



Fiscal rules and the behavior of public investment: towards growth-friendly fiscal policy? The case of Argentina

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Abstract

Public investment cuts are the norm during economic downturns and fiscal consolidations. Consequently, public investment levels have been declining across both advanced and emerging economies over the last decades. Since this can be problematic for economic growth, countries have been adding flexibility to their Fiscal Rules (FRs)—through, for example, cyclically adjusted fiscal targets, well-defined escape clauses, and/or investment-friendly provisions—to protect public investment. This paper analyzes if flexible FRs are effective to protect public investment during fiscal consolidation episodes. The Argentine case provides a good experiment as in 2004 a flexible FR was established, while the aim of protecting public investment was explicitly included. Econometric analysis suggests that a flexible FR helps to mitigate the negative effects of fiscal consolidations on public investment. This result is in line with recent evidence and holds up to several robustness tests. Based on this finding, guidelines for a proposal of a flexible FR in Argentina are provided. The analysis supplies a reference for fiscal policy discussion in other developing countries.

Keywords Fiscal rules · Public investment · Argentina

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Introduction

Fiscal rules (FRs) have become increasingly popular as an instrument to achieve long-term budget sustainability: while by 1995 less than 25 countries had adopted a FR, by 2015 this figure increased to 92 (IMF 2017). This flourishing in the adoption of FRs has taken place in both developed and developing countries. The main feature of this wave has been the introduction of flexibility in the FRs as to protect public investment. Some examples of the way flexibility has been adopted include cyclically adjusted fiscal targets; well-defined escape clauses in the case of unanticipated shocks, and investment-friendly provisions (i.e., rules that exclude capital expenditures from the numerical targets imposed on fiscal aggregates) (Budina et al. 2012; Guerguil et al. 2017; Ardanaz et al. 2021a). There are several lines of reasoning support the idea of protecting public investment through FRs adoption. Firstly, public investment cuts are usually the norm during economic downturns, producing a certain bias against this type of expenditure during unprosperous times -which is more relevant in Latin America and the Caribbean than in other regions of the world (Servén 2007; Ardanaz and Izquierdo 2021). Secondly, fiscal consolidations are usually characterized by larger decline in public investment than public consumption relative to total public expenditure. (Bamba et al. 2020; Ardanaz et al. 2021a, 2021b). Accordingly, public investment levels have been declining across both advanced and emerging economies over the last decades (Izquierdo et al. 2018). This can be problematic for economic welfare since the public investment multiplier can be quite large, especially when compared to the government consumption multiplier (Ilzetzki et al. 2013; Izquierdo et al. 2019).

In this context, the effectiveness of FRs implementation and their design to protect public investment during fiscal consolidations have become relevant issues in the discussion on fiscal policy, triggering the research question of this paper: *Are flexible FRs effective to protect public investment during fiscal consolidation episodes?* To answer this question, we analyze the case of Argentina, a developing country that established a flexible FR in 2004 which explicitly included the aim of protecting public investment.

Argentina is a federal country, with three levels of government: national, sub-national—including 23 provinces and the Autonomous City of Buenos Aires (CABA)—and local—with more than 2300 local governments. Trying to answer the research question with the case of Argentina is interesting for several reasons. First, the country has a long history of lack of fiscal discipline that ended in traumatic episodes of sovereign defaults or high inflation (Buera and Nicolini 2019). In addition, Argentina's public finances have drastically changed during recent decades. Before the 2001–2002 deep economic crisis, Argentina's primary public expenditure was about 24% of GDP. Those expenditures almost reached 40% of GDP in 2015 and declined afterward to 38% by 2017; this share is both well above the average for Latin America and Caribbean countries and closer to the OECD average (OECD 2020). This fiscal expansion was mainly explained by pensions, public wages, and

current transfers. Second, since 1999 Argentina made several attempts to establish a FR at the National level. After two frustrating attempts in 1999 and 2001, a FR was introduced in 2004 covering not only the National government but also imposing restrictions on those provinces that adhered to the FR. Twenty one out of the 23 provinces accepted the National government invitation, including some that already had their own provincial FR. Third, the 2004 National FR introduced expenditure ceilings and a balanced-budget target and was flexible in nature given that ceilings excluded capital expenditures or were established on current expenditure. Fourth, twelve out of the 23 provinces introduced their own FRs in early 2000s. Thus, many of the provincial FRs and the National FR were simultaneously implemented. Fifth, provinces and local governments account for about 45% of primary public expenditures, a share that reaches 66% for public investment (Cont and Porto 2014).

We estimate the role of flexible FRs on protecting public investment during fiscal consolidations in Argentina using panel data for the period 1992–2018 at the provincial level. The estimation framework closely follows Ardanaz et al. (2021a). We find that flexible FRs help to mitigate the negative effects of fiscal consolidations on public investment. Specifically, when there is no FR in place or there is one but without flexibility features (i.e., a rigid FR), a fiscal consolidation is associated with an average 19% reduction in public investment. Instead, when a flexible FR is adopted the negative effect of fiscal consolidations on public investment vanishes. The result holds up to several robustness tests.

The paper contributes to the literature by validating that flexibility mechanisms effectively safeguard public investment from budget cuts during fiscal consolidations. It provides empirical evidence on how in a federal and developing country, a National FR can protect subnational public investment. To some extent, this paper complements and reinforces the recent paper by Ardanaz et al. (2021a), which contributes in a similar way but using panel data at the country level. In addition, the paper contributes to the discussion on FRs and public investment protection in Latin America as Mendoza Bellido et al. (2021) does for the case of Peru and Fuentes et al. (2021) for the case of Chile. Conclusions from the Argentine experience could be useful for other developing countries that are dealing with the adoption of FRs. Also, they could help to think about the FRs' design in the discussion on fiscal sustainability in developing regions.

The paper proceeds as follows. Second section reviews previous research on public investment behavior and FRs. Third section describes the Argentine experience regarding the adoption of FRs. Fourth section presents the data and describes the estimation framework. Fifth section reports the main results, several robustness tests, and extensions to the baseline results. Sixth section concludes.

