



Macri's Macro
The meandering road to stability and growth

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Abstract

This paper reviews the various macroeconomic stabilization programs implemented during the Macri government between 2015 and 2019. We find that after an initial success, each program was discontinued because of a distinct form of *fiscal dominance*: as pensions are indexed with a lag and represent a large portion of spending, quick disinflations jeopardize fiscal consolidation. Lack of progress on the fiscal front made these reversals unavoidable.

"...Whenever I visit a country, they always say: 'You don't understand, Professor Dornbusch, here it is different...' Well, it never is."

Prof. Dornbusch to his students, 1987.

On December 10, 2015, Mauricio Macri was sworn as President of Argentina. Macri was an unexpected character for such position: an outsider coming from Argentina's business elites who had left that coveted world to become, first, the President of a popular soccer team, and later, the Mayor of the City of Buenos Aires. His own personal story of change represented what he wished for his country: a change that was expected to revert Argentina's decades-long decline.

Macri's Presidency also sparked interest worldwide. The soft-spoken Macri, emphasizing moderation, empathy and democratic values, had dethroned a 14-year hold on power by the Peronist Party. His fight had been that of a kind word against an aggressive state machinery with plenty of resources. It had been David vs Goliath. As Argentina slid closer to becoming a more authoritarian left-wing populist country, the world gazed in awe. Argentina, a member of the G20, could transform the whole political spectrum in the region. Thus, Macri's triumph, which reversed course, was received with a sense of relief.

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The same sense of relief and quiet optimism was shared by Argentina's population, as well as by Macri's team. The program they had set up envisioned a baseline annual growth rate of 3%, though deep inside they believed this was a conservative number. Inflation would gradually come down, and they expected it to be around 5% by the end of Macri's first presidency. As a result of this combination, real wages would have increased and populism would have been proven wrong.

Yet by the end of Macri's first presidency, things had turned out very differently. Output had actually decreased by more than 4% (close to 8% in per capita terms) and inflation had added nearly 300% to the price level. By the end of the term, nobody could help feeling a sense of frustration. Should things not have turned out much better? Did things work out so badly because it was the necessary pain of introducing inevitable measures? Was what happened the result of external factors or of self-inflicted mistakes? Was it an unavoidable consequence of what the government had inherited? Or was it the confirmation that Argentina is a "lost cause" and will never overcome its problems? This paper attempts to shed some light on these questions.

The paper proceeds as follows. Section I begins with an analysis of the initial conditions. Our conclusion is that the starting point was worse than expected and perceived at the time. Section II discusses the main components of the initial plan: a gradual fiscal adjustment, inflation targeting and a floating exchange rate, together with the reasons why it was chosen. Section III, the core of the paper, discusses the first two years of the program, when inflation targeting was implemented. We discuss the results: on the one hand, a consistent disinflation driven by expectations, with a pace that was comparable with other experiences, but slower than expected and slower than the pre-established targets. Fiscal policy, on the other hand, suffered a large initial worsening relative to the plan. The subsequent efforts at fiscal consolidation were not enough and led to a collision with the stabilization program. This collision, however, was not the result of an attempt to secure more resources from the Central Bank, but of a disagreement with the speed of disinflation: its fast pace jeopardized fiscal convergence, because half of government spending is indexed backwards. Section IV discusses the unravelling of the program that started with the change of the inflation targets at the end of 2017, leading to a series of successive crises that lasted until the elections, almost two years later. Section V tries to draw some lessons. Our main conclusion is that the program failed because an excessively lax fiscal led to a conflict with the Central Bank that resulted in weaker monetary institutions, which, in turn, sent the economy into turmoil. Contradictorily, it was embracing populist macroeconomic policies what undermined the administration's efforts to prove populism wrong.

I. Initial Conditions

Perhaps a good starting point is to review the conditions inherited by the incoming government at the end of 2015. The inheritance included four years of stagnation, a large and growing budget deficit, persistent high inflation, exchange rate controls that had led to a black market exchange rate trading at a large premium relative to the official rate, utility prices that had been frozen in spite of high inflation, and lack of reliable statistics. On the positive side, the current account deficit was not too large, though it had been growing. Table 1 shows the starting point of these variables, among others.

The issue of debt levels requires discussion, given that it was the centerpiece of the debate on the “legacy” left by the previous government. The previous administration argued that it had managed to achieve a dramatic reduction in the level of debt-to-GDP and, particularly, in that owed to market participants. This was supported by official data and is shown in the column labeled “Official debt” in Table 1 and Figure 1.

Table 1. Initial Conditions²

Variable	Inflation	GDP Growth	Primary Fiscal Result	Current Account	Official Debt	Adjusted Debt	Central Bank's Net Worth	Black Market FX Premia
	y/y	y/y	% GDP	% GDP	% GDP	% GDP	USD Bn*	Annual Average
2011	22.80%	6.00%	0.20%	-0.80%	20.20%	24.20%	-32.642	5.90%
2012	24.40%	-1.00%	-0.20%	-0.20%	19.00%	23.40%	-47.000	32.50%
2013	27.80%	2.40%	-0.70%	-2.00%	20.00%	26.90%	-54.465	56.50%
2014	40.20%	-2.50%	-0.80%	-1.40%	19.50%	29.50%	-70.552	38.20%
2015	24.80%	2.70%	-3.80%	-2.50%	22.50%	39.60%	-92.971**	41.5%***

(*) end of period. (**) 09/12/15. (***) until the liberalization of FX market

Yet, we believe that some adjustments should be made, as some of the changes in debt levels came hand in hand with changes in the government’s assets or liabilities, creating a different dynamics on the government’s net worth. For example, in 2014 the government issued about USD 6.2 bn in government bonds to purchase a 51% equity stake in oil company YPF³. However, this debt increase came with a simultaneous growth in assets, and as such does not alter the government’s net worth. In contrast, when the government nationalized the pension system, it absorbed the government debt that pension firms had accumulated over the previous decade, generating a sharp reduction in debt owed to third parties. But, at the same time, the government took over the liabilities with pensioners that this debt was supposed to finance. As a result, there was no change in net indebtedness (only a conversion from contractual debt into a government spending obligation). A third relevant adjustment to be considered is the role of the Central Bank’s net reserves. If the government cancels debt using Central Bank reserves, it reduces both debt and assets, without a change in net worth. In fact, other countries report debt only net of Central Bank reserves.

Adjusting these changes in assets and liabilities is a difficult task. How should these liabilities be measured? For example, what is the Net Present Value (NPV) of the future pensions that the government took over when it nationalized the pension system? Can they be defaulted more easily or less easily than contractual debt? Does this affect the value of this liability?⁴

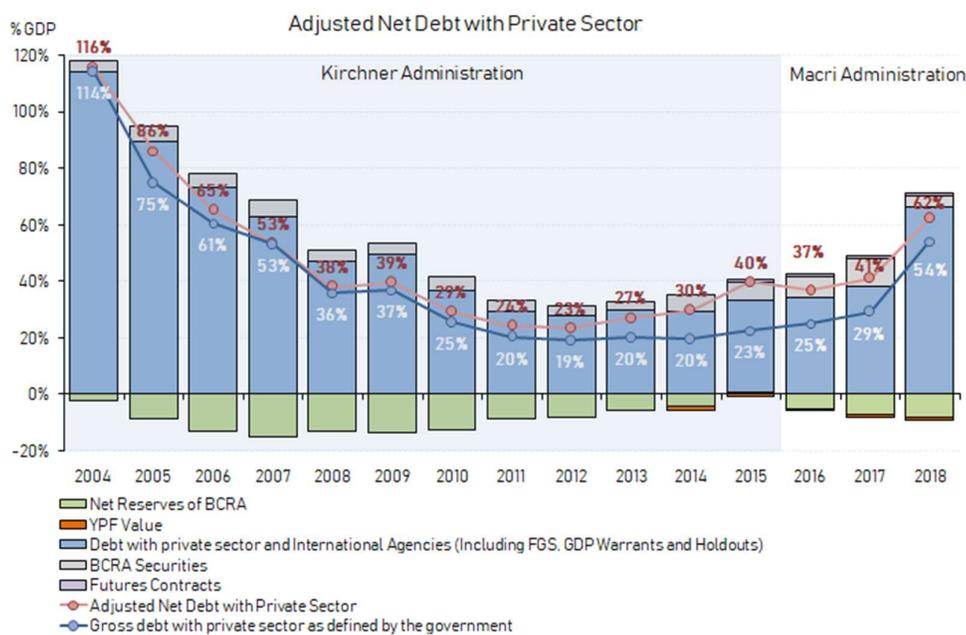
² Sources and notes: Inflation: Data from Provincial Statistical Institutes and Congress CPI (for 2011 and the first half of 2012, an average between the San Luis Province CPI and Congress CPI is used; from the second half of 2012 to end-2015, an average between San Luis Province CPI and CABA CPI); CPI end-of-period variation. GDP: INDEC; constant prices. Fiscal Result: Ministry of Finance; it does not include Social Security Fund's ("FGS") and Central Bank's transfers to the Treasury. Current Account: INDEC. Official Debt: Ministry of Finance: public debt with private creditors and International Agencies. Adjusted debt: Author's elaboration; it is calculated as the Official Debt plus FGS's sovereign bonds, GDP warrants, debt with holdouts, and Central Bank's securities, minus Central Bank's Net International Reserves and the value of the shares held by the National Government of the oil company YPF (nationalized in 2014).

³ The purchase of 51% of YPF occurred when the price of WTI was 101 dollars per barrel. Five years later, the market value of that 51% was just USD 3.7 bn.

⁴ For a detailed discussion about this topic, see Levy-Yeyati and Sturzenegger (2007).

In order to address these issues, we have made five corrections to the official account. These are not only possible, but they should also be relatively uncontroversial. First, we net out Central Bank net international reserves. Secondly, we consider that the liabilities assumed by the government at the time of the nationalization of the pension system were equivalent to the debt that was nationalized (and its rollover). Third, we add the debt from the US dollar future contracts issued in 2015 (we used the actual cost paid in 2016). Fourth, we net out the value of YPF’s assets, and, finally, we include an estimate of the debt to holdouts (we also use the numbers agreed on in 2016 to cancel these obligations). The results are shown in the column “Adjusted debt” in Table 1 and the different components are identified in Figure 1.

