.2570	7.1501	12.221
β3			5.8395	3.5992						
β4			7.4344	4.6338						
σ21	0.2809	6.3571	1.7579	9.0967	1.8849	10.4061	0.2503	8.6214	0.1107	13,780
σ22	7.0465	15.8307	2.3644	8.4256	2.0465	4.7495	12.7970	4.6024	0.1425	6,332
σ23					36.5750	11.3798	1420.80	4.6156	0.2908	3,694
π12	0.1307	0.9779	0.1806	3.9245	0.8341	4.4374	0.0000	0.0000	0.0629	4,122
π21	0.3585	2.6109	0.1281	2.8972	0.1580	1.5737	0.0000	0.0000	0.0134	2,832
π13					0.0318	St.Dev. 0.00	0.2495	3.7466	0.0004	4,920
π31					0.0000	0.0000	0.0474	1.3844	0.0089	0,397
π32					0.1656	4.1921	0.1687	2.2273	0.0000	1,693
π23					0.0175	1.9364	0.1085	1.9069	0.1428	St.Dev. 0.00
Ν <b>0</b> οβσ./ΑΙΧ	188	AIC: 4.491	168	AIC: 4.131	168	AIC: 5.440	60	AIC: 5.011	144	AIC: 1.218
Λογ–Μ <b>ά</b> ξ/ΗΘ	-413.18	HQ: 4.554	-335.045	HQ: 4.222	-442.962	HQ: 5.546	-133,341	HQ: 5.243	-70.719	HQ: 1.361

TABLE 2. Parameter Estimates under Markov Switching Models

Note: a) Impulse dummies were used for the following months: 1st period:  $\beta_1$  (January, 1959); 2nd period:  $\beta_1$  (December),  $\beta_2$  (January, 1972),

 $\beta_3$  (February, 1973),  $\beta_4$  (March, 1973); 3rd period:  $\beta_1$  (marzo-76); 4° period:  $\beta_1$  (July, 1989),  $\beta_2$  (January, 1992) y 5th period:  $\beta_1$  (January, 1995), ),

 $\beta_2$  (April, 2002). b) Shaded cells represent periods where the error term variances are statistically equal.

Source: author's calculations



# 4. A SUMMARY REVIEW OF THE STABILIZATION PROGRAMS IMPLEMENTED

he main economic causes of the Argentinean inflation during the second half of the twentieth century are (i) the structure of the economy, (ii) the chronic fiscal imbalance and (iii) the nature of the stabilization programs implemented. From 1948 to 2005, all Argentinean governments were forced to implement at least one stabilization program. Although the programs' details may differ, they generally share some important elements, in particular, in dealing with external imbalances and inflation reduction.

In most cases, prior to the stabilization program there was a balance of payments crisis accompanied by an acceleration of inflation. In most cases the exchange rate policy consisted of a maxi devaluation -30 per cent and higher- after which a fixed exchange rate was adopted. The aim of the devaluation was to generate a real devaluation to improve the external accounts, while the aim of the fix exchange rate was to tackle inflationary expectations. In addition to the devaluation, the authorities fix some key prices and imposed restrictions to wage indexation.<sup>6</sup> The aim of these measures was to limit "cost inflation", a typical outcome of nominal exchange rate adjustments.

Most programs acknowledged the need to close the fiscal deficit. However, available information shows that the authorities could not implement restrictive fiscal policies, perhaps due to the high political cost involved. Those programs that managed to initially reduce the fiscal deficit did so via a tax increase, instead of a reduction in expenses or expenditure rationalization.

Monetary policy has not been independent, because the Central Bank was forced to finance the fiscal deficit. Originally monetary policy was restrictive, and given a relatively expansive fiscal policy, the domestic interest rate rose. The authorities tried to control the interest rate fixing it and controlling domestic credit, the end result was the emergence of a secondary or informal credit market.