Related literature

Public investment cuts are usually the norm during economic downturns (Servén 2007). In addition, current public expenditure, and public investment (i.e., capital expenditure) react differently to the business cycle (Ardanaz and Izquierdo 2021). While current expenditure increases in good times and does not decrease in bad

times, public investment is reduced in bad times and does not recover—to previous levels—in good times. Thus, on average, the fall in public investment ranges from 1 to more than 2% for each percentage point of deterioration in the output gap. This produces a bias against public investment during bad times that is more remarked in Latin America and the Caribbean than in other regions of the world. Also, public investment cuts are usually the norm during fiscal consolidations: the contribution of public investment cuts is about 10% relative to average public investment, while the contribution of public consumption cuts is only about 4%, on average (Bamba et al. 2020; Ardanaz et al. 2021a). Consequently, public investment levels have been declining across advanced and emerging economies over the last decades. Since the 1980s, public investment as a share of total outlays has lost about 4% points in the developed world, and around 8% points in emerging countries (Izquierdo et al. 2018).

The decline in public investment levels harms economic welfare. Early theoretical work by Aschauer (1989a, b) and Baxter and King (1993) and more recent empirical evidence (Auerbach and Gorodnichenko 2012b, a; Leduc and Wilson 2013; Ilzetzki et al. 2013; Eden and Kraay 2014; Calderon et al. 2015; Furceri and Li 2017; Izquierdo et al. 2019) have found that the public investment multiplier can be quite large, especially when compared to the government consumption multiplier.¹ Empirical evidence also supports this finding for Argentina (Puig 2014; Izquierdo et al. 2019). This result still holds during fiscal consolidation episodes. Jovanovic (2017), comparing the government investment and government consumption multipliers in developed economies during fiscal consolidations, finds that the first one likely exceeds the second one, suggesting that fiscal consolidations should be accompanied by increased public investment. The underlying mechanism is that public investment directly improves the economy's productive capacity by increasing the marginal product of private capital and labor. As time progresses, this generates positive effects both on private investment and private consumption. Along these lines, the recent contribution by Ardanaz et al. (2021b) studies whether changes in the composition of public expenditure affect the macroeconomic consequences of fiscal consolidations. Based on a sample of 44 developing countries and 26 advanced economies during 1980–2019, Ardanaz et al. (2021b) show that while fiscal consolidations tend to be contractionary on average, the size of the output fall depends on the behavior of public investment vis-a-vis public consumption during the fiscal consolidation. When public investment is penalized relative to public consumption, and thus, its share in public expenditures decreases, a 1% of GDP fiscal consolidation reduces output by 0.7% within three years of the fiscal shock. In contrast, safeguarding public investment from budget cuts vis-a-vis public consumption

¹ Additionally, Izquierdo et al. (2019) and Ramey (2020) state that the size of the public investment multiplier as well as its spillover effects on the private sector crucially depend upon the already existing stock of public capital. When the stock of public capital is low, and based on simple first principle arguments, the marginal product of an additional unit of public investment is large and, therefore (coupled with spillovers with private investment) delivers public investment multipliers well above one.

can neutralize the contractionary effects of fiscal consolidations, and can even spur output growth over the medium term.

Considering the economic consequences of the decline in public investment, the use of FRs to protect it has been recently analyzed.² Ardanaz et al. (2021a) show that public investment behavior during fiscal consolidations (in 75 advanced and emerging economies during 1990–2018) differs significantly depending on the FRs design. FRs can be flexible, meaning that they include mechanisms to accommodate exogenous shocks (e.g., cyclically adjusted fiscal targets, well-defined escape clauses, and differential treatment of investment expenditures) or rigid, in which case they establish numerical limits on fiscal targets without considering flexible features. This definition on flexibility follows Guerguil et al. (2017). Ardanaz et al. (2021a) find that in countries with either no FR or with a rigid FR, a fiscal consolidation of at least 2% of GDP is associated with an average 10% reduction in public investment. Instead, in countries with a flexible FR, the negative effect of fiscal consolidations on public investment vanishes, which implies that flexible FRs protect public investment during consolidation episodes. The mechanism for protection is that flexible FRs reduce public investment procyclicality, as was also previously suggested by Bova et al. (2014). The so-called second-generation FRs (e.g., rules with cyclically adjusted fiscal targets, or well-defined escape clauses) have contributed to reducing expenditure pro-cyclicality in developing countries.³

Fiscal rules in Argentina

Prior to 2004, there had been two failed attempts to establish FRs at the National level in Argentina. The first was in 1999—period of macroeconomic distress and shrinking political support—when the country was entering the largest recession in its history. A balanced-budget FR (Law 25.152) with expenditure ceiling (i.e., total primary expenditures could not grow more than nominal GDP) was introduced. This FR also created a countercyclical fund. However, given the sizeable economic crisis and lacking time to build on some fiscal cushions, the FR rapidly lost relevance. The second attempt was in 2001 when the country was still sunk in the economic depression. Another balanced-budget FR (Law 25.435) established that expenditures (both at the National and provincial levels) would be reduced (at the same rate) to achieve a zero deficit. However, the FR never came into effect given the 2002 economic crisis (Artana et al. 2021); the Supreme Court ruled that this Law was unconstitutional, and it was derogated in 2003.

Having overcome the economic crisis a FR was finally established. In 2004 the National Congress approved a FR (Law 25.917 and Decree 1731/04) that was

² Empirical literature about FRs is mostly focused on the effectiveness of FRs in constraining aggregate level fiscal outcomes, such as the deficit, public debt, or the size of government (Asatryan et al. 2018; Heinemann et al. 2018).

³ Also, Guerguil et al. (2017) show how different flexible features affect the cyclical behavior of public expenditure.

expected to apply to the National government and, by invitation, to all provinces and the CABA. The approval of the FR was a conditionality of a stand-by agreement with the International Monetary Fund (IMF).⁴ At that time the National government had achieved fiscal equilibrium and the economy was growing at high rates given extremely favorable international conditions. Twenty one out of the 23 provinces accepted the invitation, including some that already had their own provincial FR. The CABA and the provinces of La Pampa and San Luis never adhered. The FR established a balanced-budget target (net of projects financed by International Financial Institutions—IFIs—and capital expenditure allocated to basic social and economic infrastructure) and a ceiling on the growth rate of expenditures. Specifically, total primary expenditures could not grow more than nominal GDP. However, should the ratio between debt services and current revenues at the provincial level be below 15%, or if the growth rate of provincial revenues were higher than nominal GDP, the ceiling would be imposed on current primary expenditure.⁵ Thus, following Guerguil et al. (2017) definition—see above—the 2004 National FR can be considered a flexible one, since expenditure ceilings exclude capital expenditures or are imposed on current expenditure.