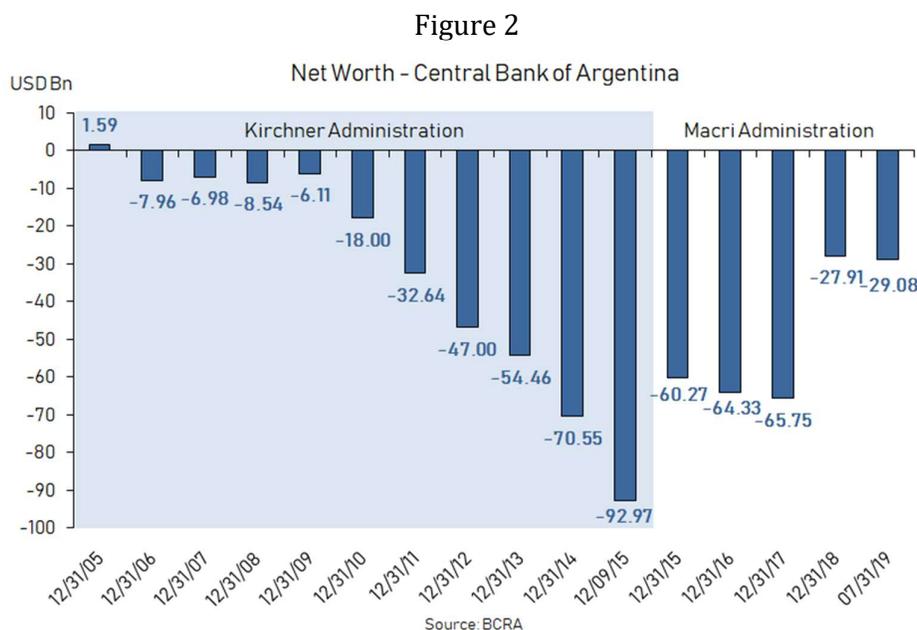
Figure 1



These corrections show that, until 2012, there was a substantial reduction in debt as a result from a restructuring in 2005, economic growth, fiscal surpluses and the appreciation of the real exchange rate. Yet starting in 2012 debt had begun to creep again. In fact, between 2012 and 2015, the debt-to-GDP ratio had increased from 23% to 40%. In conclusion, while the levels of debt remained low, they had increased significantly in the four years prior to the change in government.

Even more striking is the evolution of the Central Bank’s balance sheet. During the previous years, the government had systematically paid back debt using Central Bank reserves. In exchange, the government stashed the Central Bank with US dollar-denominated *Letras Intransferibles*, i.e. non-negotiable notes. These notes paid a below market rate and had a ten-year maturity. The first was due in 2016, although the Budget Law enacted in 2015 had extended this maturity an additional decade. In short, the NPV of this bill was minimal at most and had zero liquidity. As a result, the quality of the Central Bank’s balance sheet deteriorated very rapidly. Netting out the *Letras Intransferibles* and

the Domestic Credit account (*Adelantos Transitorios*), the net worth of the Central Bank took a nosedive between 2006 and 2015, as shown in Figure 2.



II. The Plan and the Cleaning Up Phase

II.1. The plan

During the year prior to taking office, a group of economists, businesspeople and government officials gathered by Fundación Pensar, a think-tank sponsored by Macri's political party, started working on a program in case Macri won the election. Only one constraint was imposed on the group: the reduction of the fiscal deficit had to be gradual. Beyond that limitation, the candidate left the team free to design the program as it seemed fit.

The definition of a "gradual" adjustment (*gradualism*, as it later became known), had both an economic and a political motivation. On the economic front, the consensus was that, as government debt was low, Argentina would be able to access international funding, and that it is always better to smooth over economic adjustments⁵.

But the main goal was political. The Macri administration carried the stigma of being a right-wing or center-right party, and as such it was anticipated that it would kick off its government with a large fiscal and monetary adjustment. However, the political team thought it was essential to remove this stigma. The argument was that, if the Macri

⁵ An early such approach was Thatcher's program of macroeconomic stabilization. Sargent (1981) says "A hallmark of Mrs. Thatcher's publicly announced strategy is gradualism... her government did not propose to execute any abrupt or discontinuous change in aggregate government variables... Instead, the Conservatives proposed to carry out a preannounced and gradual tightening of monetary and fiscal policies over a five-year period".

administration was seen as a different political object, this would build a political capital which would allow greater policy flexibility in turbulent times. In other words, while gradualism entailed the risk of increasing the level of debt during the initial years, it was also argued that not taking this path involved the risk of weaker political support later on.⁶

Despite this mandate, the program envisioned an initial budget correction of 1.5% to 2% of GDP, mostly from a reduction of subsidies (universally considered too large), with a slowly declining deficit thereafter. The program envisaged an annual growth rate of about 3%. With a tax burden of the national government of around 20% (Argentine Ministry of Treasury, 2018), this entailed a 0.6% of GDP increase in fiscal resources each year. Thus, to the extent that real expenditure remained constant, the government could expect to keep the deficit relatively stable, as the resources derived from growth would allow the absorption of the biggest fiscal challenge facing the government: the fact that, as inflation decelerated, the real value of pension spending would grow as a result of backward indexation. At any rate, the team expected growth to be faster, so a sense of (maybe unwarranted) easiness regarding fiscal results was transmitted.

On the monetary front, the team selected an inflation targeting regime. The speed of disinflation, however, was determined by the need to coordinate monetary and fiscal policy, and therefore constrained by the agreement that part of the fiscal deficit would be monetized to diminish the need of debt financing during the transition to a healthier fiscal result. (In addition, it was believed that the money printing agreed upon to finance the deficit should not be sterilized, given the weakness of the Central Bank's balance sheet.) Naturally, this led to the idea of establishing a multi-year inflation targets that were set on the basis of the resources to be transferred in each year. In all, the program assumed that, over the four years of Macri's administration, inflation would add up to 73%, though it was expected to be below 5% towards the end of his term.

It was also agreed that Argentina would pursue a floating exchange rate regime. The consensus on this, was a legacy of Argentina's trauma with the final period of Convertibility, a fixed exchange rate regime that had lasted a decade, between 1991 and 2001. While very successful in its initial years, its inability to adjust relative prices after the 1998 Russian default had plunged the economy into a four-year long crisis that ended with a banking crisis and a dramatic fall in output. In addition, international experience had enshrined floating rates as the agreed upon standard, due to their ability to smooth out external shocks and deliver higher growth and lower volatility in output⁷.

In all, Table 2 shows what the program envisioned at the start of the government (in italics), and what actually happened. The rest of the paper attempts to explain why the divergence was so big.

⁶ The previous center-right experience, the De La Rúa presidency, had indeed started with a quick attempt at fiscal consolidation, one which had met universal criticism. De La Rúa resigned just two years into his term.

⁷ There is extensive literature on the relative benefits of fixed vs floating rates. See Levy-Yeyati and Sturzenegger (2001, 2003, 2005, 2007, 2016), Di Giovanni and Shambaugh (2008), Schmitt-Grohé and Uribe (2011), Calvo and Reinhart (2002), among many others.

Table 2. The Team's predictions in June 2015

Variable	Units		2015	2016	2017	2018	2019
GDP Growth	%	Effective	2.7%	-2.1%	2.7%	-2.5%	-1.3%
		Projected	2.0%	1.0%	4.0%	3.0%	3.0%
Inflation	yoy average	Effective	26.0%	39.3%	25.7%	34.3%	50.1%
		Projected	28.5%	38.2%	12.5%	6.9%	4.1%
Nominal Exchange Rate	USD vs. Arg \$	Effective	9.3	14.8	16.6	28.1	45.6
		Projected	9.3	15.6	16.0	16.9	17.0
Primary Deficit	% GDP	Effective ⁽¹⁾	-3.8%	-4.2%	-3.8%	-2.6%	-0.5%
		Effective ⁽²⁾	-3.8%	-5.4%	-4.1%	-2.6%	-0.5%
		Projected	-4.6%	-2.5%	-2.5%	-2.4%	-2.2%
Monetary Base Growth	Arg \$ Mn	Effective	161.325	197.775	179.449	407.864	90.902
		Projected	163.600	94.972	81.508	59.337	43.527
Monetary Base Growth	%	Effective	40.5%	26.6%	24.7%	36.0%	6.8%
		Projected	35.4%	15.3%	11.3%	7.4%	5.1%
Financial Assistance of Central Bank to the Treasury	Arg \$ Mn	Effective ⁽³⁾	158.524	159.997	150.000	30.500	77.245
		Effective ⁽⁴⁾	158.524	136.098	122.526	-21.283	0
		Projected ⁽³⁾	158.524	94.972	81.508	59.337	43.527
Financial Assistance of Central Bank to the Treasury	% GDP	Effective ⁽³⁾	2.7%	1.9%	1.4%	0.2%	0.4%
		Effective ⁽⁴⁾	2.7%	1.7%	1.2%	-0.1%	0.0%
		Projected ⁽³⁾	2.8%	1.2%	0.9%	0.6%	0.4%
Official Reserves of the Central Bank	USD Mn	Effective	25.563	39.308	55.055	65.806	62.200
		Projected	25.766	27.888	38.198	51.339	66.084
Non Monetary Liabilities of the Central Bank	% GDP	Effective	7.0%	8.5%	10.9%	5.0%	5.6%
		Projected	7.0%	7.6%	9.1%	11.1%	12.8%
Current Account	USD Mn	Effective	-17.622	-15.105	-31.598	-28.003	-9.400
		Projected	-7.605	-11.958	-12.363	-16.289	-22.361

(1) Primary Deficit including resources obtained from tax amnesty. (2) Primary Deficit excluding resources obtained from tax amnesty. (3) Gross financial assistance to the treasury. (4) Financial assistance to the treasury net of the interests generated by the government bonds held by the BCRA.

II. 2. Capital Controls Liberalization

At the outset, the government faced significant challenges: net international reserves were negative, there were no liquid reserves to tap, and, as the government had campaigned on the promise to unify the exchange rate, both the market and exporters were expecting a depreciation of the currency, so exports had dwindled to zero⁸. Any attempt to delay a solution would have just postponed facing the issue, while the government would lose momentum and renege on one of its fundamental campaign promises. D-Day was decided for a week later.

