

# **LONG-RUN FISCAL DOMINANCE IN ARGENTINA 1875-1990**

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**ABSTRACT:** This paper examines the degree to which Argentina took advantage of *seigniorage* between 1875 and the approval of the Austral Plan in 1991. We apply a recursive analysis to the causal relation between budget and money and find that the intensity of this link varies over time. The intensity drops in the years of sustained growth and economic convergence, between 1890 and 1913, and recovers in the years of stagnation and economic divergence, between 1950 and 1985.

**JEL Classification:** C22, E31, E52, H62

**KEYWORDS:** Fiscal dominance, Argentina, long run

## 1. INTRODUCTION

The literature that deals with the twentieth century Argentine economy widely supports the idea that, for a long time, fiscal policy dominated monetary policy. The aim of this paper is to examine to what extent changes in fiscal imbalances were responsible for changes in monetary variables between 1875 and 1990. Our starting point is 1875, the first year for which GDP is available, and our period runs to 1990, just before the Convertibility Law (*Ley de Convertibilidad*) of 1991, which, by pegging the peso to the dollar and imposing the full backing of the monetary base with international reserves, put an end to *seigniorage*.

Firstly, we present the hypothesis of fiscal dominance and the calendar of periods in which this dominance could have prevailed, considering the constraints that the macro-economic *trilemma* imposes to the management of a domestic monetary policy. The *trilemma* refers to the impossibility of simultaneously combining capital mobility, a fixed exchange rate and an activist monetary policy. What we do is to use the historical record in order to identify the moments in which the absence of a fixed exchange rate commitment or of capital mobility gave Argentina enough latitude to finance deficits monetarily.

Secondly, we empirically test whether the possibility of financing deficits by issuing money was actually used. We start by discussing the data sources and summarize the econometric technique, a Vector Autoregressive (VAR) analysis, applied to the relation between budget and money. We then present the results of the econometric analysis to the relation between both variables in the whole period 1875-1990. We also investigate the possibility that the intensity of such a relation has varied over time, according to the calendar of constraints derived from the *trilemma*. To this end, we carry out a recursive analysis and observe that, effectively, causality from budget to monetary base strengthens in some periods and weakens in others and that the econometric evidence fits in quite well with the descriptive narrative. As expected, we find that causality from budget to money is noticeably significant in the early 1890s and that, consistent with the macroeconomic stability achieved after the Baring crisis in 1890, the relation loses significance, especially during the period in which the peso was part of the classical gold standard (1899-1913). With the outbreak of the WWI and the Argentine suspension of gold convertibility, the link starts to regain significance, though the relation does not reach the levels of the late 1890s until after WWII. Coinciding with years of low financial integration, due to capital imperfection in the aftermath of WWII and to capital controls from 1964 on, we find that *seigniorage* continues to increase in intensity between 1947 and 1974.

The econometric analysis finds a structural break in 1978, when external capital liberalization along with the adoption of a crawling peg with decreasing pre-announced devaluations, reduced the Argentina's control of the domestic monetary variables. However, deficits did not disappear and the inter-temporal budget constraint rapidly led to the floating of the currency and, later, to the reintroduction of capital controls. The intensification of causality from budget to money until 1985 captures these facts. Also consistent with the narrative, we find that the Austral Plan of 1985 and the commitment on the part of the BCRA not to issue money to finance the government is reflected in the sharp weakening of the link. But, it did not take long for the deficit to worsen and money was printed again for fiscal purposes. The recovery of the causal relation in 1986-1987 fits in with this restarted printing of money, just as its lost of significance in

1989 fits in with the battery of stabilization programs that followed the Spring Plan launched in August 1988.

The rest of the study is structured as follows. The second section briefly outlines the hypothesis of fiscal dominance and the historical narrative. The third section describes the econometric tools and the data employed to establish the link between budget and money in Argentina over the period 1875-1990. It also presents the main results obtained. Finally, the fourth section concludes.

## 2. FISCAL DOMINANCE IN THE ARGENTINE MONETARY HISTORY

The concept of *fiscal dominance*, as the term itself suggests, refers to a scenario where monetary policy is driven by fiscal policy. According to King and Plosser (1985), the potential influence of fiscal policy on monetary policy starts with the  $t$  single-period budget constraint:

$$D_t - D_{t-1} = GNF_t + r_{t-1}D_{t-1} - T_t - Z_t \quad [1]$$

where  $D_t$  is the stock of public debt in year  $t$ ;  $r$  is the nominal interest rate;  $GNF_t$ , the non-financial public spending;  $T_t$  the taxes collected in year  $t$  and  $Z_t$  the funds transferred by the central bank to the Treasury, in other words, the *seigniorage*.

By dividing all the variables in [1] by the product of real income  $Y_t$  and the price level  $P_t$ , and solving forward<sup>1</sup>, we obtain:

$$(d_t - f_t) + \sum_{j=1}^{\infty} \gamma_{tj} gnf_{t+j} = \sum_{j=1}^{\infty} \gamma_{tj} (\tau_{t+j} + \frac{\Delta MB_{t+j}}{P_{t+j} Y_{t+j}}) \quad [2]$$

where the lower-case letters indicate that the variables are divided by the nominal income and  $\gamma_{tj}$  denotes the product of  $j$ -periods ahead of one plus the real income growth divided by one plus the real interest rate. Equation [2] expresses the inter-temporal sustainability of budget constraint.

To introduce the role played by the monetary policy in this constraint, King and Plosser (1985) consider the  $t$  single-period behavior of the central bank:

$$F_t - F_{t-1} = r_{t-1}F_{t-1} + (MB_t - MB_{t-1}) - Z_t \quad [3]$$

where  $F_t$  is the stock of assets held by the central bank in year  $t$  and  $MB$  is the monetary base. By transforming  $F_t$  and  $Z_t$  in the same way as those of the single-period budget constraint and substituting  $z$  in [2], the consolidated inter-temporal budget constraint is obtained:

$$(d_t - f_t) + \sum_{j=1}^{\infty} \gamma_{tj} gnf_{t+j} = \sum_{j=1}^{\infty} \gamma_{tj} (\tau_{t+j} + \Delta mb_{t+j}) \quad [4]$$

where  $\Delta MB_{t+j} = MB_{t+j} - MB_{t+j-1}$ .

Given this constraint, fiscal policy is said to be dominant when the fiscal authorities autonomously fix the path of spending, taxation and debt, leaving the monetary authorities to decide only about the rhythm of money creation revenues to

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<sup>1</sup> The real interest rate being  $R_{t-1} = P_{t-1} (1+r_{t-1})/P_t - 1$ .

satisfy this inter-temporal budget constraint. Thus, under a regime of *fiscal dominance*, the theoretical nexus is between deficits and the present value of the revenue from *seigniorage*. In other words, the hypothesis of *fiscal dominance* requires the existence of a dynamic causal link from deficits (contemporaneous or previous) to money creation<sup>2</sup>, which is a link that has widespread support in the narrative on the monetary history of Argentina.