One year after being approved, the FR was modified to exclude expenditures in education that had to be increased to 6% of national GDP.⁶ As a consequence, the fiscal targets were less binding. In 2009, through Law 26.530, further modifications were introduced to accommodate the impact of the world financial crisis; those expenditures were meant to promote economic activity, sustain the level of employment, and for social assistance could be excluded from the ceilings. The broad scope of this definition meant that virtually any expense could be excluded, rendering the numerical targets of the original FR, de facto, meaningless (Artana et al. 2021).⁷ This behavior largely coincides with the findings in Claeys (2006) for developed countries; despite the presence of FRs composed—partly—of automatic stabilizers, discretionary policy decisions made by the government can reduce their effectiveness. Initially, these changes would be only applicable for the 2009–2010 period, but they were renewed every year until 2016 in the annual Budget Law. Eight years after Law 26.530, the 2017 Budget Law (27.341) set transitory clauses to progressively achieve a balanced budget and established a ceiling on current primary expenditures (i.e., they were not being able to grow more than nominal GDP). Finally, in 2018 a new FR (Law 27.428) was introduced. This FR established that current

⁴ The invitation and accession were formally voluntary for the provinces so as not to violate the federalism ruled by the National Constitution, but it was an example of coercive federalism through the refinancing of the provincial debt by the national government.

⁵ The FR also established the creation of a countercyclical fund (that was never set up) and ruled that subnational government debt and guarantees had to be authorized by the National Finance Ministry (Artana et al. 2021). In case of non-compliance with any of the ceilings, the provincial government should adopt measures to obtain primary surplus and could not issue new debt unless refinancing existing obligations under better conditions.

⁶ In Argentina, the provinces oversee primary and secondary education provision. Universities are financed at the National level. Public education charges no tuition or fees to students.

⁷ Moreover, Law 26.530 eliminated the debt clause that became irrelevant after the National government had agreed upon different debt reduction programs with the provinces.

primary expenditure could not grow more than inflation and added a ceiling on the growth rate of public employment (that must be lower than the population growth rate). Thus, after almost two decades, National FRs that restricted provincial decisions were only de facto in force for five years: 2005–2008 and 2018. From 2009 to 2016, the original ceilings were not binding. According to the IMF (2017), the rule was de facto suspended after 2009.

At the subnational level, 12 out of the 23 provinces introduced their own FRs in the early 2000s; the design of which is comprehensively analyzed in FIEL (2003). Eleven out of the 12 FRs introduced a balanced-budget target, one province adopted a Golden Rule that excludes investment from the budget target (Tucumán), two provinces (Cordoba and San Luis) applied ceilings on current expenditure, and four provinces introduced escape clauses—usually through fiscal savings in stabilization funds. Additionally, some of the provinces also imposed debt ceilings and transparency rules (see FIEL 2003). It is worth mentioning that provincial FRs were adopted by half of the provinces of Argentina regardless of their levels of development (Artana et al. 2021).⁸

Table 1 summarizes this setting on the evolution of National and provincial FRs. From 1999 to 2018 Argentina had four different FRs which involved both the National and subnational governments: (i) National Law 25.152 in 1999; (ii) National Law 25.435 in 2001; (iii) National Law 25.917 in 2004, and (iv) Provincial Laws. Given that many of them were simultaneously implemented, subnational governments can be classified into four groups: No FR (CABA and La Pampa); only Provincial FR (San Luis); provinces that adhered to the National FRs (11 provinces); and provinces that had their own FR and adhered to the National FR (10 provinces). Before 2000 no province had a FR.

Empirical strategy and data

To analyze if flexible FRs are effective to protect provincial public investment during episodes of fiscal consolidation in Argentina we rely on the following specification based on Ardanaz et al. (2021a):

$$\Delta G_{i,t}^{PI} = \alpha_i + \theta_t + \beta_1 FC_{i,t} + \beta_2 FR_{i,t} + \beta_3 FC_{i,t} * FR_{i,t} + \Gamma X_{i,t} + \mu_{i,t} \quad (1)$$

where $G_{i,t}^{PI}$ is real public investment in province i at year t ,⁹ $FR_{i,t}$ is a dummy equaling one if a FR is in place at time t and 0 otherwise (i.e., a *de jure* definition of a FR according to Table 1). With the aim of having a sample with a pure flexible FR in place, we focus on those provinces that adhered to the flexible National FR during

⁸ Argentina's 23 provinces and the CABA differ in their development and in their capacity to finance their expenditures with own-source revenues. The most developed provinces have a vertical imbalance of about 50%, but the poorest finance 90% of their expenditures with transfers from the National government.

⁹ Provincial public investment includes direct real investment, capital transfers, and financial investment. Our estimates are performed with direct real investment.

Table 1 Evolution of National and provincial FRs, 1992–2018

Province	1992 to 1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Caba	Data available but no fiscal rule in place																			
La Pampa																				
Buenos Aires																				
Chubut																				
Cordoba																				
Corrientes																				
Entre Ríos																				
Formosa																				
Jujuy																				
La Rioja																				
Mendoza																				
Neuquen																				
Santa cruz																				
Santa Fe																				
S. Del Estero																				
Catamarca																				
Chaco																				
Misiones																				
Río Negro																				
Salta																				
San Juan																				
T. DEL FUEGO																				
Tucuman																				
San Luis																				

Source: Authors' compilation based on FIEL (2003), Fiscal Responsibility Council (FFRC) and National and provincial laws. Notes: N denotes that the provincial FR was adopted after the National invitation; P denotes that the FR was established by a provincial Law; NP denotes that National and provincial FRs coexisted

the period 2004–2018 and those that did not.¹⁰ $FC_{i,t}$ is a dummy variable that equals one when province i undergoes a fiscal consolidation in year t . $X_{i,t}$ is a vector of control variables—to control for omitted variable bias—including growth rates of population and total revenues (lagged one period to reduce endogeneity concerns). Finally, α_i are province fixed effects¹¹ and θ_t are time fixed effects. Note that the conditional effect of FRs on public investment behavior during fiscal consolidations will be given by $\beta_1 + \beta_3 * FR_{i,t}$, which is estimated using the standard Delta Method; given the large size of the sample, we include robust standard errors in all our estimations.