The relaxation of capital controls was not only a matter of economic freedom, but also of economic efficiency. It eliminated a heavy burden on exporters and normalized their trade

⁸ On December 10, 2015, the first day of the new government, the Board of the Central Bank was about to approve a bank and exchange rate holiday, a move that was quickly averted by the incoming (not yet appointed) authorities. Banks accepted to implement a de facto exchange rate rationing mechanism until the controls could be dismantled. This allowed for a transition without disruptions in the functioning of the financial sector.

relationships: since now they were not forced to convert their foreign proceeds into local currency almost immediately, they were able to offer credit to their clients abroad.

It was decided that capital controls would not be lifted as a “Big Bang”, but gradually. Two main reasons supported the view that a gradual relaxation should be undertaken. Firstly, there was no clear idea of how money demand would react after four years of capital controls and forced peso savings. Secondly, there was, allegedly, a large stock of pending import payments and dividend distributions to be made. Nobody was sure to what extent this was true or not, or how real these requests were, but they were a latent risk. In addition, just to make the whole picture complete, net reserves were negative (see Figure 8 - Panel b).

The desired impact would be achieved with two features: all commercial flows would be freed immediately, and no authorization would be required to buy FX for up to 2 million US dollars per day. This number was so unexpected (some analysts expected the government to allow buying 30,000 or 60,000 US dollars), that the team believed it would create the perception of a substantial change. Requests to pay for “previous” imports would be authorized gradually over time, and were queued according to the original request day. The freeing of the demand for this purpose was expected to be fully completed by mid-year.

At the same time, the Central Bank forced banks to sell their net foreign exchange (FX) exposure to the Central Bank on December 16th, the day prior to the unification, allowing them to repurchase this exposure back only on the December 17th, after the jump in the exchange rate. This implied a gain of about 7 bn pesos (1.2% of the money base) and served to compensate, at least partially, the losses the Central Bank was expecting from a large stock of dollar future liabilities accumulated in the previous administration. Simultaneously, floors in deposit rates and ceilings in lending rates were removed.

D-Day was on December 17. The night before, the Central Bank agreed with the People's Bank of China an immediate disbursement of a USD 3.1 bn loan by converting the equivalent amount of yuan from a currency swap into USD. In addition, grain exporters (who had hoarded grains expecting the exchange rate unification) had offered to sell USD 330 mm per day on the market for three weeks, a very significant amount considering that the FX market operated only about double this amount.

Net reserves were negative, and liquid resources available to the Central Bank that day were just a mere USD 400 million dollars. The market opened at 13.90 ARS/USD and closed at ARS 13.30 a price between the previous official price of ARS 9 and the black-market price of ARS 16. The Central Bank did not intervene that day, nor in the following days, when the exchange rate moved freely around this value. In all, this was regarded as an unexpected first success of the government.

II. 3. Futures, Holdouts and Initial Steps in Monetary Policy

The Central Bank also faced the challenge that the previous government had sold a sizable number of future contracts falling due throughout June 2016 at off-market prices. The Central Bank's short position on FX futures was approximately USD 17,400 million, which,

when comparing the fixing price and the informal exchange rate, delivered an expected cost of 62,750 million pesos (11.2% of the monetary base).

Two things alleviated the burden. On the one hand, Rofex, which was the market that traded these contracts, unilaterally decided to change the terms of the contracts signed after September 29, 2015 (it was assumed that after this date participants had engaged only for “speculative reasons”). This reduced the cost by about 11,085 million pesos. The cost of other operations conducted over the counter (OTC) by banks was partially compensated by purchasing the banks’ FX position described above, which saved an additional 6,900 million. All in all, the costs were reduced by nearly ARS 18,000 million, and the total effective cost of these futures for the BCRA ended at ARS 53,719 million pesos (9.6% of the monetary base).

At the same time, the government set out to solve the long pending issue of Argentina's default. The long saga had ended a few years earlier with a ruling in favor of the holdouts on the basis of a *pari passu* clause that precluded payments to current debt if payments were not made to holdouts. This had motivated the previous administration to default on the entire debt. The Treasury started working on this issue and reached an agreement in April. Given the complexity of this negotiation, the details are deferred to Appendix 1 of this paper. The overall payment to be settled with the holdouts amounted to USD 9.3 bn. Together with the removal of capital controls and the resolution of the futures issue, this entailed a significant normalization of the economy.

The Central Bank kicked off with a strongly contractionary monetary policy to ensure a managed removal of capital controls. Money demand was uncertain after 4 years of capital controls, but money supply also turned difficult to pin down. At the end of the year, reserve requirements were averaged for the period December-February. However, in December, banks had piled an unusually large amount of liquidity in anticipation of a run on deposits. These resources had not been used, given that the transition was smoother than expected, so they found themselves covering most of the reserve requirements through February. The result was that money supply in January and February could grow significantly, as the unused excess reserves in December could be allowed to run down reserve requirements in the following two months.

Somewhat unaware of this, in January and February, the Central Bank absorbed significant amounts of money at decreasing interest rates, misreading the fall in interest rates, while contracting the monetary base, as an improvement in credibility. So, while the Central Bank absorbed 25% of the money base, it allowed the interest rate to fall significantly (from 38% to 30.25%). The result was an immediate reaction of the exchange rate, which moved from 13.55 to 15.91. Attempts to smooth the exchange rate spike by using reserves (which had started to grow since the relaxation of exchange rate controls) were not successful, and were quelled only when interest rates were increased to 38% at the beginning of March.

By then, the real amount of money had fallen by 16.4%, substantially more than what the government had anticipated. In hindsight, monetary policy should have been significantly tighter in these first months (yet this mistake in the initial months of the year would be repeated again in 2017, 2018 and 2019!). At any rate, the difficulties of these first months convinced the authorities that assessing money demand and supply movements would be

too difficult and that a mechanism should quickly be implemented to smooth out these large swings.

During those initial months, inflation rates registered an increase of 5.0% in December, 3.8% in January, 3.4% in February, 3.2% in March and 5.2% in April⁹, in which month the government had decided to bundle most tariff adjustments. Only after this did inflation decelerate.

III. The Inflation Targeting Regime

As a result of the difficulties of those first months, in March the Central Bank announced a convergence process to an inflation targeting regime (IT). We organize our discussion of the regime around four main questions. Firstly, was there a rationale for using inflation targeting in Argentina? Secondly, were the preconditions met to launch an inflation targeting regime? Thirdly, what was the adequate speed of disinflation and how was it chosen? And, finally, what were the results? On this last point, we discuss both the transmission mechanism and the policy response. We then briefly discuss the evolution of fiscal accounts and the Central Bank's balance sheet, two factors that built up tensions that ended up being relevant in the program's eventual undoing.

III. 1. A Framework to Assess Inflation Targeting

A disinflation program requires a mechanism to coordinate expectations along the disinflation path. While consistent monetary and fiscal policies cannot be avoided, the alternatives include a plethora of possibilities: using the exchange rate as an anchor, using incomes policies, reverting to monetary aggregates targets, or the more conventional (at least at the time) framework of inflation targeting with floating exchange rates.

Recent experience shows that the instruments chosen vary across countries. Of the 21 countries that, having experienced inflation rates above 20%, implement an IT targeting regime with a floating rate today (including Argentina at the time), 9 chose to disinflate with a floating exchange rate, while 12 used an additional anchoring mechanism, particularly on the convergence path. This second group always used the exchange rate as an anchor, while Israel and Iceland also resorted to incomes policies (wage and price freezes), and the Slovak Republic, to monetary aggregates targeting. Interestingly, all programs implemented after 2000, with the exception of Kazakhstan, were implemented using a floating regime. (See Appendix 2 for a detailed description.)

Consistent with the diversity of experiences, there is extensive literature discussing the merits and benefits of each alternative. Exchange rates typically help to quickly coordinate expectations, something that had already been tested in many successful stabilization episodes of the 1980s and early 1990s (Convertibility in Argentina, the Plan Real in Brazil or the Israel Stabilization¹⁰). In addition, a large body of literature suggests that exchange rate-based stabilizations lead to initial booms (Calvo & Vegh, 1993) thus helping build political support for reforms. Fixed exchange rates also provide both a sign of commitment as well as an enforcement mechanism for fiscal discipline.

⁹ These numbers are derived from the average between the CPIs of the City of Buenos Aires and San Luis.

¹⁰ See Dornbusch & Fisher (1988).

Barring the fact that using the exchange rate as an anchor requires holding sufficient reserves (or allowing a large initial depreciation), it also implies foregoing the exchange rate as a shock absorber, a tradeoff between credibility and flexibility well understood in the literature on optimal currency areas and second generation currency crisis models. In fact, as countries improved the credibility of their macro frameworks, they increasingly relied on the exchange rate flexibility as a shock absorber. Thus, the question is to what extent policymakers were willing to forego the initial benefits of exchange rate anchoring to build this adjustment mechanism. Tornell and Velasco (2000) also turned on its head the notion of exchange rate anchoring as a credibility device. According to them, floating rates signal unsustainable policies earlier on, therefore providing stronger commitment incentives.

In the case of Argentina, Sturzenegger (2016) makes these tradeoffs explicit and argues that it was worth paying the short-term costs of not having the initial boom and an easier coordination of expectations in order not to forego the use of the exchange rate as a shock absorber, which was perceived as necessary to build a more resilient framework. Of course, the protracted recession of 1998-2001 under a fixed exchange rate weighed heavily in this conclusion. It was also believed that credibility would be enhanced by using a framework that was mainstream. This was also the reason why the use of incomes policies was discarded. In addition to the fact that there were no reserves, making a commitment on the exchange rate (a key ingredient) mostly a theoretical exercise, among recent stabilization experiences, it had been used only in two cases (one of which was Iceland, whose output performance had been poor, see Figure 4). In addition to not being standard practice, incomes policies had been the bread and butter of recurrently failed populist experiences of yesteryears (see Dornbusch and Edwards, 1991 for a survey), making them an unattractive option. The government also believed that it would dilute its power and mandate for change having to sustain an ongoing debate with the “old-politics” players at the decision table, more so if that decision table was to implement policies similar to those implemented by the previous administration, from which the current administration wanted to differentiate itself. Important in this assessment was that wage indexation, one of the main issues tackled by incomes policies, was forbidden, so wage negotiations could be forward-looking, and, in fact, ended up being so (see footnote 32). At any rate, inflation and inflation expectations fell very quickly at the beginning of the program. Therefore, to the extent that incomes policies are suggested as a mechanism to help coordinate expectations, it seems this was not the main difficulty faced by the stabilization effort¹¹.