In their detailed study of the Argentine search for monetary stability in 1880-1935, Della Paolera and Taylor (2001) prove the usefulness of examining the policy tensions derived from the mentioned inter-temporal budget constraint in the macroeconomic *trilemma* framework. As Obstfeld and Taylor (1998, 2003) put it, the *trilemma* refers to the impossibility of simultaneously combining capital mobility, a fixed exchange rate and an activist monetary policy. The reason is quite straightforward: when a country has credibly pegged its currency value to the currency of some reference country, any attempt to separate the domestic interest rate from the foreign is impeded by the capital movements induced by the interest rate parity rule.<sup>3</sup> Therefore, if there is capital mobility, when a country fixes its exchange rate, the domestic money supply is endogenously determined, with little latitude for policymakers to implement a domestic monetary policy. Alternatively, if the priority is to use monetary policy for domestic goals, let us say, to finance public deficits, then the management of the domestic money supply obliges them to discard fixed exchange rates and/or capital mobility. Then, instead of an endogenously determined money supply, we should talk of a *politicized* money supply process.<sup>4</sup> The rest of this Section summarizes how, according to the historical narrative, Argentina dealt with the policy trade-offs imposed by the *trilemma* in the long run (1874-1990). The final aim is to identify the moments in which the absence of a fixed exchange rate commitment or of capital mobility gave Argentina enough latitude to finance deficits monetarily.

To hypothesize this calendar of potential fiscal dominance episodes, we start from the well accepted premise of capital mobility that prevailed in the world from 1870 to the crisis of 1929.<sup>5</sup> If capital mobility is assumed, we can think of the *trilemma* as a tension between temptations of running an autonomous monetary policy and aspirations to sustain a fixed exchange rate. In Argentina, the period began with fixed exchange rates. General Mitre had declared the gold convertibility of the peso in 1867, thus fixing its rate against the other gold currencies and leaving very little room to run an independent monetary policy. This lack of autonomy lasted until 1876, when demands

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<sup>2</sup> As King and Plosser (1985) themselves suggest, one possibility for the existence of this link is the well-known case modeled by Sargent and Wallace (1981) where fiscal authorities autonomously fix deficits which, in a framework of monetary restrictions, are initially financed via debt. Even then, the deficits end up causing money creation if, due to monetary control, the increasing interest rate of bonds exceeds the rate of growth of the economy. Once the placement of bonds reaches its limit in terms of the size of the economy, there would be no alternative but to cover the financial costs of debt via *seigniorage*.

<sup>3</sup> A recent strand of the literature has estimated the intensity of the constraints imposed by the *trilemma* through the analysis of the adjustment of a wide group of countries' interest rates to those of their reference countries. These studies find a much quicker adjustment for periods dominated by an exchange rate commitment and simultaneous capital mobility than for periods of pervasive floating systems. Within periods, adjustment is significantly quicker for countries with a pegged currency. See Shambaugh (2004) and Obstfeld *et al.* (2004, 2005).

<sup>4</sup> The term *politicized* is used by Bordo and Schwartz (1996, p. 247) to refer to the increasing pressures for an activist-autonomous monetary policy in the aftermath of the First World War.

<sup>5</sup> See Obstfeld and Taylor (2003) for a descriptive chronology of the development of international capital mobility from the mid-XIX century to the present.

for monetary financing of deficits led to the suspension of convertibility.<sup>6</sup> Convertibility was not reassumed until 1883, after several years of contractionary fiscal policy. But again for budgetary problems, which were related to an ambitious plan of development, convertibility was suspended less than two years later, in December 1885. This time its resumption would take longer, until 1899.

To understand the delay, a reference to the Law of Guaranteed Banks (*Ley de Bancos Garantizados*) is necessary. This Law, passed in 1887 with the aim of easing the financing of deficits, authorized any bank with a minimum capital to issue paper notes on the condition that it used gold public bonds as a guarantee<sup>7</sup>. For two years, the banks did not find any problem with borrowing from abroad the gold necessary to buy the new issues of public debt and, as a result, the fiscal financing of deficits was accompanied by a gold-backed monetary expansion that maintained the peso exchange rate relatively stable. But, in early 1889, when the London market showed the first symptoms of saturation with Argentine debt, all the attempts to sustain the peso rate proved to be insufficient. The demand for gold by those who anticipated the necessity to return to money creation for the financing of deficits and so, the impossibility of maintaining a fixed exchange rate, provoked a sharp depletion of the reserves of the National Bank (*Banco Nacional*, BN). Conversion was suspended in 1889 and it was no surprise when Argentine policymakers, following the Baring crisis in 1890, declared themselves conscious that, to restore gold convertibility, no link between budget and money should be tolerated in the future.<sup>8</sup>

The first step in this direction was the creation of the Conversion Office (*Caja de Conversión*), which was granted the monopoly for issuing money. At the beginning, its role was constrained to the redemption of paper currency, but once the peso exchange rate reached its legal gold par on the stock market, the Office was expected to start exchanging gold for paper. Meanwhile, in the fiscal field, consistent with the goal of installing a currency board system and the loss of monetary control that the board entailed, several measures were taken. The credit that the Treasury could get from the National Bank, transformed in 1892 into the Bank of the Argentine Nation (*Banco de la Nación Argentina*, BNA), was severely limited. Most importantly, to reinforce fiscal revenues which, until then, had come mainly from customs tariffs, a new tax on consumption was introduced<sup>9</sup>. The resulting increase in revenues plus a reduction in expenses shrunk deficit and the country returned to the gold standard in 1899.

This commitment to gold lasted until 1914. The First World War caused problems for the Argentine economy in terms of a sharp fall of imports that, as we have already said, were the main source of public revenue. Additionally, the conflict provoked a significant reduction in the level of reserves of the Conversion Office, enough to bring about a severe monetary contraction and force the suspension of convertibility.<sup>10</sup> In fact, fear of further future monetary contraction led the government to pass an emergency law. This law allowed the BNA to rediscount commercial paper

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<sup>6</sup> The historical record corresponding to 1870-1935 draws heavily on Della Paolera and Taylor (2001) and Cortés Conde (2005).

<sup>7</sup> See Cortés Conde (1989).

<sup>8</sup> A detailed description of how monetary-fiscal inconsistencies and a lax financial regulation led to the Baring crisis can be found in Cortés Conde (1989) and Della Paolera and Taylor (2001).