Fiscal consolidations

We define a period of fiscal consolidation using the trend of the primary balance to total income ratio.¹² Specifically, we assume that a province is under a fiscal consolidation process if the growth rate of this trend is positive. The idea is to capture processes reflecting that the fiscal result is being improved systematically but leaving aside short-term processes (e.g., one-year improvement) that may reflect temporary improvements and not a “true” fiscal consolidation. As an example, Fig. 1 shows our definition for four different provinces. With this definition, 121 episodes of fiscal consolidation are detected between 1992 and 2018 in our sample (Fig. 2). During those episodes, the—unconditional—average reduction in public investment is 18% when there is no FR in place and 1.7% when a FR is in place.

The data cover 15 out of 24 Argentine provinces in the period 1992–2018. Public investment, primary balance, intergovernmental transfers, and debt were obtained from the Ministry of Economy of the Argentine Republic (MECON). Data on provincial FR were obtained from FIEL (2003), the Federal Fiscal Responsibility Council (FFRC), and National and provincial Laws. Population data were drawn from the National Institute of Statistics and Censuses (INDEC). Table A1 in the Appendix presents the descriptive statistics.

¹⁰ Our sample includes Buenos Aires, CABA, Chubut, Cordoba, Corrientes, Entre Rios, Formosa, Jujuy, La Pampa, La Rioja, Santa Cruz, Santa Fe, Santiago del Estero, Neuquen and Mendoza. To avoid confounding factors due to provincial specific FRs, we do not consider—in the baseline estimation—those provinces where a National and a provincial FRs coexist.

¹¹ Fixed effects are considered in this first specification, but its inclusion will be checked later through a Hausman test.

¹² We calculate this trend using the standard Hodrick-Prescott Filter, with a smoothing parameter of 6.25. We do not directly follow the strategy used by Ardanaz et al. (2021a)—as a two-year period in which the cyclically adjusted primary balance/GDP ratio improves each year and the cumulative improvement is at least 2% points of GDP—because reliable subnational GDPs are available only for some provinces. One problem with our measure of fiscal consolidation is that it may overstate the number of fiscal consolidations because the tax base in Argentina is pro-cyclical. Therefore, we provide a robustness check based on the Ardanaz et al. (2021a) fiscal consolidation variable with the available data of reliable provincial GDPs. This check confirms our findings for the fiscal consolidation metric that we could use for all provinces.

Results

Baseline results

Table 2 provides our baseline estimations. Column 1 presents the fixed effects estimation and shows that public investment falls close to 19% during fiscal consolidations. The coefficient of the FR is negative but not statistically significant, thus suggesting that a FR per se does not have any effect on public investment. The interaction term is not statistically significant. However, according to the marginal effects, public investment does not fall during fiscal consolidations in provinces that adhered to the flexible 2004 National FR. Given the low interclass correlation ($Rho=0.013$), Column 2 replicates the estimation under random effects. The p -value derived from the Hausman test indicates that the initial hypothesis, according to which the individual-level effects are adequately modeled by a random-effects model, is not rejected.¹³ The results remain unchanged, and the interaction term becomes now statistically significant. Column 3 introduces control variables, and the results still hold. Finally, Column 4 explores whether flexible FRs are useful at protecting current expenditures. This type of expenditure is typically less likely to be cut during fiscal consolidation, as there are political economy pressures that naturally protect it (Ardanaz and Izquierdo 2021).

Robustness

Several robustness checks to our baseline results are presented in Table 3. On the one hand, we estimate Eq. (1) with an alternative definition of our dependent variable. We use the change in (i) the ratio between Real Direct Investment (RDI) and total revenues (Column 1), and (ii) the ratio between RDI and total expenditure (Column 2). With the first alternative, a fiscal consolidation reduces the public investment to total revenues ratio by 2.7 percentage points when there is no FR in place. When there is a FR in place the compression in public investment is neutralized (see marginal effects). These conclusions are reinforced with the second alternative definition.

On the other hand, we change the definition of fiscal consolidation in two ways. Firstly, we redefine our baseline definition using the global balance of the primary balance (Column 3); and secondly, in Column 4 we use available data on provincial GDPs to replicate the same strategy used in Alesina and Ardagna (2013) and Ardanaz et al. (2021a).¹⁴ Again, our main result is essentially not modified. Flexible FRs seem to mitigate the reduction of public investment during fiscal consolidations.

¹³ Not rejecting the Hausman test implies that unobservable heterogeneity is not related to the adoption of a FR. This makes sense, since the FR was adopted for every province at the same time, and during the same period. At the variable level, it captures the fact that the unobservable heterogeneity, which is fixed, is not related to an also fixed dummy variable.

¹⁴ We define a fiscal consolidation year when the primary balance/GDP ratio improves at least during two consecutive years and the cumulative improvement is at least 1 percentage point of GDP.

In addition, we control for other factors that can affect the growth rate of public investment. Column 5 includes the growth rate of debt to total revenues.¹⁵ Again, flexible FRs seem to mitigate the reduction of public investment during fiscal consolidations. Given Argentina's federal setting, and the fact that the provinces finance their public investment with resources from the National government (e.g., automatic transfers from the revenue-sharing system or discretionary transfers), we also control for the role of fiscal transfers from the National government. Specifically, we consider discretionary transfers, distinguishing between capital and current transfers (Columns 6 and 7), and automatic transfers (Columns 8–10). Only discretionary capital transfers are statistically significant and with a positive coefficient,¹⁶ suggesting a positive relation between these transfers and provincial public investment, as previously shown by Artana et al. (2012). Marginal effects for all specifications indicate the decline in public investment during fiscal consolidations. However, the adoption of flexible FR seems to (partially or even totally) mitigate the negative effects of fiscal consolidation on public investment behavior.