Barring the use of the exchange rate and incomes policy, the team faced the alternative of using monetary aggregates or inflation targets as anchors (the latter implemented by using an interest rate policy). Frankel et al. (2008) helps to understand some of the tradeoffs involved. Consider an output equation that depends both on demand and supply shocks (d and s), as well as a on monetary shock ($m - m^d$):

$$y = d + s + \beta(m - m^d).$$

¹¹ One point, however, where it may have helped, was that half of government spending was indexed to past inflation, therefore some sort of agreement as to how to deal with the impact of disinflation on actual spending would have been useful. This effect was disregarded, believing the budget could absorb it.

And an inflation equation, which also depends on the same three shocks,

$$\pi = m - m^d - \omega s + \nu d.$$

Here all shocks have zero mean, so the issue at stake is volatility. Let us assume two possibilities. An inflation targeting regime where m is chosen to make $\pi = 0$, and another of monetary aggregates where $m = 0$. Under inflation targeting (assuming all covariances equal to zero) we have:

$$\sigma^2_{\pi} = 0$$

$$\sigma^2_y = \sigma^2_d (1 - \beta\nu)^2 + \sigma^2_s (1 + \beta\omega)^2,$$

while under monetary aggregates, these volatilities are:

$$\sigma^2_{\pi} = \sigma^2_{m^d} + \omega^2 \sigma^2_s + \nu^2 \sigma^2_d$$

$$\sigma^2_y = \sigma^2_d + \sigma^2_s + \beta^2 \sigma^2_{m^d}.$$

Inflation targeting delivers a more stable inflation, obviously, but output volatility depends on the relative strength of supply shocks (which an inflation targeting regime amplifies) and demand and money demand shocks (which an inflation targeting regime smooths over).

We confront this basic framework with the data in the following way. In order to identify the volatility in actual money demand, we look at periods of constant interest rates in various inflation targeting regimes. Given that money supply is endogenous, changes in money stock can only be associated with changes in money demand and it therefore provides a valid identification mechanism for money demand shocks¹². In order to avoid volatility arising from seasonality, we take the period in which this identification can be made in Argentina and compare it to similar periods for other countries where this condition is also met. For supply shocks, we use the volatility in the prices of regulated goods, assuming that this is a valid proxy for changes in the supply conditions of these goods. The results are summarized in Table 3, which shows that Argentina exhibits an unusually high volatility both in money demand and in supply shocks.

¹² While there are several estimates of money demand (see for example Benati, Lucas, Nicolini et. al, 2016; Gay, 2005; Aguirre, et al., 2006; Ahumada and Garegnani, 2002), we believe this approach avoids the need to side with a specific specification.

Table 3. Money demand and supply prices volatility¹³

SE Ln (M2/P) in comparable periods of fixed monetary policy rate			SE Ln (CPI* / CPI) Period: 2016 to 2018		
SE Ln (M2/P)	Country	Years	Country	CPI*	
				Housing, water, electricity, gas and other fuels	Transport
0.0431	Argentina	2016/2017	Argentina	0.1307	0.0428
0.0416	Peru	2011/2012	Brasil	0.0596**	0.0087
0.0325	Peru	2004/2005	Peru	0.0319**	0.0091
0.0285	Chile	2012/2013	Mexico	0.0198	0.0412
0.0282	Chile	2002/2003	Chile	0.0155	0.0136
0.0223	Chile	2017/2018	US	0.0095	0.0178
0.0186	US	2010/2011	Colombia	0.0081	0.0227
0.0180	Brasil	2015/2016	(**) only fuels		
0.0177	Peru	2012/2013			
0.0160	Chile	2014/2015			
0.0159	Colombia	2014/2015			
0.0158	Mexico	2009/2010			
0.0157	Mexico	2010/2011			
0.0119	Mexico	2014/2015			
0.0105	US	2011/2012			
0.0102	Mexico	2011/2012			
0.0081	US	2012/2013			
0.0080	US	2013/2014			
0.0076	US	2014/2015			
0.0059	US	2009/2010			

The fact that *both* shocks are larger in Argentina means that we cannot conclude on the relative benefits of either regime, though it stresses that dealing with the volatility of money demand presents a particular challenge in Argentina¹⁴. Regarding supply shocks, they were very high in 2016, but were about half the size in 2017, when they were more in line with those of other countries¹⁵. The large size of supply shocks and the challenge they posed to the inflation targeting framework were mentioned repeatedly.

While the benefits of smoothing over monetary shocks is clear, a drawback of an IT regime is that the inflation rate is not under full control of the authorities; so transitory shocks that deviate inflation from the trajectory have a more detrimental effect on credibility than in a monetary aggregates regime, as it is more difficult to assess if monetary authorities are

¹³ The table in the left compares the Standard Error of M2/P across different Latin American countries and the US for periods of stable monetary policy rate since 2000. The comparison is established for the same months in which the monetary policy rate was fixed in Argentina, that is, from December 2016 to March 2017 and from May 2017 to October 2017. The table in the right compares the volatility in the ratio of regulated prices and the general price index for the same countries from 2016 to 2018. It uses the COICOP standardized division in the countries in which it is available; for the cases of Brazil and Peru, the categories used are Fuels and Transports, as defined by their national statistics institutes.

¹⁴ Money demand is particularly volatile in Argentina because twice a year, salaries receive a 50% extra payment, leading to large seasonal swings, while public sector deposits are a relatively large fraction of the financial sector and exhibit substantial volatility. Financial innovation, incentivized by the Central Bank itself, led to a sizable fall in the demand for cash, compounding the volatility in base money demand.

¹⁵ During the first four months of 2016, electricity prices were increased by 250%, natural gas prices by 195%, water distribution by 300%, and transportation by 100%.

sufficiently committed to fighting inflation¹⁶. This credibility effect would later turn out to be a drawback.

Another weakness of the regime arises from the fact that money supply is endogenous, so if expectations are not tamed, the inflation process remains unanchored, unless there is a strong policy reaction.¹⁷ While inflation expectations declined almost constantly during the IT regime and signaled disinflation going forward, they also remained above the inflation targets, undermining credibility.

III. 2. Preconditions for Inflation Targeting

The challenges of implementing IT starting at high inflations are not unknown, and in fact have been the source of much debate. Mishkin *et al* (2001) discuss at length the mitigating factors for the risk of credibility losses, which are likely to occur during the disinflation path. In particular, they suggest four ways of dealing with these issues: a) a gradual formalization of inflation targeting over time, b) a path of disinflation with multi-year targets, c) avoiding a range in the inflation targets, d) and having a reasonable pace of disinflation. The Central Bank tried to take into consideration these recommendations by initially allowing for a transition to IT, though it was announced it would be short (less than a year), and by setting multi-year targets with a pace associated to the agreed upon transfers to the Treasury. Contrary to the recommendation, a range was established, which in fact turned useless, as expectations converged on the upper bound (this was changed briefly in 2018)¹⁸.

There is extensive literature that also discusses the conditions required for effective inflation targeting¹⁹. Among these, the typical five pillars are: the absence of other nominal anchors, an institutional commitment to price stability, the absence of fiscal dominance, Central Bank autonomy, and policy transparency and accountability²⁰.

The team believed that, to coordinate expectations, it was necessary for the Central Bank to take ownership of the fight against inflation and to be totally committed to that objective. Regarding the absence of other nominal anchors, there is substantial consensus that this works well once economies have reached their long-term inflation objectives, but as to its effectiveness during the disinflation phase, opinions are divided. As discussed in the previous section, there were as many countries that deemed it necessary to have an additional anchor (typically the exchange rate) as countries that did not share this view. In

¹⁶ An alternative view is that inflation targeting must be understood as “flexible inflation targeting”, meaning that an inflation shock does not need to be reversed later on. In this case, supply shocks need not elicit the reaction assumed in the previous model, as a deviation arising from a supply shock is just explained and not necessarily undone, tilting the balance even more so in favor of IT. However, if these shocks are larger than expected and require permanent explanations for the deviation from targets, they eventually undermine credibility, a feature that was underestimated.

¹⁷ See Sargent & Wallace (1975), Cochrane (2011), Neumeyer & Nicolini (2011).

¹⁸ One issue was specific to Argentina. When the program was launched, there were no official inflation statistics, as the inflation numbers had been significantly tampered with and the new authorities were trying to re-launch a credible inflation statistic. The first available number came in May. Prior to that, the inflation rate of the City of Buenos Aires and San Luis province were used.

¹⁹ See Masson *et al.* (1997), Mishkin (2000).

²⁰ For a recent review of these issues, see Agénor and Pereira da Silva (2019).

the case of Argentina, this debate lingered throughout the IT regime, particularly because of the relevant role that was ascribed to the exchange rate in setting prices and inflation expectations. The Central Bank argued *the opposite*: that in order to lower passthrough levels it was important for the Central Bank to state that it did not care about the exchange rate at all. We will confront these two views with the data below²¹.

By allowing a floating rate and committing to inflation as the main priority of the Central Bank while implementing policy transparency and accountability (well defined targets, pre-scheduled communiqués and press conferences), the authorities thought most of the preconditions were met. Fiscal dominance was contained by anticipating a path for transfers from the Central Bank to the Government, and, while these announcements initially met little credibility, it build up pretty quickly as the government stuck to the framework. One important flaw, which would eventually turn lethal, was that the regime lacked Central Bank independence, as the President could easily remove the Central Bank governor. The team believed that an institutional framework was not enough to offer protection from the lack of consistent fiscal and monetary policies, so they relied on delivering results to strengthen their independence, postponing an institutional improvement for later on, when it would also be more sustainable (we will argue below that this was a mistake).

What can be said regarding two hotly debated issues: that Argentina started its disinflation program with a relatively high inflation rate and that it should have used the exchange rate as an alternative anchor?

