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Passing the Buck: Monetary and fiscal policies

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Passing the buck: Monetary and fiscal policies

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In search of a more satisfactory approach to assess the performance of the Argentine economy over the last century and a half, this chapter considers the outcomes of monetary and fiscal policymaking and the reaction of the public, as well as the constraints thereon. In particular, we place new emphasis on the so-called transversality condition – the long-run, intertemporal budget constraint of the government that places bounds on public finance policy choices.

In the long run, macroeconomic policy choice can be viewed as a game between past, present, and future generations of political rulers and economic agents. Like any other player in this game, a current government takes decisions subject to a set of bestowed restrictions, and will, in turn, bestow new restrictions on the next generation of government. It is here that the intertemporal fiscal constraints matter.

In this conception, policymaking is not a static game in which current payoffs are only affected by today's decisions. As Thomas Sargent (1986, 21) has shown, it is a dynamic game "that requires time to complete and whose current score depends on past actions of the various players." This claim is extremely important for the intellectual flavor of this chapter. Restrictions faced by each administration are heavily determined by the concurrent reaction of their constituency and by the results of similar interactions in preceding periods.

Given these constraints, a comprehensive historical analysis of the economic performance of Argentina at any point in time necessarily has to consider the burdens "inherited" from previous periods. This does not imply a causal ordering; rather, it is truly the case that *history matters*. Each period is the result of an allocation process determined by government choices and agents' preferences. Over time, each period acts as a link in a chain of outcomes where decisions are

Comments from conference participants improved this chapter. The suggestions from Colin Lewis and Alan Taylor were particularly helpful. The authors are solely responsible for remaining errors.

taken that are conditional on past outcomes and expectations about the future. This path dependence helps to frame conceptually the choice set and link the decision making of both rulers and agents throughout time.

Of course, this process "is not a story of inevitability in which the past neatly predicts the future."[1] Nor is this a story of good or bad policymakers. This study does not assume a particular utility function in the ruler, because the data in use constitute a reduced-form expression of the interaction between government and public. Furthermore, the government's preferences need not be either time invariant, or identical to those of the government's constituency, or even reflect a common or unified constituency over time.[2] We present only a forward-looking assessment of the macroeconomic results in this interaction, and do not attempt to explain the underlying process that gave birth to each outcome.[3]

In short, the aim of this chapter is to analyze the macroeconomic performance of Argentina in the long run. The database used for this purpose is an annualized series of macroeconomic and fiscal indicators built from different sources. It is the first attempt to develop a database of nine core variables that covers the entire period under study, and these 150 years of macroeconomic history are organized according to the governing national administrations. We begin with a section that stresses the contribution this analysis makes to the literature on Argentine economic history. The next section presents our methodology. Two indices are built to rate the macroeconomic outcomes during each administration. The first combines the behavior of nominal and real variables that affect the current generation of economic agents. The second includes the evolution of fiscal variables that embody intertemporal linkages by conditioning the set of choices available to future generations, both agents and rulers. Both sets of indicators are used to rank particular governments. We then compare the two rankings and seek to identify the underlying factors in the historical process. The conclusion reexamines the main features of the Argentine economy in the long run in light of this new analytical framework.

1 On path dependence see David (1997). The same idea has been used by Douglass North (1990, 98–99) to explain the path-dependent pattern of institutional evolution: "At every step along the way there were choices, both political and economic, that provided real alternatives." Mokyr (1990, 163–65) has stressed the path dependent nature of technological change.

2 Recent literature on the political economy of government behavior is vast and varied. For a survey see Persson and Tabellini (2000). Ljunqvist and Sargent (2000) extend the relevant fiscal and monetary theory. Alesina and Perotti (1995) also provide a good survey on the political economy of budget deficits.

3 However, our annual data set could permit us to unveil the driving forces in an evolving macroeconomic situation. By focusing on the indicators selected for this chapter it would be possible to identify the causality underpinning particular changes in the historical process.

1 The contribution to the literature

This particular view of the economic performance of Argentina is original and more amenable to historical analysis when compared with the existing body of literature. Our recent research on monetary, financial, and fiscal problems in the nineteenth century is changing the agenda for the study of macroeconomic history, and the current contribution follows in that trend. Overall, the century now appears to have been an unending process of searching for macroeconomic stability. Following the seminal works of Williams (1920) and Ford (1962) on the gold standard, della Paolera (1988) discussed the issues of public debt management, inflation, and the exchange-rate regime, emphasizing the linkages between monetary and fiscal policies in an intertemporal, open-economy framework. Recently, Irigoin (2000a) has offered a reinterpretation of the economic performance of Argentina in the earlier part of the nineteenth century by examining the effects of monetary instability and the inflationary finance of fiscal deficits.[4]

Yet the most reputed historical works on the Argentine economy in the twentieth century have produced assessments that only account for the results of decisions taken unilaterally by rulers. In this view, the by-product of different governments' economic policies ultimately explains the history of the Argentine economy.[5] We argue that this conventional view, which has characterized economic and political realms as unrelated, has been prone to isolate and evaluate the performance of different administrations at each point in time. As a result, the success (or failure) of a particular economic policy has been interpreted without reference to the constraints received from the past and the limitations that were bequeathed to the future. Consistent with the high degree of ideological "noise" that prevails in the economic analysis of past and present events in Argentine history, the traditional literature has tended to disregard the intertemporal constraints that are always in operation.[6] In contrast, we empha-

[4] Cortés Conde (1989) followed a similar approach to produce a thorough account of the fiscal and financial situation for the period 1860–90. However, his institutional analysis is organized by separated terms of government, assuming each administration faced a discrete and separable set of policy choices and acted in isolation from the public and from past economic choices. Other scholars have also recently been interested in the topic, e.g., Bordo and Végh (1998) and della Paolera and Taylor (2001). See also Bordo and Capie (1993).

[5] See the various chapters in the edited volumes by Di Tella and Platt (1986) and Di Tella and Dornbusch (1989). See also Gerchunoff and Llach (1998); Mallon and Sorrouille (1975); Rapoport (1984); Garcia Vazquez (1995); Sourrouille and Lucángeli (1983); Llach (1984); and O'Connell (1984).

[6] This was also noted by Carlos Díaz Alejandro (1970): "The primacy of economics over politics and [more importantly the] de-ideologizing of issues of political economy into questions of output and efficiency [contributed to the] social basis for productivity-enhancing politics." Similarly, de-ideologization helps to explain the "exceptional speed and stability of European economic growth in the 1950s and 1960s." It is true that "one must take into account the equally

size the tradeoff between current sets of choices for macroeconomic policies and their impact on framing the feasible alternatives for subsequent generations.

This analysis is dynamic rather than static because we conceive of macroeconomic performance in the long run as a continuum of mutually interdependent interactions. To explore the intuition of this concept, consider an example: think of an administration that keeps inflation low while implementing an expansionary fiscal policy by increasing government debt. A static analysis of policymaking would only consider macro-outcome variables such as present inflation or activity growth rates. Instead, our approach also takes into account the fact that a low inflation and high deficit scenario is unsustainable in the long run since future generations would have to pay for the cost of today's decisions – in this case by having to service the accumulated public debt.

As a result, by way of applying a degree of consistency to the historical analysis, our approach internalizes the costs arising from the decisions of present generations that are passed on to subsequent ones. Because no administration sets out from exactly the same initial situation, it is never feasible to compare just the results of each government's relative success with contemporaneous economic policymaking. Hence, we do not judge the decisions taken by a government while in office, but only the relative outcomes bequeathed at the end of its mandate conditional upon the situation they inherited at the start.

2 The methodology

2.1 The intervals

To organize the analysis, we identified discrete intervals according to the terms of all national administrations from 1853 to 1999. This classification of each government is made irrespective of the nature of the political regime from which it emerged. Up to 1930 Argentina had enjoyed a seventy-year period of institutional stability within a representative political system in which governments were appointed by suffrage.[7] In September 1930 constitutional order was discontinued for the first time in the political history of the country. This happened again in 1943, 1955, 1962, 1966, and 1976. For our purposes, each of these years are treated as a change of political regime. Elected governments reappeared in 1931, 1946, 1958, 1964, 1973, and 1983. From 1983 until the present, democratically appointed governments have ruled the country without

exceptional circumstances whereby a number of factors affecting the production system and the macroeconomic structures were allowed to interact with singularly apt institutional arrangements in the international economy and in the individual countries" (Crafts and Toniolo 1996, 22–23).

7 However, in practice the ballot was a restricted exercise until 1916. Only in 1912 did the Electoral Law grant and guarantee a universal franchise for male citizens.

interruption. This has been the longest span of time during which representative political institutions have stood in place without interruption and no political party has been banned since the inception of universal suffrage in 1916.[8]

According to constitutional rules enacted in the early 1850s, the length of a presidential term was set at six years with no provision for a second term.[9] Twice, in 1949 and 1994, this constitutional provision was changed and the presidential term reduced to four years. On both occasions it resulted in the re-election of the person that was currently in office.[10] Therefore, the two subsequent presidencies of Juan Domingo Perón (1946–51 and 1952–55) and Carlos Menem (1990–95 and 1996–99) are identified as separate terms of administration in our analysis.

For convenience, we label the years of each term of an administration according to the name of the president. This convention does not necessarily coincide with the date in which the person was elected or effectively took office. Our method assigns years according to whether the incumbent or incoming government ruled for the larger part of the year. On four occasions the president died in office and was replaced by the vice-president following the constitutional order of succession. In these cases, we indicate both names on the ticket: they were Luis Sáenz Peña/José E. Uriburu (1893–98), Roque Sáenz Peña/Victorino de la Plaza (1911–16), Roberto Ortiz/Ramón Castillo (1938–42), and Perón, who was succeeded by his wife Isabel Perón (1973–75).[11]

In addition, certain major break points in the political and economic history of the country have been distinguished and are treated separately. Following the crisis in 1890, Vice President Carlos Pellegrini (1891–92) took over after Miguel Juárez Celman resigned, and completed the mandated term. This was the first political consequence of a major financial and economic crisis earlier that year. Since Pellegrini's leadership in resolving the crisis was crucial, the discontinuity merits consideration as a distinct interval in our classification. In

8 From 1930 to 1946, and from 1955 to 1972, the current major political parties, the *radicales* and *peronistas*, were banned from electoral competition. The Argentine political system has been again strained at the end of 2001, when five presidents served in the space of two weeks. That episode would be a challenge for our classification system, but it is so recent as to lie outside the sample period of our study, which concludes with the second Menem administration of 1996–99.

9 Because we are using the Governor of Buenos Aires province as the head of a proxy national administration for 1853–62, it is worth remembering that the provincial constitution in 1854 ruled out a second term, but the mandate was set to a three-year term.

10 The reformed constitution of 1949 was amended in 1956 restoring six-year terms and again ruling out reelection.

11 In 1973 there were two consecutive elections. In March President Campora won under the appeal of *Campora al gobierno, Perón al poder* ("Campora for president, power for Perón"). He and the vice-president resigned and, by virtue of the *Ley de Acefalia,* a new election was held in September, which Perón won in a landslide with 62 percent of the votes.

1930 General José F. Uriburu led a coup against the ruling President Hipólito Yrigoyen, leader of the Radical Party, setting the stage for a series of military coups that deposed democratically elected civilian governments. Elections were reinstated in the following year, but by then the *Radicales* were banned from the contest. This ban was in effect until 1946.

In subsequent years, every military regime has been considered a distinct interval, with the exception of the periods 1962–63 and 1967–72. In 1962, the ruling president Arturo Frondizi was overthrown by another military coup. The Peronist party, which had been banned seven years earlier following the overthrow of Perón, was allowed to participate in provincial elections and won an overwhelming victory. This led to the suspension of the election procedures for selecting a president, and for two years the senator José Guido, a puppet of the military, acted as a surrogate president. From 1967 to 1972 three generals alternated in office. Social turmoil and growing political violence resulted in Juan Carlos Onganía's resignation. From 1970, Roberto Levingston and Alejandro Lanusse ruled while a process took shape for restoring elections, now with the legal inclusion of the Peronist Party. The shift in the army toward the restoration of civilian rule justifies a separate treatment for the different periods.

