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## Original Article

# On the closure of the Argentine fully funded system

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**ABSTRACT** Argentine demography more closely resembles southern European countries than most other Latin American nations. Its pay-as-you-go welfare system, implemented in the first half of the twentieth century, was reformed in the 1990s. The new fully funded scheme intended to solve its stressed pay-as-you-go system, as well as to yield positive externalities in the financial system, the savings rate and economic growth. After 15 years in place, the system was closed in 2008; its affiliates were sent back to the pay-as-you-go plan and the accumulated savings were transferred to the public social security administration, which must pay all future benefits. The official explanation for such a measure was twofold: the international financial crisis imperiled the value of the savings of future pensioners, and the (private) pension funds administrators were not managing the funds properly. In Congress, the political support for this reform was remarkably strong in both chambers. In a country with a tradition of mass demonstrations, the owners of the savings accounts protested little. How and why did this happen? Did pension funds administrators, given the regulatory constraints, act in the best interests of their affiliates? Can we learn some lessons that would be relevant to other countries with similar characteristics (that is, in Latin America, Eastern Europe or Central Asia), despite the uniqueness of the local circumstances? We think we can, and have developed some lessons based on this experience. We discuss the process and ask whether it could occur elsewhere. We think it could occur if a weak political consensus on the reform were built and/or if the objectives and instruments were not properly differentiated. Does the reform intend to fix the social security system or to promote national savings? In addition, the marketing and counter-marketing of the reform could polarize the debate and hamper the *per se* complex achievement of the extended consensus. Finally, the counter-reform has had unexpected pay-offs by hiding the public debt of the social security system, which the previous reform had made explicit. In addition, the available resources from contributions to finance the State budget in the short run increases the appeal of eliminating the fully funded scheme, where that contribution went to personal savings. The long-run responses to the aging process and the short-run political horizon have given rise to the counter-reform coalition.

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## INTRODUCTION

Argentina reformed its outdated pay-as-you-go system in 1994, creating a parallel system comprising a new pay-as-you-go scheme and a fully funded scheme based on individual accounts run by pension fund administrators (PFAs).<sup>1-3</sup> The reform was launched 15 years ago with the expectations of<sup>4</sup>:

1. Mending the vices of the previous pay-as-you-go regime (lax rules to qualify for benefits, low retirement age, few years of required contribution, several implicit redistributions, and benefit erosion owing to the manipulation of indexation formulas).
2. Solving the old system's deficit (which first made it necessary to consolidate pending debt with the pensioners and to allocate tributary resources to finance the system).
3. Gaining efficiency and transparency.
4. Promoting savings, financial development and economic growth.

Goal 1 was partially addressed with some parametric reforms that are still in place (the age of retirement has been deferred by 5 years, the minimum years of contributions have been raised from 20 to 30, and the benefit formula in the pay-as-you-go-system is less generous than it used to be). An indexation formula was recently approved. The redistributive potential of the system clearly fell, bound initially to a universal benefit and more recently to a minimum pension. Achieving Goal 2 was a matter of time, given the transition, since the old pay-as-you-go plan still holds obligations. However, some resources were capitalized in the individual accounts of the fully funded scheme. Goal 3 was partially achieved. Transparency produces fewer controversies; the efficiency of the system is more debatable because commissions were high and the system was expensive. Goal 4 is difficult to judge in the context of this article. As the transition will be lengthy, the promotion of savings and its consequence – economic growth – is not clear. As to financial development, the local market did not achieve the complexity and development of the Chilean market. That phenomenon could be

explained by the different maturities of the systems and also by the fiscal development in each country: Chile has virtually eliminated its public debt during the last two decades, while Argentina's public debt rose from US\$60 billion in 1994 to US\$140 billion in 2001. The crowding out was unavoidable.

During its existence, the system accumulated resources and critics, but few beneficiaries, as its contributors averaged around age 40 at the time of its closure.

Critics could be classified into two groups: a more technical one stated that the system was expensive in terms of commissions and much of its costs were seen as a waste of resources in an effort to mimic the competition among PFAs. In addition, the system exhibited low coverage, as it demanded strict requirements to access benefits when the labor market faced both strong unemployment and informal market growth in the 1990s. In 2007, a generous contribution amnesty opened the door to more than one million new pensioners (a 25 per cent growth rate). The other group is perhaps more ideological. It was supported by those who had always opposed the regime: left-wing politicians, labor unions, state bureaucracy and some intellectual circles. They criticized the regime's lack of solidarity and its strongly reduced intra-generational redistributions. These critics also argued over the low coverage that the new system yielded.<sup>5</sup>

The 1994 fully funded scheme suffered a shock following the 2002 Argentine macroeconomic crisis. Half of its portfolio was made up of public debt (mainly denominated in US dollars). The assets were the property of nine million affiliates, and the entire portfolio value rose to 20 billion dollars. The Argentine government defaulted on its debt in 2001 and issued new bonds to replace the defaulted ones 4 years later.<sup>6</sup> This implied a 40 per cent haircut on average, as well as a modification in currency and terms for pension fund portfolios. However, the government sanctioned a new valuation system that hid the losses. In 2007, important changes were introduced into the system: maximum commissions were set by law; disability and death

benefits were modified; older, lower-income affiliates with small balances in their accounts were automatically transferred to the pay-as-you-go regime; and the other affiliates were allowed to switch from one pension system to the other. Two million of the 11 million affiliates transferred their balances to the State and joined the pay-as-you-go system. The figure includes voluntary and compulsory shifts. Finally, during the third quarter of 2008, the fully funded system was eliminated, and both its assets and affiliates were transferred to the pay-as-you-go regime.