<sup>9</sup> See, for example, Cortés Conde (2005), Della Paolera and Ortiz (1995) and Della Paolera and Taylor (2001).

<sup>10</sup> For the implications of the First World War in the Argentine case, see Cortés Conde (2005).

which, in turn, could be rediscounted at the Conversion Office for cash. This measure meant that the bank could create monetary base, breaking the rule that linked its variation exclusively to the flows of gold channelled through the Office. However, Argentine policymakers did not abandon the goal of gold resumption and the BNA did not take advantage of the rediscounting possibility until much later, when the international crisis threatened to bring about a new reverse gold drain.<sup>11</sup> Thus, even if the peso remained unconvertible until 1927, variations in the monetary base were constrained to reflect the inflows of gold into the country.<sup>12</sup>

The exogeneity of the monetary base continued under the resumption of the gold standard between August 1927 and December 1929, when a fall in exports, together with a later drop in imports, led to a reduction in both public revenue and the level of reserves of the Conversion Office. In response, the Office closed to prevent an increased outflow of gold that would have meant a monetary contraction. This time, the abandonment of the standard would be forever. The steady drop in imports continued to enlarge the deficit and, in 1931, the Conversion Office began to issue money backed by the BNA's rediscounted commercial paper and the government bonds<sup>13</sup>. Initially, these emissions were relatively small, as they continued to be when the creation of a central bank in 1935, the Central Bank of the Argentine Republic (*Banco Central de la República Argentina*, BCRA), entailed the formal demise of the Office. Although the rediscounting was initially meagre, some scholars have stressed that the *genie* of issuing free money was “yet again out of the bottle”.<sup>14</sup> The consequences of this release did not become clear until after the WWII.

In the aftermath of the conflict, “imperfections” in capital mobility prevented the *trilemma* from limiting the possibility of running autonomous monetary policies.<sup>15</sup> These “imperfections” in international capital mobility, by persisting until the early 1960s, gave Argentina the sovereignty needed for the monetary financing of deficits. According to the historical narrative,<sup>16</sup> the first Peronism took advantage of this sovereignty. From 1946 to 1955, the government implemented a strategy of industrialization meant to achieve full employment, salary improvements and income redistribution. The public industrialization strategy markedly increase deficits, in the financing of which, the BCRA, nationalized in 1946, played a key role.<sup>17</sup> Apart from financing the government's deficits, the bank directly financed public companies, for example, the Agricultural Institute for the Promotion of Exchange (*Instituto Agrícola para la Promoción del Intercambio*, IAPI). The IAPI, which was set up to guarantee minimum agrarian prices to peasants, was granted subsidies financed through rediscounts in the bank. The bank also rediscounted paper to finance the nationalization of public services (the national telephone company) and the official mortgage bank

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<sup>11</sup> With the exception of three months in 1925. See Della Paolera and Taylor (2001).

<sup>12</sup> For this reason, Argentina could be seen as a part of those floaters that, “with an eye toward returning to a peg”, did not run domestically divergent monetary policies. Obstfeld *et al.* (2004 ).

<sup>13</sup> We are referring to the discount of the Treasury notes known as Patriotic Loan (*Empréstito Patriótico*).

<sup>14</sup> See Della Paolera and Taylor (2001), p.235.

<sup>15</sup> Obstfeld (2004), in a reflection on the advantages of financial integration, underlines how small countries in Latin America could combine fixed exchange rates with monetary autonomy in the 1950s and early 1960s thanks to “imperfections” in international capital markets. At this point, it is worthwhile remembering that Europe did not re-establish current-account convertibility until 1958.

<sup>16</sup> The historical record corresponding to 1946-1991 draws basically on Gerchunoff (1989), Gerchunoff and Llach (2003) and Cortés Conde (2005).

<sup>17</sup> See Rock (1987) and Gerchunoff (1989).

(*Banco Hipotecario*). Finally, the BCRA worked as a lender-of-last-resort, issuing public debt to offset the non-returned loans lent to the private financial system by the central bank.

Deficits continued to accumulate after Peron, despite the efforts to cut them. Among the reasons for this persistence, we can mention the failure to reduce the inefficiency of public enterprises. Moreover, the plans to open the economy to foreign investment as a way of fostering the domestic production of capital and intermediate goods resulted in growing interest payments for external debt. Meanwhile, the steps taken to ease international trade, beginning with Frondizi's Stabilization Plan of 1958, had a contractionary effect on customs revenues that could not be offset by the simultaneous rises in taxes on sales and profits. In sum, rising public spending along with decreasing public revenue, the latter accentuated by a rise in fiscal fraud, caused a chronic deficit.<sup>18</sup> According to the historical narrative<sup>19</sup>, the BCRA, free from external constraints, continued to issue money to finance the deficit.

In practice, the *trilemma* did not re-emerge as a constraint on Argentine monetary sovereignty until the recovering of world trade fostered international capital flows in the mid-1960s. Then, capital mobility started to produce friction between the monetary financing of deficit and the Bretton Woods peso exchange rate commitment, as is proven by the fact that, to defend its peg against the dollar, strict capital controls were introduced in 1964. The strictness of the controls remained until the mid-1970s and provided the room needed for the monetary financing of deficits in the second Peronism. From 1973 to early 1976, pay rises for public workers and the growth in transfers to the inefficient state-owned companies meant sizeable expenses.<sup>20</sup> The pressures to resort to monetary financing became stronger when the government, as a reaction to the oil crisis, subsidized the exchange rate for imports. Losses resulting from the sale of currencies at prices lower than those paid to exporters were assumed by the *Banco Central* that, monetized them.<sup>21</sup> By the end of the period, in March 1976, Argentina was on the verge of hyperinflation and the military government that succeeded the Peronists coped with the situation through the stabilization Plan of Martínez de Hoz.<sup>22</sup>

As a key piece of the Plan, capital mobility was fully restored and, hence, the *trilemma* reappeared as a tension between the alternative of maintaining a stable exchange rate or controlling the domestic monetary policy. At first, the program was successful in lowering deficits and inflation and, in February 1979, to underpin these advances, the so-called *tablita* (little table) was introduced. The *tablita* worked as a crawling peg with pre-announced rates of devaluation. Since the devaluation rates were decreasing, it was necessary for the government to accept a progressive cut of monetary sovereignty.<sup>23</sup> However, it did not take long for this constraint to collide with the other terms of the *trilemma*. To start with, the pre-fixed exchange rate of devaluation, in a context of financial liberalization, triggered a process of private external indebtment.

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<sup>18</sup> On the shortage of public incomes and fraud, see Díaz Alejandro (1975) and Torre and Riz (1993).