As a result of this classification, a sequence of 150 years of macroeconomic performance was aggregated into thirty-three intervals associated with different "administrations." These administrations will now be ranked on a scale according to the relative improvement in macroeconomic performance during their term. In our long-run analytical perspective, the best outcome (position one) should be the closest to the theoretically desirable one. For instance, the lowering of the inflation rate is assessed as a good indicator because by reducing a distortion on cash holdings it helps intermediate economic transactions. Likewise, a lower level of debt means – other things being equal – a lower expected level of the tax burden on future income. Thus, by lowering distortions on the economy, such changes would enhance the outlook for future investment, production, and consumption.

2.2 The indices

To rank the macroeconomic performance of different administrations we propose two indices. The Classical Macroeconomic Pressure Index aggregates the outcomes for classical indicator variables; we include here inflation, devaluation, and interest rates, together with annual estimates of changes in the level of economic activity (output growth). The Fiscal Pressure Index is constructed quite differently by introducing key fiscal time series that introduce intertem-

poral constraints which reflect the burden of debt financing; we include here the ratios of public debt to GDP and to exports, the ratio of primary deficit to revenues and debt service, and the real interest rate faced by Argentina (a proxy for country risk) adjusted by the increase in the level of activity (an adjustment to control for the explosiveness of debt-GDP ratios). Both indices aggregate annual data in each of the thirty-three intervals corresponding to every administration, either national (after 1862) or for the province of Buenos Aires (before 1862).[12] As mentioned, the values are assigned each year according to the person who was in office the longest in the respective year. Finally, both indices were combined into a third index, the Overall Index, to offer a "compromise" economic scoreboard of the different administrations.

2.2.1 The Classical Macroeconomic Pressure Index (CMPI)

The rationale for building a macroeconomic pressure index is to rank the improvements that occurred during a particular administration in key nominal and real macroeconomic variables. It is important for the reader to note that our conception of the CMPI measures the results of these variables compared to their levels under the previous administration (the "bequest received") . Thus the CMPI is more of a *comparative* index than a *situational* index.

The CMPI has been built on four indicators – the inflation rate, the devaluation rate, the interest rate, and the growth rate of economic activity – as follows:

(i) The inflation rate is usually linked to the government's high-powered money policy and the expectations of agents about its future rate of expansion (Sargent 1986). It sheds light on the results of one of the sources of revenue that Argentine governments have repeatedly used: the inflationary tax or seigniorage (Amaral 1988, Irigoin 2000a, and della Paolera and Taylor 2001);[13]

(ii) The devaluation rate is another way of measuring changes in nominal

[12] Data for 1853 to 1862 only refer to the situation in the province of Buenos Aires. The share of the province in the national economy makes the proxy acceptable. In 1860 Buenos Aires furnished 82 percent of total export value, and the trend matches the national values thereafter. By 1864, Buenos Aires's share in national public finances amounted to 73 percent of total ordinary revenues and 75 percent of total expenditure at the national Treasury. Its native population represented 30 percent of all Argentineans, though 82 percent of resident foreigners were living in the province by 1869, in advance of the waves of mass migration that were to follow. See *Censo Nacional de Población*, 1869 Table 6, page 20. Finally, after 1862, the fourteen provinces that form the territory of present-day Argentina united in a federal state under a leadership and institutional structure drawn from Buenos Aires. The then *bonaerense* governor, Mitre, was duly elected as the first Argentine constitutional president.

[13] The inflation rate is measured as continuously compounded, that is, given price level in year t (P_t) and the price level in the precedent year t-1 (P_{t-1}), the continuously compounded inflation rate observed in year t is defined as $\ln(P_t/P_{t-1})$, where ln is the natural logarithm function. This measure prevents the inflation rate from fluctuating widely during hyperinflation periods and

values in the economy. In particular it is a very important indicator of the willingness of a government to stabilize the external value of the domestic currency. Devaluation is often associated with balance of payments crises (Eichengreen, Rose, and Wyplosz 1996) and fiscal crises (della Paolera 1994). It also plays a part in recurrent episodes of political instability (Irigoin and Salazar 2000).[14]

(iii) The real interest rate on hard currency is a proxy for country risk fluctuations and tightness in the credit market. In a country with long periods of financial repression and credit rationing, the interest rate in the domestic credit market is not a useful measure of credit-market tightness. Thus, an estimate of the costs of borrowing in international credit markets seems a better alternative;

(iv) The growth rate on economic activity indicates the influence of the incumbent administration on the changing pace of economic development. Since the population growth rate sometimes fluctuates in response to immigration and demographic change, the rate of growth is computed from the per capita level of activity.[15]

Table 1 displays *contemporaneous* macroeconomic performance during different political administrations according to these measures. While interesting and highly informative, this information alone could be misleading for our ranking of the administration outcomes. The assessment of an administration will be flawed if the crucial conditions inherited from its predecessor are neglected. For instance, by purely contemporaneous macroeconomic performance standards, one of the most highly regarded Argentine presidents, Pellegrini, would have ranked as one of the worst chief executives in the country's history (Gallo 1997).

Table 2 depicts for all administrations their *comparative* macroeconomic performance, following Barro (1996).[16] With four standardised measures of outcome innovations for each year, the Classical Macroeconomic Pressure In-

having excessive influence in the CMPI. Also, this measure of inflation rate can be described as the (first order) logarithmic difference of the price level.

14 Devaluation is also measured as a continuously compounded rate.

15 Since data on labor is not available through the entire sample, it is impossible to accurately measure activity per worker.

16 Barro (1996, chap. 3) expands on Okun's "misery index" as a measure to assess macroeconomic performance. To isolate each administration he uses the changes in inflation, unemployment, interest rate, and the shortfall of economic activity. The difference with our index is not only due to the variables chosen. The CMPI also differs on the assignation of percentiles to the outcome innovations. Given the fact that inflation is more volatile and has a very different distributional shape than activity growth, a sum of outcome innovations would give too much weight to changes in inflation and too little weight to activity growth. Thus, to make a representative index we use percentiles to overcome this problem.

Table 1. *Contemporaneous macroeconomic performance*

Term	Chief of administration	Average over term (percent)			
		Inflation rate	Devaluation rate	Interest rate	Activity growth rate
1853	Alsina	14.11	14.11	15.19	-17.53
1854/56	Obligado	3.19	3.19	14.10	7.15
1857/59	Alsina	0.53	0.53	15.72	-4.82
1860/68	Mitre	1.68	2.08	12.70	7.43
1869/74	Sarmiento	4.33	0.00	8.63	2.30
1875/80	Avellaneda	10.01	2.24	10.02	5.19
1881/86	Roca	-2.94	3.25	7.22	8.08
1887/90	Juárez Celman	12.06	15.46	8.79	5.40
1891/92	Pellegrini	10.86	12.15	9.72	-4.43
1893/98	Sáenz Peña, L./Uriburu, J. E.	-1.23	-4.12	8.22	0.72
1899/04	Roca	-1.72	-1.76	7.32	3.82
1905/10	Quintana/Figueroa Alcorta	4.97	0.04	5.50	2.43
1911/16	Sáenz Peña, R./de la Plaza	3.71	0.06	3.73	-3.99
1917/22	Yrigoyen	1.03	2.70	5.08	3.10
1923/28	De Alvear	0.09	-2.72	8.63	2.94
1929/30	Yrigoyen	-3.67	7.47	8.77	-2.45
1931	Uriburu, J. F.	-3.31	23.26	8.72	-9.22
1932/37	Justo	3.98	-0.62	6.02	1.88
1938/42	Ortiz/Castillo	4.52	4.55	2.09	0.77
1943/45	Ramirez/Farrell	5.57	-1.46	0.52	0.77
1946/51	Perón	20.93	31.58	-0.02	2.72
1952/55	Perón II	10.25	7.19	-1.25	0.89
1956/57	Aramburu	20.93	1.64	-0.49	2.21
1958/61	Frondizi	34.67	20.15	0.46	2.31
1962/63	Guido	26.05	24.42	2.89	-2.41
1964/66	Illia	22.84	22.50	4.39	6.42
1967/69	Onganía	11.59	9.24	7.64	4.93
1970/72	Levingston/Lanusse	37.01	40.28	5.48	3.37
1973/75	Perón III	70.83	79.67	2.44	2.35
1976/83	Videla/Viola/Galtieri/Bignone	108.58	94.51	5.15	0.03
1984/89	Alfonsín	178.76	181.46	17.38	-1.96
1990/95	Menem	53.35	33.73	14.26	3.09
1996/99	Menem II	-0.60	0.00	9.75	2.31

Notes and sources: See text and Appendices.

dex is calculated as a simple average of the standardised variables for the respective period of each administration.[17] Thus, a chief of the executive who ranks above the fiftieth percentile is better than the median administration in terms of macroperformance.

Indeed, initial conditions matter if we are to accurately evaluate the result of the interaction between government and economic agents' decisions during a particular administration. Therefore, our Classical Macroeconomic Pressure Index has been adapted to account for the conditions that exist when each administration takes office. Each variable has been adjusted by the "legacy component" received from the previous administration as follows: the values within the term have been subtracted from the last annual observation of the variable for the preceding administration. The resulting difference is a measure of "outcome innovation" – which we think yields a more accurate ranking of the changes, positive or negative, in key variables.

To compare different outcome innovations, a ranking of the national administrations has been organised for each variable. We assigned each observed outcome innovation a percentile by comparing it with similar innovations across all years for which information is available. The highest percentile corresponds to the best innovation or improvement (lowest inflation innovation, highest activity-growth innovation, and so on) and the lowest one reflects the worst. This exercise provides some interesting details on the performance of various administrations.

In 1931, during Uriburu's year in office, the interest rate on hard currency was 8.72 percent, as can be seen on the column corresponding to average interest rate in Table 1. The legacy component, in this case the interest rate in the last year of the second Irigoyen term (1930), was 8.70 percent.[18] The outcome innovation for the interest rate in that administration is consequently 0.02 percent, which ranks the Uriburu administration outcome with respect to interest rates at the 40th percentile, worse than the *median* innovation (the 50th percentile). In the case of Nicolás Avellaneda's administration (1875–80), inflation innovation is found by comparing actual inflation to the legacy value, that is, the inflation rate in the last year of Domingo Sarmiento's administration.

Another important example is provided by the analysis of the administrations of Adolfo Alsina and Pastor Obligado. The real dimension of their performance is apparent when we include the legacy component. Alsina was elected gov-

[17] It is worth remembering that the results in the tables only show average values for each term of administration. Data are available per year upon request.

[18] The legacy component for each government can be inferred by subtracting the innovation component from the average value of the variable considered in each administration. Further details about index construction can be found in Appendix A.