Here we do not consider those programs whose implementation was interrupted due to inflation acceleration, a deeper crisis or political instability. The following programs managed to reach some degree of price stability: Ramón Cereijo's Program (February, 1952), Alvaro Alsogaray's Stabilization and Development Program (July, 1959), Adalberto Krieger Vasena's Program (March, 1967), José Ber Gelbard's



<sup>&</sup>lt;sup>6</sup> Vitelli (1986) describes the periods of price controls from 1945 to 1975.

Program (May, 1973), first and second phase of José Martinez de Hoz<sup>'</sup> Program (April, 1976 and January, 1979), Austral Program (June, 1985), Primavera Program (August, 1988), BB Program and Bonex Program to stop hyperinflation (August, 1989 and January, 1990), Convertibility Program (January, 1991), and Post convertibility Programs (April, 2002).<sup>7</sup>

- Ramón Cereijo 's Program (February 1952)

Implemented during the second presidency of General Peron, this program fixed all prices. Producers of wage goods were given subsidies to compensate for cost differentials. Wage bargaining allowed for moderate biannual wage increases. In addition imports were severely restricted via tariff increases and the implementation of a multiple exchange rate regime.

- Alvaro Alsogaray's Stabilization and Development Program (July, 1959)

The aim was to accelerate the economy's growth rate and to stabilize the price level. In order to raise the growth rate, the authorities directed investment towards "strategic sectors" - following an unbalance growth strategy á *la* Hirschman<sup>8</sup>- and a strengthening of the import substitution industrialization. In addition, there were incentives to foreign investment, particularly in oil exploration. In order to achieve price stabilization, wages were fixed as well as prices from public enterprises, the exchange rate was also fixed and a series of price control agreements were signed with the largest domestic enterprises.

- Adalberto Krieger Vasena's Program (March, 1967)

After a maxi-devaluation of 37 per cent, the authorities fixed the exchange rate. Import tariffs were reduced and taxes to traditional export were increased. Eventually these taxes were reduced. Wages were adjusted by less than the previous period inflation rate and prices of the leading 500 private enterprises were fixed. The fiscal deficit was reduced via increases in taxes and prices of public enterprises.<sup>9</sup>

- Jose Ber Gelbard's Program (May, 1973)

The kernel of this program was a "Social Accord" between workers, entrepreneurs and the government. This accord aimed at reducing wage pressures and price increases. After initial wages and prices readjustment, the authorities followed a strict wage and price control scheme. A fixed exchange rate regime was adopted. Private bank



<sup>&</sup>lt;sup>7</sup> Dates attached to the stabilization programs indicate the time when they were announced or the first measures were implemented.

<sup>&</sup>lt;sup>8</sup> Albert O. Hirschman warmly approved the development plans implemented by the Frondizi administration. See Hirschman (1958, 1963), some of the same ideas were put forward by Gunnar Myrdal (1957).

<sup>&</sup>lt;sup>9</sup> See Di Tella (1983), De Pablo (1984) and Maynard (1989).

deposits were nationalized.<sup>10</sup> And, in order to raise the rate of growth, the authorities followed an expansionary fiscal policy. The authorities followed a highly protectionist industrial policy.<sup>11</sup>

- Jose Martinez de Hoz' Economic Program, first and second phases (April, 1976 and January, 1979)

The program began with a maxi-devaluation of 88 per cent, followed by periodic devaluations adding to 80 per cent by August 1976. Then these devaluations were suspended. Wages were strictly frozen. A fiscal reform included an expansion of the value added tax. Quantitative restrictions to imports were gradually lifted and the capital account of the balance of payments was liberalized. The authorities also implemented a program of domestic financial liberalization, which included interest payment on commercial bank reserves.<sup>12</sup>

By the end of 1978 the authorities implemented a second program whose aim was to control inflationary expectations. In order to do so, the exchange rate followed a preannounced devaluation schedule and whose implicit devaluation was lower than the inflation rate.<sup>13</sup>

- Austral Program (June, 1985)