<sup>19</sup> See Díaz- Alejandro (1975) and Cortés Conde (2005).

<sup>20</sup> See Di Tella (1989).

<sup>21</sup> According to Cortés Conde (2005).

<sup>22</sup> The month before Martínez de Hoz took office as Finance Minister, the monthly consumer price index had increased at an annual rate of 5.000 per cent. Dornbusch and De Pablo (1987).

<sup>23</sup> In the words of Calvo and Vegh (1999), this plan, by pegging the Argentine currency to dollar, "openly recognized the constraints imposed on monetary policy by open financial markets".

Argentine debt was bought with money borrowed from abroad. The operation was profitable because the domestic rate of interest minus the devaluation pre-announced on the *tablita* was higher than the interest on foreign loans. Problems started when, in 1980, despite having lowered the annual rate of inflation to under 100 percent, the overvaluation of the peso led financial markets to anticipate the necessity of devaluation. Private capital outflows substituted inflows and, in defence of the exchange rate, the central bank and public companies were forced to borrow massively from abroad.

The effort to maintain the exchange rate lasted until February 1981, when the peso was sharply devalued. This was the end for the *tablita*'s attempt to curb inflation by using the constraint that the *trilemma*, in a framework of capital mobility, imposes on monetary sovereignty.<sup>24</sup> From then until the Convertibility Plan of 1991, Argentina solved the *trilemma* policy trade-offs through monetary autonomy. Initially, from February 1981 to June 1982, this autonomy was preserved by the lack of rules in the exchange rate field. From 1982 on, monetary sovereignty was basically supported by the reintroduction of capital controls.<sup>25</sup>

This change of scenario coincided with years of worsening deficits. In 1981-1983, the deficit increased as a consequence of rising international interest rates and the Falklands War. Meanwhile, the central bank built up losses (the so-called quasi deficit) through three channels: by backing trade with exchange rate guarantee programs, by bailing out the financial system after the banking crisis of 1980-1981 and by operating through the Monetary Regulation Account (*Cuenta de Regulación Monetaria*, CRM)<sup>26</sup>. Most importantly, in the early 1980s, the deficit was severely worsened by the same inflation it was contributing to.

After decades of high chronic inflation, the real demand for Argentine money had been retreating in favour of interest-bearing assets and foreign notes. The historical narrative records a strong process of domestic demonetization and simultaneous currency substitution in dollars during the early 1980s, which fits in perfectly with the analytical framework proposed by Dornbusch and Simansen (1987) and Dornbusch (1990) to explain extreme inflation in Latin America.<sup>27</sup> Assuming currency substitution, these authors propose a model where the endogenous effect of inflation on deficits can be summarized as follows. Flight from domestic money reduces the base for the government's inflation tax and, consequently, the rate of inflation to finance a given

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<sup>24</sup> A detailed description of the failure of Martínez de Hoz's stabilization Plan can be found in Dornbusch and De Pablo (1987).

<sup>25</sup> See Kiguel and Newmeyer (1989).

<sup>26</sup> Following the liberalization of the Argentine financial sector in 1977, the BCRA started to collect interests on the fraction of reserve requirements that corresponded to demand deposits and to pay interests on the reserve requirements corresponding to time deposits. The balance of these operations, known as the Monetary Regulation Account, became an important source of losses, as the interests paid ended up exceeding those collected. See Rodríguez (1991).

<sup>27</sup> For Argentina, the increasing use of dollars as a medium of exchange against the domestic currency, is well documented in Beige *et al.* (2002) and Kamin and Ericsson (1993, 2003). Feige *et al.* (2002) elaborate an index of dollarization (as the percentage of dollar currency in circulation plus dollar deposits in Argentina over the effective broad money) based on the shipments of dollars reported in the *Currency and Monetary Instrument Reports* (CMIRs) of the US Treasury Department. According to this index, the process gained momentum in the early 1980s, when dollar-denominated total holdings made up 25 per cent of the effective broad money. For an exhaustive discussion on the concept and measurement problems of the currency substitution phenomenon, see Calvo and Vegh (1992) and, above all, Giovannini and Turtelboom (1992).

fiscal imbalance increases (the Laffer curve effect). This increasing rate of inflation, in turn, due to lags in revenue collection, erodes the real value of taxation (the Olivera-Tanzi effect), thus worsening deficits and encouraging new money creation. The vicious circle, where deficits and money are in a feedback relation, can only be broken through an enduring fiscal adjustment. However, as seen above, this was certainly not the case for Argentina in 1981-1983, which helps to explain the inflation explosion of those years.<sup>28</sup>

The same dynamics was ongoing when Alfonsín took power in January 1984. His first attempts to curb inflation by reducing deficit through cuts in civil servants' salaries and public investment did not work.<sup>29</sup> There was a steady worsening of inflation and several devaluations of the peso took place until June 1985. Then, following various months of inflation rates of over 25 percent, the Austral Plan was approved. This Plan included the raising of customs tariffs as a means by which, added to a prior increase of public prices, to cut the deficit. The Plan also included a wage-price freeze and the launch of a new currency, the austral, which, fixed against the dollar, entailed a big devaluation. Finally, the program included a commitment on the part of the BCRA not to issue money to finance the government.

In the short run, it meant spectacular drops in deficit and inflation. Problems did not re-emerged until the moment of price flexibilization, in April 1986, when anticipating its overvaluation effects, the fixed exchange rate was changed into a mini-devaluations crawling peg.<sup>30</sup> By then, the budget had started to put pressure on money creation again. The fiscal adjustment had relied heavily on the strengthening of public revenues. The increase of public prices prior to the freeze, the rise of customs tariffs and the break in the erosion of real tax collection induced by the price freeze included in the Plan, had been the reasons for the spectacular drop in deficit mentioned above. However, since only one source of improvement, customs tariffs, was sustainable, the adjustment was made on a "transitory basis".<sup>31</sup> Deficits did not disappear and, in the last quarter of 1986, their monetary financing was resumed, reopening the door for the Olivera-Tanzi effect.

The deficit continued deteriorating in 1987 and difficulties in finding external financing forced the BCRA to continue issuing money, despite its commitment not to do so, by granting direct rediscounts to public enterprises and public banks, as well as by placing Treasury paper denominated in dollars<sup>32</sup>. Flight from domestic currency recovered and, with it, the vicious circle where deficits were in a feedback relation with inflation was re-activated. Several plans attempted to break the vicious circle: the First Spring Plan, the February Plan, the Austral II Plan and the Spring Plan in August 1988.