Table 2. *Comparative macroeconomic performance*

Term	Chief of administration	Average innovation (percent)			
		Inflation rate	Devaluation rate	Interest rate	Activity growth rate
1853	Alsina	20.91	20.91	0.00	-43.42
1854/56	Obligado	-10.92	-10.92	-1.09	24.68
1857/59	Alsina	-1.63	-1.63	-0.01	-12.54
1860/68	Mitre	4.80	5.19	-4.70	8.13
1869/74	Sarmiento	3.34	0.00	-3.93	8.96
1875/80	Avellaneda	9.16	2.24	2.20	27.33
1881/86	Roca	-48.32	14.01	-0.71	3.88
1887/90	Juárez Celman	9.01	14.01	0.93	8.42
1891/92	Pellegrini	-23.06	-23.85	-0.62	3.30
1893/98	Sáenz Peña, L./Uriburu, J. E.	21.51	8.70	-0.93	-4.77
1899/04	Roca	2.01	10.66	-0.55	-1.66
1905/10	Quintana/Figueroa Alcorta	2.63	0.13	-0.55	-5.88
1911/16	Sáenz Peña, R./de la Plaza	-4.06	-0.20	-1.38	-6.07
1917/22	Yrigoyen	-11.25	4.01	3.34	7.89
1923/28	De Alvear	9.48	9.60	0.40	-2.03
1929/30	Yrigoyen	-4.69	7.62	0.30	-5.75
1931	Uriburu, J. F.	0.95	9.68	0.02	-2.46
1932/37	Justo	7.29	-23.88	-2.70	11.10
1938/42	Ortiz/Castillo	-8.70	12.35	-2.77	-4.74
1943/45	Ramirez/Farrell	-1.18	-2.01	-0.27	1.31
1946/51	Perón	9.71	31.13	-1.01	7.65
1952/55	Perón II	-30.83	-42.06	0.51	-0.91
1956/57	Aramburu	10.18	-28.25	0.39	-2.94
1958/61	Frondizi	12.02	18.39	1.04	-1.13
1962/63	Guido	11.26	23.81	1.00	-9.20
1964/66	Illia	1.87	27.14	1.75	9.23
1967/69	Onganía	-11.75	-8.99	0.11	4.57
1970/72	Levingston/Lanusse	30.27	40.20	-2.38	-4.98
1973/75	Perón III	17.73	60.39	-1.97	0.75
1976/83	Videla/Viola/Galtieri/Bignone	-39.96	-81.35	4.00	1.15
1984/89	Alfonsín	13.42	47.80	2.81	-4.16
1990/95	Menem	-342.83	-409.31	-9.18	10.73
1996/99	Menem II	-4.25	-0.20	-6.36	6.49

Notes and sources: See text and Appendices.

ernor of Buenos Aires by the provincial chambers that were restored after the collapse of General Juan Manuel de Rosas' twenty-year autocratic rule. However, because of prevailing political instability, Alsina could not complete his mandate. In 1853 Buenos Aires seceded from the rest of the Confederation – the latter led by General Justo José Urquiza who had defeated Rosas and with that relinquished his base of power in Buenos Aires. Buenos Aires seceded to maintain its monopolies on custom revenues and the seigniorage provided by the only existing bank.[19]

In 1854, Obligado was elected to be the first constitutional governor of the province. During his term a process of dramatic institutional changes occurred with the emergence of a political market place and substantive fiscal and financial reforms. A mix of taxation reform (which lowered taxes on consumers and expanded the fiscal base to include exporters, who were formerly free of duty), a reorganisation of public expenditure management (on a more rational basis and controlled by public officials), and a tight control over the administration's financial and monetary policy (by both the legislature and "the market") rendered extraordinary results. Economic uncertainty arising from political arbitrariness was reduced while an unprecedented balance in the fiscal accounts and a virtuous monetary policy tended to diminish inflationary expectations. Increasing stability in financial and monetary events led to the restoration of external credit in 1857 and the restoration of convertibility in 1866.[20]

Table 1 shows how inflation subsided and the level of economic activity recovered during Obligado's term. However, the picture better captures the real changes in the economy when we include the legacy component as in Table 2. Here, the reduction in the inflation rate looks even more impressive. The interest rate was also lowered, and the rate of activity growth recovered notably. These achievements of the Obligado administration are outstanding and strongly contrast with the situation that had prevailed during the previous three decades of inconvertibility and inflationary finance.

2.2.2 The Fiscal Pressure Index (FPI)

For a small, open economy like Argentina's, the management of public debt matters, and substantially so. Debt management should be conducted so as to avoid unbearable pressure on the fiscal arithmetic of the forthcoming govern-

[19] Both had been fundamental in the fiscal and monetary policies of Buenos Aires that had established the province's leadership in the region. Rosas is now remembered for arbitrary rule and recourse to inflation taxes to fund fiscal deficits. These inflationary policies did not start with him, they went back to the 1820s. In any event, the legacy of the formative years of the Argentine state and market were dramatically shaped by fiscal deficit, the curtailment of external borrowing, the exhaustion of domestic credit and, ultimately, inflationary finance.

[20] See Irigoin and Salazar (2000).

ment. The Fiscal Pressure Index (FPI) augments the estimates from the CMPI by adding the fiscal policy dimension. This allows us to incorporate pressures emerging via the intertemporal budget constraint of a government, which is also known as the "transversality condition" in macroeconomics.

The FPI permits a closer characterization of the economic scorecards of the different administrations. That is, monetary and fiscal policy must be coordinated to obtain an intertemporally consistent outcome. In the case of a mature economy, the CMPI is quite adequate for the task of comparing different administrations in terms of their overall management. However, the CMPI is, we think, quite insufficient to satisfactorily assess the economic history of Argentina, a peripheral economy with an imperfect and small domestic capital market and recurrent macroeconomic crises. The Ricardian equivalence proposition – which asserts the irrelevance of the debt level for a given level of government expenditures – is not an adequate representation for an economy with incomplete information and debt ceilings. A long history of financial crises in Argentina, each one temporarily curtailing the government's ability to finance deficits through debt issue, underscores the fact that fiscal solvency does indeed matter.

The aim of the Fiscal Pressure Index is to rank administrations in their efforts to cope with the intertemporal solvency constraint. Given a government decision on current expenses, the incumbent administration has to decide how to fund them by choosing a combination of taxes, money base expansion, and new debt issues. The particular mix that is chosen matters. An accurate assessment of macroeconomic management has to consider the intertemporal effects of present decisions on net debt issues and the primary deficit. These decisions certainly will affect present outcomes (e.g., inflation and devaluation rates, or activity growth). But they also have a strong impact on future restrictions on macroeconomic policymaking (e.g., country risk, the burden of future debt servicing, and the possibility of an eventual future debt ceiling).

The new index has been constructed to rank administrations while correcting for changes in the intertemporal solvency situation. The Fiscal Pressure Index allows us to characterize the fiscal legacy handed down. High indebtedness or an unbalanced budget is a hot potato passed to succeeding administrations; the opposite situation is a "positive externality" that future generations of both policymakers and economic agents will inherit.

The Fiscal Pressure Index is based on the following first-order difference equation linking the debt-to-GDP ratio at a given point in time (t) to its previous ($t-1$) value and the primary fiscal result, assuming for simplicity a Ricardian regime (where debt payments and primary deficit are entirely bond financed)

and that bonds possess a one-period maturity (see *inter alia* della Paolera and Taylor 2001):

$$\frac{B_t}{Y_t} = \frac{1+r_t}{1+g_t}\frac{B_{t-1}}{Y_{t-1}} + \frac{DEF_t}{Y_t},$$

where: B_t is national government debt measured in real terms, in period t; Y_t is real GDP measured in period t; $1 + r_t$ is the one-period real gross interest rate between time $t - 1$ and t; and $1 + g_t$ is the growth rate of the activity level between time $t - 1$ and t, that is Y_t / Y_{t-1}.

The first order difference equation on B/Y sheds light on the dynamic determinants of the government debt burden. On the one hand, low growth or high interest rates push the ratio B/Y up, so that $(1 + r)/(1 + g)$ can be seen as an amplifying factor that determines the future debt-to-GDP ratio given its initial value. Hence, the loss of credibility on future debt payments (an increase in r) or a poor growth performance (a fall in g) will result in a higher debt burden in the future. The primary fiscal result also directly affects the ratio of debt-to-GDP passed on to the next administration. *Ceteris paribus*, the higher the fiscal deficit, the higher is the need for issuing bonds. Ultimately, this will increase the ratio of debt to GDP that subsequent policymakers will have to face in the future.

The Fiscal Pressure Index therefore aggregates five indicators:

(i) the ratio of government debt to GDP as a measure of the debt burden relative to real activity;

(ii) the ratio of government debt to exports estimates the debt burden on the capacity of the economy that would allow a government to repay its obligations;

(iii) the ratio of the primary fiscal result to total government revenues, which discounts the amount of debt services bequeathed from previous administrations – it is a net measure of the management ability of an administration on fiscal issues;

(iv) the ratio of the primary fiscal result to debt servicing, stressing the available resources to service the public debt. It expresses the relation between the results of ordinary revenues minus current expenditure and the amount needed to effectively service the debt; the lower the ratio the more gloomy would be the outlook for debt fulfillment and, hence, for borrowing in the future;

(v) the ratio of the gross interest rate on hard currency to the growth rate of activity, $(1 + r)/(1 + g)$, which shows the factor by which the debt-to-GDP ratio would increase if the fiscal primary deficit were nil. It allows

for market sensitivity to the actions taken by administrators in office the expectations on future decisions about debt management.

To characterize key features of the components of the Fiscal Pressure Index, Table 3 presents the average value of the variables for each administration considered in the time span of the study. Next, in a similar fashion to the method used for the CMPI, "legacy components" (or the "initial conditions" for the five indicators) are computed to obtain the innovations or improvements for each year and variable in the FPI. For each variable, each observed "outcome innovation" is assigned a percentile by comparing it with similar innovations across all years for which information is available. The highest percentile corresponds to the best innovation (greatest reduction in debt burden, or greatest improvement in the fiscal situation) and the lowest one reflects the worst. With these new standardized time series for outcome innovations, the Fiscal Pressure Index is calculated as a simple average of the five components for the respective period of each administration. Thus, a chief of the executive that ranks above the fiftieth percentile is better than the median administration in terms of fiscal performance.

3 The results

3.1 The Classical Macroeconomic Pressure Index (CMPI)

To compare macroeconomic improvements over the last 150 years of Argentina's history, Figure 1 ranks the 33 identified administrations according to the CMPI over the period. On this basis, it looks as if the best macroeconomic performance in the history of the Argentine economy was near the very end, the six years associated with the first term of Menem (1990–95). Why? There was a drastic change in the monetary regime during his tenure as a result of the inception of the Convertibility Law in 1991 and the establishment of the independent Central Bank. The latter acted as a quasi-currency board, creating a virtual dollar exchange standard, and had rapid success in cutting the inflation and devaluation rates.

This macroeconomic situation, measured by the CMPI, has no equivalent in Argentine macroeconomic history over the 150 years considered here. Menem had inherited high inflation (or hyperinflation) from his predecessor Raúl Alfonsín (1984–89), whose departure was so hasty that he even arranged to advance the balloting to elect his successor in violation of the constitution.[21] Yet one might still be inclined to say that achieving *disinflation* after a time of exorbitant rates of inflation should not be taken alone as evidence of heroic policymaking

[21] Incidentally, Alfonsín's term ranks twenty-sixth in the classification of all thirty-three terms.

