Past and present currency board experiments in Argentina

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Abstract

The paper analyses currency board experiments in Argentina in two different time periods, 1899-1914 and 1991-2001. The 1899-1914 currency board system established a 'Conversion Caisse' ensuring the gold backing of all issues of paper money. More than a hundred years later in 1991, Argentina implemented a variant of a unilateral currency arrangement with the United States known as the 'Convertibility Plan' fixing the exchange rate at one peso per dollar, and providing close to full foreign currency convertibility for the money supply. Both monetary systems were implemented to guarantee the stability of prices and the exchange rate and ultimately designed to insulate monetary arrangements from government interference and political influence. Both currency boards lasted for a period covering close to a decade, were subject to external shocks and ultimately marked by fiscal disequilibrium and foreign debt accumulation.

Both cases provide examples of instances where a monetary rule was put in place to mitigate the economic effects of a distributive conflict. Rather than seeking to replace the power of discretionary authority the rule was a substitute for a political or social institution. The analysis also reveals that a period of prosperity followed their implementation but that the underlying economic logic of both experiments is that of events unfolding in an ergodic environment. Furthermore, it shows that a rule can change the parameters on which agents' base their decisions and is thus not neutral. Finally both examples illustrate the importance of fiscal equilibrium but at the same time highlight the fact it is the joint dynamics of the public and private sectors, which set the stage for their demise.

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Introduction

The paper analyses and compares two currency board experiments carried out in Argentina in two different time periods, 1899-1914 and 1991-2001. In the first case a currency board was put in place in 1899 to avoid variations in the peso-gold exchange rate, which were detrimental to the interests of Argentina's economy and its exporters. The currency board regime fixed the exchange rate and a Conversion Caisse ensured the backing of fiduciary paper money issues. The 1991-2001 currency board was established to stop drastic variations in price variations. It consisted of Convertibility Plan establishing a one-to-one parity between the domestic currency (the peso) and the United States dollar. The plan allowed agents the choice to carry out transactions in domestic or foreign currency and was accompanied by a set of market oriented reforms.

Both currency board experiences share common traits. They brought about a change in regime and eliminated price and exchange rate fluctuations. Price stability and favourable external conditions set the basis for a period of economic prosperity that lasted for fourteen years in the case of the Caisse and five years in the case of the Convertibility Plan. In the latter case not all the available macroeconomic indicators were favorable to the currency board.

Both currency boards were confronted with external shocks. In both instances the monetary authorities tried unsuccessfully to confront the temporary disturbances. However, their manoeuvring room was severely constrained by the fiscal position of the authorities and the fragility in the balance sheets positions of the private sector.

The Caisse faced the change in external conditions brought about by poor agricultural performance and the WWI conditions in 1914. In that year the convertibility scheme was suspended. The Caisse resumed operations in 1928 but was again faced with declining the terms of trade and eventually the beginnings of the Great Depression. The Caisse was definitely shut down in 1929.

For its part, the Convertibility Plan was challenged with the 1995 Mexican Crisis, the 1997 and 1999 Asian and Russian crisis and finally with the devaluation of the currency of a key trading partner, namely Brazil. At the end of 2001, Argentina announced its default on its external debt servicing and the peso was allowed to float against the United States Dollar.

The study of both episodes sheds light on the main issues pertaining to currency boards. It also provides a critical basis on which to examine the conceptual and empirical underpinnings of monetary rules.

The paper is divided into four sections. The first one describes the 1899 monetary reform centering especially on the views of its progenitor the then minister of finance Jose Maria de la Rosa. The second section analyzes the economic performance of the Conversion Caisse from 1899 to 1914 and from 1927 to 1929. The third section presents the conditions under which the Convertibility Plan was adopted, its main features, its evolution and its results. The fourth section extracts the lessons of these two monetary experiments. The final reflections are centered on the issue monetary rules and are found in the conclusion.

The 1899 monetary reform

In 1899 José María Rosa, the finance minister during the second presidency of General Roca (1898-1904) formulated the Conversion Law of 1899. The monetary reform of 1899 sought to suppress the effects of a fluctuating gold premium on the commercial interests of Argentina. The gold premium, which stood at 257% in 1894 decreased to 125% in 1899. A rising gold premium favored the economic interests of exporters while a falling gold premium favored those of the importers (See Figure 1).

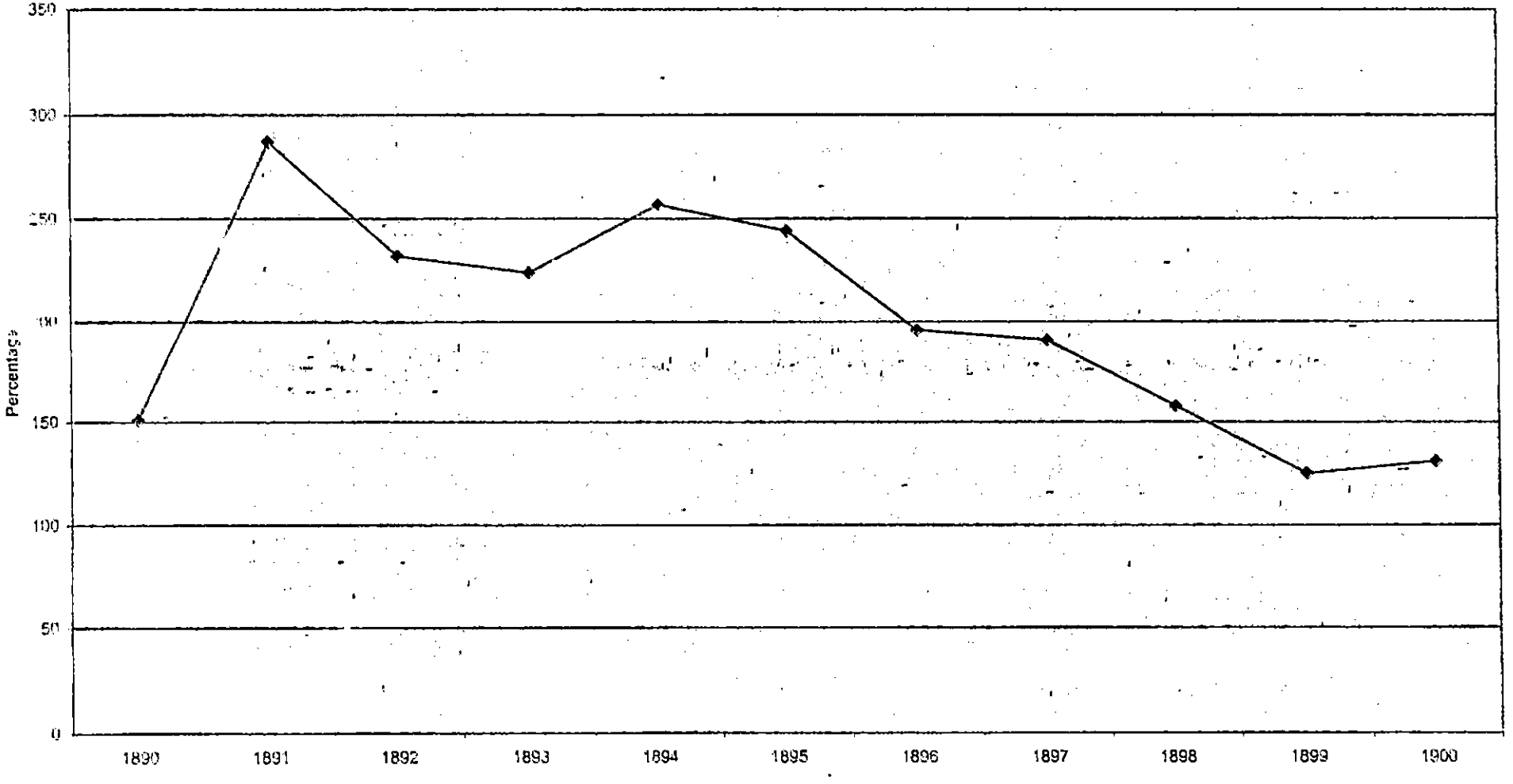
Exporters made their payments for variable costs (wages, salaries, interests, and rents) in fiduciary money while they received their proceeds in gold. When the gold premium stood high their profits increased. In the opposite way a decline in the gold premium meant lower profits unless costs and especially wages could be brought down to reflect the new value of gold. In 1899, variable costs were esteemed to be rigid downwards and thus the disparity between prices and costs was inevitable causing a decline in exports and an increase in imports.