This program included three main elements.<sup>14</sup> In the first place, there was a reduction of the fiscal and quasi-fiscal deficit. In order to do so, prices of public enterprises were raised; taxes on international trade increased -in particular, taxes on exports;- the Treasury collected a forced loan from the taxpayers and new legal dispositions allowed for a better tax collection. The deficit of the Central Bank went down due to a reduction of the nominal interest rate.<sup>15</sup>

In the second place, there was a de-indexation of the economy. Future payments of debts contracted before June 14, 1985, were adjusted downwards, reflecting the reduction of the inflation rate.<sup>16</sup>

<sup>&</sup>lt;sup>16</sup> The service of contracts denominated in Argentinean pesos -the austral substituted this currency unit- due after June 14 was recalculated. The authorities issued a table that reduced debt payments according to the lower inflation rate. The idea was to avoid a redistribution of wealth from debtors to lenders, as the inflation rate went down. See Bruno et al. (1988)



<sup>&</sup>lt;sup>10</sup> The law that nationalized bank deposits imposed a reserve ratio of 100 per cent. See "*Ley de Nacionalización de los Depósitos*".

<sup>&</sup>lt;sup>11</sup> One example was the promulgation of a law that required that public enterprise had domestic suppliers. See "*Ley de Compras Argentinas*". <sup>12</sup> See Noques (1986).

<sup>&</sup>lt;sup>13</sup> The Central Bank preannounced a monthly daily table showing the exchange rate for the next 30 days. The rate of devaluation was gradually reduced. See Fernandez (1987).

<sup>&</sup>lt;sup>14</sup> See Heymann (1986) or Machinea and Fanelli (1988).

<sup>&</sup>lt;sup>15</sup> The 30 days lending rate was fixed at 6 per cent per month and the rate on 30 days deposits at 4 per cent. Prior to the program, the respective rates were 30 per cent and 28 per cent per month.

In the third place, after the initial adjustment, prices, wages and prices of public enterprises were fixed. And the exchange rate was also fixed.

#### - Primavera Program (August, 1988)

This program consisted of a sharp reduction of the fiscal deficit accompanied by a severely contractionary monetary policy. The reduction in government expenditures followed a restriction in the use of electricity and fuels, closing of government agencies, selling of public assets and forced retiring of more than 30000 civil servants. In order to reduce inflationary expectations, the authorities implemented price and wage controls, after an initial readjustment. The exchange rate was devalued.

#### - BB and Bonex Programs (August, 1989 and January, 1990)

The BB Program was able to stop inflation by fixing the exchange rate, the nominal exchange rate became the nominal anchor of the system; in addition, all public debt due in the second half of 1989 was forcibly converted into longer term debt under a new public bond, denominated in Australes, BOCON.<sup>17</sup>

However, by December, 1989, the BB Program had to be abandoned due to a sharp depreciation of the black market exchange rate. Hyperinflation was aborted by Program Bonex. In this case, all short term government debt was converted into long term debt, denominated in dollars. In order to do so, the authorities issued a new series of BONEX.<sup>18</sup> This program transformed the debt accumulated by the Central Bank with commercial banks - that arose as a consequence of the obligation of remunerating commercial bank reserves - into government debt, thus eliminating the so-called quasi-fiscal deficit, a serious source of monetary issue. The authorities adopted a floating exchange rate regime and there was important foreign reserve accumulation.

#### - Convertibility Program (January, 1991)

This program, designed by D. Cavallo, had four basis: convertibility of the Argentinean currency - no legal restrictions to buy, sell or possess foreign currency by private citizens, - deepening and acceleration of the fiscal reforms already began - the aim was to lower the level of expenditures and to increase tax collection, - general deregulation of the economy and privatization of manufacturing enterprises in the hands of the government.<sup>19</sup>

<sup>18</sup> See Dornbusch andy Edwards (1992).