Table 3. *Contemporaneous fiscal performance*

Term	Chief of administration	Average over term (percent)				
		Debt/ GDP	Debt/ exports	Primary result/ revenue	Primary result/ debt service	$\frac{(1+r)}{(1+g)}$
1853	Alsina	60.1	130.1	-121.0	-406.7	133.7
1854/56	Obligado	49.7	111.1	2.7	11.2	104.0
1857/59	Alsina	59.1	121.3	-33.1	-260.6	117.5
1860/68	Mitre	69.8	148.9	-3.7	-20.6	102.3
1869/74	Sarmiento	80.6	186.2	-11.1	-18.0	105.2
1875/80	Avellaneda	68.7	174.0	3.6	8.1	102.6
1881/86	Roca	58.3	181.0	-25.2	-72.8	97.6
1887/90	Juárez Celman	82.0	281.4	-13.0	-91.5	100.7
1891/92	Pellegrini	124.7	366.9	-1.5	6.4	112.1
1893/98	Sáenz Peña, L./Uriburu, J. E.	110.2	384.9	-9.5	-20.7	104.4
1899/04	Roca	93.1	240.2	35.9	85.2	101.4
1905/10	Quintana/Figueroa Alcorta	54.2	122.3	2.2	2.5	98.6
1911/16	Sáenz Peña, R./de la Plaza	57.4	122.9	-14.3	-51.9	104.3
1917/22	Yrigoyen	54.0	78.5	4.3	18.9	100.3
1923/28	De Alvear	49.5	91.6	1.8	12.3	102.5
1929/30	Yrigoyen	52.1	135.8	-12.5	-35.1	108.7
1931	Uriburu, J. F.	42.7	131.9	3.4	9.7	116.8
1932/37	Justo	52.1	281.8	7.1	16.7	102.5
1938/42	Ortiz/Castillo	54.4	390.5	-21.3	-105.8	99.7
1943/45	Ramirez/Farrell	56.7	392.9	-51.1	-210.7	98.5
1946/51	Perón	36.6	175.4	-32.1	-315.6	95.4
1952/55	Perón II	36.1	209.4	-32.9	-312.6	96.2
1956/57	Aramburu	32.1	222.3	-42.4	-359.5	95.7
1958/61	Frondizi	20.1	209.6	-40.6	-528.1	97.0
1962/63	Guido	16.4	168.4	-27.5	-328.7	103.8
1964/66	Illia	14.4	169.1	-25.8	-268.2	97.0
1967/69	Onganía	11.8	177.0	-10.9	-129.2	101.2
1970/72	Levingston/Lanusse	11.4	154.3	-14.8	-113.5	100.5
1973/75	Perón III	14.1	138.5	-69.3	-286.2	98.5
1976/83	Videla/Viola/Galtieri/Bignone	24.5	276.3	-36.3	-153.3	103.8
1984/89	Alfonsín	66.0	656.6	-17.5	-126.8	118.4
1990/95	Menem	42.0	624.7	3.6	32.6	109.8
1996/99	Menem II	38.1	438.8	3.0	6.9	106.2

Notes and sources: See text and Appendices.

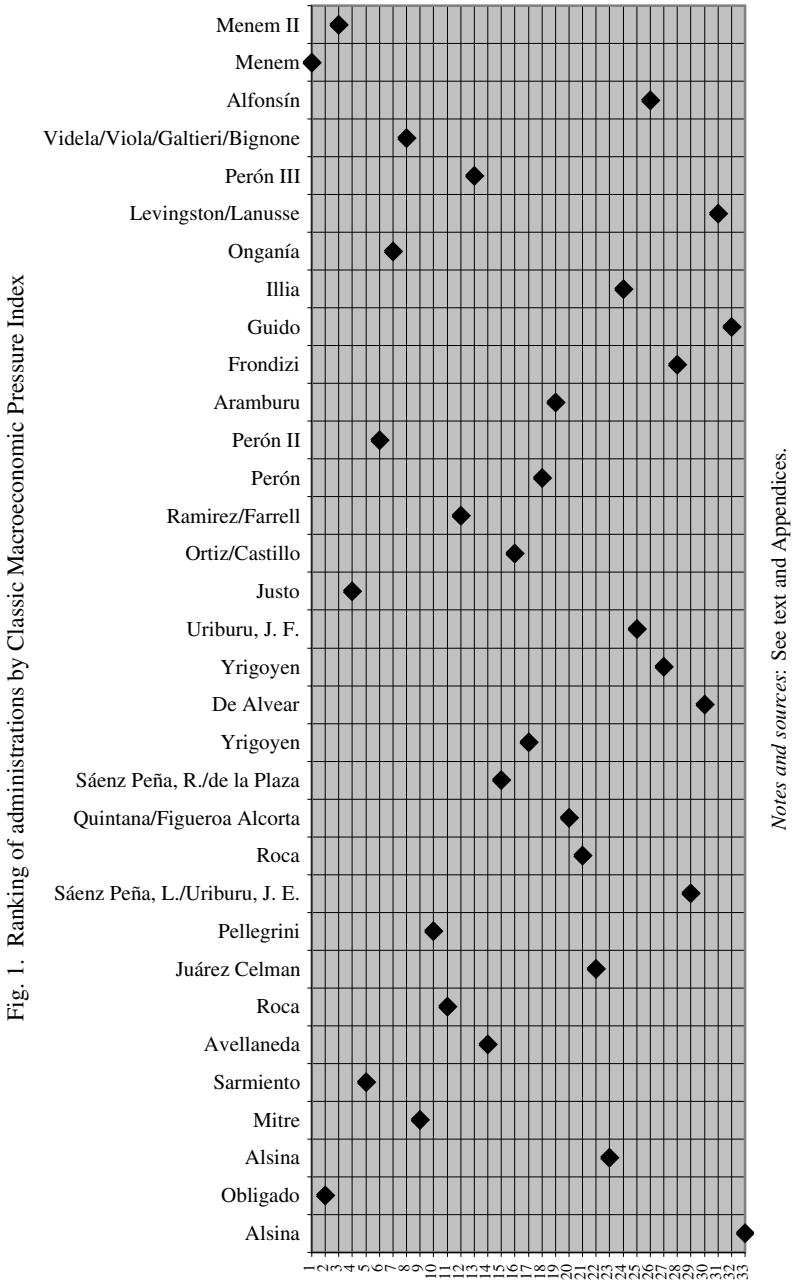


Fig. 1. Ranking of administrations by Classic Macroeconomic Pressure Index

Notes and sources: See text and Appendices.

skill. However, a particularly salient aspect of President Menem's first term in power is that Argentina achieved more than in previous short-run programs of stabilization. A drastic change of monetary regime achieved stability after the extreme hyperinflationary experiences of 1989–90. A considerable reduction in country risk and the return to sustained activity growth after almost twenty years of stagnation could still justify Menem's position at the head of the rankings. Furthermore, macroeconomic stability and a decent economic performance continued throughout his second presidency (1995–99), which stands in third place according to the CMPI.

Proceeding in descending order, the second best outcome came at the very beginning of the 150-year period under analysis. In the period 1854–57 the fruits of major institutional reforms allowed a substantial change in expectations about the chronic insolvency of the state. The recourse to inflation tax disappeared and the costs of exercising power and political strife were curtailed dramatically; this allowed for high rates of economic growth. These achievements look even more impressive when compared with the inherited situation. Although technically attained by preceding governments, a definitive change in the macroeconomic situation was put firmly in place.[22] Considering that the second interval associated with Alsina falls in twenty-third place, the sudden slowdown in economic growth deserves an explanation. In fact, 1859 and 1861 were years of warfare when Buenos Aires' army clashed with the other provinces' confederation army. Currency issues to fund the war disrupted the rate of recovery of both the inflation and the interest rates, but these effects did not last long.

The early 1930s in Argentina are another interesting case. According to the rankings, the years associated with General Agustín Justo's administration (1932–38) had the fourth best macroeconomic indicators. A combination of greater exchange rate stability after the demise of the gold standard in 1931–32 and the recovery of growth after the Great Depression of 1930–32 justifies the position in the rankings. This is an interesting finding because it suggests that, at least through the lenses of the CMPI, Justo's presidency in the interwar period was one of the most successful of the entire twentieth century until the hyperinflation of the late 1980s. Remarkably, Argentina recovered from the

[22] Among many other existing institutions, the single bank of issue was reformed and its management was made independent of the government. Monetary policy was thereafter a matter of bargaining between administrations, the legislature, and the merchants on the board of the bank. The institution regained the favor of the public and greatly expanded its business of discounting commercial bills. Deposits grew at an unprecedented rate, both in paper (i.e., inconvertible) and metallic currency, demonstrating the greater confidence placed in the institution. Interests rate diminished substantially and credit reappeared and was readily available to the public. Formal sources of credit resulted in lower interest rates while greater monetary stability was conducive to greater activity growth. See Irigoin (2000a).

effects of the Great Depression in spite of the relative decline of the United Kingdom.[23] The years 1933–44 are a period in the economic history of the country that surely deserves further research .[24]

We might also consider Sarmiento's tenure (1869–74), when Argentina enjoyed six years on an uninterrupted gold standard regime with a hard peso (*peso fuerte*) quoted at a fixed rate of twenty-five paper pesos. The devaluation rate was zero, nominal interest rates converged for the first time to North American levels, and the expansion of economic activity was unparalleled.[25] These facts also justify the inclusion of Sarmiento's administration as one of the best five as assessed by the CMPI.

So much for the top five; what about the bottom of the rankings? The worst times for the Argentine economy – measured by substantial inflation rates and interest rates and by a shortfall in economic activity growth – correspond, perhaps not surprisingly, with times of severe political instability. The first mandate of Alsina was a replay of conditions first seen forty years earlier – a failure to organize the state and polity after independence. As mentioned above, inflationary tax was the ultimate means to meet excessive expenditure that was most often a result of civil war. Economic uncertainty caused by political instability or discretionary rulers explains the abysmal rate of economic activity of the early 1850s. Other times of economic malaise are associated with the 1962–63 and 1970–72 intervals.[26] These were the years of greatest political instability in the last century. An increasing rate of inflation and more pronounced rates of devaluation, plus a substantial reduction in the levels of activity, both contemporaneous and adjusted for the legacy component, mark these as the darkest years in the performance of the Argentine economy.

The incorporation of initial conditions, or legacy components, seems to make a difference in our rankings, and some findings here seem quite notable. Again, for most historians, the role of Pellegrini (1891–92) in alleviating the 1890s crisis has secured his prominent and revered place in the annals of history. However, the outcome of his mandate looks dire if we consider only the contemporaneous data as depicted in Table 1. Only when adjusted for the legacy he inherited can his administration be viewed much more favorably, as in Table 2. In 1890, tumultuous macroeconomic shocks following the Baring crash

23 See della Paolera and Taylor (2001).

24 See, however, O'Connell (1984) and Llach (1984).

25 See della Paolera and Taylor (2001, 43).

26 It should be mentioned that these rankings are based on averages in each administration. A year-by-year ranking, not reported in this chapter, also highlights some other crucial periods of instability. Examples include the first year of hyperinflation in 1989, the transition to democracy in 1983, and the last and agitated year of the mandate of Isabel Perón in 1975, previous to the *coup d'état*.

spelled the demise of the financial system and, fiscally, the collapse of the national administration. Even so, Pellegrini still ranks tenth among thirty-three administrations. This is a decidedly better performance than his predecessor, Juárez Celman (1887–90) who ranks twenty-second, highlighting the fact that Pellegrini inherited an extraordinarily bad macroeconomic situation.

2 The Fiscal Pressure Index (FPI)

Using a procedure similar to that employed to calculate the CMPI, the results of the Fiscal Pressure Index are charted in Figure 2. We now find that the fiscal and financial history of Argentina over 150 years shows a quite different ordering of intervals when ranked by the FPI.

As further evidence of the extraordinary success of the 1854–57 reforms, Obligado's administration now leads the ranking. As shown in Table 3, the performance of the fiscal indicators during Obligado's administration was extraordinary. The ratio of debt to GDP and to exports was reduced at the same time as unprecedented balance was brought to the fiscal accounts.[27] The Baring loan of 1824 was renegotiated in 1856, renewing access to foreign borrowing for the first time since the default on this loan in 1827. Similarly, public credit in the domestic market was restored in 1856 with the launch of the first series of public bonds since 1840, the year in which conventional means of financing the deficit were exhausted under Rosas' regime.[28]

The second administration of Julio A. Roca (1899–04) stands second in the rankings. This administration was clearly in favor of restoring the gold standard and achieved extraordinary results in Argentina's fiscal position. The relative performance in debt reduction as measured by the ratio of debt to GDP and an extraordinary average surplus for the treasury explain Roca's success at the turn of the twentieth century. The third-best administration in the FPI rankings is the one associated with Menem's first term (1990–95), putting him slightly ahead of President Juan Perón's first term in office (1946–51).