This was the argument put forward by Rosa (1909, pp. 69-70). The decline in the gold premium affected fundamental economic interest of Argentina's economy, which were at the time exporter interests. More specifically Rosa (op.cit. p. 70) made reference to agriculture and grazing activity (beef, wheat, corn, linseed, hides and wool), which dominated economic. In addition, but to a lesser extent the finance minister indicated the negative effects on debtors and working classes due to the slowdown of economic activity provoked by the decline in exports and consequent increase in unemployment.

Rosa discarded any solution to this problem based on a soft peg exchange rate regime. He explicitly stated that in situations of a falling gold premium a 'crawling peg' type regime would simply recreate over time the disparity between costs and prices. Prices could adapt gradually to the fluctuations in the value of gold while costs would fail to adjust. As he put it (op.cit.p.98):

> To establish a gradual falling exchange rate is to decree disequilibrium, the stoppage of economic life, the permanent crisis. Those who propose a gradual exchange rate assume, without doubt, that the law can decrease concomitantly, year by year o semester by semester, the prices of all goods and services. This is the most grave error; wages, rents, capital interests, the articles of national production... as is well known, are by nature refractory to the movements of gold and that their changes proceed with extreme slowness...What will then happen with every decrease in the peso-gold exchange rate? A disequilibrium will occur between those values that are sensitive to gold changes and those that are refractory to the movements of gold...We will have a disequilibrium and a perpetual monetary disorder. Under such circumstances only the holders of cash balances would benefit from the decline in the value of gold and at the same time debtors would ruined and the expectation of a further appreciation in the value of paper money would inhibit contractual obligations.

Figure 1
Evolution of the gold premium in Argentina
1890 - 1900



Rosa's main reform concern was the choice of the parity at which to fix the peso-gold exchange rate should. He realized the dangers in establishing a parity that was too low or high. Rosa was aware that a high peso-gold exchange rate by discouraging exports would negatively affect production and output and increase imports. A low peso-gold exchange rate would have the opposite effects. An additional factor to consider in deciding to establish the exchange rate parity was its effects on the state of public finances. Since at least 1880, Argentina had imported capital to develop and transform itself "from a simple pastoral community to a modern close-knit agricultural nation, well equipped with railroads, ports, power and production facilities" (Peters, 1934, p.33).

Table 1
Argentina
The deficit and the funded debt (millions of gold pesos)
1879 – 1900

Year	Revenues (1)	Expenditure (2)	Revenues/expenditures (3)	Funded debt (4)
1879	21.0	22.5	93.3	77.7
1880	19.6	26.9	72.9	86.3
1881	21.3	28.4	75.0	107.1
1882	26.8	58.0	46.2	124.1
1883	31.0	44.8	69.2	128.0
1884	37.7	56.4	66.8	122.5
1885	26.6	40.5	65.7	113.4
1886	30.4	39.2	77.6	117.2
1887	28.2	48.2	58.5	141.7
1888	34.9	51.6	67.6	277.5
1889	38.2	55.8	68.5	295.2
1890	29.1	38.1	76.4	355.8
1891	19.5	33.7	57.9	370.1
1900	....	....	....	447.2

Note: "...." Denotes not available.
Source: Peters (1934), p. 35.

The economic transformation of Argentina was accompanied by an increase in the stock of external debt. Between 1887 and 1888 the stock of foreign debt increased by almost a 100% from 142 to 278 million gold pesos and further by another 50% between 1887 and 1891. In 1900 it had reached 447.2 million gold pesos (See Table 1 above).

For these reasons a return to the old parity would have caused an unwanted disruption in the economic life of the nation. The alternative chosen by Rosa was to fix the parity at the on-going market rate. According to Rosa this decision responded to expediency, to the needs of consolidating the existing state of affairs and to erase the monetary past of Argentina.[2]

[2] Rosa also defended this decision by citing the cases of France in the 19th century, Austria (1811 and 1819) and Russia (1839).

Rosa's monetary law was passed in 1899. It consisted of six main features. First it preserved the gold peso created in 1881 and adjusted the paper peso to the existing premium of gold, corresponding to 127.3 %. The exchange rate was thus fixed at 44 centavos of gold for a paper peso.

Second, the law was set up according to the Currency Principle and distinguished between an issue and a banking department. The functions of the issue department were assumed by the Conversion Caisse, which converted pesos into gold. The Bank of the Nation, which held the excess gold reserves, assumed the functions of the banking department.

Third, it sought to establish a powerful gold base to guarantee the stability of the currency. This gold base was named the Conversion Fund. The conversion fund would draw its main resources from: (i) a 5% tax on imports; (ii) the profits of the Bank of the Nation; (iii) the earnings from the sale of a state owned railway; and (iv) the regular government budget.

Fourth it maintained the peso-gold parity through two mechanisms: the Conversion Caisse acted as an automatic regulator of the money supply and foreign exchange intervention. The Conversion Caisse guaranteed that any addition to the money supply should have a 100% gold backing. In the same way any withdrawal of gold would be accompanied the withdrawal of an equal amount of paper pesos. The Bank of the Nation carried out foreign exchange interventions by exchanging its gold reserves for the peso notes of the Conversion Caisse. In this way the system sought to provide elasticity to the money supply avoiding temporary excesses or shortages of currency that could undermine the functioning of the Caisse. The Bank of the Nation could also function as a lender of last resort [3].

Fifth the law contemplated the decline in government expenditure to ensure an equilibrated state of public finances. The contraction in government expenditure was achieved by curtailing public salaries and wages by 10%. Finally the authorities would ensure the decline and eventual extinction of the floating debt of Argentina.

The performance of the Conversion Caisse

The Conversion Caisse functioned smoothly between its entry into force in 1900 and 1914. In 1914, unfavorable external developments led to the suspension of convertibility and the closing of the Caisse. The Caisse resumed operation in 1927 but

[3] Ford (1962, p.103) writes: "Besides using the Conversion Fund to smooth out temporary fluctuations in the foreign exchange rate market, the Bank of the Nation which held a much larger amount of gold in its vaults than its gold peso liabilities, would, in the event of heavy seasonal gold shipments by other banks which had obtained the gold by depositing paper notes in the Caisse, at its discretion pursue the opposite course and deposit gold from its vaults in exchange for notes at the Caisse. Thus is other banks were unwilling to grant loans or discounts because of inadequate cash reserves, the hard pressed marchant might obtain funds from the Bank of the Nation. This offsetting policy was limited by the extent to which the Bank was prepared to run down its gold holdings, and by the sizxe of its Conversion Funds..."

was definitely shut down in 1929 as a result of a gold drain driven in part by an unsustainable foreign debt burden.

Between 1899-1914, fair weather conditions facilitated the Caisse's operations. Favorable terms of trade for Argentina's agricultural export products (see Table 2). In turn this favorable external performance improved the credit rating of the country. This was due to the fact that country's foreign credit base depended on the value of its main exports. As put by Peters (1934, p.50):

> The picture is amazingly simple; the basis of the nation's prosperity lies almost entirely in agricultural and grazing products. With its beef and wheat, corn, linseed, hides and wool, the country pays for all that it imports from abroad, and it is upon the value of these commodities that its credit rests....As a result it is not at all an unfamiliar spectacle to find the credit of the entire nation measured in the exchanges of the world with complete reference to the value of a single commodity –wheat...When grains and meat are high so are the Argentine bonds.

As a result the authorities were able to substitute short term for long term foreign debt. They also obtained loans under very favorable conditions such as the Public Works Loan of 1909 and the Internal Gold Loan of 1911 which were payable in gold at fixed exchange rates.

At the same time it provided the basis for a favorable outturn in the balance of payments and a level of gold stock guaranteeing the safe functioning of the Conversion Caisse. Between 1900 and 1914, total exports grew on average 8% (the main categories of exports such as grain and grazing exports increased 12% and 7% respectively) and imports 12%. However in all years with the exception of 1911, the result of the trade balance remained positive and yielded on average a surplus of 59 million gold pesos. [4]The surplus in the trade balance and the capital inflows (estimated at 40 million gold pesos annually) allowed the country to service its foreign debt obligations and to obtain a surplus in the balance of payments. Estimates by Martinez and Tornquist show a surplus of 27, 39, 159 and 30 million gold pesos in the balance of payments for the years 1904, 1908, 1914-15 and 1915-16.

As a result the imports of gold also showed an increasing trend evident especially from 1903 to 1910 which translated into a net increase in the net gold holdings of the Conversion Caisse. This is illustrated both in Figure 2. It plots the net imports of gold and the net increase in Caisse Holdings (the simple correlation coefficient is 0.73). A similar picture emerges out of the fact that the actual note creation as a percentage of the potential note creation based on the net gold imports (shown in Table 2 Column (3)) was equal or greater than 96% between 1903 and 1908 (Ford, 1962, p. 98).