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<sup>28</sup> The same framework, where the Laffer curve and the Olivera-Tanzi effects combine to explain the dynamics in high inflation countries, is used in Dornbusch and De Pablo (1987) to explain the feedback effects of inflation on deficits in Argentina in the early 1980s. It is also used in Dornbusch *et al.* (1990) to explain the instability of inflation, as well as in Argentina, in Brazil, Perú and Israel in the same decade.

<sup>29</sup> See Rock (1987) and Torre and de Riz (1993).

<sup>30</sup> The expression mini-devaluations come from Dornbusch and Simonsen (1987). For a description of the Austral Plan, see also Gerchunoff and Llach (2003) and Cortés Conde (2005).

<sup>31</sup> Dornbusch and Simonsen (1987) attribute to the break in the erosion of real taxes much of the deficit reduction in 1985. Based on this fact and on the lack of reforms on the spending public side, they insist on the "transitory basis" of the 1985 fiscal adjustment.

<sup>32</sup> The placement of dollar-denominated Treasury Bills at the BCRA, even though the operation was labelled as external financing, was equivalent to the issue of money since those bills would be never paid back. See Rodríguez (1991).

In essence, all of them included exchange rate devaluation and a wage-price freeze. But none of them included fundamental fiscal changes, so none eliminated the need of financing deficits through the issue of unwanted money. With each new price flexibilization process, exchange rate overvaluation re-emerged and the loss of competitiveness led yet another devaluation prior to the approval of a further stabilization plan.

The inflation spiral finally accelerated in mid-1989, when a new stabilization plan, the first of a series that would focus more on fiscal adjustment and with little or no resort to wage-price freezes, was implemented. The Bunge and Born Plan (July 1989) fixed the exchange rate, previously devalued, and agreed a three-month price freeze with the leading industrialists. Most importantly, it began a major fiscal adjustment through privatizations of the public sector. But again, the flight from domestic currency to the dollar led to an inflation explosion at the end of the year.<sup>33</sup> The BONEX Plan (December 1989) came to address this situation. It included the floating of the currency and an important cut in liquidity by imposing the conversion of short-run deposits into long-run bonds (BONEX, 10-year External Bonds). The Plan also provided immediate fiscal relief by the rescheduling of debt. These measures were supplemented through the approval of a new stabilization plan in March 1990 aimed at deepening the fiscal adjustment (basically, making noticeable cuts in subsidies and public employment). But, even though the budget imbalances dropped in size, in practice, fiscal adjustments proved not to be enough to slow down inflation, which accelerated in January-February 1990. As a response to this, the Convertibility Plan (March 1991) adopted full currency convertibility of the Argentine currency at a fixed exchange rate. In terms of the *trilemma*, the exchange rate commitment was quite reminiscent of the willingness that Argentina had shown a century before to sacrifice monetary sovereignty by creating the Conversion Office, in 1891, as a reaction to the Baring crisis.

### 3. DATA AND ECONOMETRIC RESULTS

As previously stated, the aim of the present paper is to test for the existence of a dynamic causal link between a fiscal (budget) and a monetary (monetary base) variable. In Figures 2 and 3, we show the three available series of public budget (*pb1*, *pb2* and *pb3*) and the series of monetary base growth (*dmb*), all related to nominal GDP. The source for the first series the public budget, *pb1*, is Della Paolera *et al.* (2003). While this series spans the whole period 1875-1990, it has the disadvantage that it only considers the central government deficit, rather than the consolidated deficit. This is vital in the case of Argentina because provincial deficits, especially during the more recent years, have frequently caused serious problems at national level. For this reason, we built a second series, *pb2*, that links the data of Della Paolera *et al.* (2003) between 1875 and 1912 with the data of Cavallo *et al.* (1986) between 1913 and 1984. The Cavallo *et al.* (1986) data include the consolidated deficit of Argentina's public sector,

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<sup>33</sup> See Kiguel and Liviatan (1992) and Beckerman (1992). The index of currency substitution estimated by Feige *et al.* (2002) signals a reversion after the 1985 Plan Austral and a quick recovery in 1987-1988, followed by a shooting up in 1989-1990. By the first quarter of 1990, the dollarization reached a peak of 76 per cent with 90 percent of the value of currency of circulation held in dollars. Using the same CMIRs source as Feige *et al.* (2002), Kamin and Ericsson (1993, 2003) estimate that the fraction of dollars in circulation over total dollar holdings was over 90 percent in the first quarter of 1990. Whatever the part of dollar denominated deposits held with a store-of-value goal was, the advance of currency substitution from the early 1980s on is out of doubt.

that is, the figures for provinces and municipalities and that of the Social Security<sup>34</sup>. What is more, this source gives a broad definition of fiscal deficit that includes the expenses and incomes resulting from the monetary operations of the *Banco Central* which were not recorded in the state's budget accounts. As said before, the financing of this deficit, known as "quasi-fiscal", implies a direct effect on the monetary base, which justifies its consideration in terms of fiscal dominance<sup>35</sup>. It is extremely important to take this into account, especially during the eighties when the quasi-fiscal deficit grew enormously<sup>36</sup>. For the years between 1985 and 1990, the pb2 series uses the data provided by the *Subdirección de Hacienda del Ministerio de Economía* (2005) that, starting in 1960, are perfectly comparable in coverage to those of Cavallo *et al.* (1986). Finally, the third public budget series, pb3, results from combining the data of pb2 from 1875 to 1960 and the data that the *Ministerio* provides for the sample of the national administration, public enterprises, trust funds and other national and provincial public bodies from 1961 to 1990. For this latter period, the pb3 series does not include the non-financial public sector, so we consider it only as a control variable to confirm the robustness of the results obtained by using pb1 and, above all, pb2. Finally, the source for the monetary base series, dmb, is again Della Paolera *et al.* (2003).

We start by studying the order of integration of these series by applying a battery of unit root tests. As a complement, the KPSS test of stationarity of Kwiatkowski *et al.* (1992) is also applied. The results, shown in Table 1, confirm that all the series, public budget and changes in the monetary base, are I(0). The results obtained with the MZ-GLS test are especially interesting because they are robust in the presence of outliers, which is the case here.

As shown in Table 2, a widespread presence of outliers in the series is detected by applying the method proposed by Gómez and Maravall (1998). Their methodology starts with the selection of the most suitable ARMA or ARIMA (Autoregressive Integrated Moving Average) model for the process and detecting abnormal observations with respect to the estimated value. This technique allows for two types of atypical data, additive outliers (AO) and temporary changes (TC). We also test for a third type of outlier, level shift (LS), which implies a permanent change in the level of the series. In the case of *dmb*, the outliers are concentrated from the mid-1970s on. In the case of *pb1* and *pb3*, we only find two outliers, in 1882 and 1898. And, finally, for *pb2*, we again locate outliers in the 1970s and 1980s.