Figure 3 tries to shed light on these questions. It shows all countries that implemented IT or eventually converged to IT, but had inflation rates above 20% at least once since 1990. For each country, it shows disinflation from the last time inflation was above 20%, and for those coming from higher rates, from the time they reach a 45% yearly inflation rate. In short, the sample attempts to illustrate the final phases of disinflation in each case.

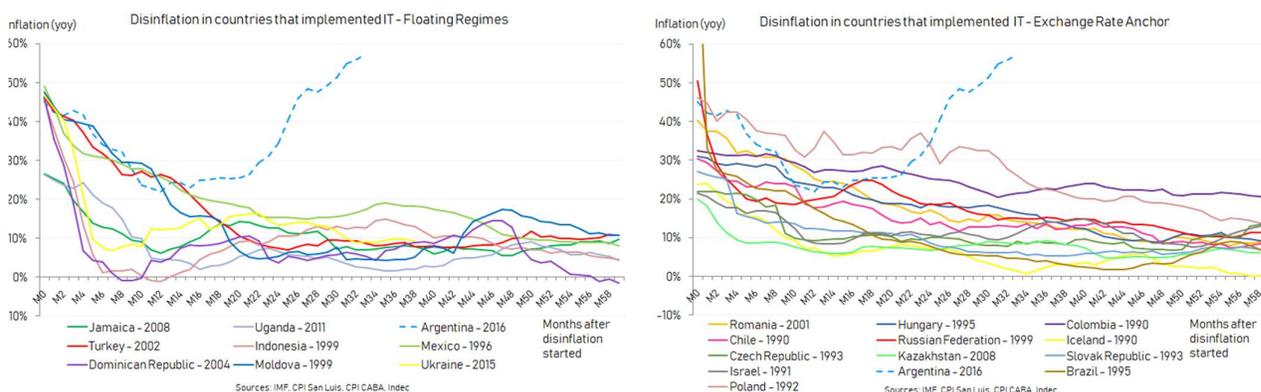
The reason why the graph includes a period prior to the formal launch of IT is that this is mostly a denomination issue. In the 1990s and 2000s, many central banks focused on disinflation by implementing most of the features of inflation targeting regimes, but only named their regime as such later in the process, when the denomination became popular. If we focused on the later part, we would be missing most of the picture. Furthermore, once the name started to be used, many countries split the disinflation process into two: a pre-inflation targeting period and a full-fledged inflation targeting. However, this did not cause a relevant change in policies; it simply allowed a larger degree of initial flexibility. Leaving out this initial period would also be a methodological mistake.

The graph does distinguish those cases that implemented disinflation through a pure float and those that used some sort of exchange rate anchor during the initial phases of the disinflation period (in this latter group, we include Iceland, Israel and the Slovak Republic, which used other anchors as well).

²¹ There is also literature on the role of FX in the reaction function. See Morón & Winkelried (2005), Cespedes et al. (2012), De Paoli (2009), Garcia et al. (2011) and Pourroy (2012).

Figure 3 shows that countries choosing either a floating regime or alternative anchors engineered consistent disinflations (Appendix 2 provides a case-by-case analysis). Those that opted for a floating rate, started, typically, at inflation rates similar to those of Argentina. Countries with lower inflation rates used the exchange rate tool, but had slower stabilizations, probably because the gradual adjustment in the exchange rate conditioned the rate of disinflation. In some cases, by enabling sharp appreciations, the float made it possible to accelerate stabilization, as in the case of Indonesia, where the Rupiah appreciated from 14,900 to approximately 7,000 per USD, or of the Dominican Republic, where the Dominican Peso appreciated from 48.67 to 28.55 per USD.

Figure 3. The Path of Disinflation in IT Experiences²²



III. 3. The Discussion on Speed and Other Implementation Details

The speed of disinflation proposed with the inflation targets, was, somewhat surprisingly, the source of much debate. Some argued that it would have been better to finance a larger share of the deficit through money printing and inflation to avoid a debt buildup; others, that the targets were too aggressive for Argentina, given its history of inertia and chronic inflation, and would lead to output costs²³.

²² The countries were selected from the IMF (2019). The Slovak Republic was included because of having adopted an IT framework before joining the Euro Area in 2009, see Novak (2011). Data retrieved from IFS. The classification of floating regimes and nominal anchor regimes was established with a case-by-case narrative analysis. (See Appendix 2). Using a de facto classification of exchange rate regimes such as that in Levy Yeyati and Sturzenegger (2016), Israel, Colombia, the Czech Republic and Poland would be classified as floats. Also, the Russian Federation and Kazakhstan would be classified as floats at the beginning of the disinflation process.

²³ Di Tella (2019), in his comments to this paper, defines aggressiveness as the ratio between the inflation rate at the launch of formal IT and the target set for the first year. I believe this is misguided on two counts. First, this definition excludes the initial phases of disinflation as discussed in the previous section. Second, by looking arbitrarily at yearly inflation at the time of the launch, he may include shocks that may be irrelevant to inflation dynamics when the IT regime was implemented. Argentina is an obvious case. At the beginning of 2017, year-on-year inflation was close to 40%, but this was due to the large transitory shock that took place a year earlier, when capital controls were removed. If the six-month period before the launch had been chosen, when inflation had already fallen to 17%, the Argentine program would have been classified as one of the *least* aggressive. Similar comments can be applied to Indonesia and Ukraine.

Uribe (2016) provides a normative analysis. In his perfect foresight infinitely lived agent model, the optimal policy is to aim for the long-run inflation rate (a version of the tax smoothing principle of Barro, 1979), even if this implies a higher sterilization effort and a higher steady-state inflation²⁴. Yet the weakness in its balance sheet made this tax smoothing approach too risky. Therefore, only part of the fiscal deficit was financed with money printing (full financing would have led to very high inflation rates), but then none of these transfers were sterilized. Thus, the amount of financing to the deficit would determine how much the money base would grow in each year, and this, in turn, would roughly determine what the target should be. Barring big changes in money demand, inflation should align with this number (only a 10% fall in money demand was expected in the first year). For example, the first year the Central Bank would transfer the equivalent of 25% of the money base; the second year, 17%, then 10%, and then 5%.²⁵ Linking the targets to the growth in money from transfers, did, however, reduce to a minimum the Central Bank's margin to improve its balance sheet throughout the process. This would eventually become a heavy burden.

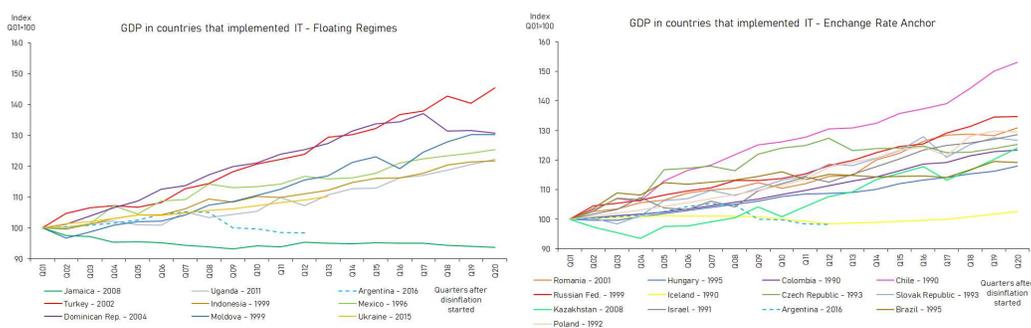
These upper limits of the path (25%/17%/12%/6%) appeared to be quite in line with those of other disinflation experiences starting at similar rates. Among them, the cases of Chile (20%/16%/12%), Mexico (42%/20.5%/15%), Turkey (35%/20%/12%) or Ukraine which, starting at 25%, set its initial targets at 12%/8% leaving the first year undefined (see Appendix 2).

Figure 4 addresses another issued that was hotly debated: the output cost of stabilization. It shows what could be expected in terms of output from similar disinflation experiences. Splitting the sample between floaters and non-floaters, the graph again delivers a uniform message: disinflations implemented within (or on the way) to the inflation-targeting framework are simultaneous with sustained economic recoveries (Iceland and Jamaica being the only two outliers), rendering the debate on the costs of stabilization rather mute. Argentina would fit this mold, as the disinflation of the first two years came with a sustained recovery in economic activity, which reversed only when the program was abandoned.

²⁴ Manuelli and Vizcaino (2017) provide a similar model with incomplete credibility.

²⁵ A point of contention was about the targets for 2016. The team anticipated a fall in the demand of money that would take the inflation rate initially to the 40% range, thus a commitment of 25% for the year seemed too aggressive and risked undermining the credibility of the Central Bank from the start. The Central Bank suggested that the inflation targets should be set once money demand was stabilized in April or May. However, the Executive announced the targets in January. Eventually, the Central Bank did not endorse the 2016 target and just announced that it would try to approximate it as much as possible. However, considering that the targets for the following years matched those announced, the Central Bank suffered in terms of credibility, as it could never revert the idea that it had committed to a 25% target for the first year.

Figure 4. The Output Effect of Disinflations



However, two decisions concerning the targets became a problem. The first was to use overall inflation and not core inflation as the objective. As we will see later, core inflation declined smoothly over the following year and a half, while overall inflation had larger fluctuations. Recently, some countries, such as Thailand, had moved away from core to overall inflation arguing that this is a measure more easily identified by the population. Yet large disinflations that need considerable changes in relative prices may be better served by using core inflation (the Czech Republic, where authorities created a special index where all regulated prices were excluded, is perhaps the clearest example²⁶). So, while overall inflation is a more palpable measure for the target, it is more volatile, which makes it more difficult to control and to build credibility.

In addition, setting targets for a fixed calendar also became a problem. If the initial months of the year were above target, this represented a drag throughout the year, inflicting a loss of credibility if the Central Bank was not willing to undershoot its target in order to compensate for past deviations. Maybe a better system would have been to look at 12-month forward expectations, more in line with the current view that central banks should target inflation expectations and not inflation per se, or have a rolling target (many countries set targets on a yearly basis). However, Gibbs & Kulish (2017) provide a model of disinflation in an inflation target framework with imperfect credibility. Their findings suggest that announcing a path of disinflation reduces the sacrifice ratio even at low levels of credibility. At a minimum, having an institutional mechanism to set and even review the targets would have avoided sending out such a negative signal if the targets at any point were changed. Alternatively, the targets could have been interpreted more loosely (as a projection rather than an objective), thus reducing their coordination power, but diluting the credibility costs in case they were not reached. All these issues suggest that implementing targets requires very meticulous attention.