One of the most impressive fiscal performances took place during Avellaneda's administration (1875–80), which ranks fifth overall. In these years, the

[27] The Treasury showed an unprecedented trend towards balancing its budget – a feat not managed since 1810. Other achievements were the drafting and constructive redrafting of the Budget Law in congress, marking a consensus for the first time in decades. Furthermore, a bicameral committee annually audited the final accounting of the budget as mandated by the law.

[28] The main engineer of the reforms conducting these outstanding outcomes was de La Riestra, who was minister in charge of provincial finances from 1855 to 1861 and worked in several of the administrations listed in the tables. He was the main advisor for macroeconomic policy to President Mitre (1862–68) and was back in office throughout the presidency of Avellaneda (1875–80).

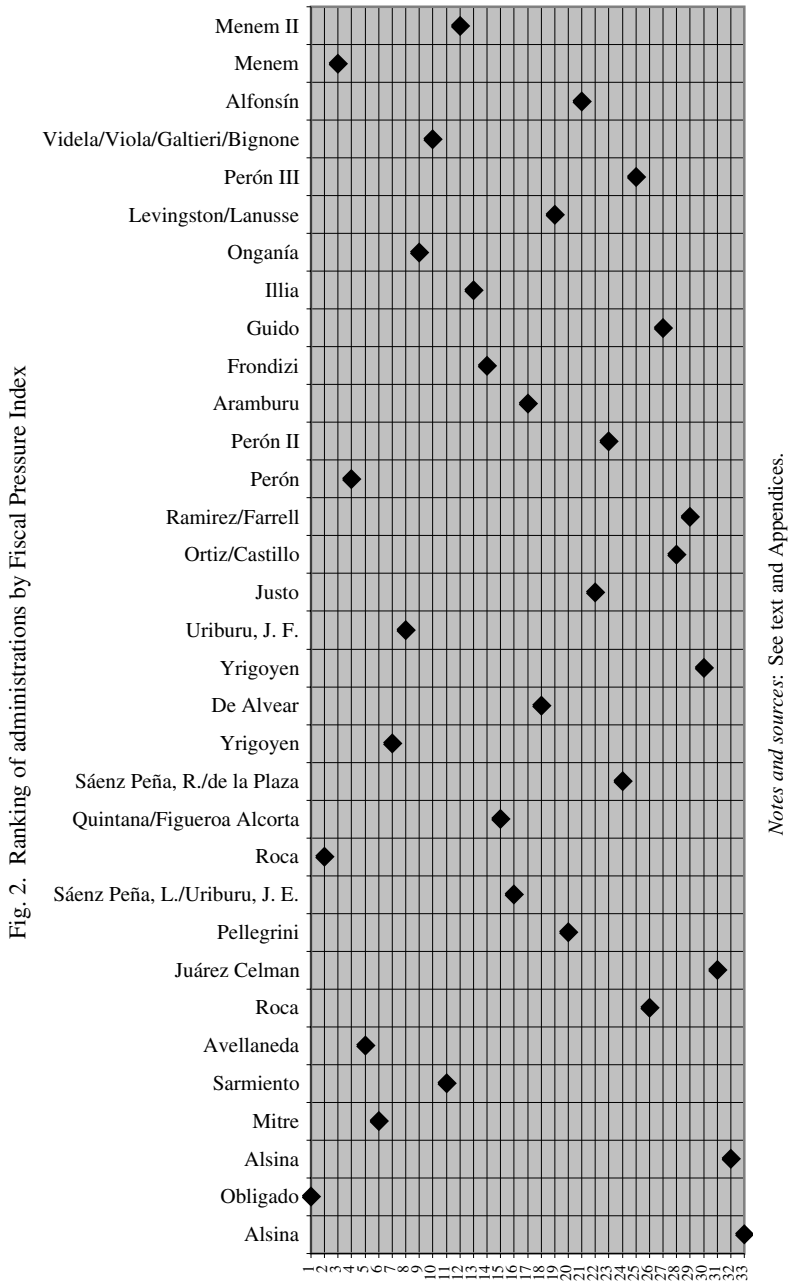


Fig. 2. Ranking of administrations by Fiscal Pressure Index

Notes and sources: See text and Appendices.

government redressed problems associated with the fiscally overheated economy that had developed during the preceding administration, a hot potato left behind by the departing president. The ratio of debt to GDP fell by around 10 percent from the average levels it had reached during Sarmiento's term (1869–74). As a result of virtuous fiscal policy during Avellanda's mandate, high indebtedness was reduced while a significant reduction in country risk came about after the crisis of 1876. Avellaneda passed on to his successor, Roca (1881–86), a much more manageable economic environment.

Similarly, there are some intervals of interests in the twentieth century that rank surprisingly well compared to conventional wisdom. Notably, Yrigoyen's first mandate (1917–22) appears close to the top. A mild surplus in the primary fiscal results following a recovery after the First World War, together with a reduction in the relative rate of indebtedness, puts Yrigoyen in seventh place. The first term of Menem (1990–95) shows substantial gains in fiscal performance, though its FPI ranking is not as high as its CMPI ranking. A notable improvement in revenues plus a reduction in the debt-to-GDP ratio stand out in these years. His second mandate, though, does not show comparable achievements: it falls to twelfth position as a result of increasing debt-to-GDP ratios from 1997 and no major improvements in the fiscal accounts.

At the other end of the rankings, the provincial administrations led by Alsina (1853 and 1857–59), which coincided with the secession of Buenos Aires, show an extremely poor performance. Efforts to fund extraordinary expenditure on the internecine conflict with the Confederation (a war between Buenos Aires and the rest of the provinces), made the fiscal deficit skyrocket. The final battles in the civil wars occurred in 1859–61 and soured the achievements obtained during Obligado's (1854–56) term in office. Not surprisingly, one of the worst times in the country's history, according to the FPI, is the period (1887–90) associated with Juárez Celman. A substantial increase in the ratio of debt to GDP toward the end of his tenure and an increasing weakness in the fiscal situation over the years was fatal for the political survival of Juárez Celman and almost as unhealthy for the country as whole, and this was the mess inherited by Pellegrini.

Table 4 displays the comparative positions of each Administration ranked by the CMPI, the FPI, and the average position derived from the two rankings.[29] There are some notable reversals in the respective rankings that are worth describing in detail. They reflect the occurrence of certain short-run monetary

[29] The average position is calculated by ranking the simple average of the CMPI and FPI for each administration.

and fiscal policies that could not be expected to remain consistent in the long run.

First, from 1860 until the 1890 crisis, there is a noticeable alternation of administrations in both rankings. This stresses the importance of the legacy effect as an intertemporal linkage between subsequent governments. In other words, a relative (and short-lived) amelioration in one of the indices is achieved at the expense of a worse performance in the other index as the hot potato is passed.

The pair of presidents Sarmiento (1869–74) and Avellaneda (1875–80) offers a good example. Sarmiento ranks fairly well at fifth place according to the CMPI; however, the FPI ranks him eleventh. This difference in the rankings of Sarmiento's term is explained by a favorable macroeconomic environment (a fixed exchange rate regime and the convergence of interest rate with international levels) on the one hand and an explosion in the ratio of debt to GDP on the other hand. In 1870, total debt amounted to 48 million gold pesos. A year later, it had increased almost twofold. Sarmiento's administration generated growth, but at a price.

This phenomenal expansion in the ratio of debt to GDP could hardly be disregarded by his successor, Avellaneda. He ranks only fourteenth in the CMPI, in part because of tough actions needed to get the debt under control. In the middle of his term (1876) convertibility was once again suspended. The inflation rate rose to almost 20 percent in the following year. However, the ratio of debt to GDP plummeted. Avellaneda's administration was the first to deliver a balance in the fiscal accounts since the mid-1850s. This explains his outstanding position, according to the FPI, at fifth all time. He ranks only seventh on the overall index, but Sarmiento ranks only tenth overall.

Nevertheless, according to this last ranking, the decades of the 1860s and 1880s experienced the most favorable performance of the economy overall, setting the stage for the so-called Golden Age of Argentine history. Up to the late 1880s, the rankings still show an alternation in the relative position of administrations. This indicates the possible existence of a stop-and-go dynamic, a feature common even in later periods of Argentine economic historiography (Cortés Conde 1997). Thus, we may consider this to have been a very long-run characteristic of the country's economic performance.

Until 1887, administrations had somehow managed to overcome the intertemporal solvency constraint. They had succeeded at passing the buck to the following government. Over these years, beyond the alternations, we also see a gradual deterioration in the trend of the overall index, which may explain the extent of the crisis that Argentina finally suffered in 1890. All the same, between 1853 and the 1930s, fiscal instability was a transitory phenomenon.

Table 4. *Comparative ranking of Argentine administrations, 1853–1999*

Term	Chief of administration	Rank		
		CMPI	FPI	Overall index
1853	Alsina	33	33	33
1854/56	Obligado	2	1	2
1857/59	Alsina	23	32	31
1860/68	Mitre	9	6	3
1869/74	Sarmiento	5	11	10
1875/80	Avellaneda	14	5	7
1881/86	Roca	11	26	16
1887/90	Juárez Celman	22	31	29
1891/92	Pellegrini	10	20	14
1893/98	Sáenz Peña, L./Uriburu, J. E.	29	16	25
1899/04	Roca	21	2	5
1905/10	Quintana/Figueroa Alcorta	20	15	17
1911/16	Sáenz Peña, R./de la Plaza	15	24	21
1917/22	Yrigoyen	17	7	11
1923/28	De Alvear	30	18	27
1929/30	Yrigoyen	27	30	30
1931	Uriburu, J. F.	25	8	15
1932/37	Justo	4	22	12
1938/42	Ortiz/Castillo	16	28	24
1943/45	Ramirez/Farrell	12	29	22
1946/51	Perón	18	4	8
1952/55	Perón II	6	23	13
1956/57	Aramburu	19	17	18
1958/61	Frondizi	28	14	23
1962/63	Guido	32	27	32
1964/66	Illia	24	13	19
1967/69	Onganía	7	9	6
1970/72	Levingston/Lanusse	31	19	28
1973/75	Perón III	13	25	20
1976/83	Videla/Viola/Galtieri/Bignone	8	10	9
1984/89	Alfonsín	26	21	26
1990/95	Menem	1	3	1
1996/99	Menem II	3	12	4

Notes and sources: CMPI = Classic Macroeconomic Pressure Index. FPI = Fiscal Pressure Index. See Tables 1–3, text, and Appendices.

Because of the relatively balanced budget in the long run, and fairly frequent access to international capital markets, governments had some room for maneuver. Expansionary policies (deficits) were feasible in some administrations, and were considered an occasional but expected phenomena, reflecting the belief that economic growth would in the long run generate the resources to pay today's bills. This explains the outcomes during the Sarmiento and Juárez Celman regimes. The disequilibrium (assessed by deterioration in the FPI) was corrected in the subsequent administrations. Avellaneda's and Pellegrini's terms emphasized fiscal equilibrium and debt repayment rather than expansive demand policies.