[4] According to Williams (1920) the trade surplus ranged between 10 and 118 gold pesos with an average of 75 million.

Figure 2
Net imports of gold and net increase in Caisse holdings in Argentina
1903 - 1913

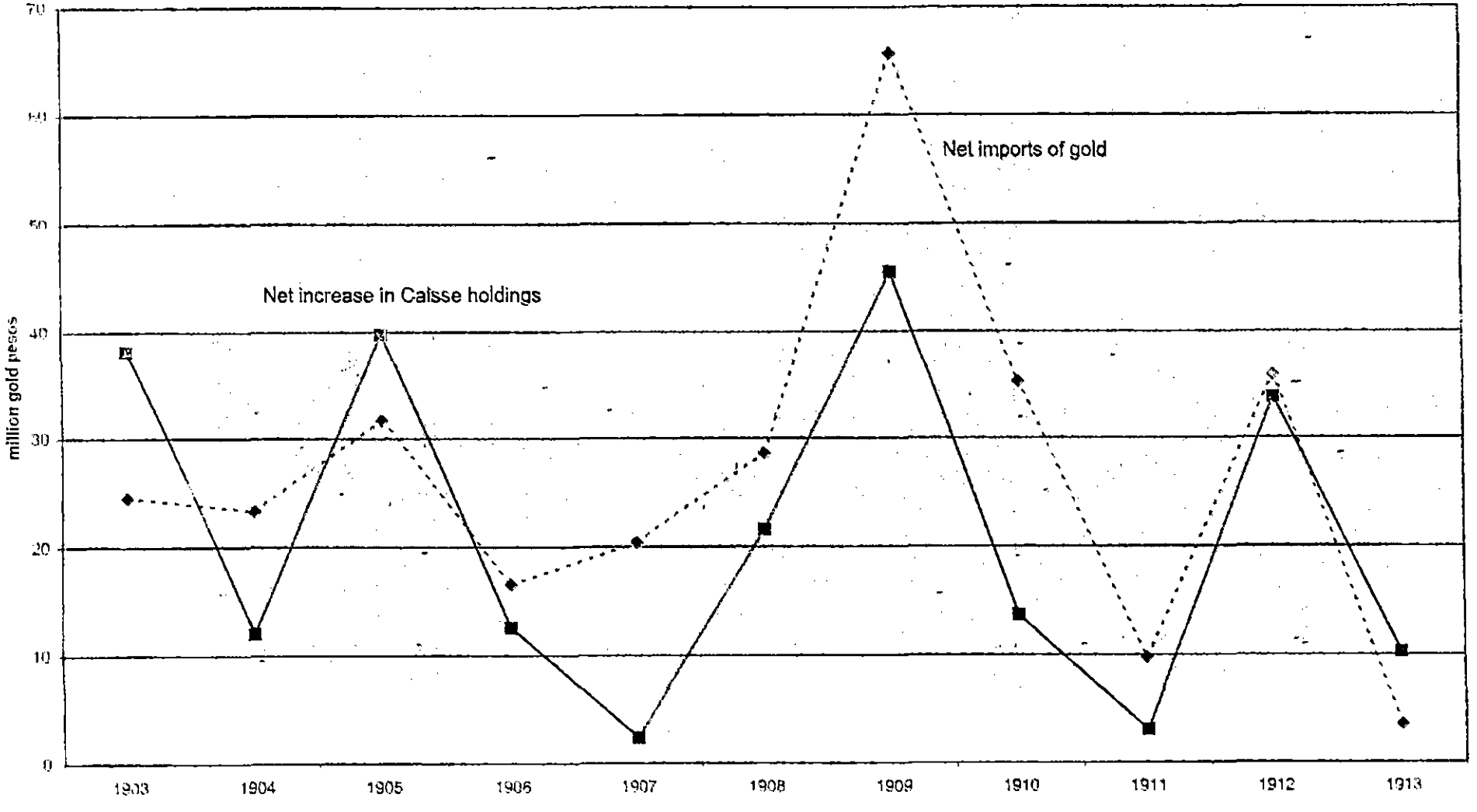


Table 2
Argentina: economic indicators
1900 – 1914

Year	Trade Balance (1)	Net imports of gold (2)	Actual note creation as a percentage of potential note creation (3)	Inflation (4)	Terms of trade (5)	Differential interest rates on domestic debt and UK consols (6)	Issues on London Stock Exchange for Argentina
1900	42	6.7	95		100.0	2.6	7
1901	54	0.1	95	-12.0	88.9	2.3	25
1902	76	5.8	93	9.1	97.0	2.3	16
1903	90	24.5	100	-5.2	91.0	2.2	26
1904	77	23.3	96	2.2	92.1	2.1	21
1905	118	31.7	104	8.6	100.0	2.1	61
1906	22	16.6	104	5.9	104.9	2.1	63
1907	10	20.4	98	2.8	105.8	1.9	72
1908	93	28.6	97	-3.6	103.9	1.9	80
1909	94	65.7	92	9.4	112.6	1.8	109
1910	21	35.3	88	7.8	117.9	1.7	115
1911	-42	9.8	87	-0.8	115.9	1.6	84
1912	95	35.9	87	2.4	115.5	1.5	101
1913	63	3.6	88	0.0	113.4	1.5	60
1914	77	-13.3	83	0.8	113.3	1.6	76

Note: (1) and (2) are expressed in million gold pesos; (3) Obtained by dividing actual note issue by the note issue creation of net gold imports; (4) Inflation refers to the rate of change of the Wholesale Price Index for Argentina with 1900=100; (5) calculated as the ratio of Argentina's Wholesale Price Index to the UK's Consumer Price Index; (6) refers to the difference between Argentina's Custom Loan.
Sources: Ford (1962); Williams (1920) and Nakamura & Zaragaza (1998)

The overall economic context allowed the law to meet its objective. The favorable external conditions made it possible for the Caisse to accumulate the necessary gold reserves to maintain a fixed peso-gold parity. The Caisse abolished speculation regarding the future value of the gold and thus the fluctuations in the gold premium thereby putting an end to the distributive conflict, at least temporarily, affecting exporters and importers.

Seven years after the start of operation of the Caisse, Rosa expressed satisfaction with the results obtained. As he put it (op. cit. pp. 162-163):

> We could say that we have today a stable and healthy national currency that represents the wealth of the country...that increases or decreases according to the needs of the country and aids the movements in public wealth, a currency that has produced the great benefit of having money at the low rates of interest of industrialized nations, a currency that stimulates commerce and trade and that is the most potent element that concurs to our progress.

However at the same time he was well aware that a currency board, under 'foul weather' conditions, could be the source of violent fluctuations in the value of the currency thus undermining the foundation on which the board rests. Rosa stated (ibid): "In the situation which we find ourselves it is true that a crisis, produced by disorderly speculations, a panic, a political commotion could bring violent contractions in our monetary market, bringing the end of the of the Conversion Caisse and the return to inconvertibility...." In order to avoid situations such as a flight from fiduciary paper to gold, Rosa urged that the gold reserves of the Caisse be increased. Only then would the public be assured of the full gold backing of the paper currency at all times.

Rosa's premonitions were not unfounded. In 1913-1914, the Caisse was subject to severe external pressures turning a virtuous economic cycle into a vicious one.

Argentina suffered a failure of the cereal crop representing close to 50% of the country's total exports. This had a negative effect on agricultural exports. Cereal exports declined by –43% between October 1912-September 1913 (322 gold pesos million) and October 1913-September 1914 (182 gold pesos million). The fall in export production affected not only the balance of trade position but also had a depressing effect on land values and thus on capital outflows. This last effect was reinforced by the needs to finance the war efforts of European countries, which dried up the country's external sources of finance. As shown in the Table 3 below, these were instrumental in guaranteeing a positive balance of payments equilibrium and the necessary reserves for the smooth functioning of the Caisse.

Table 3 Argentina's Balance of Payments 1911-1914 (October to September) Millions of gold pesos			
	1911-1912	1912-1913	1913-1914
Balance of trade	20	52	12
Debt service	-168	-161	-139
Tourism and remittances	-87	-87	-38
Current account	-235	-196	-165
Capital account			
Net gold movements	35	35	-13
Δ Foreign debt	200	161	178
Ford (1962), p. 173. And own estimates.			

The unfavorable balance of payments result caused a contraction in the liquidity of the financial system. In turn, the decrease in the money supply had a negative effect on income and employment. It also aggravated the financial situation of the farmers affected by the poor climatic conditions thus impinging on the recuperation of exports and land values. This provided a further blow to the confidence of foreign investors. Two examples illustrate this point. The shares of the Spanish Bank declined from 200 to 150 between the 11 of January 1913 and July 4th 1914 and the ordinary shares of *Edificación Argentino* followed the same trend from a peak of 157 on January 1913 to 79 at the end of March 1914 (Williams, 1920).