III. 4. Results of the Inflation Targeting Regime

In March 2016, the Central Bank announced a transition to an inflation targeting regime that would start the following year, with inflation targets of 12-17% for 2017, 8-12% for 2018 and 4-6% for 2019. After launching the program, inflation came down quickly, and inflation expectations started at relatively low levels, i.e., the program started with a substantial amount of credibility. After many years with inflation ranging between 25% and 40%, the first measurement of inflation expectations in June 2016 reported an

²⁶ See Adrian, Laxton and Obstfeld (2018).

expected inflation of 19.0% for 2017 and 15.7% for two years ahead. In October 2016, when the Central Bank survey asked for a multi-year inflation expectation, the results were 19.7% for 2017, 14.8% for 2018 and below 10% for 2019. Figure 5 shows that 12-month forward inflation expectations decreased systematically²⁷.

Inflation was 5.2% in April, 4.2% in May, 3.1% in June, 2.0% in July and 0.9% in August, when some of the April tariff hikes were temporarily reversed. Inflation remained subdued in the second half of the year, amounting to 8.9%, averaging 1.4% per month. Inflation in December and January was 1.2% and 1.6% (MOM).

Disinflation met with continuous criticism from the Treasury regarding interest rates. This discussion was particularly serious between March and May, when the interest rate remained at 38%, but disagreements did not abate even after the Central Bank started reducing interest rates in the second half of the year. In addition, in July, the Treasury managed to secure a Presidential decree requesting USD 4 bn from Central Bank reserves, which the Central Bank blocked. In all, these conflicts helped the Central Bank gain credibility and reaffirm its independence and commitment to lowering inflation²⁸.

During this period, the Central Bank pushed for a further opening of the capital account. In fact, by April 2016, the USD demand for past imports and dividend payments was fully freed. In addition, in May 2016 the USD 2 mm cap for FX purchases was increased to USD 5 mm and eliminated altogether in August.

In September 2016, the Central Bank announced the formal launch of the inflation targeting regime starting in 2017. In fact, not much would change, except that the policy instrument would stop being the 35-day Lebacs (Central Bank paper) and would become the center point of the 7-day repo rate. This change attempted to align the operational framework of the Central Bank with that of standard procedures in central banking and build a more direct link with rates in the financial sector.

The fall in inflation during this period had an impact in output and the bond market. Figure 5 shows that the economy started growing in the third quarter, and country risk continued to fall. In October 2016, Argentina placed USD 8.3 bn in peso bonds at 5, 7 and 10 years at nominal annual rates of 18.2%, 16% and 15.5%, which showed confidence in the stabilization program. This issue would have been unimaginable a few months earlier.

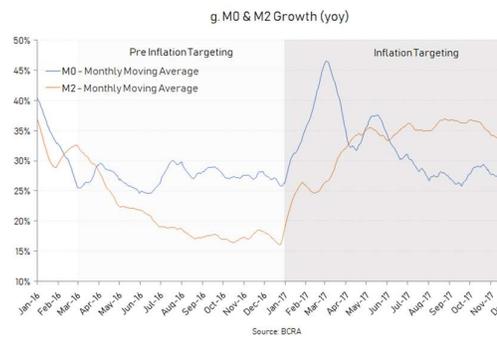
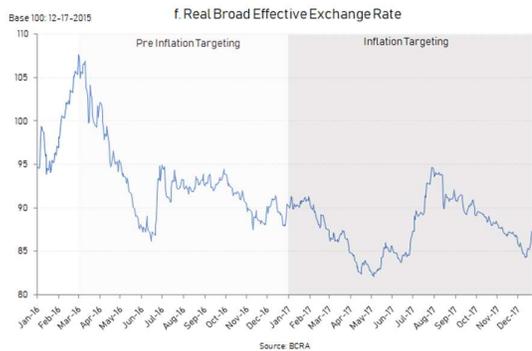
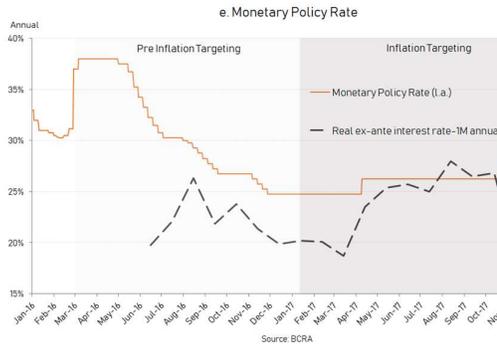
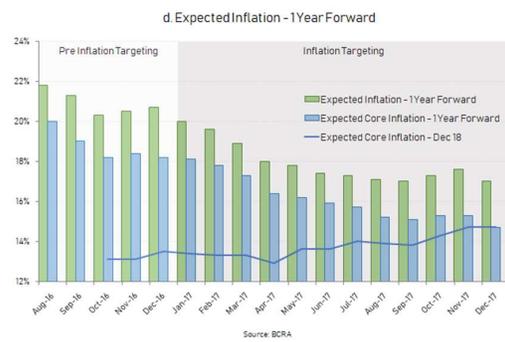
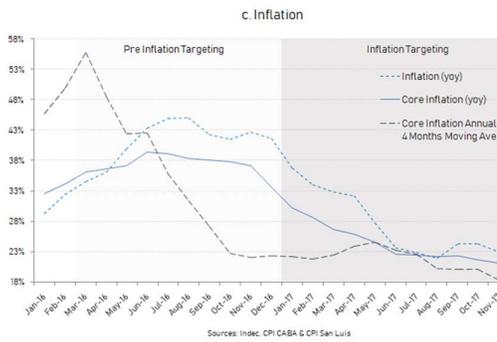
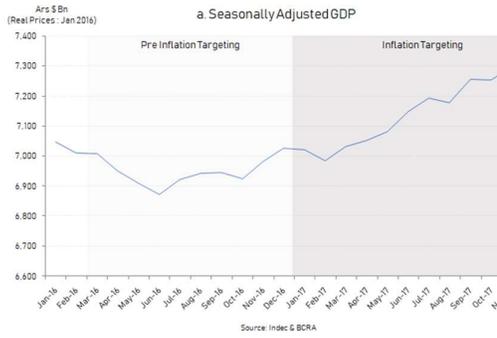
Despite the fears of inertial inflation, the cut in inflation was rather quick, though year-on-year numbers remained big due to the big spike of earlier months. Perhaps the only sour spot in this process was that core inflation did remain somewhat higher, at 10.8%, in the second half of 2016²⁹ (1.7% monthly).

²⁷ Due to the lack of a national (core and general) price index at the beginning of Macri's administration, the reported series uses the expected inflation for the Metropolitan Area of Buenos Aires until June 2017 and the national expected inflation from July 2017 to present. Data retrieved from BCRA Market Survey (REM).

²⁸ Decree 834/2016.

²⁹ IPC-GBA INDEC, the only core inflation index available until 2017.

Figure 5. The Economy during the IT Phase



III.4.a What Was the Disinflation Mechanism?

Despite the fall in the inflation rate, a debate ensued on whether the interest rate was enough to reduce inflation and on the role of utility price adjustments, inertia and the FX in the inflationary process.

Due to the lack of data, little research in Argentina has focused on the role of expectations in the inflation process. As shown in Figure 6, prices, expectations, the FX and regulated prices all move together. Thus, it is easy to see how either of these variables would fuel inflation. But how does each variable play out when taking the others into account? In particular, is it true that the FX has such a determinant role in price dynamics as is typically believed?

We address this question by running a VECM of weekly core prices, FX, regulated prices and inflation expectations, not with the intention to provide a model for inflation, but to check how these variables interact and react to each other. Appendix 3 describes the methodology. Table 4 shows the coefficients of the cointegrating regression. In the first column, only FX and regulated prices are taken into account, while the second and third columns for each sample period include inflation expectations at a one-month and a twelve-month horizon. The results show that during the IT period, once expectations are included, the statistical relationship between prices with FX and utility prices virtually disappears. This result reverses if the sample is extended to 2019, when the inflation process had unanchored, and inflation targeting was abandoned. These results also apply to the short-run pricing behavior (results in Appendix 3). Noticeably, during the IT regime, shocks to the FX had no effect on pricing behavior, a result that also reverted once the regime was abandoned. These results show that passthrough coefficients typically considered large had been quickly reduced (actually eliminated) as a result of the new monetary regime. Figure 7 shows the variance decompositions and portrays the same results from a different angle. It shows that inflation has an inertial component but, again, for the IT period, expectations appear to have been the fundamental driver of price dynamics, while the exchange rate became relevant only when the regime was abandoned. Other results (see Appendix 3) show that during the IT regime, while mute in the long run, jumps in regulated prices did affect pricing in the short run (a result found also in Navajas, 2019 and consistent with Alvarez et al, 2019).

The estimation is not without problems, and the samples are small, as discussed in Appendix 3, but the result is relatively robust for different econometric specifications. These results are included here to note that it is necessary to include expectations as a relevant driver of the inflationary process, something that has been lacking in the empirical work on inflation in Argentina. Certainly, further research on this topic is required.

These estimates address the fundamental question of the transmission mechanism to achieve disinflation in the IT regime. It appears that expectations coordination played a fundamental role in the disinflation process, and that the traditional channel from exchange rates to inflation expectations and pricing behavior had weakened, if not altogether disappeared, indicating a quick adjustment to the new monetary regime. These results were probably aided by the fact that Argentina has no formal indexation of contracts, which reduces inertia. In fact, wage negotiations were quite forward looking. For example, we consider the transition from 2016 to 2017. Inflation ended at 36.6% in 2016,

and the Central Bank inflation target for 2017 went up to 17%. Wage negotiations ended in the 20/25% range, which was consistent with the inflation target³⁰. Thus, to some extent, the inflation target acted as a substitute for income policies. On the other hand, inflation expectations remained consistently around 5% above the inflation targets in every year, a result reminiscent of a Barro-Gordon bias: as if players expected the Central Bank to be willing to tolerate a deviation from its target, which expectations anticipated.