Having confirmed that both kinds of series, public budget and changes in the monetary base are I(0), a stationary VAR (Vector Autoregressive Model) is used to study their relationship. In a general form, a p-order VAR can be expressed as:

$$Y_t = \sum_{i=1}^p \gamma_i Y_{t-i} + \alpha D_t + \varepsilon_t \quad [7]$$

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<sup>34</sup> This series, constructed by a team led by Cavallo, Doménech and Mundlak (1986) and published in *Estudios*, updates the figures provided by Cavallo and Peña (1983) and follows the same line as the previous version with only minor variations of level. See Cavallo and Peña (1983).

<sup>35</sup> See Cavallo and Peña (1983).

<sup>36</sup> Cortés Conde (2005) also highlights the importance of the fiscal and quasi-fiscal deficit for the eighties, although this author only calculates total deficit figures for the four years between 1986 and 1989 so a complete series is not available to use for comparisons.

where  $Y_t$  is a vector of  $k$  endogenous variables and  $D_t$  may include the deterministic components, intercept, trend or dummy interventions. In our case, we have two variables ( $k=2$ ) and will use the following specification:

$$Y_{1t} = \sum_{i=1}^p \gamma_i Y_{1t-i} + \sum_{i=1}^p \mu_i Y_{2t-i} + \alpha D_t + \varepsilon_t \quad [8]$$

$$Y_{2t} = \sum_{i=1}^p \lambda_i Y_{2t-i} + \sum_{i=1}^p \delta_i Y_{1t-i} + \beta D_t + \xi_t \quad [9]$$

We can test for causality between  $Y_1$  and  $Y_2$  in the sense of Granger (1969, 1988) according to which  $Y_2$  is not causing  $Y_1$  if all lagged values of  $Y_2$  are zero in [8], and  $Y_1$  is not causing  $Y_2$  if all its lagged values are zero in [9]. In practice, we test for the null of non-causality by applying a Likelihood Ratio test (LR), that is to say, by making  $\mu_i = 0 \forall i$  in [8] and  $\delta_i = 0 \forall i$  in [9]. Previously, we select the order of the VAR according to the SBIC and AIC criteria and check for autocorrelations, heteroskedasticity and normality in the residuals.

However, when testing for causality, we must recall the proliferation of atypical observations that, concentrated at the end of the series, might distort the results. For this reason, we carry out a recursive estimation of the LR causality test, instead of the traditional one, on the full sample. Figure 5 shows the evolution of this test and the normalized critical value at the 5% level of significance (3.84) is represented by the dashed line. According to this estimation, there is no effect from monetary base to public budget. Conversely, although with a different intensity depending on the public budget series, we find a long causal relationship running from this variable to monetary base. It is worth mentioning how after the gold standard parenthesis, the LR test begins to recover intensity. When considering *pb2*, that is, the series that best captures the size of budgetary imbalances, we find that the intensity of causality shoots up from the late 1940s to the mid-1970s. From then on, coinciding with the years that concentrate the presence of outliers, the significance of the LR test fluctuates dramatically, until it disappears in 1989.

The methodology of Bai and Perron (BP) (1998, 2003a, b) to test for the presence of structural breaks confirms the existence of a change in the causal relation between budget and money at the end of the period. Based on the principle of global minimizers of the sum of squared residuals, the BP methodology looks for multiple structural breaks, consistently determining the number of break points over all possible partitions as well as their location. They consider  $m$  breaks ( $m+1$  regimes) in a general model of the type:

$$y_t = x_t' \beta + z_t' \delta_j + u_t \quad [10]$$

where  $y_t$  is the dependent variable;  $x_t$  ( $p \times 1$ ) and  $z_t$  ( $q \times 1$ ) are vectors of independent variables of which the first is univariate and the other can change,  $\beta$  and  $\delta_j$  ( $j=1, \dots, m+1$ ) are the corresponding vectors of coefficients and  $T_1, \dots, T_m$  are the break points treated endogenously in the model.<sup>37</sup>

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<sup>37</sup> Using this method, Bai and Perron (1998) propose three types of tests. The  $supF_{\{T\}}(k)$  test considers the null hypothesis of no breaks against the alternative of  $k$  breaks. The  $supF_{\{T\}}(l+1/l)$  test takes the existence of  $l$  breaks, with  $l=0,1,\dots$ , as  $H_0$ , against the alternative of  $l+1$  changes. Finally, the so-called "double maximum" tests, UDmax and WDmax, test the null of the absence of structural breaks against

Following the strategy of Bai and Perron (2003b), we have explored the existence of structural breaks in a pure changing model representing the causal relationship as in equation [8]. A maximum number of 5 breaks has been considered, which, in accordance with the sample size  $T=125$ , means a trimming of  $\varepsilon=0.10$ . The results, shown in Table 3, detect a clear structural break, with an extremely narrow confidence interval, located in 1978. Thus, econometrics backs the idea of a change in the dynamics of the relation budget-monetary base at the end of the period under examination when, as we saw, the significance of the LR causality tests undergoes sharp fluctuations.

We find the statistical analysis carried out in this section fully supportive of the ideas posited in the economic narrative. As we said in the previous section, following the Baring crisis in 1891, Argentina made the firm commitment of cutting deficits to stop the issuing of money to finance them. This allowed the country to return to the gold standard in 1899, a situation which lasted until 1913. The re-adoption of gold entailed the acceptance of fixed exchange rates for the peso plus full capital mobility and, consequently, the acceptance of an exogenously determined monetary base. Coherently with these efforts, the causal relation between budget and money weakened sharply until 1899 and continued falling, although more slowly, until 1914. In that year, a severe monetary contraction provoked by the outbreak of WWI led Argentina to suspend convertibility and to authorize the *Conversion Office* to rediscount commercial paper. But, as we already said, the emissions by the *Conversion Office* were relatively low until 1927 when, for just two years, until December 1929, gold convertibility was restored. Most importantly, the printing of money continued to be limited even after the creation of the *Banco Central de la República Argentina* (BCRA) in 1935 meant the demise of the *Office*. Thus, with the short parenthesis of 1927-1929, the *trilemma* did not formally impose any monetary constraint to deficit financing from 1914 to 1935. Here again, the econometric findings fit in with the narrative, since the causal link from budget to money regained intensity.