The official explanation for the end of the fully funded system was that the international financial crisis imperiled the value of the savings of future pensioners, and the PFAs were questioned for their management of the funds, which were transferred to the public social security administration. In Congress, the political support for this reform was remarkably strong in both chambers. In a country with a tradition of mass demonstrations, the owners of the savings accounts protested little.

How and why did this happen? Did the PFAs, given the constraints they faced, act in the best interests of their beneficiaries? Can we learn some lessons that would be relevant to other countries with similar characteristics (that is, Latin America, Eastern Europe or Central Asia), despite the uniqueness of the local circumstances? We think so, and have developed some lessons based on this experience.

This article reviews how the system was eroded, modified and eliminated starting from year 2002. Using a Markowitz Efficiency frontier, it also analyzes how the PFAs behaved, given the regulations and the market incentive they received. The third objective of this article is to understand why this system was abandoned after a decade and a half, returning to a system with better initial parameters than in 1994 (retirement age, required years of contribution, benefit-determining formula), but with demographic problems that can only worsen over time (more beneficiaries and fewer contributors) and a heavy burden on salaries already in place.

After this introduction, the next section describes the system at the time of its elimination.

We then analyze the 2002 crisis in the following section, together with the modifications in the system. The subsequent section summarizes the reforms implemented in 2007. The penultimate section summarizes the legal instruments that ended the fully funded system. The final section constructs the efficiency frontier, concluding that the portfolio regulations (intended to assess the *individual* risk of each instrument) led to a sub-optimum group of portfolios. In addition, we show that, given the regulation on portfolios, PFA choices were located in the efficient sector of the frontier. This section closes with some final reflections.

## THE SYSTEM AT THE TIME OF ITS ELIMINATION

Although the system had incorporated almost 11 million affiliates, after the 2007 reform it was left with 9.5 million, of whom only 3.6 million (38 per cent) were regular contributors in June 2008. The 10 PFAs (after the last merger in July 2008) controlled almost AR\$99 billion (approximately US\$33 billion) (Table 1 and 2)

While different contribution rates had been in place during the regime's existence (we will focus on this below), on 1 January 2008, the historical contribution of 11 per cent was restored. The system's average commission was limited to a maximum of 1 per cent of the salary subject to contributions from the fees accrued in April 2007, the Executive Power having the power to reduce the commission.

At the time of the counter-reform, the Argentine economy had already recovered from the 2001 deep economic crisis – which included a 12 per cent fall in GDP and a 22 per cent rise in unemployment – after 5 years of 8 per cent growth in GDP.

Table 3 presents the evolution of the pension funds, expressed in current Argentine pesos and US dollars, and the evolution of returns. Its return in dollars reached 0.8 per cent during the last year against a nominal return of -0.2 per cent in pesos.

Table 4 shows the system's global portfolio composition and the evolution of each item at the end of June 2008.

**Table 1:** Dimension of the fully funded regime in Argentina (amounts in June of each year)

<i>Period</i>	<i>Affiliates (Thousands)</i>	<i>Contributors (Thousands)</i>	<i>Contributors/Affiliates (%)</i>	<i>Funds (Millions of AR\$)</i>
1995	3843	2033	52.91	1364
1996	5245	2586	49.30	3838
1997	5820	2987	51.32	7345
1998	6696	3275	48.91	10 102
1999	7475	3366	45.03	13861
2000	8104	3349	41.33	18714
2001	8624	3332	38.63	22 166
2002	8977	2859	31.85	35 142
2003	9275	3108	33.51	42918
2004	9712	3620	37.27	47660
2005	10 317	3995	38.73	58447
2006	10 959	4341	39.61	74874
2007	11 670	4669	40.01	95872
2008	9488	3600	37.94	98808

Source: Superintendencia de AFJP (PFA Regulator).

**Table 2:** Market of each PFA (affiliates, contributors and funds)

	<i>Affiliates</i>		<i>Contributors</i>		<i>Funds</i>	
	<i>(Thousands)</i>	<i>(Share) (%)</i>	<i>(Thousands)</i>	<i>(Share)</i>	<i>(Millions of AR\$)</i>	<i>(Share) (%)</i>
Arauca Bit	1153	12.20	482	13.40	10294	10.40
Consolidar	1316	13.90	535	14.90	17968	18.20
Futura	401	4.20	126	3.50	1325	1.30
Máxima	1017	10.70	375	10.40	11 609	11.70
Met AFJP	1359	14.30	524	14.50	18322	18.50
Nación	920	9.70	422	11.70	14864	15.00
Orígenes	1805	19.00	628	17.40	17968	18.20
Previsol	326	3.40	131	3.70	2447	2.50
Profesión + Auge	659	6.90	213	5.90	1332	1.30
Prorenta (30/6)	319	3.40	87	2.40	1705	1.70
Unidos (30/6)	213	2.20	78	2.20	975	1.00
Unidos (since 1/7)	532	5.60	165	4.60	2680	2.70
All PFA	9488	—	3600	—	98 808	—

Source: Superintendencia de AFJP (PFA Regulator).