Finally, it should be mentioned that our estimates could be subject to potential endogeneity concerns. That is, FRs can be endogenous in empirical applications given politicians' incentives to change fiscal institutions in response to changes in fiscal outcomes (Ardanaz et al. 2021a). As remarked in third section the 2004 National FR was passed when the National government had achieved fiscal equilibrium and the economy was growing at high rates given highly favorable international conditions. Also, the approval of the FR was a conditionality of another stand-by agreement with the IMF. For this reason, we consider that the 2004 National FR can be considered exogenous to the Argentine business cycle.¹⁷

De jure and de facto fiscal rules

Equation (1) was estimated using a *de jure* definition of FRs. That is, $FR_{i,t}$ equaling one if a FR is legally in place at year t , zero otherwise. However, this definition may not truly reflect the effective compliance with the FR.¹⁸ In other words, a FR may be legally established but not actually fulfilled. To address this issue, in this Section we

¹⁵ We do not include this variable as a control in baseline estimates given that it is available since 1996. Also, endogeneity concerns should be considered since one of the fiscal rule ceilings includes a debt to revenues target.

¹⁶ Argentine provinces receive automatic transfers from the National government that are guaranteed by the Constitution and the Revenue-Sharing Law. On top of that, the National government distributes discretionary transfers with no formal restriction on the share that each province receives. In some years discretionary transfers reached 2% of GDP.

¹⁷ However, additional robustness checks could be performed to address this potential concerns. For example, through an instrumental variable's estimation. Naturally, this strategy faces the challenge of having an exogenous and relevant instrument.

¹⁸ It should be noted that the "*de jure*" metric equals one when the National FR was in place (regardless of compliance or non-compliance). Thus, this metric is a dummy variable equaling one for 12 out of the 15 provinces in the sample during 2005–2018 and equals zero for CABA, San Luis, and La Pampa. For the 1992–2004 period equals zero for all provinces because, either there was no rule in place, or there was a rigid one.

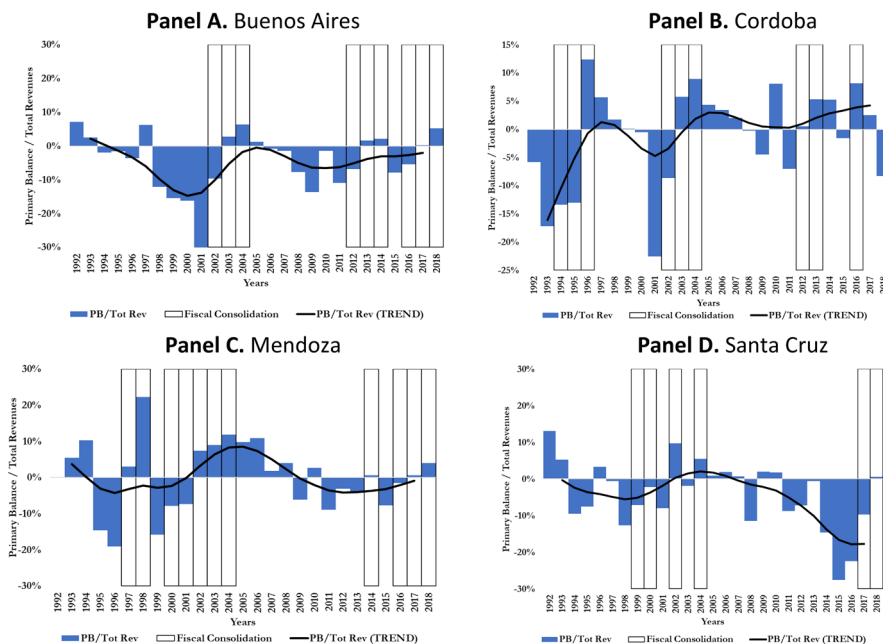


Fig. 1 Fiscal Consolidation Episodes in Argentine Provinces, 1992–2018. *Source:* Authors’ elaboration based on the Ministry of Economy of the Argentine Republic (MECON)

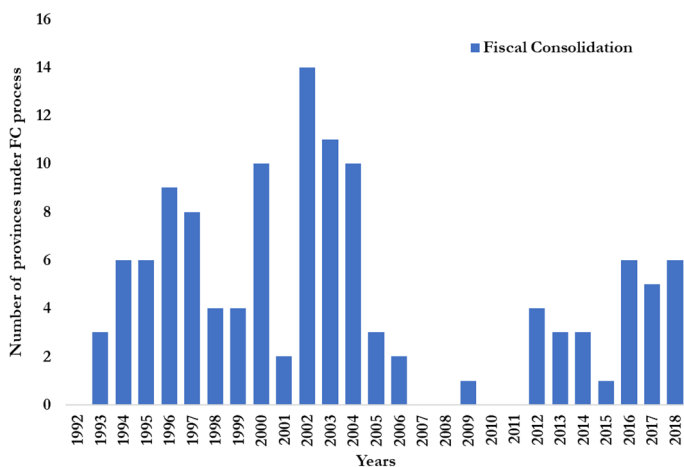


Fig. 2 Number of Fiscal Consolidation Episodes in Argentine Provinces by Year, 1992–2018. *Source:* Authors’ elaboration based on the Ministry of Economy of the Argentine Republic (MECON)

redefine $FR_{i,t}$ using a de facto definition of FRs, and we perform additional economic analysis.