However, for the causal relation to reach new heights, it is necessary to wait for the BCRA to become the main instrument in the Peron government's economic policy after WWII when, in a context of imperfect capital mobility, the *trilemma* continued to leave room for monetary policy to serve fiscal needs. This change perfectly matches the sharp climb of causality from budget to monetary base from 1944 to 1958 shown by the *pb2* series, which include the public losses directly assumed by the central bank. This causality continued to gain intensity until the mid-1970s, thus supporting the narrative that insisted on the failure of successive governments, including Peron's 1973-1976 office, to stop deficits. Deficits were financed through money printing, this possibility being feasible because of the strictness of capital controls introduced in 1964 to maintain the peso exchange rate. This scenario changed radically in 1977 when, following the Stabilization Plan of Martínez de Hoz, capital outflows were liberalized. This change of scenario is well captured by the econometric analysis, which locates a structural break in 1978. From then on, as shown in the recursive estimation of the *pb2*

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the existence of an unknown number of breaks. Bai and Perron (2003b) suggest beginning with the sequential test  $supF_{\{T\}}(l+1/l)$ . If no break is detected, they recommend checking this result with the UDmax and WDmax tests to see if at least one break exists. When this is the case, they recommend continuing with a sequential application of the  $supF_{\{T\}}(l+1/l)$  test, with  $l=1, \dots$ . In addition, an information criterion like the SBIC is used to select the number of change points.

series, the dynamics of the causal relation between budget and money entered a decade of ups and downs.

The introduction of the *tablita* in 1979, in a context of capital mobility, implied the acceptance of a progressive cutting of monetary control. But this constraint only survived until February 1981, when the peso was sharply devalued. From then on, until the Convertibility Plan of 1991, Argentina recovered its monetary autonomy. Initially, until June 1982, this autonomy was preserved by a floating exchange rate. From 1982 on, monetary sovereignty was supported by the reintroduction of capital controls and repeated renouncement to maintain the exchange rate fixed. As proof that deficits were behind the abandonment of the *tablita* discipline, the causal link from budget to money shoots up in 1982 and, following the failed Austral Plan's commitment, peaks in 1986-1987. Deficits had worsened in 1981-1983 as a result of rising international interest rates, the expenses related to the Falklands War and the losses accumulated by the BCRA. Thus, the monetary financing of deficits fits in perfectly with the high values of the link in 1982-1984, especially when focussing on the pb2 series, which includes the quasi deficit.

The *Austral Plan* of 1985 and the BCRA's commitment not to issue money to finance the government is reflected in the weakening of the link. But, once more, the fiscal correction was made on a transitory basis and the deficit soon began to grow. The central bank started to issue money maskedly through the granting of direct rediscounts to public enterprises and public banks, as well as by placing Treasury paper denominated in dollars. Thus, the recovery of causality in 1986-1987 is consistent with this loosening of budgetary control and the monetary financing of deficit. Finally, we find that the relation between budget and deficit became non-significant in the hyperinflationary year of 1989, a finding consistent with the battery of stabilization measures that followed the Spring Plan of August 1988.

## 6. CONCLUSIONS

In this paper, we examine the degree to which Argentina took advantage of *seigniorage* between 1875 and the approval of the Convertibility Plan in 1991. More precisely, we examine the degree to which the hypothesis of *fiscal dominance*, understood as the subordination of monetary to fiscal policy, applies to Argentina in the very long run. We start by testing for the presence of a dynamic causal relation from budget to money between 1875 and 1990. We first apply a recursive analysis to the causal relation and find that, as expected, the intensity of the causal link varies over time. It drops after the Baring crisis in 1891 and clearly continues to decrease clear from 1899 to 1913 when the peso remained under the discipline of the classical gold standard. The relation recovers strength after WWI, although the intensity of the link until WWII stays well below the levels reached in the second half of the twentieth century.

Coinciding with years of low financial integration, due to capital imperfections in the aftermath of WWII and to capital controls from 1964 on, we find that fiscal dominance continues to increase in intensity until the mid-1970s. By limiting the control over domestic money, the *tablita* weakened that dominance, although very briefly. The monetary discipline aimed at by adopting the *tablita* disappeared in February 1981 when the peso was sharply devalued. In 1982, capital controls were reintroduced and, consistent with the regained autonomy, the causal link from budget to money shoots up in 1982 and, following the failed Austral Plan's commitment, peaks in

1986-1987. As the fiscal correction was made on a transitory basis, deficits started worsening again at the end of 1986 and, with this worsening, the pressures for money print increased. It is true that the imbalances did not reach the early 1980s levels but, in a framework of increasing reluctance to hold domestic currency, the inflationary effects of deficits rocketed. The threat of hyperinflation led to the adoption of a chain of stabilization programs (August 1988, July 1989, December 1989, February 1990). As a reflection of these shocks, the link between deficit and money disappears at the end of our period of study.

In sum, this paper statistically supports the widespread idea that, for most of the XXth century, fiscal policy dominated monetary policy in Argentina. The causal link between budget and money shows an overall increasing trend from 1913 on, especially clear from the end of WWII. The loss of significance of the link in 1989 should not be seen as a loss of the responsibility of deficits in the evolution of prices. At the moment, we are investigating the possible effect of deficits on the hyperinflation of that year by introducing currency substitution into the analysis.

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**TABLE 1. UNIT ROOT AND STATIONARITY TESTS**

| With constant and trend | ADF     | PP      | MZ <sub>t</sub> -GLS | KPSS ( $\eta_{\tau}$ ) |
|-------------------------|---------|---------|----------------------|------------------------|
| <i>dmb</i>              | -1.79   | -7.79** | -0.11                | 0.21*                  |
| <i>pb1</i>              | -4.65** | -7.21** | -3.62**              | 0.15*                  |
| <i>pb2</i>              | -2.94   | -5.01** | -2.57                | 0.15*                  |
| <i>pb3</i>              | -3.49   | -5.85** | -2.91*               | 0.16*                  |
| With constant           | ADF     | PP      | MZ <sub>t</sub> -GLS | KPSS ( $\eta_{\mu}$ )  |
| <i>dmb</i>              | -0.76   | -7.31** | -2.60**              | 0.61*                  |
| <i>pb1</i>              | -4.66** | -7.23** | -2.14**              | 0.14                   |
| <i>pb2</i>              | -2.45   | -4.31** | -2.38*               | 0.59*                  |
| <i>pb3</i>              | -2.85   | -5.15** | -2.58**              | 0.63*                  |

Notes: Critical values for ADF and PP test in McKinnon (1996). The number of lags of ADF and MZ<sub>t</sub>-GLS have been selected in accordance with the MAIC method of Ng and Perron (2001). In the PP and KPSS test, quadratic spectral kernel has been used, choosing the bandwidth by Newey and West method (1994).

\* Significant at the 5% level.

\*\* Significant at the 1% level.