Figure 6. The Comovement of Prices and Expectations

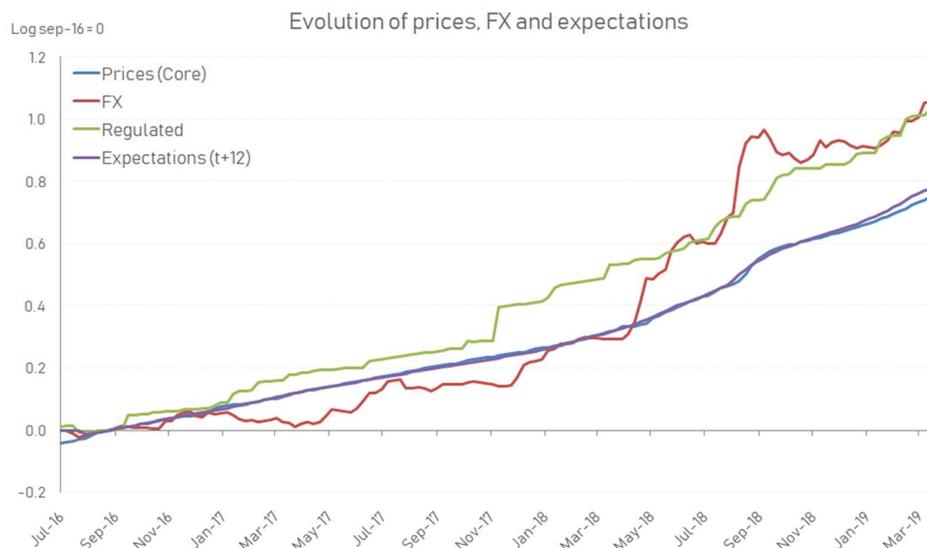


Table 4. VECM Model for Inflation in Argentina. Cointegrating Vector.

Period	Ago2016-Nov2017			Ago2016-Mar2018			Ago2016-Apr2019		
	(I)	(II)	(III)	(I)	(II)	(III)	(I)	(II)	(III)
Frequency of data	Weekly			Weekly			Weekly		
Prices	1	1	1	1	1	1	1	1	1
FX	-0.3566** (0.1270)	-0.0268 (0.0153)	-0.0194 (0.0157)	-0.3268 (0.3692)	-0.0235* (0.011)	-0.0233* (0.0109)	-1.1840** (0.4395)	-0.0822** (0.0263)	-0.1831** (0.0478)
Reg	-0.7186** (0.0812)	0.0275 (0.0574)	0.0030 (0.0521)	-0.6434** (0.2322)	-0.0006 (0.0167)	-0.0373 (0.0201)	0.0753 (0.4764)	-0.0612 (0.0451)	-0.1759* (0.0815)
Exp (t+1)		-1.0356** (0.0784)			-0.9978** (0.0244)			-0.7991** (0.0774)	
Exp (t+12)			-1.0141** (0.0728)			-0.9517** (0.0286)			-0.5739** (0.1380)
Constant	Yes								

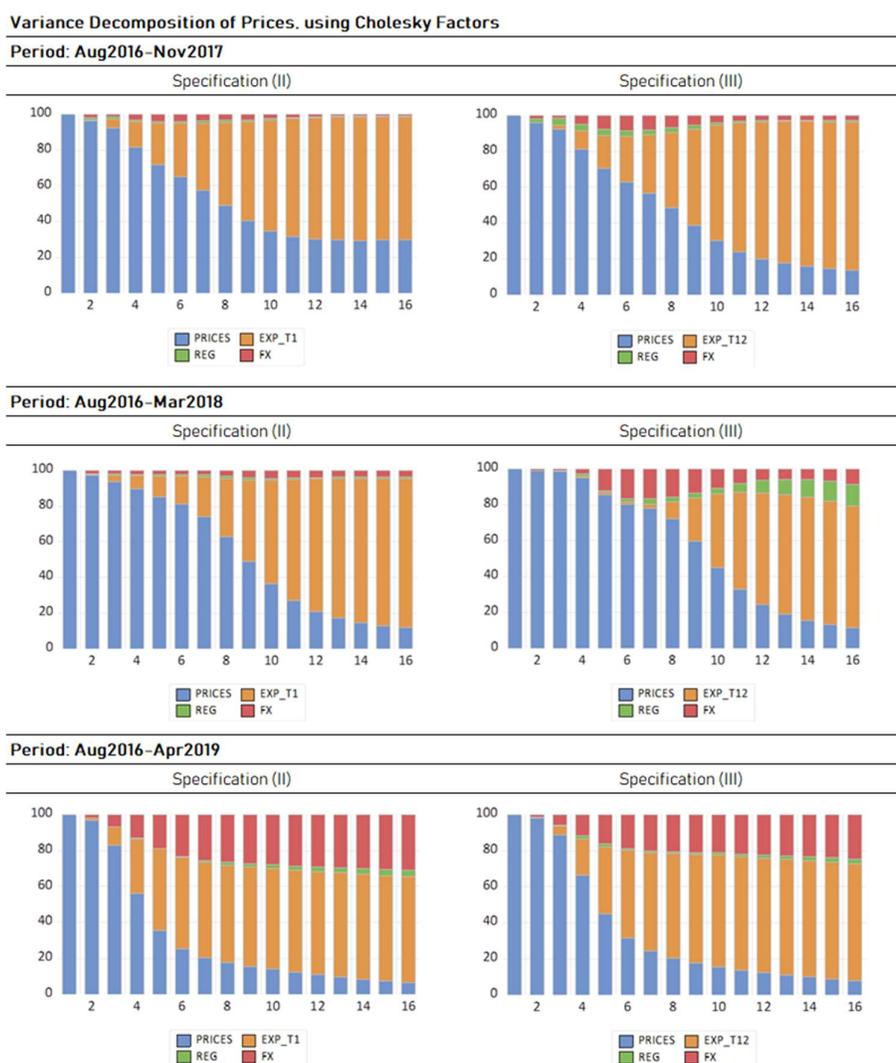
*significant at 5%. **significant at 1%. Standard Deviation in ()

Notation and sources of data: Prices: CPI reported by Pricestats. FX: ARS/USD exchange rate reported by com. A3500 of BCRA. Reg: regulated prices reported by Elypsis. Exp (t+12): core inflation expectations 12-month forward. Exp (t+1): core inflation expectations 1-month forward.

Cointegration test of Johansen (Max. Eigenvalue Test). Each equation is cointegrated at 1% of significance

³⁰ See Banco Central (2016.b), where it is shown that, in a disinflation process, wage negotiations that keep the real wage constant equal the average of the next year inflation and the past year inflation, thus reaching a higher value than the future inflation rate.

Figure 7. Variance Decompositions



III. 4. b. The Policy Reaction

The quick fall in the inflation rate triggered a gradual reduction in the policy rate. By the end of 2016, the rate had been cut from 38% to 24.75%. In January 2017, when the transition to a formal inflation targeting regime was made, a technical problem emerged. Repos paid a local city tax which the Lebac did not, and as the policy rate was kept constant at the previous Lebac rate, this led to an abrupt fall in the Lebac rate that had neither been anticipated nor desired by the authorities. The Central Bank delayed a solution, allowing a de facto easing of monetary policy.

In addition, in January 2017 a new Treasury Minister eliminated the last remaining vestiges of capital controls a 4-month minimum holding period on peso investments. The four-month stay imposed a sizable amount of currency risk on any bet on the Argentine peso. The Treasury decided to collapse this period to zero, thus freeing all capital flows in practice. The Central Bank seconded this move, as it allowed eliminating the last vestiges of

capital controls, which consisted of a required registration (needed to be able to track this 4-month period). As a result, capital flows started to increase, thus resulting in peso appreciation. The Central Bank read the ensuing real appreciation as a consolidation of the disinflation of the second half of 2016. For a second time, reading inflation signals at the beginning of the year turned out to be difficult.

In February, as the government resumed utility price adjustments³¹, inflation picked up again, signaling the Central Bank that easing had gone too far. In fact, by the end of February, inflation seemed to be above the levels needed to attain the 17% target for the year. Thus, in late February the Central Bank started tightening monetary conditions by pushing the Lebac curve upwards and then in April moving the policy rate upwards³².

Inflation increased somewhat in the February-April period, but by mid-2017, monetary tightness appeared to be working again, and inflation started abating pretty quickly. By July, yearly inflation had fallen to 21.4%, the lowest in 7 years, while wholesale prices had moved 13.9% in the previous year. In the second half of 2017, while overall disinflation stalled, core inflation continued to decrease. Core inflation, that had been 1.7% monthly in the second half of 2016, had fallen to 1.5% in the second half of 2017, and had further fallen to 1.4% in the last quarter. For 2018, the expected core inflation was just 14.7%. However, overall inflation that had been 1.4% in the second half of 2016, had been 1.8% in the second half of 2017 (1.5% if excluding the large increase in December resulting from a large regulated price jump engineered after the mid-term elections). Inflation expectations for 2018 had increased 2.3 pp in the previous 14 months, which, considering that 2017's target would be missed led to continued doubts about the success of the disinflation program.

Throughout this period, as inflation decreased, output recovery had been quite consistent, and had strengthened in 2017, which ended with a growth rate of 4% (Figure 5 - Panel c), capping seven quarters of sustained growth. Credit growth had also accelerated in 2017, reaching a 20% growth in real terms by the end of the year, allowing investment to grow at double digits. The growth in credit responded to a series of deregulation measures taken to improve the operation of the financial sector. The question of whether this in turn jeopardized the disinflation process was again disregarded at the time by the Central Bank on the argument of the endogeneity of money, although it may also have played a role in somewhat slowing the disinflation path. The combination of high growth and falling inflation worked to sharply bring down poverty levels. The end result was a landslide victory for the government during the midterm elections.

After the midterm elections, even though core inflation had decreased, because inflation remained above the target, the Central Bank implemented a significant monetary policy

³¹ Electricity prices were increased by 90%, natural gas prices by 30% and water distribution by 20% between February and April.