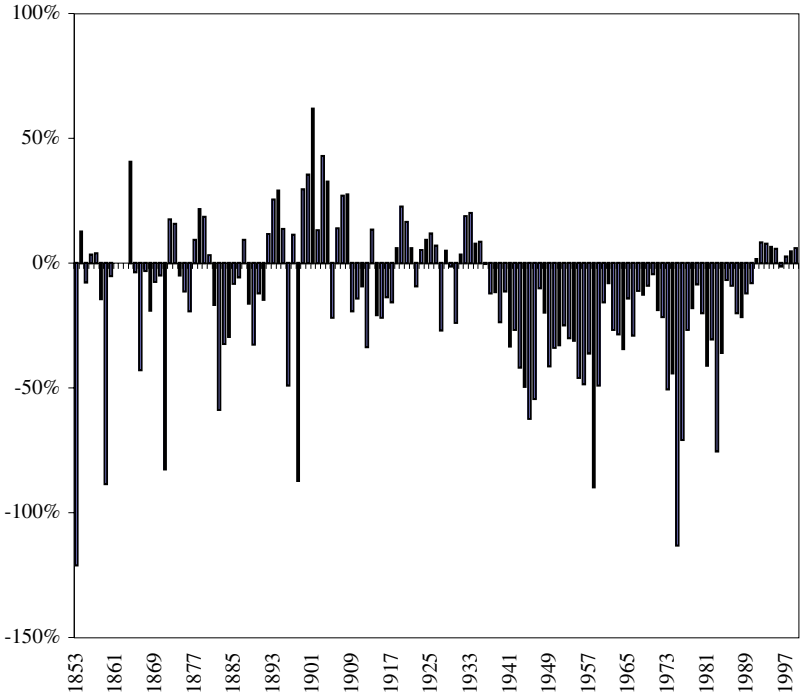
After 1914 the policy context changed dramatically. There was now limited access to the international capital markets (Taylor 1992, 1994). After heavy fiscal imbalances began in the 1940s monetary expansion became the crucial link between chronic deficits and nominal instability.[30] As shown in Tables 3 and 4, only those administrations that tried to reduce the fiscal gap improved both their FPI and CMPI outcomes, and they are the ones that appear higher in the rankings. For example, Onganía, with his finance minister Adalbert Krieger Vasena, succeeded – if only briefly – in improving Argentina's fiscal position in the period 1967–69. This helped reduce monetary expansion and, hence, annual inflation rates into single digits in 1969. This explains the favorable position assigned to this administration. But few postwar administrations had such success: corrections in fiscal disequilibrium became very rare until the 1990s, so that stabilization attempts tended to collapse shortly after being implemented. The lesson from the second half of the twentieth century is that fiscal discipline is the *sine qua non* condition for achieving nominal stability.

4 Conclusions

According to the Overall Index displayed in Table 4, the five most successful periods in the macroeconomic history of Argentina are the episodes associated with Menem's two mandates (1990–95 and 1996–99), Roca's second term (1899–1904), and years of the Obligado (1854–56) and Bartolomé Mitre (1860–68) administrations. It is worth noting that all of these five periods share one important institutional commonality: they each featured the establishment of, or convergence toward, a convertible monetary regime. This chapter thus offers one very striking finding; namely, that a good position in the macroeconomic

[30] An exception occurred in the late 1970s and early 1980s, when the government's external debt grew at rates approaching 50 percent per year. This abrupt issue of liabilities ended in severe capital flight, default on obligations, and the inability to access international credit markets during the 1980s.

Fig. 3. Ratio of primary result (net of interest) to fiscal revenues



Notes and sources: No data are available for the period 1861–63. See text and Appendix B.

rankings is definitively associated with a hard or strong currency regime. Moreover, a sound currency plan has proved sustainable in the immediate future only on those occasions when it has been associated with a sound fiscal situation. The above-mentioned intervals are also clear benchmarks in the history of Argentina's fiscal performance, as shown in Figure 3 containing the ratio of primary results to fiscal revenues from the mid-nineteenth century to recent years.

Although Argentina's first experience with a convertible monetary regime since independence officially occurred solely in 1867, the process of stabilization had already started in 1854. This trend toward greater macroeconomic stability was temporarily interrupted in the later years of the 1850s. The combination of warfare and currency issues during Alsina's second term (1857–59) was a clear manifestation of the devastating effects of civil war, and they affected the path to economic recovery so adversely that the second Alsina term is at the bottom of the rankings. Fortunately, this was a short-lived discontinuity

between the administrations of Obligado and Mitre, which rank as the second and third best periods, respectively.

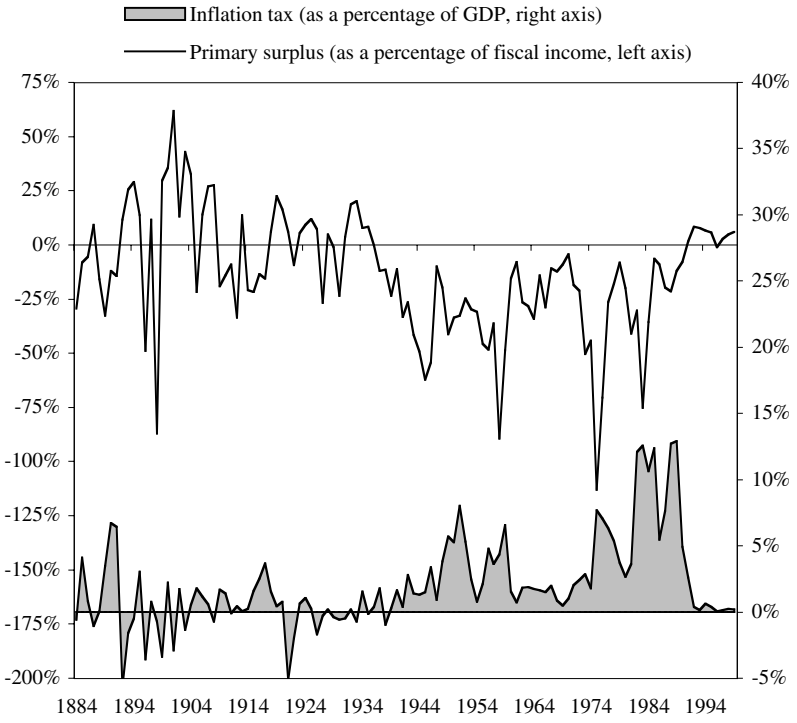
The period 1854–57 was a crucial turning point for the treasury, with the reduction of chronic imbalances that manifested the ongoing economic costs of independence and delays in the process of nation building. Recall that in 1854, the only existing financial institution – and the single bank of issue – was reformed, granting to its managers independence from government financial needs. Henceforth, Argentina pursued a virtuous monetary policy for some time. From 1899 during Roca's second presidency, the treasury enjoyed outstanding primary surpluses for six years in a row. This outcome was truly extraordinary in relation to the entire fiscal record from the country's 150 years of public finances. Thereafter, the budget was balanced on average and showed no significant shortfalls until the early 1930s.

After five years of fiscal bonanza following the recovery from the Great Depression, a dramatic and persistent string of deficits was re-inaugurated in 1936. We can note here that the central bank had just been created the year before. Not only was fiscal deficit the rule for more than fifty years until the 1990s, but it also reached substantial levels at times. In 1945, 1958, 1975–6, and 1983 the disparity between revenues and expenditure represented over 60 percent of total revenues. This trend only reversed in 1991 when the primary results turned positive. Although they were smaller in comparison with previous episodes, the surplus was steady. Once again, as part of the reforms introduced in the 1990s, the management of the central bank became autonomous from the government. A new charter established the bank as an independent authority in monetary policymaking.[31]

The relation between the institutional reforms in monetary authority and the shifts in the fiscal position of Argentina are apparent in Figure 4. The figure displays the evolution of the ratios of primary results to fiscal revenues and of the inflation tax to GDP. As mentioned before, fiscal disequilibrium was a transitory phenomenon from the 1850s to the 1930s, when budget deficit came to rule Argentine public finances. As was the case prior to the 1850s, currency issue was the ultimate recourse taken to meet the fiscal gap. This was the result of the government's capacity to influence the authorities in charge of monetary policymaking. Eventually, excessive monetary expansion led to inflation and allowed the government to repudiate some of its liabilities. Because inflation diminished the real value of money, the monetization of the fiscal deficit acted as a progressive expropriation of domestic currency held by private agents, i.e., it

[31] In 2001 this charter was *de facto* amended and modified by one of its architects, minister of finance Domingo Cavallo, terminating the bank's brief period of autonomy.

Fig. 4. Fiscal imbalance and inflation tax: A link between CMPI and FPI?



Notes and sources: See text and Appendix B.

acted as an inflation tax. This permanent erosion in the purchasing power of the public's cash holdings had dramatic consequences. Over time, this repeatedly used device reached extreme proportions: on a percentage basis, increases in the fiscal deficit were often met one-for-one with increases in inflation tax.[32]

The use of monetization to finance persistent fiscal deficits was one of the main problems of the Argentine economy in the second half of the twentieth century. At different points in time, several programs sought to break this pattern. Success was always ephemeral. Some of these measures achieved a reduction in the inflation rate that lasted for several months or for a few years;

[32] For example, as explained in Appendix C, by using a narrow definition of cash in the hands of the public, between 1960 and 1990 the inflation tax yielded $175 billion, and with the same figure exceeding $300 billion if we consider a broader definition of currency (M1). These figures are even greater than the outstanding public debt today ($125 billion) and represent more than 3 times the present annual fiscal revenues ($50 billion). Thus, given the magnitude of the fiscal disequilibrium this repeated recourse to inflation tax to fund deficit dramatically affected the nominal and real variables expressed in the Classical Macroeconomic Index.

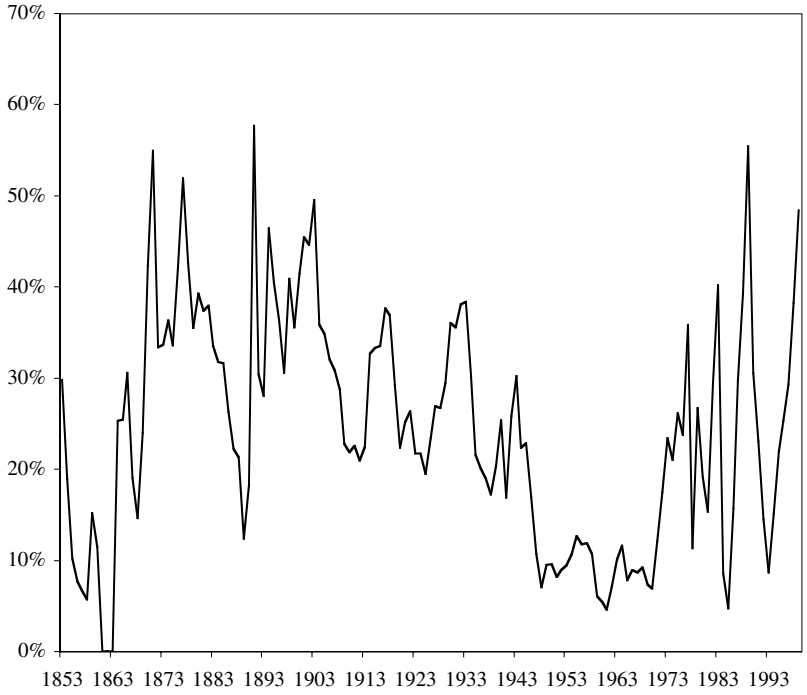
but soon, the fiscal scenario was repeated, and all stabilization plans ended in failure. These attempts usually began in periods of contraction in economic activity and soon afterwards they gave rise to demand booms that faded away when inflation accelerated again. Short-lived recoveries did not evolve into sustained growth because the fundamental problems underlying the fiscal problem remained unsolved. In the long run these failed stabilization attempts underline an incongruity between nominal stability and fiscal disequilibrium that was always, until the 1990s, ultimately solved in favor of maintaining the imbalances. Thus, the economy returned, again and again, to a path of increasing rates of inflation until it reached levels that brought about the need to try another round of stabilization.

For more than half a century governments made frequent recourse either to printing money or to trying other, more sophisticated means of expanding the money supply to resolve fiscal deficits, e.g., rediscounting facilities to private banks that fostered artificial credit expansion. All such policies resulted in high levels of inflation. Moreover, positive rates of inflation persisted in every year from 1940. This process reached a dramatic peak during the hyperinflation of 1989–90 when inflation rates neared 200 percent per month.