**Table 3:** Time evolutions of pension funds and their rates of return (in June of each year)

<i>Date</i>	<i>Accumulated fund (in current million Pesos)</i>	<i>Accumulated fund (in current million Dollars)</i>	<i>Nominal annual return (in pesos) (%)</i>	<i>Nominal annual return (in Dollars) (%)</i>
1995	1364	1366	0.00	0.00
1996	3838	3842	21.50	21.50
1997	7345	7352	22.20	22.20
1998	10 102	10 112	0.70	0.70
1999	13861	13861	4.80	4.70
2000	18714	18714	10.90	10.90
2001	22 166	22 166	4.70	4.70
2002	35 142	9762	41.10	-60.80
2003	42918	15552	21.60	58.60
2004	47660	16211	6.40	-0.10
2005	58447	20407	16.70	19.80
2006	74874	24456	20.00	12.30
2007	95872	31 337	28.30	28.40
2008	98808	32 651	-0.20	0.80

Source: Own elaboration on Superintendencia de AFJP (PFA Regulator).

**Table 4:** Portfolio composition (June 2008)

<i>Instrument</i>	<i>Percentage over total (June 2008) (%)</i>
Availabilities	0.77
National debt	51.96
Fixed time deposits	5.50
Stocks (Domestic)	12.20
Stocks (Foreign)	8.97
Others	21.37

Source: Superintendencia de AFJP (PFA Regulator).

## THE 2002 CRISIS AND THE CHANGES IN THE SYSTEM

### Crisis, public debt ‘haircut’ and regulatory changes

Several regulatory changes were introduced into the regime from its origins in 1994. At the end of 2001, the Argentine government defaulted on its debt owing to a major financial crisis. This episode had a significant impact on PFA portfolios, which had a 50 per cent exposure on public debt mainly denominated in US dollars. A debt swap was implemented in June 2005. This process implied a 40 per cent ‘haircut’ for the value of the debt held by the PFAs. Nevertheless, a special accounting treatment allowed the PFAs to keep the national debt in their portfolios without losing its nominal value if those bonds were maintained until maturity. In this way, the portfolios did not reflect the haircut. This process is detailed in the study by Ferro and Romero (2008).<sup>7</sup>

### Regulatory changes before and during the crisis

Following Ferro,<sup>8</sup> this section describes the most important changes in the period 2000–2001. The first modification refers to how the undecided affiliates were assigned to a PFA. Before these changes, the new workers who had not chosen between the pay-as-you-go and fully funded schemes were incorporated into the latter; if they had not chosen from among the different PFAs, they were assigned to one via an administrative procedure. Additionally, a minimum number of contributions was needed to be able to shift between PFAs. In contrast, after the regulatory changes, the undecided affiliates were assigned to

the PFA that charged the lowest commission in the affiliate’s area of residence.

Furthermore, personal contributions were temporarily reduced from 11 to 5 per cent of the wage in December of 2001. In March 2003 they were raised to 7 per cent and returned to 11 per cent at the beginning of 2008. That reduction had a macroeconomic purpose in a depression context, but, at the same time, it created financial distress in the regime and raised the participation of commissions in the contribution, worsening the public’s opinion of this system.

During the crisis, the required ratings for the instruments allowed in the portfolios were relaxed, this being one logical consequence of the general downgrade in the credit quality of local financial instruments.

### Portfolio changes owing to the crisis (2001–2005)

During Argentina’s default, the national debt in the PFA portfolios, expressed in US dollars, euros and pesos for an equivalent of US\$17.33 billion, was replaced by new issued debt valued at US\$10.126 billion. This operation implied a nominal reduction of 41.57 per cent, but the loss was not registered thanks to the new accounting treatment allowed for these instruments.

Of the new debt issued to replace the old bonds, 60.13 per cent was securities valued without reflecting any nominal loss, if maintained in the portfolios until maturity, 21.45 per cent was non-negotiable bonds, valued mark-to-market, and the other 10.08 per cent was guaranteed non-negotiable loans to the National Government (Table 5).