**TABLE 2. OUTLIERS ANALYSIS**

|            | AO                                           | TC           | LS                   |
|------------|----------------------------------------------|--------------|----------------------|
| <i>dmb</i> | 1883<br>1946<br>1976<br>1977<br>1987<br>1989 | 1975<br>1986 | 1982<br>1983<br>1985 |
| <i>pb1</i> | 1882<br>1898                                 |              |                      |
| <i>pb2</i> | 1898                                         | 1975<br>1981 |                      |
| <i>pb3</i> | 1882<br>1898                                 |              |                      |

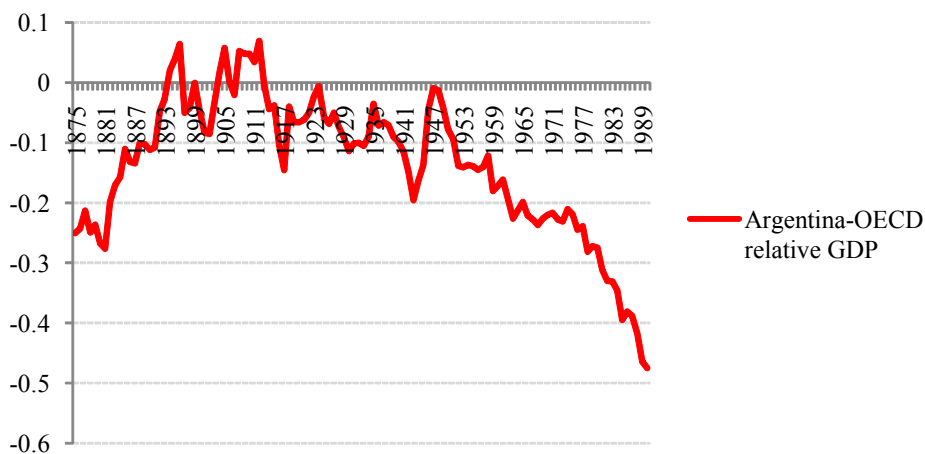
Notes: Three types of outliers, additive outliers (AO) and level-shift (LS), have been found in the years shown in the Table. In the first case we consider a dummy variable that takes the value 1 in the atypical observations and zero otherwise. In the second, the AO effects can be prolonged for more that one period. Finally, in the third, the dummy variable is 0 after the change point and 1 en the rest of the period. We have applied the TRAMO-SEATS program of Gómez and Maravall (1989).

**TABLE 3. MULTIPLE STRUCTURAL BREAKS IN THE CAUSALITY RELATION BETWEEN BUDGET *PB* AND CHANGES IN MONETARY BASE *DMB* (BAI-PERRON METHODOLOGY)**

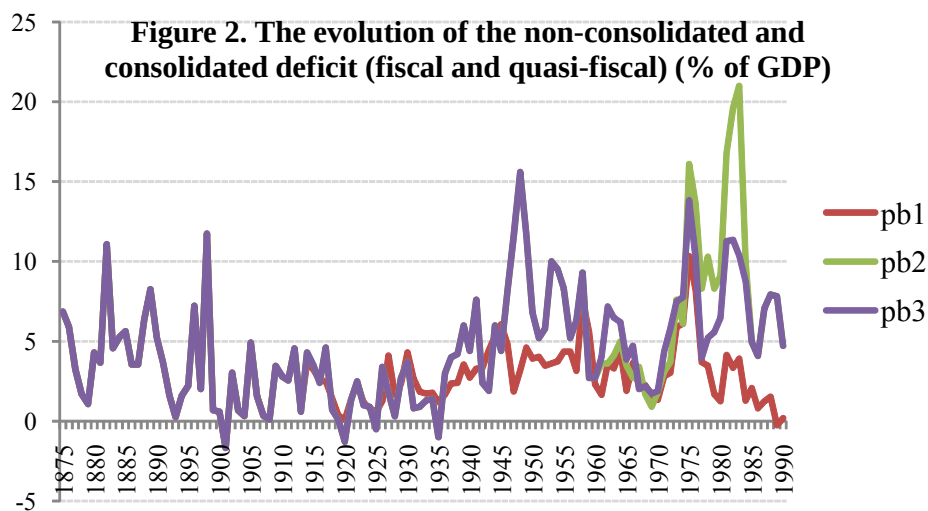
|                                    | <i>UDmax</i> | <i>WDmax</i> | <i>T<sub>i</sub></i> ( <i>SBIC</i> ) | <i>T<sub>i</sub></i> ( <i>sequential</i> ) |
|------------------------------------|--------------|--------------|--------------------------------------|--------------------------------------------|
| <i>ORIGINAL SERIES (1875-1990)</i> |              |              |                                      |                                            |
| <i>pb1</i>                         | 23.31**      | 34.90**      | 1978<br>(1977,1979)                  |                                            |
| <i>pb2</i>                         | 14.99*       | 22.04**      | 1978<br>(1977,1979)                  |                                            |
| <i>pb3</i>                         | 19.20**      | 30.03**      | 1978<br>(1977,1979)                  |                                            |

Notes: Changes in the pure structural model are tested selecting a trimming  $\varepsilon=0.10$  and a maximum number of 5 structural breaks. Serial correlation in the errors is not allowed. The consistent covariance matrix is constructed using the Andrews (1991) method.

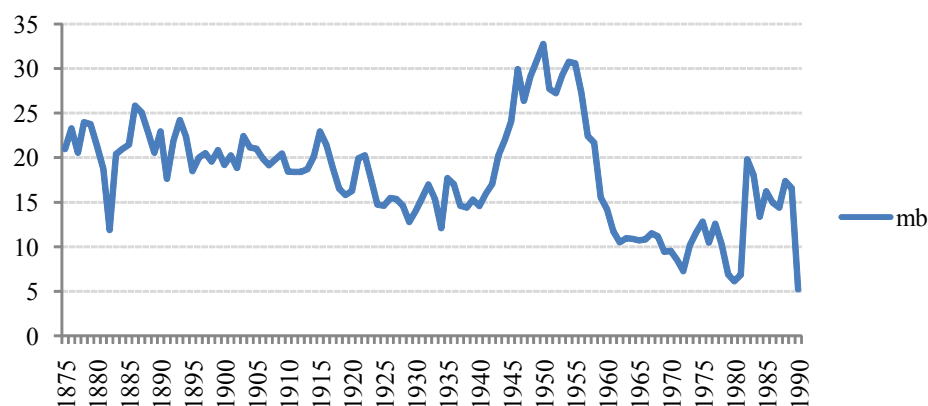
**Figure 1: Convergence between Argentina and the OECD**



**Figure 2. The evolution of the non-consolidated and consolidated deficit (fiscal and quasi-fiscal) (% of GDP)**



**Figure 3. Evolution of the monetary base in Argentina: 1875-1990**



**Figure 4: Results of recursive causality test**