This pattern changed in 1991 once the mechanism was truly exhausted. In fact, by 1989–90 Argentines were reducing their real cash holdings, marking the start of a complete demonetization of the economy. Contemporary balance sheets of the Argentine central bank reveal the dramatic drop in cash available for transactions. Notes and coins in the hands of the public represented less than 2 percent of GDP. This is the ultimate example of the complex interaction between government choices and agents' preferences: a massive substitution of currency had occurred. This causes us to question the conventional interpretation of the economic history of Argentina as a mere reflection of economic policy, and it is one of the main features of the analysis developed in this chapter.

In 1991, the monetary discipline of the Convertibility Law curtailed the scope for fiscal imbalances. Because every increase in the stock of currency could only arise from an equivalent increase in the country's reserves, the new regime sought to tie the government's hands, preventing the expansion of unbacked money as a means to fund the deficit. Subsequently, there were only two alternatives: a reduction in the fiscal imbalance or its funding through debt issue. The alternative chosen in the 1990s was a mixed policy, and it signified a dramatic change in regime. Although in 1991, as mentioned before, the government achieved an unusual primary fiscal surplus that it maintained throughout the decade, it was insufficient to pay for the interest on the debt. Hence, debt increased, although until 1997 it grew at a slower rate than that of the economy. Thus, debt to GDP and debt to export ratios diminished during the majority of

Fig. 5. Ratio of debt service to government revenues, 1853–1999



Notes and sources: No data are available for the period 1861–63. See text and Appendix B.

the 1990s. As a result of relatively greater economic growth, greater fiscal discipline, and a virtuous monetary policy, country risk was reduced substantially as compared to the 1980s. In other words, the burden of the debt appeared to be alleviated, at least in the short run.

The situation changed dramatically after 1997 when debt ratios started to increase. Within the framework of lower economic growth, the increase of debt services without a matching surplus in primary results penalized the strategy of rolling over. Since 1993, the service of amortization and interest has reached extremely high levels as shown in Figure 5. By 2001, more than half of government revenues were committed to servicing the debt, a situation comparable to the one faced by Juárez Celman's administration (1886–90). Furthermore, the cost of using debt instruments to maintain actual fiscal imbalances proved increasingly dangerous, reaching prohibitive levels. Argentina seems to be approaching a new turning point in its economic history. The discipline imposed by the Convertibility Law ended in the months of December 2001 and January

2002 when the new Argentine authorities decided to devalue and default on both the internal and external public debt.

The problem of macroeconomic policymaking is yet again at center stage for Argentina. Can consistent policies be designed and implemented? Or will stablilizations alternate with crises, a stop-and-go cycle that has been so destructive over time? This chapter offers some historical perspective. We have considered the performance of the Argentine economy for the last 150 years by analyzing the relationship between nominal, real, and fiscal indicators. The indices presented are reduced forms for the interaction between government choices and agents' preferences over time. Since history really does matter, this interaction implies a strong path dependency linking past and present.

The inexorable intertemporal restriction – that is, how the fiscal deficit is financed over time – is today strongly conditioned by the path-dependent nature of Argentine economic history. Previous outcomes of the interaction between economic policy and public reaction have narrowed the choice set for decisionmakers when searching for ways to fund the deficit. There are almost no degrees of freedom left and woe to any administration that ignores the fiscal foundations of the economy. In a country that was once rich and proud, there is no longer time for fiscal illusion.

The once-abundant economic rents of Argentina have been consumed bit by bit during the twentieth century, and this of necessity prompts society to take more seriously the simple but ill-understood phenomenon of economic scarcity. How are Argentines going to cope with scarcity? Can they develop credible institutions for the purpose of dealing with a real, hard budget constraint? We have an intuition that a new constitutional and fiscal design could help the country escape the trap of discretionary rulers and diminish the incentives for opportunistic administrators to pass the buck.

Appendix A: Methodology

Both the Classical Macroeconomic and Fiscal Pressure indices can be interpreted as a summary of variables that reflect the outcome of the interplay between policymakers and agents over time relative to the initial conditions inherited. Thus, they are not "situation indices," but instead are "relative indices" in the sense that they reflect innovations instead of the compiling of the results of current and previous interactions between the government and the private sector.

The procedure to obtain both indices can be summarized as follows. First, time series of key macroeconomic variables are selected as primary components of both indices. These are observed at annual frequency from 1853 to 1999. These variables are summarized in Table 5. Second, each year is assigned to an administration (the chief of the executive branch of the national government after 1862 or the chief of the executive branch of Buenos Aires province before 1862) that ruled during the majority of the year. In this case, the period 1853–1999 was divided into thirty-three administrations. Let k

Table 5. *Index components*

Classic Macroeconomic Pressure Index	Fiscal Pressure Index
1. Inflation rate[1]	1. Debt to activity ratio
2. Devaluation rate	2. Debt to export ratio
3. Real interest rate[1]	3. Ratio of primary result of central government to total revenues[2]
4. Activity growth rate	4. Ratio of primary result of central government to debt servicing[2]
	5. Real interest rate adjusted by growth of activity, $(1 + r)/(1 + g)$

[1] Some observations are based on proxies. See Appendix B for further details.
[2] Observations are missing for the period 1861–63. See Appendices A and B for further details.

denote an administration (or interval), that is $k \in K = \{1, 2, \ldots, 33\}$, and let $t \in T$, the set of all years between 1853 and 1999. Then, according to the previously detailed administration assignment rule, each year $t \in T$ is assigned an element of $k \in K$. For each k there is a set A_k whose elements are the years in which administration k ruled. For example, the elements of A_2 are the years when the second administration (Obligado's) ruled: hence, $A_2 = \{1854, 1855, 1856\}$.

Third, let X_{jt} be the value observed at time $t \in T$ for the variable $j \in J$, the latter considered as primary component (e.g., inflation rate, activity growth, debt to export, etc.) of either the classic macroeconomic index or the fiscal pressure index. Now, for each variable $j \in J$ and administration $k \in K$ an inherited or "legacy component" level of the considered variable is computed. This number is the value observed in the last year of the previous administration and is labeled $X_{jk}(-1)$. Note that the value $X_{jk}(-1)$ is repeated in all the years of an uninterrupted administration, that is holding k and j fixed $X_{jk}(-1) = X_{jtk}(-1)$ for all $t \in (T \cap A_k)$. The sequence of $X_{jtk}(-1)$ (holding j fixed and $t \in (T \cap A_k)$) can be regarded as the previous administration's legacy for variable X_j. Hence, X_{jt} can be decomposed as the sum of two components:

$$X_{jt} = X_{jt}(-1) + x_{jt},$$

where: $X_{jt}(-1)$ is the legacy component, that is, the initial conditions for variable j inherited from previous administration; and $x_{jt} = X_{jt} - X_{jt}(-1)$ the innovation component, also the "outcome innovation" for administration ruling in year t. The innovation component can be regarded as the improvement over the "legacy component" or "initial condition" inherited from the previous administration, as defined above. Thus, the innovation component is the desired time series in order to build a *relative* index, because it corrects for initial conditions.

Fourth, the sequence of outcome innovations, namely $x_{jt} = X_{jt} - X_{jt}(-1)$, is computed and then sorted so that the best year of macroeconomic management is listed at the top of the rank according to indicator x_{jt}. For example, let $x_{jt} = X_{jt} - X_{jt}(-1)$, $t \in T$ be the sequence of outcome innovations for the inflation rate. Since higher innovations in inflation are associated with worse outcomes, the sequence x_{jt} will be sorted in ascendant order and at the top of the ranking will be the year with the lowest value of x_{jt} (lowest inflation innovation). In other cases, such as activity growth innovation, the sorting will be descending: the higher is the growth innovation, the better the position in the ranking.

Table 6. *Sorting of innovation index components*

Innovation component	Sort
Inflation rate	Ascending
Devaluation rate	Ascending
Real interest rate	Ascending
Activity growth rate	Descending
Debt to activity ratio	Ascending
Debt to export ratio	Ascending
Ratio of primary result of central government to total revenues	Descending
Ratio of primary result of central government to debt servicing	Descending
Real interest rate adjusted by growth of activity, $(1 + r)/(1 + g)$	Ascending

Table 6 summarizes the sort ordering used to construct the percentile rank table of for each policy innovation variable.

Finally, given these positions for each year and each variable (measured by its outcome innovation component) we define a relative index for the positions of each variable in the following manner. For a certain variable j (e.g., the policy innovation of the inflation rate) each year with available observations is assigned a relative position in the [0, 1] segment, using the position in the ranking. The year ranked as number one will be assigned number one and the year with the lowest position will be assigned number zero. The rest of the years will get the corresponding percentile fraction according to the position in the ranking according to the following formula:

$$R_{jt} = (O_j - o_{jt})/O_j,$$

where: o_{jt} is the position in the ranking of the policy innovation for variable j in period t (using the ordering shown in Table 6); and O_j is the total number of observations ranked for policy innovation x_{jt}.

To sum up, for each variable, this method considers its innovation component (the difference between actual outcomes and initial conditions), and then standardizes the innovation component in the [0, 1] interval using a percentile ranking method. The higher the value in this relative index, the better the management situation of the incumbent government as measured by the variable considered.

The Classic Macroeconomic Index for an administration is the average of four relative indices (in the [0, 1] range) over all years of the term of that administration. These indices are based on the four primary components of the Classical Macroeconomic Index mentioned above: inflation, devaluation, and interest rates together with activity growth.

The Fiscal Pressure Index for an administration is the average of five relative over all years of the term of that administration. One caveat should be made: there are no available observations for the following ratios in the 1861–63 period (Mitre Administration): primary result of central government to total revenues, and primary result of central government to debt servicing. If one were to compute the average based on the other three available policy innovations, this would create distortions in the evolution of the index for that year because of variable omission. To reduce partially this risk, interpolated values for both relative (those based on primary result of central government to total revenues and primary result of central government to debt servicing) were calculated by assuming a constant growth rate for each index in the 1861–63 period. The values of the relative indices for years other than the above-mentioned period are

left unchanged.[33] This procedure corrects for spurious level changes in the Fiscal Pressure Index that might arise if the latter were calculated only on the levels of the three relative indices mentioned above. However, given the constant-rate-change hypothesis used to interpolate, the actual volatility of the Fiscal Pressure Index during these years can be underestimated. The effect on the average value of the Fiscal Pressure Index for the Mitre administration (1860–68) is roughly nil because this average is based on forty-five observations (nine years of government with five variables per year), of which only six have been interpolated.

Appendix B: Data sources and methodology

Inflation rates

1853–65: Annual devaluation rates (Irigoin 2000a and Cortés Conde 1989).

1866–79: Implicit export prices growth (Dieguez 1972) converted to paper pesos using exchange rates (Cortés Conde 1989).

1880–84: Based on a price index constructed by Cortés Conde (1989, 210–11).

1885–1939: della Paolera and Ortiz (1995).

1939–49: Simple average between CPI and WPI inflation from *Revista Económica*, Banco Central de la Republica Argentina (BCRA), several issues; *Anuario Estadístico de la República Argentina*, several issues; and *Statistical Yearbook of the League of the Nations*, several issues.

1949–99: Simple average between CPI and WPI inflation, from *Boletin Techint*, several issues, and DATAFIEL (database of Fundacion de Investigaciones Economicas Latinoamericanas, FIEL).

Devaluation rates

Based on the devaluation rate of paper money to gold (until 1938) and to U.S. dollar (since 1939):

1822–63: Irigoin (2000a).

1864–84: Cortés Conde (1989).

1885–1938: della Paolera and Ortiz (1995).

1939–46: End of year quotation from *Revista Económica*, BCRA, several issues.

1947–59: End of year quotation, *Boletín Techint*, several issues.

1960–89: Average of December quotations from Ruíz (1990).