Imports responded rigidly to the decline in income and with a lag thus aggravating the fluctuations in the downward phase of the cycle. Imports were rigid because they included among others raw materials, machinery and final goods, which were essential for on-going production and consumption. In addition as pointed by O'Connell, (1984, p. 192): "... import demand...revealed a rather perverse lagged response which meant that it would remain at a high level even after exports and the level of activity were falling creating thus a severe external payments problem in the downward phase of the cycle."

Imports eventually responded and the effect was positive for the external position. But this was not the case for domestic finances. Import duties represented more than 53% of all government revenues (Peters, 1934, p. 68). Their fallout translated in a fiscal deficit. Between 1913 and 1941, government revenues fell -24% and the deficit increased fourthfold, from 14 to 60 million of gold pesos (See Table 4 below).

The twin deficits made it difficult to maintain the backing and convertibility of the currency. In august 1914, gold payments were suspended and the Conversion Office was closed. Argentina returned to inconvertibility until 1927. The decision was again linked to the impinging appreciation of the peso and the unfavorable consequences for exporters interests (Fuentes, 1998).

Table 4
Exports, exchange rate, government revenues and expenditures
1927 – 1931

Year	Grazing Exports (1)	Agricultural exports (2)	Total export (3)	Unit value (4)	Exchange rates (5)	Revenues (5)	Expenditures (6)	Deficit (7)	Total debt (8)
1927	1650	16263	18740	53.8	0.9630	.....	.....	.....	281.8
1928	1323	15010	17029	62.0	0.9648	319	389	70	289.8
1929	1268	14761	16703	59.4	0.9513	348	436	88	289.8
1930	1212	9279	11027	55.7	0.8551	324	482	158	339.8
1931	1149	16877	18477	34.7	0.6674	336	390	54	309.8

Note: (1), (2) and (3) in thousands of tons. (4) unit values were obtained by dividing total export values expressed in million pesos divided by export volumes expressed in millions tons. (5) the exchange rate refers to the ratio of United States and Argentina wholesale prices (1926=100). (5) And (6) are expressed in million gold pesos. (7) Refers to the difference between (5) and (6). (8) Refers to the sum of funded and floating Argentine debt in the United States expressed in million dollars.
"...." Denotes not available.
Source: Peters (1934)

On that year the peso returned to par with gold. However, starting in 1928 the convertibility scheme was confronted again with unfavorable external conditions. The monetary authorities tried to respond differently than in 1914, using their reserves to finance gold exports.

From 1928-1932, Argentina faced unfavorable terms of trade for its export products. For that period according to O'Connell (1984, p.196) export prices declined by 64%. As a result as in 1914, gold reserves would have declined directly. However, contrarily to the earlier Caisse period this did not translate into a contraction in liquidity. The monetary authorities had sufficient reserves accumulated during 1927-1928 and decided to intervene to maintain the convertibility by financing the concomitant export of gold without causing a liquidity contraction. More precisely, the Bank of the Nation used its own reserves to pay for gold exports. This allowed banks to expand credit and thus undertake a counter-cyclical monetary policy. This scheme was eventually faced with failure due mainly to the floating debt of the government.

The 1991 Convertibility plan

In the following decades and especially after WWII the focus of development turned from agriculture to manufacturing and capital accumulation. Those of the urban replaced the opposing interests of exporters and importers versus rural interests and later on by different urban social strata. The outcome turned out to be a history of persistent inflation that reached its climax at the end of the 1980-decade. During this whole period opposing interest groups alternating in government made different demands on society and the economy that were reflected in inconsistent relative prices bypassed ultimately through fiscal deficits and inflationary processes. In 1989 following inflation stabilization attempts, the Central Bank president of Argentina remarked:

> Stabilization has never been a public good. Labor union leaders, some entrepreneurs, the Peronist Party, the administrators of public enterprises, the governors (of the provinces)...did not conceive of economic stabilization as something that needed to be defended everyday. In this context the stabilization was an impossible task for a technocratic elite...whose effective influence was confined only to some segments of the central power[5]

Following very high price surges in that year (1989) sold to the public as "a hyperinflation episode," Argentina chose to implement in 1991 a variant of a unilateral currency arrangement with the United States known as a currency board.

The events that led to the adoption of the currency board are well known. Following a military dictatorship in the 1970's, a democratic elected government took office in 1983 and identified the control of inflation as its main priority. Inflation which was running at 400% a year was confronted with the standard orthodox measure namely,

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[5]Quoted in Wynia (1992). The quote is by Jose Luis Machinea who was President of the Central Bank of Argentina from 1986-1989.

demand restraint. The failure of these policies led the government to the adoption of a stabilization plan termed the Austral Plan (1985-1987). It combined a wage, price and exchange freezes with fiscal and monetary reforms. Despite an early success of the Austral Plan and the implementation of three other stabilization plans inflation could not eventually be brought under control. The monthly rate of inflation reached 38% in August 1988, 200% in July 1989 and an average of 79% in the first trimester of 1990 See Figure 3).[6] These high rates of inflation were accompanied by the deterioration of public finances, external disequilibrium, and capital flight. Moreover the shift in the composition of agent's portfolio from peso denominated to dollar denominated assets due to currency depreciation endangered the stability of the financial system.

Within this context, the newly appointed finance minister of the Carlos Menem government who took office in 1990, Domingo Cavallo, introduced the Convertibility Plan in April 1991. The plan was intended as a regime change and had most of its characteristics. That is paraphrasing Sargent (1982, p.42), the plan required more than just a few temporary measures of fiscal and monetary restraint.

Rather it had to consist in a change in the policy regime and more specifically in an "abrupt change in the continuing government policy, or strategy as to be widely believed."[7] It was aimed at restoring the confidence in the currency while postulating a break with the past behavior of inflation, that is, with the inertial behavior of inflation. The change in regime embedded in the plan paid particular attention to the way in which the government approached the management of public finances.

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[6] These stabilization plans are the Primavera (1988), the Bunge and Born (1989), and the Bonex Plans (1990). Bunge and Born were two executives of a multinational corporation and the Bonex plan was masterminded by the economics minister Erman González (December 1989 to March 1990) of the Menem government.

[7] Sargent's original quote refers to the "government policy for setting deficits now and in the future sufficiently binding as to be widely believed." The change in regime brough about by the Covertibiltiy Plan is seen in a broader context although particular attention is paid to fiscal factors.