Table 2 Baseline results: effect of flexible fiscal rules on public investment growth rate during fiscal consolidations in Argentina

	Growth rate of public investment			Growth rate of current spending
	[1]	[2]	[3]	[4]
Fiscal consolidation	- 0.191** (0.0751)	- 0.190*** (0.0701)	- 0.177** (0.0755)	- 0.0544*** (0.0144)
FR	- 0.0608 (0.0854)	- 0.0289 (0.0495)	- 0.0176 (0.0526)	- 0.00418 (0.00744)
Fiscal consolidation * FR	0.172 (0.107)	0.197** (0.0916)	0.181* (0.0948)	0.0213 (0.0147)
Growth rate of population			- 1.812 (1.831)	0.176 (0.206)
Growth rate of revenues ($t - 1$)			- 0.102 (0.392)	- 0.00626 (0.0551)
<i>Marginal effects</i>				
FR = 1	- 0.0185 (0.0713)	0.00712 (0.0660)	0.00413 (0.0674)	- 0.0331*** (0.00846)
FR = 0	- 0.191** (0.0751)	- 0.190*** (0.0701)	- 0.177** (0.0755)	- 0.0544*** (0.0144)
Observations	390	390	375	375
R^2	0.369			
Number of prov	15	15	15	15
Fixed effects	Yes	No	No	No
Random effects	No	Yes	Yes	Yes
Controls	No	No	Yes	Yes
Rho	0.013			
Hausman (Chi)		1.732		
Hausman (p -val)		0.630		

Source: Authors' elaboration based on the Ministry of Economy of the Argentine Republic (MECON)

Note: robust cluster standard errors in parenthesis. Significance level * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, respectively. Intercepts and year dummies are included but not reported

As described in third section, effective compliance with the FR requires a balanced-budget target and ceiling on total or current primary expenditure depending on whether the debt to current revenues ratio at the provincial level was below 15%; or the growth rate of provincial revenues was higher than nominal GDP growth. Using official data -published by the FFRC- we compare effective fiscal figures of each province with the ceilings established by the 2004 National FR. The comparison is made for each ceiling (i.e., expenditure, a balanced budget, and debt) each year.¹⁹ We do so for the period 2005–2016

¹⁹ For the period 2005 to 2008, the FFRC published the year-on-year-variation of current primary expenditure (net of IFIs financed projects and capital expenditure allocated to basic social and economic infrastructure) and the nominal GDP variation for the comparison. When the data were not available, and we compute them as missing.

Table 3 Robustness of baseline results: effect of flexible fiscal rules on public investment growth rate during fiscal consolidations in Argentina

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
	Growth rate of public investment to total revenues ratio		Growth rate of public investment to total spending ratio		Growth rate of public investment					
Fiscal consolidation	-0.0269*** (0.00811)	-0.0132* (0.00744)			-0.304*** (0.0910)	-0.204** (0.0956)	-0.177*** (0.0800)	-0.172*** (0.0783)	-0.171** (0.0782)	-0.173** (0.0791)
FR	-0.00312 (0.00625)	-0.00226 (0.00570)	0.00208 (0.0401)	-0.0498 (0.0330)	-0.0185 (0.0527)	0.0194 (0.0396)	-0.0149 (0.0540)	-0.0143 (0.0532)	-0.0143 (0.0533)	-0.0140 (0.0530)
Fiscal consolidation * FR	0.0157	0.0112			0.267** (0.106)	0.242** (0.109)	0.180* (0.0963)	0.176* (0.0990)	0.175* (0.0993)	0.176* (0.0989)
Fiscal consolidation (alt 1)	(0.0110)	(0.00905)	-0.146*							
Fiscal consolidation (alt 1) * FR			(0.0757)							
Fiscal consolidation (alt 2)			0.116**							
Fiscal consolidation (alt 2) * FR			(0.0541)							
Growth rate of gdp (t - 1)					-0.193*** (0.0533)					
					0.0933** (0.0475)					
					-1.035 (0.670)					

Table 3 (continued)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
	Growth rate of public investment to total revenues ratio		Growth rate of public investment to total spending ratio							
Growth rate of population	-0.239*	-0.242**	-2.180	-0.851	-1.547	-6.416***	-2.272	-1.972	-1.979	-2.076
Growth rate of revenues ($t - 1$)	(0.131) 0.00829	(0.107) -0.00689	(1.695) -0.0658	(1.252)	(2.361) -0.0730	(2.203) -0.438*	(2.332) -0.115	(2.165) -0.112	(2.149) -0.112	(2.187) -0.114
Growth rate of debt to total revenues	(0.0391)	(0.0353)	(0.387)	(0.503)	(0.503) -0.517***	(0.250)	(0.387)	(0.389)	(0.389)	(0.391)
Growth rate of capital discretionary transf				(0.126)		0.118***				
Growth rate of current discretionary transf						(0.0292)	-0.00572			
Growth rate of automatic transf							(0.0462)	0.0578		
Growth rate of revenue-sharing syst. transf							(0.152)		0.0615	
										(0.129)

Table 3 (continued)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Growth rate of public investment to total revenues ratio										
Growth rate of public investment to total spending ratio										
Growth rate of other transf										0.0462 (0.119)
<i>Marginal effects</i>										
FR = 1	- 0.0112 (0.00796)	- 0.00201 (0.00549)	- 0.0304 (0.0525)	- 0.1000** (0.0478)	- 0.0371 (0.0664)	0.0379 (0.0664)	0.00348 (0.0669)	0.00431 (0.0668)	0.00429 (0.0671)	0.00312 (0.0684)
FR = 0	- 0.0269*** (0.00811)	- 0.0132* (0.00744)	- 0.146* (0.0757)	- 0.193*** (0.0533)	- 0.304*** (0.0910)	- 0.204** (0.0956)	- 0.177** (0.0800)	- 0.172** (0.0783)	- 0.171** (0.0782)	- 0.173** (0.0791)
Observations	375	375	330	330	309	367	370	370	370	370
Number of prov	15	15	15	15	15	15	15	15	15	15
Random effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Authors' elaboration based on the Ministry of Economy of the Argentine Republic (MECON). Note: robust cluster standard errors in parenthesis. Significance level * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, respectively. Intercepts and year dummies are included but not reported

during which the 2004 National FR was legally in force. Now, $FR_{i,t}$ equals one for each province in each year, only if the province effectively complies with the ceilings. Here we adopt two alternatives; the first is an effective evaluation based on all ceilings, and the second is based solely on the ceiling of current expenditure. In addition, given the consensus on the fact that the FR was not binding from 2009 onwards (IMF 2009),²⁰ we redefine the two previous alternatives by setting $FR_{i,t}$ to zero for all provinces in the period 2008–2016.²¹ We then estimate Eq. (1) using these de facto definitions of FRs.