## 2007 REFORMS

On 1 February 2007, President Kirchner sent Congress a bill to reform the social security regime. That reform was enacted as Law 26222. The bill’s objectives were:

1. To improve the system’s coverage;
2. To ensure freedom of choice between pay-as-you-go and fully funded schemes;
3. To strengthen equity and transparency;

**Table 5:** National debt swap and PFA portfolios as of June 2005

*Expressed in millions, except when mentioned*

<i>Instrument</i>	<i>Previous</i>	<i>New</i>
Bonds in dollars	US\$15 400	—
Bonds in euros	S1400	—
Bonds in pesos	AR\$700	—
'Cuasi Par' in pesos	—	AR\$23 010
'Boden 2014' in pesos	—	AR\$3540
'Discount' in pesos	—	AR\$2655
'Discount' in dollars	—	US\$295
Value in pesos	AR\$51464	AR\$30 075
Value in dollars	US\$17330	US\$10 126
Value in euros	S14322	S8378
Percentage of loss	—	41.56%
Exchange rate at the time of the swap 1 ARS=0.337 USD=0.279 EUR, USD 1.21=EUR 1		

Source: Ferro and Romero (2008).

4. To raise the replacement rate (pension/salary);
5. To assure the financing of the system;
6. To lower PFA administrative fees;
7. To increase State involvement in the system; and
8. To guarantee a minimum pension to the beneficiaries of both regimes

In order to achieve those objectives, the following changes were introduced:

1. New workers had 90 days (from the start of their first job or when registering as independent workers) to choose between the pay-as-you-go and the fully funded scheme. Had they not chosen within that period, it would be assumed that they preferred the pay-as-you-go regime; as stated above, the default option was the fully funded regime;
2. Choosing the public system implied that the affiliate's contributions would be assigned to finance this regime. The public system's benefit was raised by 76.5 per cent (as its formula changed from 0.85 per cent times the years of contribution, times the average salary of the last 10 years of work, to 1.5 per cent times the years of contribution, times the average salary of the last 10 years of work);
3. Affiliates could switch regimes once every 5 years;
4. Men over 55 or women over 50 who were affiliated with the fully funded regime and

whose individual capitalization account did not reach AR\$20 000 (approximately US\$6000) would automatically be transferred to the public regime. Their savings would also be transferred to the public regime. Only those affiliates who specifically expressed a desire to continue in the private regime could stay;

5. The PFA commissions would have a 1 per cent cap on the salary subject to contributions. The Executive reserved the power to lower that percentage;
6. A minimum of between 5 and 20 per cent of the PFA portfolios would have to be made up of securities whose objective would be to finance '*infrastructure or productive medium- or long-term projects*'. This fund would gradually build up following a 5-year schedule established by the Executive;
7. Contributions for disability and life insurance were changed in the fully funded regime. Every PFA would have to form a special fund, financed with the balances of the affiliates. Before the reform, commissions charged to the beneficiaries financed those benefits.
8. Affiliates that were not included in (4), that is, those with higher balances in their accounts, could also switch to the pay-as-you-go regime on a voluntary basis within a 6-month period.

During these 6 months, the government launched a major campaign to induce the population to abandon the fully funded regime. Between January 2007 and June 2008, the private regime lost 16.09 per cent of its affiliates and 21.12 per cent of its contributors. The proportion of affiliates over 45 years of age shrank by one-third. Furthermore, the regime experienced a qualitative change, as it lost low-salaried affiliates with small balances who were relatively advanced in age. This modification implied an increase in the ratio fund-to-affiliate, which grew at the same rate as the official salary index ('CVS'). In contrast, the collections per affiliate and per contributor rose well above that value. This phenomenon implied that the remaining affiliates were younger and had higher incomes on average than before the reform.

## THE END OF THE FULLY FUNDED SCHEME

The Argentine fully funded regime was eliminated by Law 26425 and Decree 2099 in 2008. The previous year's reform had been enacted on the premise that a massive shift in affiliates would take place given the public's poor opinion of the system. However, only two million of the 11 million affiliates switched, one million of these being the compulsory shifts owing to the small balances in their accounts (under AR\$20 000).

The new reform in 2008 simply absorbed and substituted the fully funded scheme for the public pay-as-you-go regime. The work time computed when the affiliates who were part of the private regime was accepted in full by the public regime. Pension for all workers was unified at 1.5 per cent of the average salary of their last 10 years of work, multiplied by the years of contribution (a 30-year contribution being the minimum toward a pension). The actuarial consequences of the reform have not been published to the knowledge of the authors.

Previously issued annuities remained in the hands of the insurance companies that sold the policies.

The assets that formed the individual accounts of affiliates and beneficiaries of the private regime were transferred to the Social Security National Administrator (ANSES in Spanish), and converted into the 'Sustainability Guaranty Fund' of the public regime. These assets could only be used to pay the benefits of the new public system.

The law stated that the Fund's assets would be invested 'following security and return criteria, contributing to the sustainable development of the real economy, in order to guarantee the virtuous circle between economic growth and increase in social security resources'. Additionally, the new public Fund had to be invested domestically.

## HAVE THE PFAs DONE THEIR JOB WELL?

Following Castagnolo,<sup>9</sup> in this section we test the job of the PFAs. Financial theory suggests that it is possible to obtain an optimal portfolio frontier in terms of the mean and variance of its return. In addition, every restriction that does not allow

portfolio managers to reach that frontier leads to sub-optimal results. With these considerations in mind, this section tries to determine whether the portfolio restrictions imposed by law at the time of the reform were efficient, and whether the PFA portfolios were placed in the efficient sector of the restricted frontier.