Figure 3
Monthly rate of inflation in Argentina
1987 - 1991

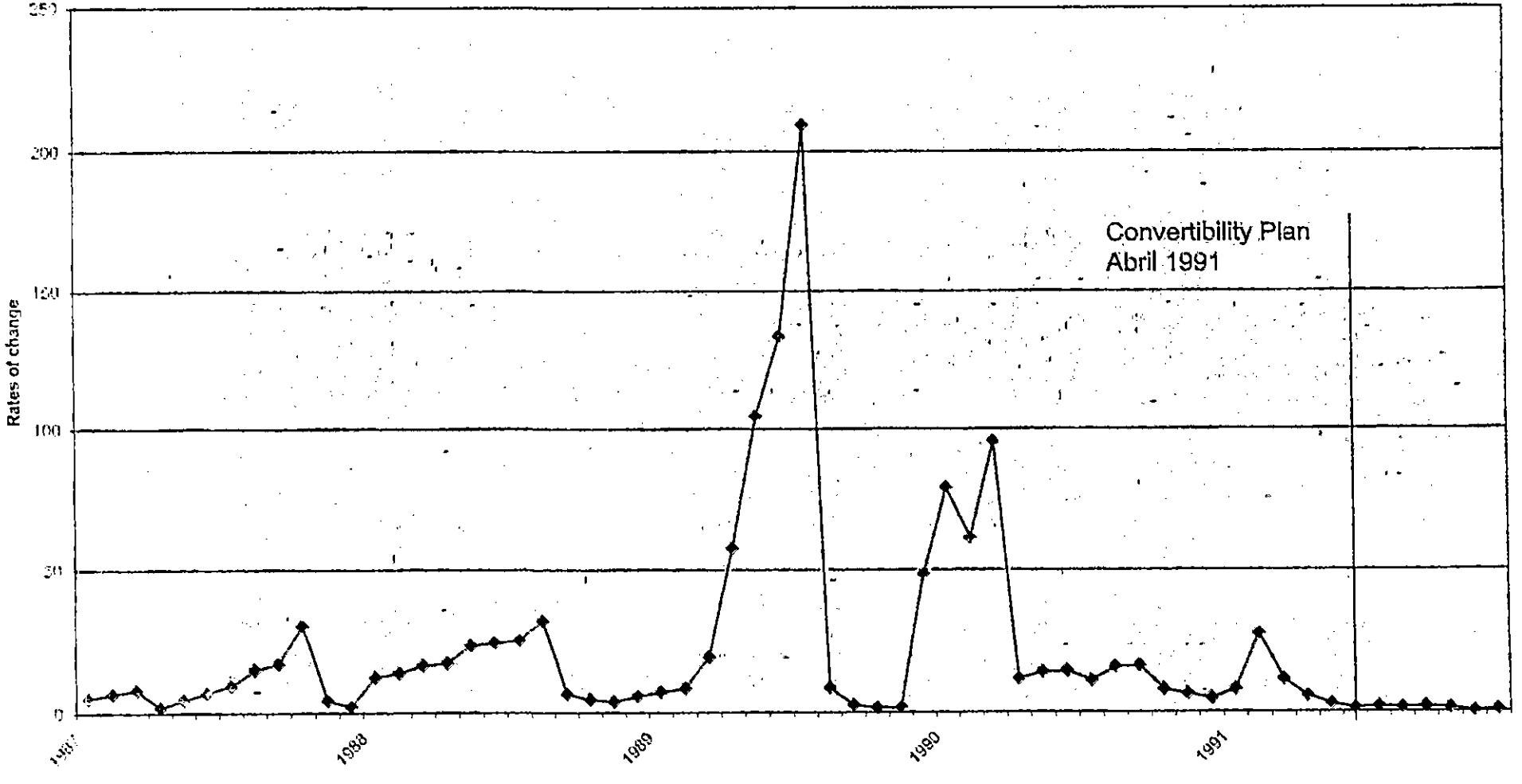

Table 5
Argentina: Macroeconomic indicators
1989 – 2001

Year	GDP (1)	Inflation (2)	Fiscal deficit (3)	Current Account deficit (4)	External debt (5)	RER (6)	FDI (7)	Unemployment rate (8)	Real wage (9)
1989	-6.6	3,079.5	-2.7	-1.7	....	....	...	7.7	....
1990	-0.5	2,315.5	-1.6	3.3	....	.....	.....	7.4	103.2
1991	10.0	172.1	-0.3	-0.2	32.3	....	....	6.5	94.6
1992	9.5	24.9	0.9	-0.1	27.4	103.5	3218	7.0	98.6
1993	5.7	10.7	-0.3	1.5	28.0	95.4	2059	9.6	100.0
1994	7.5	4.1	-1.4	-0.3	30.4	94.6	2480	11.5	101.9
1995	-5.0	3.4	-2.2	-0.6	35.2	100.0	3756	17.5	96.8
1996	5.5	0.1	-1.4	-1.9	36.9	101.9	4937	17.2	97.1
1997	8.1	0.3	-1.2	-1.5	42.6	98.6	4924	14.2	93.6
1998	3.8	0.7	-1.6	-1.4	47.1	95.7	4175	12.9	92.6
1999	-3.4	-1.8	-1.7	-4.4	51.5	89.1	22633	14.2	97.5
2000	-0.8	-0.7	-2.4	-3.1	51.8	89.6	10553	15.0	94.5
2001	-4.5	-1.1	-3.5	-1.6	....	87.1	3500	17.4	....

Note: (3), (4) and (5) are expressed as percentages of GDP.(3) refers to the result of the non-financial public sector.(7) is expressed in millions of US dollars. (1), (2) and (8) are expressed in percentages.(6) refers to the real exchange rate of imports. In (9)the base year is 1990.
... denotes not available.
Source: ECLAC (2001-2002); Bauer (2001); Cavallo (1996); IMF Financial Statistics. Several Issues.

The plan fixed the exchange rate at one peso per dollar and gave agents the possibility of freely using the dollar or the peso to settle monetary transactions. [8]Concomitantly the law suppressed foreign exchange controls, permitted the settling of contracts in foreign currency and prohibited indexation clauses in the terms of contracts. The law provided close to full foreign currency convertibility for the money supply. The law permitted that up to 10% of the money base could be backed by dollar-denominated government bonds. This made it illegal for the authorities to issue currency without foreign exchange backing and transformed the central bank into a quasi-monetary monetary board.[9] Also the convertibility law forbade the alteration of the exchange rate parity and Central Bank lending to the government.

The convertibility plan was supported by a set of key measures which were meant to reflect changes in 'fundamentals. ' These measures responded to the so-called 'necessary preconditions' for adopting and defending a currency board. These consisted in a set of measures to liberalize and deregulate the economy, expose the productive apparatus to competition and privatize its resources.

The average tariff rate was reduced from 22% to 11% between 1991 and 1998, price controls abolished and traditional sectors such as the mining sector were opened to foreign capital. The privatisation of state owned assets began in 1990 with the sale of the telephone company (ENTEL) and the national airline (Aerolíneas Argentinas). Other industries affected by privatization included the state petroleum company, electricity, gas, transportation, water utility, and petrochemical plants (Baer, Elosegui, and Gallo, 2001).

This market-oriented strategy was accompanied by measures to strengthen the state of public finances. Tax increases and decreases in government expenditure were implemented. Public sector employment was downsized by 20%, and public sector wages were frozen.

The government also liberalized the financial system. Since 1994, it allowed foreign financial institutions to compete with Argentine ones. The share of foreign bank deposits in total deposits increased during 1994-1998 from 26% to 41% of total deposits.

The overall results of the Covertibility Plan were mixed. Initially the prospects appeared to favor the adoption of the Plan. As in other stabilization plans inflation abated abruptly, growth resumed and the main macroeconomic variables were in sink.

These positive aspects were counterbalanced by real exchange rate appreciation rising unemployment and lower real wages, increases in interest rates, and eventually unsustainable foreign debt stock levels.

Both aspects are not in fact contradictory effects of the Convertibility Plan but are fitting parts of its coherent overall strategy. Initially the plan restored agents' confidence in the currency and the economy. The monthly rate of inflation that had reached levels

[8] Cavallo (1996, p.176-177) considered the freedom to choose the currency in which contracts should be settled as a key feature of the stabilization plan since as he put it, it "sustained the prohibition on moetary corrections or indexation clauses in contracts. This was very important to the elimination of all vestiges of inflationary inertia in the system."

[9] Unlike the Argentine currency boards, the more orthodox currency boards normally do not have a central bank and leave no room for discretionary monetary policy.

above 50% in 1989 (April to July) declined to 0.7% by the end of 1991 and price fluctuations were virtually eliminated.

The decline in inflation coupled with higher nominal interest rates increased real interest rate levels. Interest rates rose from 3.1% in 1993 to 10% in 1996. The effect of interest rates was asymmetric. Domestic productive activities were penalized while activities directed to foreign investment levels were rewarded by higher rates of return. As a result the country experienced high levels of capital inflows which were reinforced with official financial assistance from multilateral organizations. Foreign direct investment and the international reserves more than quadrupled between 1989 and 1994 (4 and 18 billion dollars respectively).

A greater part of foreign direct investment referred to purchases of shares in domestic companies by non-residents, that is, it reflected the privatization initiatives of the government. Thus at the same time that foreign direct investment increased, government receipts rose *pari passu.* Jointly with expenditure restraint and tax increases this led to a change in the budget position from a deficit of –8% 1989 to a surplus in 1992. In addition since foreign direct investment was mainly channeled in domestic existing activities it affected the ratio of investment to GDP increasing from from "13% to an average of 22% between 1993-1999" (Baer et al., 2001).[10] A concomitant result was the sudden increase in productivity mirroring the behavior of investment (12% between 1989 and 1992 and 14% between 1992 and 1994).

GDP growth reflected this state of affairs. Economic growth which was negative in 1989-1990 (-6.6% and –0.5% respectively) soared to 10% in 1991. Between 1991 and 1994, GDP grew at an average annual rate of 7.7%.

This state of affairs was undermined by the appreciation in the real exchange rate, and the fiscal outturn. Also the increase in interest rate led the private sector to adopt risky financial positions.

Real exchange rate appreciation responded in part to the level of prices at which the government had decided to peg the exchange rate. That level of prices was too high to guarantee a competitive edge for the economy. Indeed, the real exchange rate had an immediate tendency to appreciate causing an important external disequilibrium and forcing the authorities to rely on several occasions on quantitative controls as a substitute for devaluation. In addition, high interest rates and capital inflows also contributed to the performance of the exchange rate. Finally, the overvaluation of the United States dollar was also an additional to take into consideration.