1990–99: Average of December quotations from DATAFIEL.

Note: When necessary, the assumed conversion factor between *pesos fuertes* and gold pesos considered was unity.

Interest rates

1853–63: Least squares interpolation using observed discount rates on hard currency for the period 1850–80 and long-term yield on specified issues of public bonds (*fondos públicos*) denominated on hard currency for the period 1864–80 (Cortés Conde 1989). The estimated relation for the 1864–80 period is $i_t = 1.3909 d_t + 0.0046$, where i_t is the

[33] Note that these completed relative indices no longer have the interpretation of percentile ranks. However, the difference is minimal, since interpolation was done on only three of almost ninety observations.

long-term yield on *fondos públicos* and d_t is the discount rate of Banco de la Provincia de Buenos Aires.

1864–82: Long-term yield on specified issues of *fondos públicos* denominated on hard currency (Cortés Conde 1989).

1883–1913: della Paolera (1988). Cortés Conde (1989) and della Paolera (1988) have coincident values in the 1883–84 period, thus there is no spurious level change when changing from one source to the other.

1914–26: From della Paolera and Ortiz (1995), subtracting expected inflation rate. della Paolera (1988) and della Paolera and Ortiz (1995) have coincident values in the 1884–1913 period, thus there is no spurious level change when changing from one source to the other.

From 1945 to the end of the 1980s: Real interest rates were almost always negative (with a few exceptions, such as the financial liberalization experiment in late 1970s or during the late 1960s), because of financial repression. We constructed time series that reflect the cost of foreign debt (in real terms) following the methodology of Rodriguez (1986) and subtracting U.S. expected inflation rate, and with balance of payments data from Balboa (1972) and Oficina de Estudios para la Colaboración Económica Internacional (OECEI) from 1926 to 1969. To avoid changes in 1926, the real interest rate calculated from della Paolera and Ortiz (1995) was given decreasing weight in the period 1926–40. Thus, only estimates based on Balboa and OECEI 1940–69 are reported for the 1940–69 period. Further information on external debt were constructed from IEERAL (1986) and Avramovic (1964).

1970–81: Rodriguez (1986).

1981–94: We constructed a new monthly database for the *bonos externos* (BONEX) using information on term structure of T-bills to approximate the expected interest yield (the coupon rate was not fixed). Weights on different issues of BONEX were used to avoid excessive fluctuations in the duration of the bonds in the portfolio.

1994–99: Average stripped yield of Argentine Foreign Bonds provided by J. P. Morgan (EMBI and EMBI+).

Note: in all cases, the expected inflation rate was computed as the trend of inflation rate using Hodrick–Prescott Filter (the relevant smoothing parameter was set at 100, given the frequency of the data).

Exports and imports

1853–61: Observations in some years based on statistics included in Irigoin (2000a) for the 1822–61 period. Missing observations were replaced with interpolations made with most adjacent available data and assuming constant growth rates for both imports and exports separately.

1862–82: della Paolera and Taylor (2001).

1883: Vázquez-Presedo (1971–76) coincident in overlapping years with della Paolera (1988).

1884–1899: della Paolera (1988).

1900–99: Gerchunoff and Llach (1998) and *Informe Económico*, Ministerio de Economía, several issues.

GDP (activity)

Growth rates based on:

1853–75: Export plus imports in gold pesos.

1876–84: Cortés Conde (1997) index of GDP.
1885–1993: della Paolera and Ortiz (1995).
1994–99: *Informe Económico*, Ministerio de Economía, several issues.

Because the della Paolera and Ortiz (1995) source extends to 1993, the constructed index based on the previous sources was denominated in gold pesos using the value of the constructed index in 1986, GDP at 1986 prices (in australes), and the exchange rate index in 1986. These two last series are based on della Paolera and Ortiz while the first is constructed on growth rates from different sources mentioned above. Growth rates from 1994 to 1999 are based on GDP at constant 1993 prices.

Note that for the 1853–75 period this index assumes that the exports plus imports ratio to GDP remains constant.

Fiscal revenues, total expenditures, and deficit

1853–60: Irigoin (2000a).
1862: Cortés Conde (1997).
1864–83: Cortés Conde (1989).
1884–89: Weighted average of Cortés Conde (1989) and della Paolera and Ortiz (1995). Weights for 1884 are 1/7 for the latter data and 6/7 for the former. The weights for della Paolera and Ortiz (1995) increase linearly in 1/7 per year, thus weighting 7/7 = 1 in 1890. Weights for Cortés Conde are the difference between 1 and the weights for della Paolera and Ortiz (1995).
1890–1940: della Paolera and Ortiz (1995).
1940–99: Combines data from della Paolera and Ortiz (1995) for 1940–71, FIEL (1987) for the period 1960–85 (primary deficit), IDB Database for the period 1980–94 (primary deficit), and Ministerio de Economía, which covers 1987–91 and 1993–99 (primary deficit). Information in overlapping periods is a weighted average of sources, to avoid sudden changes in values.

Debt servicing

1853–60: Irigoin (2000a).
1864–75: Cortés Conde (1989).
1876–89: Based on Cortés Conde (1989) and Vázquez-Presedo (1971–76), with linear increasing weights for the latter in the same manner that was done for revenues and expenditures in the 1884–89 period (see above).
1890–1914: Vázquez-Presedo (1971–76).
1915–70: Garcia Vizcaíno (1972).
1971–77: From FIEL (1987) and *Anuario Estadístico* (INDEC), several issues.
1978–85: From FIEL (1987) and *Memoria Anual*, BCRA, several issues.
1986: From *Memoria Anual* 1986, BCRA, and IDB database.
1987–91): From IDB database and Ministerio de Economía.
1992–99: Dal Din and Lopez Isnardi (1998) and Ministerio de Economía.

Internal and external debt

1853–70: Own calculations based on Irigoin (2000a), Burgin (1971), Agote (1881–88).
1870–1909: Coincident data based on Chiaramonte (1971) and Vázquez-Presedo (1971–76).

1910–14: Weighted average from Vázquez-Presedo (1971–76) and Cottely (1981, converted to gold pesos). The latter labels this particular series Deuda en Circulación. Weighted average was based on linear increasing weight for Cottely's data in this period.

1915–40: Cottely (1981), converted to gold pesos.

1940–99): Own calculations based on Vázquez-Presedo (1971–76); *Boletin Estadístico*, BCRA, several issues; Dornbusch and de Pablo (1988); IEERAL (1986); Dal Din and Lopez Isnardi (1998); and Ministerio de Economía.

Population Growth

Used to calculate the increase in per capita GDP/ACTIVITY levels. Based on Cottely (1981) for the period before 1950. For the 1853–1864 period the assumed rate of population growth is the average for this variable over the years 1865–69. Penn World Tables data is used for the period 1950–74. Instituto Nacional de Estadística y Censos (INDEC) estimates are used from 1975.

Appendix C: The intratemporal budget constraint of the government

The interaction between debt, inflation, and deficits over the long run can be addressed through the introduction of a simple tool, the intratemporal budget constraint of the government.[34] Over the last 150 years, and despite the heterogeneity of fiscal-monetary regimes, the national government had to obey in every moment a golden rule, the so-called intratemporal budget constraint. This simple constraint will us help to understand the mechanics of deficit financing under different regimes and their consequences for the evolution of money supply, inflation, and debt.[35]

To simplify, assume that government debt consists of one-period bonds, that is, bonds that mature one period after being issued. Thus, the intratemporal budget constraint in period t is:

$$G_t = T_t + [B_t - (1 + r_t)B_{t-1}] + [M_t - M_{t-1}]/P_t,$$

where G_t is real government expenditures (the term real means that the considered nominal variable was divided by a representative price index; then real expenditure can be seen as the expenditure measured in terms of goods rather than money; this helps to differentiate fluctuations in the level of nominal expenditures caused by inflation from other types of movements). In addition, T_t is real government tax revenues; B_t is the real value of debt at the end of period t (in this case, the income from bonds issued in period t); $B_{t-1}(1 + r_t)$ is the real value of debt at the end of previous period plus real interest income earned between period $t - 1$ and t; M_t is the nominal stock of currency in period t (similar for M_{t-1}); and P_t is the price level index in period t (similar for P_{t-1}).

Note that $[B_t - (1 + r_t)B_{t-1}]$ represents the net borrowing of the government in period t and $[M_t - M_{t-1}]/P_t$ are real resources raised from money issuing at period t. The last expression is known seigniorage or real revenue of money issue.

34 An *intra*temporal restriction links variables observed in a determined period, characterizing the inherent restriction for that period. An *inter*temporal restriction links variables observed in many periods, and is therefore quite different.

35 An excellent reference that addresses this issue in depth is Sargent (1986), especially chapters 1, 2, and 5.

The interpretation of the intratemporal government restriction is simple: current expenditures are financed by a combination of (1) tax revenues in the same period, (2) net borrowing, and (3) money issue.

Rearranging the restriction, we obtain the following expression:

$$G_t - T_t = [B_t - (1 + r_t)B_{t-1}] + [M_t - M_{t-1}]/P_t.$$

The above equation means that primary deficit $G_t - T_t$ must financed via net borrowing and/or seigniorage (money increase). Eventually, excessive money expansion will lead to inflation, thus allowing the government partially to repudiate part of its liabilities because inflation will erode the real value of money, a nominal liability of the government.

Noting that

$$[M_t - M_{t-1}]/P_t = M_t/P_t - [(M_{t-1}/P_{t-1})(P_{t-1}/P_t)],$$

and defining $m_t = M_t/P_t$, the amount of currency in real terms held by the public at the end of period t (similarly for m_{t-1}), and $(1 + \pi_t) = Pt/P_{t-1}$, one plus the rate of inflation between $t - 1$ and t, we conclude that

$$[M_t - M_{t-1}]/P_t = m_t - [m_{t-1}/(1 + \pi_t)] = m_t - m_{t-1} + m_{t-1}[\pi_t/(1 + \pi_t)].$$

Then we know that the real resources raised from money issuing at period t, $[M_t - M_{t-1}]/P_t$ can be decomposed into $m_t - m_{t-1}$, that is, the increase in money demand from the public, and $m_{t-1}[\pi_t/(1+\pi_t)]$, that is, the real amount eroded by price increase between $t - 1$ and t. The expression $m_{t-1}[\pi_t/(1 + \pi_t)]$ is usually labeled "inflationary tax", and $[\pi_t/(1 + \pi_t)]$ is the "tax rate" on real balances held by the public. The inflationary tax is not necessarily the revenue arising from money printing, but is a good measure to evaluate the erosion on real money holdings. Note that money is indeed a liability of the government, hence the inflation tax can be seen as a tax on a subset of government creditors – those who hold money. Thus, through inflation, the government diminish the amount of liabilities to the private sector. In this interpretation, inflation can be seen as a partial default on monetary liabilities.

Two remarks about the sources used to construct the series of Inflation Tax must be made. First, to compute the evolution of inflation tax as displayed in Figure 4, a time series of real cash holdings and real GDP is obtained, considering $M = \text{M0} =$ currency in the hands of public plus vault cash. The database used in Figure 4 is from della Paolera and Ortiz (1995), completed with information from the Ministerio de Economía (*Informe Económico*, several issues). The results are based on annual observations.

Second, to calculate the amount of inflation tax between 1960 and 1990, monthly series were used to get higher accuracy. Two different series, cash in the hands of public and M1, were used as a proxy for M. The primary source was the Banco Central de la República Argentina and the price index used was the CPI provided by Instituto Nacional de Estadística y Censos. Given the above definitions, and considering all monthly observations as a sequence from $t = 1, \ldots, t_{\max}$, the inflation tax at prices of time T totalizes

$$P_T \sum_{t=1}^{t_{\max}} m_{t-1} \frac{\pi_t}{1 + \pi_t}.$$

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