### The model

To judge the efficiency of the PFAs, we used Markowitz's Mean Variance Model. The model allowed us to rank the possible set of financial portfolios in two associated dimensions: return and risk (that is, mean and variance of the portfolio's yields). Every portfolio (that is, every pair of connected values, return and risk) has implicit weights of each individual asset. At a given level of risk, several portfolios have different levels of return; the best achievable return on a particular risk is considered an efficient portfolio. Alternatively, the minimum achievable risk on every individual level of return is considered an efficient portfolio – we used this last approach, whose basic features are shown in the Technical Appendix. The set of efficient portfolios is known as the efficiency frontier, and an efficient portfolio manager has to reach the frontier either by maximizing the portfolio's return subject to a particular level of risk or by minimizing its risk subject to a certain level of return.

Regulation, by means of ceilings on particular assets, for example, could make some portfolios unfeasible – even if they were efficient – and the portfolio managers could also make bad choices, buying inefficient proportions of assets. The former purchases are misallocations of resources and do not achieve portfolios on the efficient frontier. Other regulations imply floors on certain assets, prohibition on others and so on. As a whole, they are intended as a 'quantitative' regulation, in contrast to a 'prudent person rule', which is common in Britain and the United States.

### The data

We have used monthly data from January 1998 to June 2008 to analyze the performance of the PFAs. To develop the model, it was necessary to

create two different databases: one included the weights of each instrument of the different PFAs and the other included the returns on each of those instruments. This was necessary, as the portfolio shifted continuously; however, the regulations were almost always binding with their principal components.

During the period under analysis, the average portfolio was strongly concentrated in four instruments: Public Debt (54.56 per cent), Time Deposits (12.01 per cent), Domestic Shares (13.52 per cent) and Mutual Funds (5.53 per cent).

The behavior of the different PFA funds was strongly correlated, bringing up a correlation coefficient greater than 0.9 in nearly all cases. Given this behavior, we could analyze the system as a whole.

Law 24241, which introduced the fully funded regime in 1994, limited the weights that 17 different financial instruments could represent in the portfolios of the PFAs. Although it would have been better to have one price and return series per instrument listed in this law, it was only possible to elaborate one database formed by nine instruments (only the most important were included, excluding some of the instruments with very low individual weights or with discontinuous quotations).

As many national Public Debt securities defaulted and were valued at their accounting value, we used indexes of the Argentine Capital Markets Institute (IAMC in Spanish) to consider their returns.

For Time Deposits, we used the reference rate for deposits of more than one million pesos, and a term of less than 60 days, published by the Argentine Central Bank.

When considering Mutual Funds, we noted that PFAs invested mainly in Money Market Mutual Funds (which are not traded in Capital Markets); this is why we used a benchmark provided by Itaú Capital Asset Management, adjusting it by the real return obtained in the last period by the most important Funds.

Foreign financial instruments (Shares and Public Debt) were analyzed using the S&P index and T-bonds, as they were the most representative securities from these categories

during the period under analysis. Additionally, the *Merval Argentino* index was used to represent the behavior of domestic shares. The use of the above indexes achieves two objectives: first, it reduces the analysis to a smaller group of variables; and second, it addresses not only the rigidities of investing in foreign markets, but also the risk qualification floor, assuming that PFAs would only invest in the leading instruments of each market.

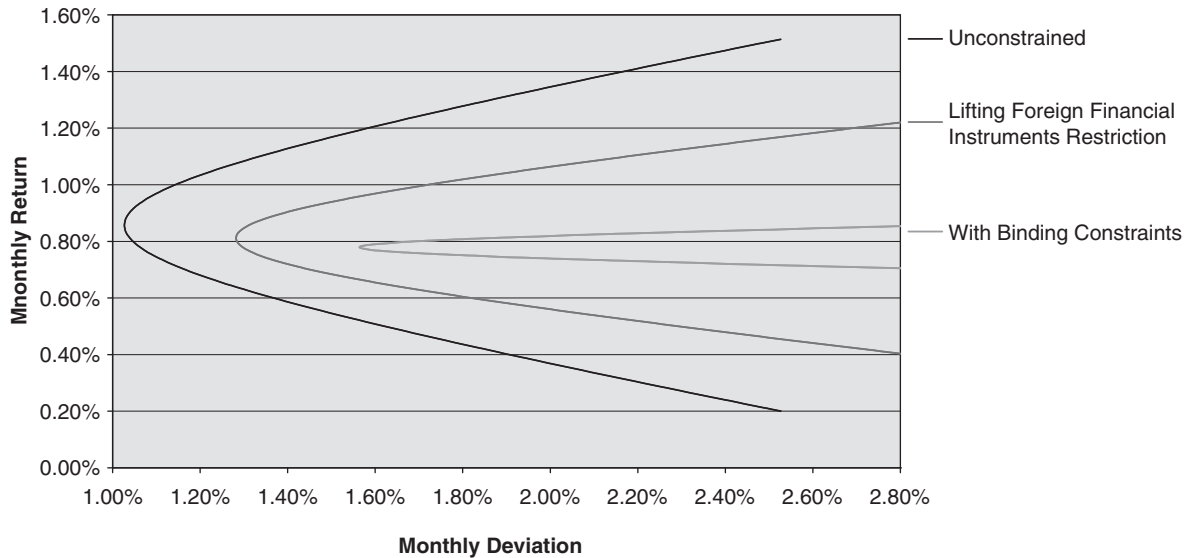
Finally, we chose Yacimientos Petroliferos Fiscales (YPF) shares (the former national petroleum company, whose controlling package was sold to the Spanish company Repsol in the 1990s) to represent shares of Privatized National Companies. The above-mentioned instrument presented high liquidity and was traded on a regular basis. This did not occur with other series of the same instrument.