<sup>&</sup>lt;sup>19</sup> See Kiguel (1999), Heyman (2000) and Tomba (1996). The monetary aspects of Convertibility' Program were implemented in 1991, however, its structural reforms were implemented from 1991 until 1998. The monetary base was backed in 100 per cent by foreign reserves, indexation was scraped, the American dollar became legal tender in Argentina and the Central Bank was



<sup>&</sup>lt;sup>17</sup> Plan BB owns its name to the fact that the new economic team included former administrators with Bunge Born, a domestic corporation.

Until 1998, this program showed good results: the average rate of growth from 1991 to 1997 was 6.7 per cent, while inflation was virtually eliminated. Financial deepening, which included the domestic consolidation and internationalization of the banking sector as well as an increasing dollarization of the financial sector and of the rest of the economy.

The program began to falter in 1998, by then the economy faced the currency-growth-public debt trap characterized by:

- 1. An increasingly overvalued real exchange rate.
- 2. A stagnation of the domestic economy.
- 3. An increasing public debt that increased the financial exposure of the fiscal sector, thus raising doubts over the program's sustainability and giving rise to capital outflows.

The inconsistencies of the program became more apparent during De la Rua's administration (1999). The government tried to regain public confidence via implementing a fiscal adjustment; however, this adjustment did not produce the expected results provoking a rapid succession of Ministers of Economics (Machinea, Lopez Murphy and, once again, Cavallo in April 2001). Cavallo implemented a set of new economic measures whose aim was to gain control over an economy in full social, political and economic crisis.<sup>20</sup> These new measures were:

- 1. Abandonment of convertibility and adoption of a floating exchange rate regime.
- 2. Default of external public debt.
- 3. Severe restrictions on withdrawals from checking accounts (*corralito*).
- 4. Abandonment of the monetary rule and the appearance of near monies due to the lack of official currency.<sup>21</sup>

The maintenance of a hard peg while the economy faced a recession and fiscal vulnerability, made it extremely costly and difficult to adopt a new exchange regime. Additionally, the adoption of a pro-cyclical fiscal policy proved to be a disaster. Fiscal stability required an institutional structure that would have stimulated fiscal surpluses, or at least, that it would

<sup>20</sup> See De Pablo (2005) for a good description and analysis of these measures.

<sup>21</sup> Most Provinces issued their own near money: "*patacón*" in the Province of Buenos Aires, "*porteño*" in the City of Buenos Aires, "*lecor*" in the Province of Córdoba, "*petrom*" in the Province of Mendoza and "*bocade*" in the Province of Tucumán. Even the Federal Government issued this type of near money: "*lecop*".



given independence from the fiscal authorities. Regarding exchange rate policy, a strict fixed exchange rate regime was adopted, a Currency Board. Under these conditions changes in the money supply only reflected changes in foreign reserves.

have checked fiscal deficits, but, unfortunately, this was not the case. Finally, banking regulation in a highly dollarized economy needed to be tougher than previously thought.<sup>22</sup>

On December 19, 2001, the Cabinet resigned and the next day was the turn for President De la Rua. The presidency was provisionally assumed by Puerta, then by Rodríguez Saa, who was supposed to serve for 60 days, but turned out to be only seven. On December 30, the Chamber of Deputies elected Eduardo Duhalde as the new President, whose term began on January 3, 2002. At this point convertibility was just history.

#### - Post convertibility Programs (January, 2002)

From January to April 2002, President Duhalde implemented a series of measures finalizing the convertibility era. Congress approved legislation allowing the depreciation of the Argentinean peso and *pesificación*, which meant changing the denomination of assets and liabilities from dollar to peso.<sup>23</sup> The new authorities also implemented various social programs whose intent was to reduce the unemployment and to provide social assistance.

The first impact of these measures was an inflationary hike: the monthly inflation rate in January 2002 was 2.3 per cent and in April 2002, it reached 10.4 per cent per month. Meanwhile the economy was still experiencing a severe depression.