[10] According to Baer et al. The privatisation process was also accompanied by a concentration of assets: "The result of privatizations of 1991-1994 was that 66% of the privatized companies made their appearance on Argentina's list of the top 200 companies. And 50 companies of the newly privatized group soon accounted for 60% of total profits of the top 200 firms and ...in 1995 just three of these privatized firms accounted for 40% of the total turnover of the seventy companies listed in the Buenos Aires stock exchange." This concentration of wealth joinlty with the increasing rates of unemployment for some sectors account for the growing inequality in the distribution of income (the Gini coefficient changed from 0.49 to 0.45 in the period 1989-2000) and the consumption patterns.

The solution adopted, which turned out to be unsuccessful, was to induce a decrease in costs by decreasing the price level trough nominal wage restraint.

Strong labor unions however, impeded the decline in wages and in fact as point by Baer et al.: "From 1991-1994 the real wages of professionals increased by 46%, those of skilled and unskilled workers grew by 27.2% and 16%." The result was a rise in the unemployment rate from 7.7% in 1989 to 12% in 1994 and to 15% in 2000. Real wages in fact finally declined (11% and 16% for skilled and unskilled workers) in 1995 at the peak of the unemployment rate (17%) which coincided with the Mexican Crisis.

The real exchange rate appreciation was unfavorable to the balance of trade and increased the country's dependency on foreign capital. In turn, this fed back into the appreciating trend of the exchange rate. The evolution of the fiscal situation reinforced the need for foreign capital. In turn the need for capital widened the spread between the cost of borrowing in domestic currency versus that of borrowing in foreign currency. In 1992 credit in dollars as percentage of the total was 54% (See Table 6) and this ratio increased throughout the 1990's.

Between 1993 and 1999, the government expenditures increased from 15.9% of to 17.2% of GDP while income declined from 16.3% to 14.1%. The government was unable to adjust the level of expenditure to that of income creating a perennial for financing. Since the law forbade the Central Bank to lend to the government, the government sought foreign financial sources.

The decomposition of fiscal expenditures show that the only relevant change were the decline in current transfers (25% and 20% in 1993 and 1999) as a result of the sale of state owned assets and the increase in interest rate payments. Interest payments as a percentage of total expenditure increased from 7% to 17% between the same period. This reflected a growing level of indebtedness. External debt as a percentage of GDP increased from 32% to 51% between 1991 and 1999. In the same the service of the foreign debt increased from 22% to 35% between 1993 and 1999. The debt burden was eventually reflected in the widening of the interest rate differential between the Argentine dollar interest rate and that of the United States Treasury Bill rates -measuring the compensation for perceived risk of default-, which is, may 2001 reached levels similar to those of strife-ridden African countries.

These weaknesses did not endanger the viability of the Convertibility during most of the 1990's decade and in fact Argentina's quasi currency board had a large base of support. This responded in part to the growth prospects of the economy, the memory of inflation and to the growth in dollar denominated debt and the importance of dollar denominated assets. In 1997, 64% of all credit granted by the banking system was denominated in dollars. In addition besides the public foreign debt, the private sector issued 9$ billion worth of bonds in foreign currency with short maturity periods (less than 5 years).

However, the real exchange rate and the fiscal situation became key variables when the economy was confronted with two important external shocks: the Mexican

'Tequila effect' and the Russian and Brazilian crises that followed the Asian debacle. The last shock led to the abandonment of the parity between the peso and the dollar and the currency board arrangement.

The Mexican 1994 devaluation and the economic crisis that followed mined investor's confidence in emerging markets provoked important capital outflows and threatened currency stability. Initially, Argentina, followed the 'rules of the game' imposed by the adoption of a currency board. Capital outflows resulted in heavy reserve losses (the Central Bank lost a third of its international reserve stock), a decrease in both peso and dollar deposits and a contraction in the rate of growth of money supply which resulted in an increase in the interest rate structure.

These effects were compounded by the decision of international banks to suspend the credit lines to their Argentine branches on the basis of an increase in the perceived country risk, forcing these to turn to the domestic market for funds which further increased the rate of interest.

At a more fundamental level, the search for funding in the domestic financial market was interpreted as a signal of a systemic banking failure and contributed to trigger a run not only on peso but also on dollar denominated deposits.

However, the government and central bank did not remain by any means passive and took action to avoid the collapse of the convertibility scheme. They increased bank liquidity by reducing reserve requirements, approved an amendment to the central bank law which allowed it to act as a lender of last resort to troubled institutions, and contributed to establish a privately financed deposit insurance fund. Finally, the creation of the Fiduciary Fund for Provincial Development to privatize provincial banks permitted the restructuring and consolidation of the financial system. After the Mexican crisis, the lender of last resort function was partly restored in a permanent way to the Central Bank by the provision of the Contingent Repurchase Facility allowing the Central Bank to sell assets with a repurchase clause (Repo option).

The Asian and Russian crisis (1998-1999) and the devaluation of the Brazilian real that followed in 1999 provoked a confidence crisis, a severe loss of competitiveness in Argentina *vis-à-vis* its main trading partner (Brazil) and a decrease in its terms of trade. The resulting recession lasted was long lasting and cast serious doubts on the ability of Argentina to confront its external debt obligations (14 billions dollars) due in 2001. In addition the government's margin of action was constrained by a deteriorating fiscal balance which left no choice but to pursue contractionary policies. These, in turn, compounded the expectations of a stagnant economy.

Table 6
Financial indicators
1992 – 2001

	1992	1994	1996	1999	2001
Dollar deposits	10	24	28	47	48
Peso deposits	.....	.....	26	34	19
Credit in dollars as % of the total	54.2	59	63	.....	.....
Credit in dollars to the private sector	15.5	27.3	31.7	.....	.....
Credit in dollars to the public sector	4.0	3.4	4.4	.....	.....
Average money market rate, pesos (%)	15	8	6.2	6.99	24.9
Average money market rate, dollars (%)	.....	.....	5.9	6.07	12.76
Average lending rate, pesos	.....	10.0	10.5	11.04	28.6
Average lending rate, US$	.....	8.0	9.12	9.07	17.5
Country risk premium	.....	.....	4.9	5.3	43.7

Note: dollar and peso deposits and credit to the public and private sectors are in billions.
..... Denotes not available.
Source: Bonilla and Schamis (2001) and Schuler (2002)

Due to both the Mexican and the Russian-cum-Brazilian crises, Argentina received substantial financial aid from multilateral organizations. In the former case, the international aid amounted to 7 billion dollars whereas in the latter it shot up to 39.7 billion dollars (the most substantial rescue package after Brazil (August, 1998) and Russia (July, 1999). While the first rescue package was destined to avoid a financial crisis the latter rescue package was provided to avoid an external debt crisis.

However Argentina's stagnant economy did not allow the country to service its foreign debt payments. As in the very recent past several attempts were made to restore confidence in the economy and to get the 'growth ball rolling.' These included the re-appointment of Cavallo as minister of finance, the granting of special powers to Cavallo which allowed him to pass budgetary measures and change institutional arrangements without the approval of Congress. Cavallo also attempted to jump start growth by a set measures to stimulate investment, tax relief measures, the roll over of short term for long run external debt involving 29 billion dollars and differential exchange rate for exporters and importers.

These measures were ultimately unsuccessful, the country risk soared and Argentina suspended its foreign debt service payments at the end of 2001 signaling the end of the currency board regime.

The lessons of two monetary experiments

Argentina adopted currency type board arrangements in the nineteenth and the twentieth centuries under very different historical circumstances and contexts. Both experiences have similarities worth exploring. They shed light on the main issues specific

to currency board regimes while providing a basis on which to examine the analytical underpinnings of economic rules [11].

First, the Conversion Caisse and the Convertibility Plan were put in practice ultimately to mitigate a distributive conflict that put in peril economic stability and growth. The 1899 Caisse sought to eliminate the fluctuations in the gold premium that had led to opposing interests between exporters and importers. The 1990 Plan put an end to an inflationary process that reflected the antagonistic interest of economic and political groups.

Viewed from this perspective rules suppress the economic manifestation of political and/or social processes. But they do not provide a solution to the ultimate problem nor do they cover all of its possible economic manifestations. As a result, the political and social conflicts appear in another guise. Unemployment, increasing debt, dollarization of assets, the divide between debtors and creditors are some of the well-known alternate forms. This line of analysis implies that an economic rule is not an efficient alternative to, say a process of inflation because it simply evades the problem. In fact, it suggests that an economic rule must by logic be accompanied by a political rule. Yet this undermines the very foundations an economic rule is supposed to help guarantee, that is freedom of choice.