## Results

The quantitative restrictions imposed by the regulations generated portfolios with lower returns and higher risk levels than those that could have been obtained if PFAs had been allowed to invest without restrictions. Using the returns and covariance of the different instruments, we calculated Markowitz frontiers with and without restrictions. Figure 1 shows that the regulated portfolio with quantitative limits was inferior to (sub-optimal) the unrestricted minimum variance portfolios. Only the restrictions on Foreign Financial Instruments, Mutual Funds – highly correlated with Time Deposits – and the Time Deposits themselves were not binding during the period of analysis. Foreign Financial Instruments had the expected results because PFAs would have been able to reduce Argentina's market risk owing to international diversification by investing more in those instruments. Mutual Funds and Time Deposits had low volatility during the period under analysis.

When analyzing the restriction on Mutual Funds and Time Deposits, the result is more surprising, but this is mainly because these were the only options that PFAs had to invest in non-risky instruments. Mutual Funds risk is





**Figure 1:** Markowitz Frontiers, with binding constraints, lifting Foreign Financial Instruments restriction, and unconstrained.

strongly correlated with Time Deposits, which, by their very nature, exhibit lower volatility. Of course, banks can go bankrupt, and the deposits vanished in the absence of deposit insurance. The figure 1 also shows the Markowitz frontier, lifting the Foreign Financial Instruments constraint. We can see that PFAs would have been able to reach portfolios with considerably higher returns than the current ones had the restrictions on Foreign Financial Instruments been relaxed.

We have calculated the average portfolio composition, return and variance of the system during the 10 years under analysis to determine whether the PFAs behaved efficiently given the regulated constraints on portfolios.

Figure 2 shows that the average system's portfolio was located in the efficient part of the frontier. This result indicates that PFAs behaved efficiently even when the regulations they faced did not. PFAs obtained the best results they could have, given the restrictions they faced.

Additionally, we conducted the same analysis for the average portfolio of three of the most important PFAs (Consolidar, Met and Arauca Bit). As Figure 2 shows, they all composed a portfolio allocation in the efficient part of the

frontier with a short distance from each other for the system's average portfolio. This suggests that the portfolios were highly correlated within PFAs, given the incentives that the regulation had set.

Finally, the system's average portfolio was efficient despite the imposed restrictions, and yielded a monthly deviation of 5.29 per cent and a monthly return of 0.92 per cent (Figure 3).

Without the quantitative restrictions, PFAs would have been able to obtain a monthly return of 2.35 per cent facing the system's average portfolio risk level. Alternatively, they would have been capable of maintaining the historic return of 0.92 per cent, but would have faced a deviation of almost 1 per cent, that is, less than one-fifth the risk they had actually assumed from the regulation.

Hypothetically, if an agent made monthly contributions of AR\$100 for 40 years, faced with a deviation of 5.29 per cent, he would accumulate AR\$57993 in his personal account, if his PFA had to deal with Law 24241 restrictions. In contrast, if the PFA had just been restricted to an upper risk limit of 5.29 per cent, the agent's personal capitalization account would have been able to accrue AR\$79237 (37 per cent higher than if the quantitative restrictions by instruments were imposed).