President Duhalde named Lavagna as Minister of Economics by the end of April 2002. The new minister implemented an economic policy aimed at reaching external equilibrium; the policy also generated a substantial economic recovery. President Kirchner confirmed Lavagna without changes in the orientation of economic policy. The main difference between this stabilization program and those implemented in the 50s, 60s, 70s or 80s was the stabilization of the exchange rate starting in 2003 at levels never observed in the past.<sup>24</sup>

The high level of the dollar added to a favorable development in commodity prices - particularly soya – has raised fiscal revenues. The increase in fiscal revenues resulted from higher export taxes. The fiscal situation improved considerably, reaching a primary surplus of 3.2 per cent of GDP in 2004.

Favorable external conditions and healthy public finances allowed an important recovery of the Argentinean economy. From 2003 to 2005, the rate of growth reached 9 per cent and unemployment went down from 19.7 per cent in 2003 to 12.5 percent in 2005. This expansionary

<sup>&</sup>lt;sup>23</sup> It should be noted that *pesificación* was not symmetric: assets from the nonbanking public denominated in dollars were transformed into pesos at a higher rate than assets denominated from the banking sector denominated in dollars. <sup>24</sup> Brotherson (2006) points out that the high unemployment level and the freezing of prices of public services reduced the distributive effects associated with a devaluation.



<sup>&</sup>lt;sup>22</sup> See Perry and Serven (2002).

cycle seems to continue in 2006, with an expected rate of growth of 8 per cent.

This new economic paradigm, based on the twin surplus - external and fiscal, - has kept a highly depreciated peso stable and fostered economic growth. Nevertheless, as pointed out by Brotherson (2006), this strategy faces the following four challenges:

- 1. The policy of administered prices implemented by Lavagna and followed by Micelli is the key to today's good economic conditions. However, the government's capacity to continue with a policy of price stability does not seem assured: annual inflation rate in 2004 was 4.4 per cent, in 2005 9.6 per cent and as of March 2006, this rate was 11 per cent.
- The policy of administered prices has generated distortions in relative prices. These distortions reduced incentives to invest in specific sectors <sup>25</sup>, thus negatively influencing the economy's long term prospective and, more importantly, raising social pressures for public investment and/or subsidies in these sectors.
- 3. The labor market segmentation is generating severe problems of social equity. More than 45 per cent of the workers are in the black market, thus without access to the health system and pension funds.<sup>26</sup> This situation could, sooner than later, have a negative impact in the inflationary control and the capacity to keep a depreciated exchange rate.
- 4. The development of wages and pensions indicates an extremely inequitable economic policy. Two examples: real wages of public employees have fallen by 29 per cent since 2001 and retirees receiving the minimum pension have risen from 16 per cent to 79 per cent.

These challenges indicate that the Argentinean economy will face some serious problems in the future. The economic policy implemented today has the problem of relative price distortions. Starting from the dramatic conditions of 2001, it seems reasonable to accept and to manage these distortions in the short run. However, with time, they will become a complicated issue and quite difficult to manage. The Argentinean recovery should not be thought as normalization, but as circumstantial accommodation that encompasses grave risks: mainly, high poverty

<sup>&</sup>lt;sup>26</sup> Brotherson (2006) shows that since the end of 2001 real wages in formal sector rose by 10 per cent, while in the informal sector they fell by 20 per cent.



<sup>&</sup>lt;sup>25</sup> These sectors are quite important; they include all the previously privatized public services. It should be noted that while consumer prices have risen by 81 per cent from December 2001 to April 2006, administered prices have risen by only 13 per cent.

levels that generate social inequality and, difficulties to create stable employment in the formal sector.<sup>27</sup>

## **5. INFLATION UNCERTAINTY AND STABILIZATION PROGRAMS**

his section considers the hypothesis that inflation uncertainty increases as the implemented stabilization program comes to an end. The empirical analysis consists of identifying the date when a new stabilization program was adopted and testing whether the inflation uncertainty changed within the period.