Second, after their implementation both Argentine monetary arrangements were followed by a short period of 'good' macroeconomic performance. In the case of the Conversion Caisse it lasted from 1910-1914. In the case of the Convertibility Plan the golden years comprised 1990-1994. This period of prosperity is used as the main argument to defend and justify currency boards (Cavallo, 1996; Hanke, 1999; Frankel, 1999) [12].

This performance illustrates that currency boards are indeed perceived by the public as 'regime changes.' That is they are associated with changes in policy that are widely believed. This pertains to national and also foreign agents. The change in national agents' expectations leads to the restoration of confidence in the currency and the abrupt stoppage in inflation. Changes in foreign agents' expectations set the basis for capital inflows. Both sets of expectations obviously feedback upon each other: domestic price stability provides credibility for foreign capital flows and these guarantee the expectations that warrant price stability. Maintaining a belief in a 'change of regime' proved crucial to the survival of the currency board.

Third, the benefits produced by market reforms –which accompany the implementation of currency boards- including trade and financial liberalisation, and privatisation – were not shared by all. An illustrative example is the evolution of the

[11] Obviously economic events unfold as Taylor (1993) puts in chronological time, they are irreversible, affected by chance and contingencies that occur only once and to some extent unique.

[12] Mishkin (1999, p.19) writes: "Since 1991 Argentina has become a model of price stability and has achieved laudable growth rates, aside from setbacks such as the Mexican Peso Tequila –induced recession in 1995, from which Argentina son rebounded strongly. By most accounts, the currency board has worked in Argentina."

ratios of professional to unskilled and skilled workers wages in Argentina. Available data show that, between 1990 and 1998, both ratios increased from 3 to 5 and from 2 to 3. The concentration of assets referred to above and the change in the Gini coefficient from .49 to .45 between 1989-1999 point in a similar direction. Moreover the groups (i.e., existing pensioners) that function outside the market are simply excluded from the whole process of reforms.

Thus overall, policy makers needed to balance the need for wide held belief in a regime change with the resulting effects currency board cum stabilisation package which favoured specific interests. But the balance is very hard to strike. The outcome may well be complex political economy interactions involving coalitions and changes of coalitions over time that undermine the very basis for 'credibility' that sustains the change in regime. An example is provided by the Economist's analysis of President's Menem lobbying for support in 1999: "he has been consolidating his support among provincial governors and trade unions. In return, the president has diluted his ambitious labour reform proposals, much to the annoyance of both business and IMF."

Fourth, the expectations induced by the regime change are not immutable and indeed are liable to changes and reversals. Shifts in expectations are brought about by changes in the external conditions, which in turn affect the 'fundamentals.'
Both Argentinean regimes discussed in this paper were subject to unforeseen external shocks that could be not withstood. The shocks produced a reversal in expectations. This is especially clear in the case of the Convertibility Plan.

The Caisse faced the contraction in capital flows that accompanied the belligerent efforts of 1914. Later in 1929, it was faced with a pronounced decline in the terms of trade and a floating debt that could not be serviced. The Convertibility Plan confronted the Mexican crisis, the Asian crisis and the devaluation of the Brazilian Real.

The fact that currency boards function smoothly under favourable external conditions and are liable to break under opposite conditions has made them earn the "fair weather boards" label. Ford (1962, p. 108) puts this issue succinctly in the following words referring the 1899 Caisse:

> In short the convertibility of the currency is dependent upon our prosperity and not upon the existence of a Conversion Fund. As occurred earlier in Argentine history, such an exchange bureau had proved a one-way street, **a fair weather scheme**, which functioned only when gold was coming in....But when gold moved out of the country and the note circulation was being contracted...weak governments in the face of political pressure might hesitate to allow the currency supply to be contracted, accepting inconvertibility by resorting to the printing press to maintain the currency supply in the hope of avoiding numerous failures, and incidentally, bringing a favourable redistribution of income for the land-owning and exporting interests.

More to the point this line of reasoning indicates that the underlying logic of a currency board is that economic events unfold in an ergodic environment. That is in an environment where "the future is merely the statistical reflection of the past" (Davidson, 1994, p. 90).

Fourth, the monetary authorities were not passive when faced with the external shocks. This highlights the fact that a currency board regime is not equivalent to putting an economy on 'automatic pilot' and that a central monetary authority remains an essential institution.

The nature of the currency board, the fiscal position, and the state of balance sheets of the financial and private sector severely constrained the degree to which the monetary authorities' can pursue an activist policy. These factors also determined the nature of the intervention.

The nature of the currency board implies that fiduciary issues have to be backed by reserves and that there is a limit to which the monetary authorities can run down reserves when faced with an external shock. In addition, the credibility needed to make a currency board function often sets an implicit backing limit above the required currency board limit. Also a decline in central bank assets, i.e., international reserves, is accompanied by a decline in its liabilities, i.e., domestic credit. The overall result is a reduction in the liquidity of the system threatening

An alternative course of action is to increase domestic interest rates. Yet this has negative repercussions on business production decisions output and may lead to a rise in foreign debt increasing the fragility of public and private sector balance sheets. Higher interest rate spreads widens the mismatch between the composition of assets and liabilities and short and long debt positions in foreign and domestic currency. This also rules out any devaluation of the currency.

In both case studies presented the monetary authority opted for three courses of action: (i) restoring 'restoring' the lender of last resort function to the central monetary authority; (ii) provide a partial exit option; (iii) abandoning the currency board. The use of the Nation's Bank currency in its vaults in 1914 and 1929 to avoid a decline in reserves and the 5$ billion liquidity provided by the Argentinean Central Bank following the Mexican crisis are examples of the first course of action. The dual exchange rate system for exporters and importers and deciding to peg the exchange rate to a basket of currencies (the dollar and the Euro) in 2001 are examples of the second course of action.

In the case of the Caisse, in 1928-1929 the public floating debt frustrated the Bank of the Nation's intent to avoid a downfall in reserves. In the case of the Convertibility Plan, the attempts to ignite the economy by partially changing the exchange rate regime were frustrated by lack of credibility induced by the accumulation of foreign external debt.

Fifth, although the monetary authorities were not purely passive, the main adjustment leverage of a currency board is always fiscal. Authorities control aggregate demand and hence determine the current account position through fiscal means. The fiscal result is also one of the main variables through which the 'fundamentals' are judged by international investors.

Yet a currency board does not guarantee *per se* fiscal discipline. Both case studies presented in this paper attest to this fact, which can be easily found as well in other examples of countries that adopted currency boards in the 1990's decade. Table 7 shows both the fiscal deficit and foreign debt as a percentage of GDP before the implementation of the currency board, one year after and the latest available estimate. In most cases the fiscal position deteriorated.

Table 7
Fiscal deficit and foreign debt as percentage of GDP
1990's currency board countries

Country	FDcb	Fdacb1	FdacbL	EDbcb	EDacb1	EdacbL
Argentina	-7.6	-0.2	-2.0	32.3	27	51
Estonia	4.7	-0.7	-4.8	0.0	....	4
Lithuania	-5.3	-4.5	-7.9	....	14	22
Bulgaria	-12.7	0.9	0.5	....	...	....
Bosnia and Herzegovina	-3.0	-2.0	....	....	....	....

Note:
FDbcb = Fiscal deficit as a percentage of GDP before the currency board.
Fdacb1 = Fiscal deficit as a percentage of GDP one year after the currency board.
FdacbL = Fiscal deficit as a percentage of GDP after the currency board. Latest available estimate.
Edbcb = External debt as a percentage of GDP before the currency board.
Edacb1 = External debt as a percentage of GDP one year after the currency board.
EdacbL = External debt as a percentage of GDP after the currency board. Latest available estimate.
.... = Denotes not available.
The dates of currency boards for these countries are
Argentina, 1991
Estonia, 1992
Lithuania, 1994
Bulgaria, 1997
Bosnia and Herzegovina, 1997
Source: IMF Financial Statistics. Several Issues. Hanke (2000)

This line of reasoning leads logically to argue in favour of a fiscal rule as opposed to a monetary rule. The budget constraint of a government in a currency board states that government expenditure and its interest payments on the domestic and foreign debt net of taxes can be financed by an increase in domestic and/or foreign debt.[13] Formally,

(1) $G + rD + reD^* - T = \Delta D + e\Delta D^*$

where,

[13] It is assumed that the Central Bank does no issue high-powered money to finance the government déficit.

G= government expenditure.
T = tax revenue.
D and D* = domestic and foreign debt stocks.
r and r* = domestic and foreign rate of interest.
e = the exchange rate.
Δ = change over time.

Assuming for simplicity purposes that D and ΔD are zero, and following De Grauwe (1994, p. 195) the budget constraint can be expressed as,

(2) $\Delta(eD^*/Y) = (G/Y - T/Y) + (r^*-y)((eD^*)/Y)$

where,

Y = output level.
y = rate of growth of output.