Results are presented in Table 4. In Column 1, we define the de facto FR evaluating all ceilings. In Column 2 we evaluate only the current primary expenditure ceiling²² and the debt restriction. In Columns 3 and 4, the analogous analysis is done controlling by the consensus on the fact that the FR was not binding from 2009 onwards. Interestingly, the redefinition of $FR_{i,t}$ seems not to modify our main finding: when there is no flexible FR or when there is such a FR without compliance, public investment is reduced during fiscal consolidations. However, public investment does not decline when a flexible FR is in place and effectively complied with.

Finally, we explore if the degree of FR compliance is relevant for public investment protection. For this purpose, we re-estimate Column 4 in Table 4 replacing the dummy variable of FR with a continuous one. This continuous variable is defined as the difference between the growth rate of nominal current primary expenditure and the growth rate of nominal GDP (i.e., one of the 2004 National FR's ceilings). Only zero or negative values are considered since a positive one indicates that the FR was not complied with.²³ Figure 3 presents the results for the overall distribution of the degree of compliance, by percentiles.²⁴ The degree of compliance matters on the extremes of the distribution. During fiscal consolidations, those provinces in which the growth rate of current primary expenditure was 13 percentage points less than the growth rate of GDP (percentile 5)

²⁰ It's worth remembering that after 2008 the ceilings were relaxed through different exclusions of expenditure items. Initially, these changes would apply for the 2009–2010 period, but they were renewed every year until 2016 in the annual Budget Law.

²¹ The spirit of this correction is like that employed by Riera-Crichton et al. (2016). There, the authors estimate the effects of tax changes on output. Tax changes are measured as the change in VAT tax rates. However, while it may be true that changes in rates are more likely to be exogenous than changes in cyclically adjusted revenues (since rates are a policy tool and revenues a policy outcome), if the policymaker is changing tax rates as a response to the cycle, those changes are endogenous. To correct for endogeneity, the authors use a narrative approach to distinguish between exogenous and endogenous changes. Then, they “clean” their metric replacing with 0 all endogenous changes and re-estimate the model with the truly exogenous ones. In our case, we replace with 0 the values equaling one of our dummies during the period in which there is a complete consensus that the FR was not binding. Although the period when 2004 National FRs were fully enforced is brief (5 years), we had 15 episodes of fiscal consolidations.

²² Specifically, we look at the difference between the nominal GDP growth rate of the economy and the growth rate of current primary expenditures and the debt clause. A positive difference implies that the fiscal rule was complied with. However, if the ratio of debt to income clause was not complied with, capital expenditures were not protected; then we assumed that the province did not comply with the rule.

²³ Our continuous variable (the difference between the growth rate of nominal current primary expenditure and the growth rate of nominal GDP) is interacted with the previously used “de facto” dummy (FR de facto in Table 4, Column 4). So, positive values that indicate no compliance with the rule are removed.

²⁴ Note that here we are estimating marginal effects in each percentile of the degree of compliance distribution. See Column 1 in Table A2 in the Appendix.

expanded public investment by about 26%. This protection of public investment, although not statistically significant, decreases as the degree of compliance declines.

The interaction between national and subnational FRs

We finally analyze the interaction between National and provincial FRs depending on which one was active in each period. Thus, we expand our sample to all provinces, and we include the provincial FRs. For this purpose, $FR_{i,t}$ —as defined in the baseline estimation—is now redefined by splitting it into different categories. Specifically, we identify FRs as National, provincial, and mixed (when National and provincial FRs coexisted in some jurisdictions). Regarding National FRs, we define two different rules: the 2004 National FR (which was flexible), and the 2001 FR (which was not). The definitions of provincial and mixed FRs present a major concern. Since each provincial FR has specific features (intrinsic to each provincial FR's design), and they are different from one another, it is hard to group them into a single category. Naturally, the same applies to mixed FR since a unique National FR coexists with a specific provincial one. So, we define a province-specific dummy variable to identify each provincial FR.²⁵ It is worth noting that the new $FR_{i,t}$ basically replicates the framework presented in Table 1. We estimate Eq. (1) including the original controls (population and revenues) and capital discretionary transfers, since they are an important feature of the Argentine fiscal framework, and it is important to isolate these effects from the estimates.

Figure 4 shows the results of the marginal effects for each type of FR.²⁶ It can be appreciated that conclusions from previous Sections remain unchanged. In the absence of a FR, public investment decreases by around 19% during fiscal consolidations. The presence of a flexible FR (i.e., 2004 National FR) at the National level neutralizes this compression in public investment. However, the implementation of a rigid FR (i.e., 2001 National FR) at the National level does not help to protect public investment during fiscal consolidations. At the provincial level, mixed results can be appreciated. San Luis's FR, the most relevant one since it remained unchanged during the whole analyzed period, does not protect public investment during fiscal consolidations. Large heterogeneity is observed among the other provincial FRs. Those for Salta and Río Negro seem to protect

²⁵ The new FR dummy variable has 16 categories which identify: (i) the 2004 National FR; (ii) the 2000 National FR, (iii) the San Luis FR; (iv) to (ix) the Provincial FRs for Catamarca, Chaco, Misiones, Río Negro, Salta and Tierra del Fuego; (x) to (xv) the Mixed FR for Catamarca, Chaco, Salta, San Juan, Tierra del Fuego, and Tucuman; and finally, (xvi) the No Fiscal Rule category. In the case of Mixed FRs, we identify each as a single rule during the entire period under analysis (that is, by not splitting it depending on the two different NFRs).

²⁶ The regression is reported in Table A2, Column 2 in the Appendix. The same comment on potential endogeneity concerns applies to these estimates, where both the National and provincial fiscal rules are considered (see fourth section). Here, the implementation of, for example, an instrumental variables strategy becomes even more challenging due to the need to instrument not only the National FR but also each provincial FR.