Although Graph 3 allows testing this hypothesis, we proceed to give a verbal commentary of each period.

- First Period (January, 1945 - December, 1960). There are two states, one of low inflation (0.34 % per month) and one of high inflation (2.3 %). Inflation uncertainty fluctuates between 4 and 7. Cereijo's Program, implemented in February, 1952, did not have an immediate impact on uncertainty; it went down to 1.5 by June 1953 lasting only six months. In March 1955 there was a new reduction that lasted nine months. The stabilization program seemed to come to an end in December 1955 when uncertainty reaches a level of 7 and it stayed there until mid 1959.

It is likely that the changes in political and economic authorities in September and November 1955, with two *Coup d'etat*, were responsible for this situation.<sup>28</sup> From September 1955 until June 1959 there were five Ministers of Economics and an also five Presidents of the Central Bank. Alsogaray's program from July, 1959 did not have an immediate impact on uncertainty. Uncertainty began to decline in March 1960 and it did so until March 1962, when it was below 2.

- **Second Period** (January, 1961 - December 1974): There are two states, one of low inflation (0.66 % per month) and one of high inflation (3.14 %).

Uncertainty of inflation fluctuates between 1.8 and 2.4. It should also be observed that the period is homoskedastic. From January, 1968 until September, 1970, uncertainty was in the lower end of the range.

<sup>&</sup>lt;sup>28</sup> This fact had not been considered, but its inclusion makes the analysis more robust.



<sup>&</sup>lt;sup>27</sup> Baccino (2005) analyzes the impact of negative wealth effects and their negative implications for future growth.





eijo's Program (1952, 02), 2: Álvaro Alsogaray's Program (1959, 07), 3: Vasena's Program (1967, 03), 4: Gelbard's Program (1973, 05), 5: Martínez de Hoz' Program (1976, 04), 6: Martínez de Hoz' Program (1979, 01), 7: High inflation after Lorenzo Sigaut's government (1981, 01), 8: Austral Program (1985, 06), 9: Primavera Program (1988, 08), 10: BB Program (1989, 08), 11: Bonex Program (1990, 01), 12: Convertibility Program (1991, 01), **13:** Lavagna's Program (2002/04), **14:** Miceli's Program (2005/11).

Full Line G: Coup d'etat or non democratic Government, E: Democratic Government. E1: 1946, 06, E2: 1952, 06, G3: 1955, 09, G4: 1955, 11, E5: 1958, 05, G6: 03/1962, E7: 10/1963, G8: 06/1966, G9: 06/1970, G10: 03/1971, E11: 05/1973, E12: 07/1973, E13: 09/1973, E14: 07/1974, G15: 03/1976, G16: 03/1981, G17: 1981, 11, G18: 1982, 06, E19: 1983, 11, E20: 1989, 07, E21: 1995, 12, E22: 1999, 12, G23: 2002, 01, E24: 2003, 05

Source: author's calculations

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As in previous cases, the Krieger Vasena's Program managed to reduce uncertainty only after ten months of implementation. As the program reaches its end, uncertainty increased to the higher bound of the range. And it continued to increase until the implementation of Gelbard's Program in May, 1973. This program generated an immediate reduction of uncertainty, lasting for only ten months.

- Third Period (January, 1975 - December, 1988): There are three states, one of low inflation (6.28 % per month), another of mid inflation (10.35 %) and one of high inflation (17.3 %). Uncertainty fluctuates between 1.9 and 36.7.

Initially high levels of uncertainty went rapidly down with the first phase of Martínez de Hoz ´ program (April 1976), which coincided with a *coup d* ´*etat*. Uncertainty remains at the lower bound of the range until June, 1982 and it encompassed the second phase of the program (January 1979). From June, 1982 until February, 1985 there were four Ministers of Economics. This institutional instability and the lack of a clear economic policy explain the higher levels of uncertainty observed then.