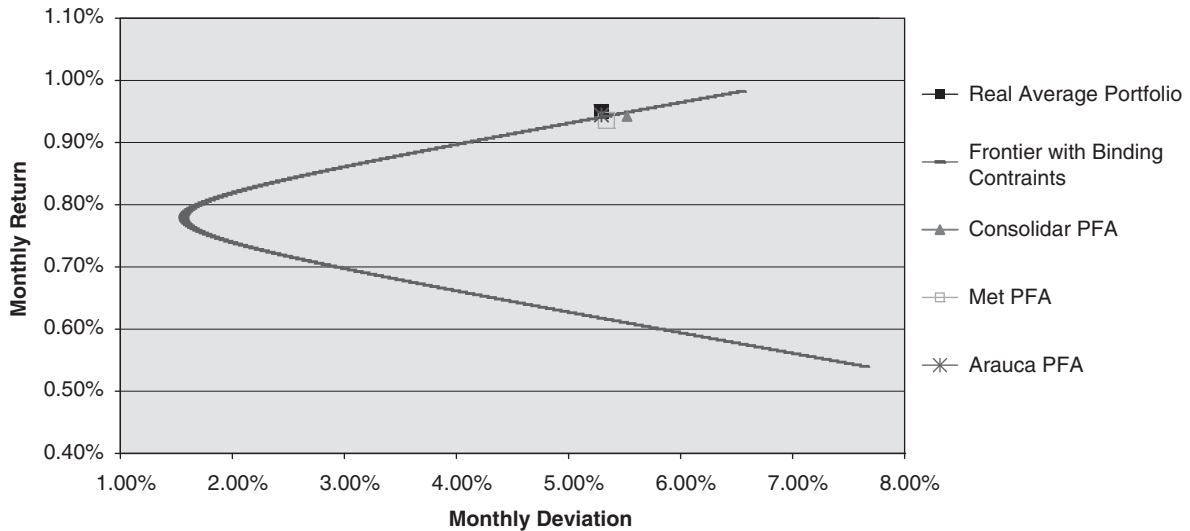


Figure 2: The PFA Actual Portfolios in the Markowitz Constrained Frontier.

## FINAL CONSIDERATIONS

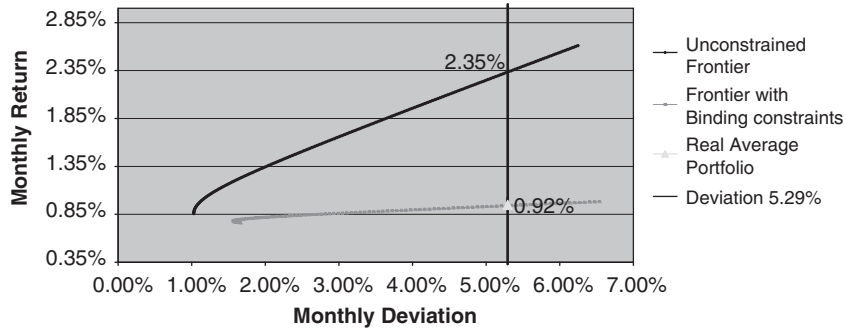
The system was affected by different shocks before, during and after the 2002 default. Its portfolios were flooded with public debt securities, whose valuations were manipulated by public policies. Although losses were masked via accounting mechanisms, the system was strongly affected by the debt swap of 2005.

A voluntary regime shift was attempted with the 2007 reform, but only two million of the 11 million workers chose to return to the public regime. Both financial markets and PFA portfolios were hit by the 2008 financial crisis. Argentina's financial markets have been declining since the beginning of 2007, owing partly to the political interference in the National Institute of Statistics and Census. That organization computes the Consumer Price Index, which indexes an important part of the public debt. When the private system was eliminated, the PFA portfolios had already lost a significant percentage of the value they had at the beginning of 2008. The elimination of the regime was argued as a way to protect future pensioners from greater losses.

Can this happen in other regions? Some countries in Latin America, Eastern Europe and Central Asia have implemented similar reforms.<sup>10,11</sup> These reforms may share some of

the characteristics that made the events in Argentina possible. Potential reforms may find scant consensus in the population; they may also be questioned and later reverted. The counter-reform can include clauses guaranteeing benefits that are as good as or even better than those in the private system. These clauses can prevent legal actions that can hinder the counter-reforms – it is hard to prove how detrimental it can be to the affiliate, whose average age of retirement is far off in the future, when the average 40-year-old contributor is to retire.

Let us close with four reflections. The first has to do with the achievement of political consensus and with the content of rational discussions. A recent World Bank document emphasized the three stages to build a political consensus: commitment to the reforms, coalition development and implementation.<sup>12</sup> The sequence is logical, but the arithmetic of the consensus is dynamic. Coalition support can weaken and reverse commitment, coalition and implementation. The balance between the winners and losers can evolve in different coalitions. The classical rejection of these reforms comes from left-wing politicians, labor unions and some groups of workers that may have a privileged treatment in the status quo. However,



**Figure 3:** The effect on the PFA returns lifting regulatory constraints (same risk).

a wide consensus could be hard to construct. The balance could be reached via a correct determination of winners and losers and the logical minimization of the latter. As many winners are about to be born, and many losers still have several years ahead, the most reasonable solution (to obtain a durable agreement) would be to hold a rational discussion to evaluate – efficiently and without exaggeration – the gains and losses. Afterward, a reform with marginal winners and losers (that is, new entrants in the labor market or future contributors) is more likely to succeed. In Mexico, for instance, an option mechanism was implemented targeting those workers that had been most affected by the reform, letting them choose between pre- and post-reform benefits upon retirement. This mechanism removed any non-ideological opposition. New entrants in the labor market would register under the new rules. The transition is prolonged; there exist potentially undetermined future financial compromises, but they will still be in place, unless there exists a recognition bond that establishes those at the time of the reform and would not undergo future revision, as in Chile.