Table 4 *De jure* versus de facto: effects of flexible fiscal rules on public investment growth rate during fiscal consolidations in Argentina

	Growth rate of public investment			
	[1]	[2]	[3]	[4]
Fiscal consolidation	− 0.152** (0.0605)	− 0.169** (0.0674)	− 0.133** (0.0591)	− 0.133** (0.0583)
FR de facto (all ceilings)	0.0217 (0.0354)		− 0.0934 (0.0767)	
Fiscal consolidation*FR de facto (all ceilings)	0.0733 (0.0802)		0.133 (0.141)	
FR de facto (CE ceiling)		− 0.0356 (0.0604)		− 0.0878 (0.0762)
Fiscal consolidation*FR de facto (CE ceilings)		0.164* (0.0947)		0.159 (0.104)
Growth rate of population	− 1.259 (1.687)	− 0.0848 (2.458)	− 0.867 (1.518)	− 0.174 (2.131)
Growth rate of revenues ($t - 1$)	− 0.195 (0.416)	− 0.184 (0.383)	− 0.189 (0.405)	− 0.157 (0.378)
<i>Marginal effects</i>				
FR = 1	− 0.0788 (0.0879)	− 0.00512 (0.0730)	− 0.00003 (0.153)	0.0265 (0.100)
FR = 0	− 0.152** (0.0605)	− 0.169** (0.0674)	− 0.133** (0.0591)	− 0.133** (0.0583)
Observations	335	361	337	363
Number of prov	15	15	15	14
Random effects	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

Source: Authors' elaboration based on the Ministry of Economy of the Argentine Republic (MECON).
Note: robust cluster standard errors in parenthesis. Significance level * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, respectively. Intercepts and year dummies are included but not reported

public investment, while those for Catamarca and Chaco do not. In the case of Salta's FR, the provincial result still holds when its FR is combined with the National FR.²⁷

Conclusion

The effectiveness of FRs implementation and how they are designed to protect public investment during fiscal consolidations have become a relevant concern in current debates on fiscal policy. In this paper, we analyze whether flexible FRs are effective

²⁷ In this case we are testing the de jure definition of FR. Even though we used the available controls (especially discretionary transfers from the central government), there may be some confounding variables such as institutions.

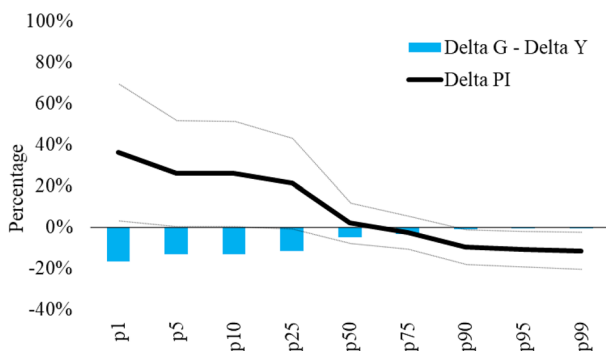


Fig. 3 Effects of degree of compliance with flexible fiscal rules on public investment growth rate during fiscal consolidations in Argentina. *Source:* Authors' elaboration based on the Ministry of Economy of the Argentine Republic (MECON). *Note:* Marginal effects with 90% confidence interval (dashed line). Delta G defines the growth rate of nominal current primary expenditure; Delta Y defines the growth rate of nominal GDP; and Delta PI defines de the growth rate of real public investment

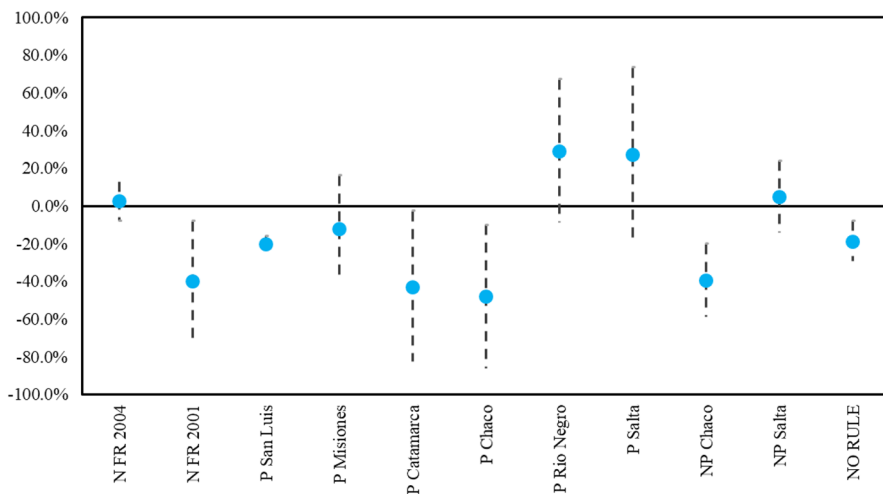


Fig. 4 Effect of national and provincial fiscal rules on public investment growth rate during fiscal consolidations in Argentina. *Source:* Authors' elaboration based on the Ministry of Economy of the Argentine Republic (MECON). *Note:* Marginal effects with 90% confidence interval (dashed line)

to protect public investment during fiscal consolidation episodes. For this purpose, we study the implementation of FRs in Argentina which in 2004 moved towards an investment-friendly FR. The 2004 National FR introduced expenditure ceilings and a balanced-budget target and was flexible in nature given that ceilings excluded capital expenditures or were established on current expenditure. We find that a flexible FR helps to mitigate the negative effects of fiscal consolidations on public investment. This finding is robust to several specifications reinforcing the idea about the relevance of including flexibility features in FR design to protect public investment.

With regards to design, lessons for the Argentine case indicate that both National and provincial governments adhering to the FR must face a limit on the growth rate of current primary expenditures, which in turn cannot exceed inflation plus population growth (approximately 1% a year) given the relatively large size of the government. The FR could be complemented with a ceiling on public employment growth (not higher than population growth) due to the heavy burden that public wages and pensions impose on public accounts. This proposal is in the spirit of the 2017 Fiscal Agreement that was suspended at the end of 2019 and in that of the 2018 FR that is currently *de jure* in force. To encourage the participation of all provinces, a “carrot-and-stick” mechanism may be included in the FR. One possibility is to create an investment fund with financing provided by the National government and multilateral agencies that can only be spent in the provinces that accepted the restrictions of the FR. Payments due to works in provinces not complying with the FR should go through a process of being firstly delayed and ultimately curtailed or interrupted. The use of the resources should be subject to strict social cost–benefit analysis, and the evaluation, control, and auditing of the fund be the responsibility of the Federal Fiscal Responsibility Council.

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Data availability The data that support the findings of this study are available from the corresponding author, JP, upon request.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval This paper does not contain any studies with human participants or animals performed by any of the authors.

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