Uncertainty went down dramatically since September, 1985, three months after the implementation of the Austral Program. It remains in the lower bound of the range until July, 1987 when the Program was reaching to an end. Primavera Program contributed to a three month reduction of uncertainty.

- Fourth Period (January, 1989 - December 1993): There are three states, one of low inflation (0.59% per month), one of mid inflation (6.57%) and one of high inflation (31.86%). The range of uncertainty for this period runs from 1 to 1420. BB Program managed to reduce uncertainty only for three months.

Bonex program from January, 1990, generated a reduction of uncertainty by July, 1990 and the values of uncertainty fluctuated around 50. Convertibility program implemented in January, 1991, generated a sharp reduction in uncertainty.

- **Fifth Period** (January, 1994 - December, 2005): There are three states, one of deflation or zero inflation (-0.005 % per month) another of mid inflation (0.66 %) and one of high inflation (3.24 %). The levels of uncertainty are in a range of 0.11 to 0.30.

Uncertainty remains within the lower bound of the range until December, 2001, when the Convertibility's Program reached its end. Lavagna's Program (April, 2002) did not have an immediate impact on uncertainty; it went down by August, 2002. It remains in the lower bound of the range until May, 2004. See Graph 4.





Source: author's calculations



# **6.** CONCLUSIONS

A ll administrations between 1948 and 2005 were forced to implement at least one stabilization program. In order to analyze the success of these programs we have considered the evolution of inflation uncertainty. The main conclusions of this paper are:

1) Programs implemented after 1973 generated a reduction of inflation uncertainty.

2) *Coup d'etat* generated an increase of inflation uncertainty; the only exception was March, 1976, that coincided with the implementation of Martinez de Hoz' program.<sup>29</sup>

3) The positive results of the programs disappeared as economic agents lost confidence in them.

4) Convertibility program showed the longest reduction of inflation uncertainty. This result is not surprising because, since the program's implementation economic agents had favorable expectations about it. In addition, economic authorities remained their jobs for a longer period of time.

5) The crisis of 2001 and the program implemented after it did not generate a permanent increase in inflation uncertainty. Although uncertainty rose during the first half of 2002, since then it went down to the levels of convertibility.

<sup>29</sup> From 1976 until 1983 there was a succession of military governments -Videla, Viola, Galtieri and Bignone. Bignone allowed a transition to the democratically elected president Raul Alfonsín.



#### REFERENCES

- AGHION, P. AND SAINT-PAUL, G. (1991): "On the virtue of bad times: Analysis of the interaction between economic fluctuations and productivity growth", CEPR Discussion Paper, 578
- AKAIKE, H. (1981). Likelihood of a model and information criterion. Journal of Econometrics, 16.
- BACCINO, O. E. (2005). A Case of Persistent Disequilibrium: Argentina since 2002. Mimeo.
- BROTHERSON, M. (2006). ¿Es válido el nuevo paradigma argentino?: La onda larga de Kondratieff reemplazó a los ciclos de stop and go. Argentina Macreoeconomic Outlook, 36, Mayo. Econométrica S.A. Buenos Aires.
- BRUNO, M., DI TELLA, G., DORNBUSCH, R. AND FISHER, S. (eds., 1988). Inflation Stabilization. The experience of Israel, Argentina, Brazil, Bolivia and Mexico. MIT Press. or Inflación y Estabilización. La experiencia de Israel, Argentina, Brasil, Bolivia and México. El Trimestre Económico. Fondo de Cultura Económica, 62, 484 p.
- DE PABLO, J. (1984). Política Económica Argentina. Ediciones Macchi. Buenos Aires. 364 p.
- DE PABLO, J. (2005). La economía argentina en la segunda mitad del siglo XX. La Ley. Buenos Aires.
- DEMPSTER, A., LAIRD, N. AND RUBIN, D. (1977). Maximum likelihood estimation from incomplete data via the EM algorithm. Journal of the Royal Statistical Society, 39, Series B, 1-38.