A reform with a majority of abstract losers would more easily receive wide and permanent consensus. Parametric changes, such as raising the retirement age and the number of years to contribute, produce many potential losers, but they may be shared equally by the different cohorts, augmenting the possibility of establishing a consensus. The rationality of the discussion has

to do with reasonable demographic projections and objective financial simulations that satisfy different potential observers. It is not by chance that a consensus in democratically mature and prosperous societies with an extended aging population has been so difficult to obtain. And when the consensus was obtained, it only referred to system parameters.<sup>13</sup>

The second reflection has to do with the objectives and instruments of the reform. During the reform some important but subordinated objectives were emphasized. The principal function of a social security system is not to promote national savings. The system could promote *individual* savings, which could also be influenced by the tax system; gross savings is a global result, which can be addressed via stabilizing macroeconomic management. In fact, the transition period almost ensured that there would not be any expected net savings from the reform for several years,<sup>14</sup> especially when the reform would generate a public budget deficit for decades. In a *tabula rasa* context, this argument would make sense, but it does not when a pay-as-you-go system with millions of beneficiaries already exists (some of whom would continue to benefit for several decades more).<sup>15</sup> Again, the Mexican solution seems reasonable. If the public regime is going to be underfinanced, then the private system has to cover 100 per cent of the financial gap during its early stages. This means that PFA portfolios should be totally made up of public debt during their initial years. The financial gap will shrink as the old system

matures and eventually disappears. This is confirmed by Chile's experience. The financial market's growth will be achieved, as the State's need to issue debt diminishes. In addition, a limit on the amount of debt that the State can place in the portfolios will potentially crowd out the financial markets. This potential crowding out leaves two choices: either the system is mostly based on public debt during its initial years or the public sector will have to finance itself by raising the interest rate on public debt if no quantitative regulation is set. We mentioned that foreign investment is an option to protect the private savings of domestic risk. When analyzing the case of an emerging country, foreign assets are less volatile, but they would probably offer a lower rate return. In 2007, the Argentine PFAs were called to repatriate the money invested in foreign assets so as to protect their portfolios from international volatility.

The third reflection has to do with the marketing and counter-marketing of the reform. The reforms in Latin America were implemented in a period of pro-market thinking with right-wing governments and the support of credits tendered by international organizations that financed and participated in the reform with technical aid.<sup>11</sup> Efficiency was considered the *leit motif* of the reform. Those strengths became weaknesses when left-wing governments with anti-market views took power and the international organizations that supported the reforms came under question. Equity became the most important premise, over efficiency. A balanced vision could not correlate the reform with certain political parties, fractions or groups because the reform would then be reversed when the opposition, fraction or group took office.

The fourth reflection is related to some curious effects of the counter-reform. The reform promised to make public debt explicit, otherwise implicit in a pay-as-you-go system, to put an end to hidden and arbitrary redistributions, to take the importance of demography into account and to reach a fiscal equilibrium. The reform moved towards an improvement in the system's financing, limiting and individualizing benefits by

means of more restrictive conditions. The counter-reform returned to the rhetoric of solidarity, diluting the goal of financial balance. The average age in the private regime is nearly 40 years. Women retire at 60 and men at 65, and their benefits in the public regime will be determined as the average salary of their last 10 years of work. Note that the determination of the benefits for this group will begin to be defined on average in 10–15 years, and will eventually be defined on average 20–25 years ahead of that. Just as the reform made the liabilities of the system explicit, the counter-reform hid them.

We showed that the system's average portfolio was efficient given the portfolio regulations, and yielded a monthly deviation of 5.29 per cent and a monthly return of 0.92 per cent. Without the quantitative restrictions, the PFAs would have been able to obtain a monthly return of 2.35 per cent given the system's average portfolio risk level. On the other hand, they would have been capable of maintaining the historical return of 0.92 per cent, but facing a deviation of nearly 1 per cent or less than one-fifth the risk they actually assumed as of the regulation.

These reflections can be summed up by stating that the problems (aging, a high tax burden on salaries and an informal job market) are still in place. They have never disappeared, but now one instrument has been lost (that is, the fully funded scheme) with which to confront them.

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## TECHNICAL APPENDIX

The minimization approach can be expressed as follows:

Minimize:

$$\sigma_m^2 = \sum_{i=1}^n \sum_{j=1}^n x_i x_j \sigma_{ij}$$

Subject to:

$$\sum_{i=1}^n x_i E_i = E_m$$

$$\sum_{i=1}^n x_i = 1$$

where  $\sigma_m^2$  is the portfolio's market variance;  $x_i$  the weight of each asset in the portfolio;  $E_i$  the expected return on asset  $i$ ;  $E_m$  the expected return on the portfolio; and  $\sigma_{ij}$  the covariance between assets  $i$  and  $j$ .

Restriction (2) implies that the portfolio's return must be equal to the sum of the return on each asset weighted by its participation in the portfolio. For example, if the portfolio is formed by two assets in equal proportions, whose returns are 10 per cent and 15 per cent, respectively, then the portfolio's return should be  $0.5 \times 10\% + 0.5 \times 15\% = 12.5\%$

Restriction (3) means that the sum of all the proportions of each asset that constitute the portfolio must be equal to one. This implies that all the money in the portfolio should be invested in the different assets.

The objective of the model is to find the efficiency frontier. Each point of the frontier represents a combination of risk and return that can be obtained by creating different portfolios.