Eq.(2) states that unless the government has surplus (i.e., (G/Y-T/Y) 0), the foreign debt to output ratio (eD^*/Y) will increase as long as the foreign rate of interest is greater that the rate of growth of output (y). Note thus that the currency board does not place any constraint or limit to the increase in the foreign debt stock. A fiscal rule can be imposed such that $\Delta(eD^*/Y)=0$. Applying this fiscal rule to Eq.(2), the following equality is obtained,

(3) $(T/Y - G/Y) = (r^*-y)((eD^*)/Y)$

Eq. (3) states that the fiscal rule proposed implies that if $r^* > y$ then the government will have to obtain a surplus. That is, any external shock that increases r* or causes a decline in y will have to be met by an increasing tax ratio (T/Y) or decreasing government expenditure ratio (G/Y).

A fiscal rule has however two important drawbacks. It is as procyclical as a monetary rule and can aggravate rather than mitigate fluctuations. Authorities can respond to a decline in y by decreasing G/Y which in turn causes a contraction in y leading to further reductions in G/Y. In addition, if the fiscal deficit represents the confluence of political and economic interests there is little chance of making the rule a binding one. The fiscal rule will become a 'soft' rule and making a 'hard rule' implies the type of contradiction discussed at the beginning of this section.

Sixth and finally, both episodes illustrate that the fiscal deficit and the accumulation of foreign debt were important contributors to the demise of the currency board. But an explanation of currency board crises should also take into account the

behaviour of the private sector. In fact it is the dynamics generated by both the public and private sectors that brings about the downfall of this monetary arrangement.[14]

Let i be the domestic interest rate and i* the foreign rate of interest. External and internal monetary long run equilibrium conditions require that:

(4) $i^* = i + \delta$

(5) $\delta = (p_f - p_s)/p_s$

and

(6) $i = \varphi + r$,

where δ is the premium or discount on the currency (p_f is the forward price of the currency and p_s its spot price); φ is the expected appreciation or depreciation of an asset in money terms and r is the rate of return of the asset measured in terms of itself.

Equation 4 is simply the interest rate parity theorem. Its states that "the market is prepared to pay a premium for future delivery of a currency, when the return on deposits in that currency, i.e., the interest rate is higher than that payable on other currencies" (Rogers, 1989, p.204). The latter equation is the condition for monetary equilibrium and follows from Keynes (1936). [15]

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[14] Taylor and Eatwell (2001, p.176) state: "...financial crises are not made by an alert private sector pouncing upon the public's sector fiscal or moral hazard foolishness. They are better described as private sectors (both domestic and foreign) acting to make high short-term profits when policy and history provides the preconditions and the public sector acquiesces." Part of the explanation that follows is based on Taylor (1998) and Taylor and Eatwell (op.cit) but the public sector plays a bigger role that in their explanations validating partly mainstream crisis models suc as those of Paul Krugman.

[15] Eq. (4) and (5) follow from Keynes' *Tract on Monetary Reform* (1923). According to Keynes (1923) the forward premium or discount over spot prices reflects the preference of the market for holding funds in one center relative to another. If the dollar forward is quoted cheaper than the dollar spot to a London buyer this indicates a preference for maintaining liquid funds in New York rather than in London. In turn this preference is determined by the difference in the rates of interest in New York and in London. That is,

(4a) $i - i^* = (p_f - p_s)/p_s \;=\; i = i^* + (p_f - p_s)/p_s$

According to Rogers (1989) and Kregel (1986) Keynes applied this framework in the *General Theory* (1936) to the determination of "interest rates between different commodities rather than interest rates applied to different financial centers." The rate of interest is the rate of return over over cost and is defined as the difference between future and present value over present value. This applies both to commodities and to assets. The rate of return for a commodity expressed in terms of that commodity equals,

(4b) $r = (q_f - q_p)/q_p$. This rate of return can be expressed in money terms as,

(4c) $r_m = (p_f q_f - p_p q_p)/p_p q_p$

The condition of equilibrium requires the equality between both rates of interest. However, the equality between a rate of return on a commodity expressed in physical terms with that of money requires adding to the rate of return of a commodity a factor accounting (i.e., a) for the appreciation or depreciation of the commodity in question in money terms.

(4c) $r_m = r + a$

Starting from a condition of full equilibrium a change of regime produces an increase in φ as confidence is restored in the currency and the state of the economy. This in turn produces an increase in the domestic rate of interest i. Initially in a fixed exchange regime when there are no devaluation expectations the future and spot prices coincide, thus the term capturing the premium or discount on the currency $((p_f-p_s)/p_s)$is equal to 0. This produces an interest rate spread, which reduces the cost of indebtedness in foreign currency relative to borrowing in domestic currency. This induces firms and the government to increase their stock of foreign currency held debt. As it was illustrated in the case of the Convertibility Plan, 63% of bank credit in 1997 was in foreign currency and most of the credit was granted to the private sector.

This situation is sustainable as long as foreign savings net of debt service payments (S*n) can finance the process of debt accumulation. This follows from financial balance accounting. Accounting identity conventions require that total savings equal total domestic investment plus foreign savings. Equivalently, conventions require that the excess of investment over savings of households (Sh – Ih), firms (Sf – If) and the government (Sg – Ig) which are equal to the increase in their internal and external debt ((ΔDh - ΔMh), (ΔDf+ δΔD*f) and (ΔDg+δΔD*g) respectively) be equal to foreign savings. Foreign savings are equal to net exports (X-M), interest rate servicing (r*eD) and current and capital transfers (F and Z respectively).[16] That is,

$$(7)\quad Sh + Sf + Sg = Ih + If + Ig + S^*n$$

$$(8)\quad \begin{aligned} Sh - Ih &= \Delta Dh - \Delta Mh \\ Sf - If &= \Delta Df + \delta\Delta D^*f \\ Sg - Ig &= \Delta Dg + \delta\Delta D^*g \end{aligned}$$

$$(9)\quad (\Delta Dh - \Delta Mh) + (\Delta Df + \delta\Delta D^*f) + (\Delta Dg + \delta\Delta D^*g) = Sn^*$$

$$(10)\quad Sn^* = (X-M) + F + \delta Z$$

An external shock causing a downward change in the components of equation (10) or a sudden change in the discount of premium (δ) on holding the currency that is not accompanied by change in Sn* in the same direction generates a situation of financial fragility. When foreign capital flows dry up the alternatives are to boost investment, exports, reduce imports, increase savings or attract more capital.

The path chosen involves reducing imports by aggregate demand contraction in an effort to increase public savings and increasing interest rates to attract foreign capital. The positive effect on the trade balance is generally overpowered by the negative effect of output contraction on aggregate savings (including government savings) which are

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Eq. (4c) states the condition for monetary equilibrium taking into account domestic assets and eq.(4a) states the condition for monetary equilibrium taking into account domestic and foreign assets. In full equilibrium both conditions should hold.

[16] In the example used for the fiscal rule the term δ was not included for expository purposes.

compounded by the decline in investment plans due to higher rates of interest. This type of response can generate unsustainable debt dynamics. The stage is thus set for the demise and definitive abandonment of the currency board regime.

Conclusion

The paper analysed two monetary experiments in Argentina in two distinctly different historical contexts. Both experiments involved the implementation of monetary rules to efface variations in exchange rates and prices. In both cases, following a period of prosperity, the boards were confronted with external shocks that proved to be fatal to their existence. The dynamics, which ultimately led to the abandonment of these experiments, depended on both public and private sector behaviours.

At a deeper level a comparison of both case studies illustrates the limitations of economic rules. Economic rules are meant to replace authorities in decision making and to allow agents to express their freedom of choice. As put by Simons (1948, p.160): "The liberal creed demand the organisation of our economic life largely through individual participation in a game with definite rules. It calls upon the state to provide a stable framework of rule within which enterprise and competition may effectively control and direct the production and distribution of goods." One such rule is a monetary rule. Monetary rules are defended on the grounds that they reduce uncertainty (Friedman, 1960). The monetary rule must also determine fiscal policy (Simons, op.cit., p.79).

However, as shown in the cases presented in the paper rules can be a source of economic instability. Rules do not replace authorities but are rather set up as substitutes for institutions. In addition, because rules function in an ergodic environment and possess the credibility and authority of an institution, which is reinforced by their public perception as changes in regime, they convey to private investors the atmosphere that indeed the future will be like the past. This validates their practical behaviour as "perfect Benthamite maximisers," which jointly with public sector profligacy (which is in fact not constrained by currency board arrangements) leads to unstable dynamics.

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