DI TELLA, G. (1983). Argentina under Perón 1973-76. St. Martin's Press, Nueva York.

- DOORNIK, J. (1998). Object-Oriented Matrix Programming using Ox 2.0. Timberlake Consultants Press, London.
- DORNBUSCH, R. AND EDWARDS, S. (1992). Macroeconomía del populismo en la América Latina. El Trimestre Económico. Serie de Lecturas, 75, 458 p.
- FELLINGER, E. (2004) Análisis de la relación inflación-incertidumbre de inflación. El caso argentino (1945-2000), Tesis Doctoral, Universidad de Alcalá, 294 p.

FERNÁNDEZ, R. (1987). Crecer en libertad. El Cronista Comercial, 286 pág.

GOLDFELD, S. Y QUANDT, R. (1973). A Markov model for switching regression. Journal of Econometrics, 1, 3-16.

IAES

- HAMILTON, J. (1989). A new approach to the economic analysis of nonstationary time series and the business cycle. Econometrica, 57, 2, 357-384.
- HANNAN, E. Y QUINN, B. (1979). The determination of the order of an autorregression. Journal of the Royal Statistical Society, serie B, 41.
- HEYMANN, D. (1986). Tres ensayos sobre inflación y políticas de estabilización. CEPAL, Buenos Aires.
- HEYMANN, D. (2000). Políticas de reforma y comportamiento macroeconómico: La Argentina en los noventa. CEPAL, Buenos Aires, Serie Reformas Económicas, 61, mayo, 95 p.
- HIRSCHMAN, A. (1958). The strategy of economic development. Yale University Press. Reimpreso en 1978 por The Norton Library y en 1988 por Westview Press.
- HIRSCHMAN, A. (1963). Journeys toward progress: Studies of economic policy-making in Latin America. Twentieth Century Fund. Reimpreso en 1973 por The Norton Library.
- KIGUEL, M. (1999). The Argentine currency board. Universidad del Cema, Buenos Aires.
- KIM, C. AND NELSON, C.(1999). State-space models with regimen switching. Classical and Gibbs-sampling approaches with aplications.The MIT Press, 297 p.
- KIM, C., NELSON, C. AND STARTZ, R. (1998). Testing for mean reversion in heteroskedastic data based on Gibbs-sampling-augmented randomzation. Journal of Empirical Finance, 5, 131-154.
- KROLZIG, H. (1997). Markov-Switching Vector Autoregressions. Modelling, statistical inference, and application to business cycle analysis. Lectures Notes in Economics and Mathematical Systems, 454, Springer, 357 p.
- KROLZIG, H. (1998). Econometric modelling of Markov-Switching Vector Autoregressions using MSVAR for Ox. http://www.economics.ox.ac.uk/ research/hendry/krolzig. University of Oxford.
- KROLZIG, H. (2002). Regime-Switching Models. http://www.economics.ox.ac.uk/ research/hendry/krolzig. University of Oxford.
- MACHINEA, J. AND FANELLI, J. (1988). El control de la hiperinflación: El caso del Plan Austral en Argentina 1985-1987. En Bruno, M. et al. (eds., 1988), 141-188.
- MAYNARD, G. (1989). Argentina: Macroeconomic policy, 1966-73. In G. Di Tella y R. Dornbusch (eds., 1989), 166-175.
- NOGUÉS, J. (1986). The nature of Argentina's policy reforms during 1976-81. World Bank Staff Working Papers, 765.



- PERRY, G. AND SERVÉN, L. (2002). The anatomy of a multiple crisis: Why was Argentina special and what can we learn from it. World Bank. May.
- TOMBA, M. (1996). Argentina. ¿Hacia el siglo XXI?. En Rodríguez Prada, G. (ed.) La macroeconomía de los mercados emergentes. Colección de Economía. Universidad de Alcalá, 261-282.
- VITELLI, G. (1986). Cuarenta años de inflación en la Argentina: 1945-1985. Legasa. Buenos Aires. 245 p.



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