³² Monetary growth had also picked up at the end of the previous year, hand in hand with a tax amnesty for non-declared capital abroad which required funneling tax payments through the financial sector. This, combined with an abnormal reduction in the money base in February of the previous year, briefly propelled the year-on-year money growth rate to nearly 50% (see Figure 5 - Panel g), before normalizing at a 34% year-on-year rate by May. The Central Bank disregarded these numbers under the argument that money demand was endogenous, but this anyhow stirred renewed criticism against the Central Bank for carrying out a monetary policy that was considered inconsistent with the disinflation path.

tightening (with two hikes, one of 150 bps and one of 100 bps two weeks later). Its intention was to keep the disinflation process moving ahead. What the Central Bank did not know is that, by doing so, it had triggered resistance to its policies within the government, which would shortly after unravel the program.

III. 5 The Evolution of Fiscal Accounts

So far, we have focused on monetary policy, but to understand why disinflation eventually conflicted with fiscal policy, we need to discuss the evolution of fiscal accounts. As mentioned, the government inherited a large fiscal problem and expected some fiscal convergence, initially from a reduction in subsidies, but was not ambitious (see Table 2). Anyhow, even this lax plan got quickly off track for three main reasons: output did not grow as expected, taxes were cut, and expenditure was increased in unanticipated ways.

That the fiscal situation would be challenging became clear when, a few days before taking office, the Supreme Court granted a favorable ruling to three provinces on a tax dispute (which the government later granted to other provinces). Galiani (2018) estimates that there was an impact of 1.6% of GDP on the government's accounts between 2016 and 2018, and a steady state annual impact of 1%. In addition, export taxes were eliminated across the board, followed by a series of other tax cuts, such as those to small and medium sized enterprises, and the automobile industry. Towards the end of 2016, the government also increased the minimum income required to pay the income tax and indexed this amount. This cost an additional 0.6% of GDP. In all, tax reductions added up to 2.2% of GDP.

In addition to the weakening of the income stream the government implemented an increase in pension payments to compensate for the lack of indexation of pensions during the years 2002-2006. This added an annual expense of about 1% of GDP to government spending, plus the obligation to repay the accumulated debts with pensioners originated from that absence of indexation, which added an additional stock of 1.4% of GDP³³.

While utility price adjustments provided additional resources, rather than decreasing, the deficit actually *increased* (Figure 8) from 3.8% to 5.4%! The 2016 tax amnesty provided some relief, but just enough to avoid a marked deterioration of the fiscal situation (it added 1.2% of GDP in 2016 and 0.3% in 2017).

Before moving on, we need to assess a critical feature of fiscal accounts in Argentina: the backward indexation of pensions and social expenditure. As Argentina returned to high inflation in the 2000s after a decade of stability, it was forced to re-index pensions that had been frozen during the Convertibility period. However, at the time, there were doubts about the reliability of inflation statistics, so the government indexed pensions to a combination of tax collection and nominal wages. In reality, this represented an indexation of pensions to nominal GDP, thus triggering an unsustainable dynamic, particularly if Argentina was to start growing again.

³³ According to the figures reported by the FGS in its Accountability Report to the Congress in October 2016 and official information provided by Casa Rosada retrieved from: <https://www.casarosada.gob.ar/36439-programa-nacional-de-reparacion-historica>.

In order to analyze the evolution of fiscal performance during this period more objectively, it is useful to implement two adjustments. The first is aimed at correcting the cyclical movements of the economy³⁴. The second adjustment corrects the fact that pension and social aid are formally indexed backwards, so that their real value is reduced when inflation accelerates and increases in a context of disinflation. A rough estimate is that the budget improves (deteriorates) about 0.4% for each increase (fall) of 10% in yearly inflation. Thus, an additional relevant concept in Argentina is the “cyclically adjusted inflation-constant” budget deficit. Figure 8 shows the results (Appendix 4 discusses the methodology).

With this estimation at hand, we can see that in 2017, after a new Treasury Minister took over, the government started tackling the fiscal imbalance. In fact, in the “inflation constant” measure, the budget improved by 1.1% in 2017. This was a significant reduction. However, the headline budget deficit only moved from a 4.2% deficit to 3.8%: disinflation had increased the real value of pensions, undoing most of the fiscal effort. It was this divergence which propped the Treasury to attempt to slow down the disinflation process in order to avoid a repeat of these dynamics in 2018.

Confident that the government would strengthen after the elections later that year, the markets did not appear overly concerned with the slow pace of fiscal improvement, and country risk continued to fall despite the large deficits. (Figure 5, panel b).

Indeed, after its success in the midterm elections, the government made additional moves at fiscal consolidation by passing a tax and pension reform as well as by hiking up utility prices (December 2017 saw the largest increase in regulated prices for the whole period, see Figure 6). But the tax reform, while improving the efficiency and distributive impact of taxes, implied a *reduction* of taxes going forward³⁵. The only cost-saving features came from the pension reform. One of its provisions was that workers were to be allowed to stay an extra 5 years in their jobs if they so decided. As this was voluntary, it did not create much controversy. In practice, it extended the working age around 3 years (women were previously allowed to retire at between 60 and 65 years old, and the average retirement age was 63). The other one was that the government pushed for a change in the indexation formula, which attempted to move it to a more sustainable dynamics, increasing the weight of prices and shortening the adjustment lags. These changes however met fierce resistance and significant union mobilization, which casted doubts on the ability of the government to push further with other reforms.

To summarize, Figure 8 shows that the government tried to move in the direction of fiscal consolidation in 2017, though the effort was undermined by disinflation, which led the Treasury to become a strong advocate of slowing the stabilization program. In fact, 2018,

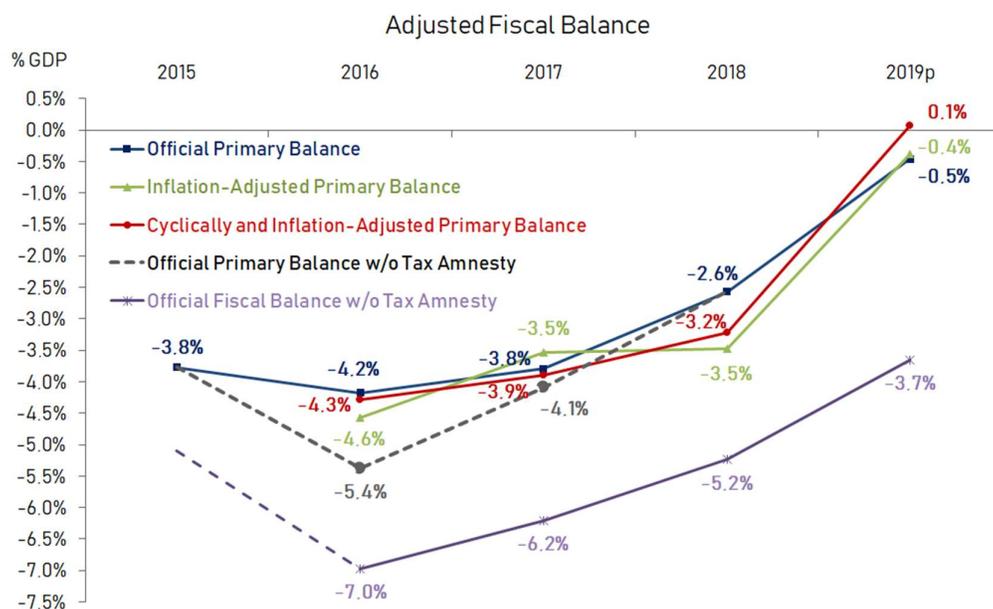
³⁴ We follow the standard methodology detailed in Escolano (2010). See also Girouard & André (2006), Daude et al. (2010), Larch & Turrini (2010), Fedelino et al. (2009)

³⁵ The tax reform included a reduction in corporate income tax (though increasing taxes on the distribution of dividends); the introduction of a tax on financial investment income; and a tax exempt minimum income, which reduced the incidence of labor taxes for the lower half of the income distribution. A tax on bank movements would progressively be considered as a withholding of income tax. The provinces agreed to reduce the maximum rates of the turnover tax (though some provinces which were below these maxima used the opportunity to increase taxes). In all, the tax reform anticipated a gradual reduction of the tax burden, which would reach 2.9% of GDP by 2022..

when inflation accelerated, shows the opposite dynamics. At a constant inflation rate, there was no progress in the fiscal numbers (the devaluation forced the government to increase energy and transportation subsidies), but the acceleration of inflation made a sharp reduction in the real value of pension and social programs, which allowed for a reduction of 1.2% in the headline primary deficit. It was only in 2019 that all measures coincide to signal a significant reduction in the deficit.

The lack of adjustment in the fiscal accounts (for whatever reasons) in the first two years, plus a reduction in private sector's savings, led to a significant deterioration of the current account. By the end of 2017, there were growing concerns regarding the external imbalance. With political power consolidated in the midterm elections, the markets considered that the time had come for the government to start delivering on the fiscal front, but nobody was prepared for what was about to happen.

Figure 8. The Evolution of Fiscal Accounts



III. 6 The Central Bank's Balance Sheet and the Issue of Lebac's

The program started with a weak Central Bank (Figure 2), with a mind-boggling negative net worth of USD 93 bn, net of Letras Intransferibles and Adelantos Transitorios. The Central Bank balance carried remunerated liabilities for 5.7% of GDP in Lebac's and repos, a number that grew to 6.9% in March of 2016, when the Central Bank sterilized the bulk of issuance arising from dollar futures liabilities and at least part of the monetary overhang³⁶.

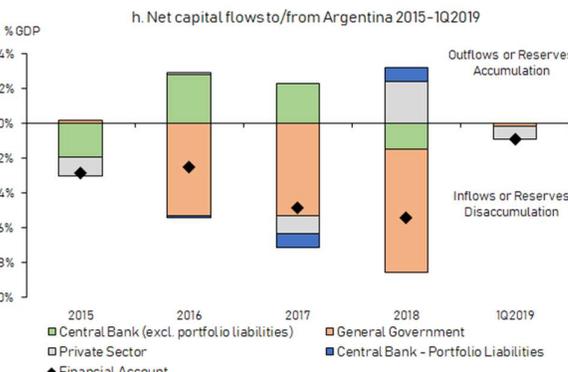
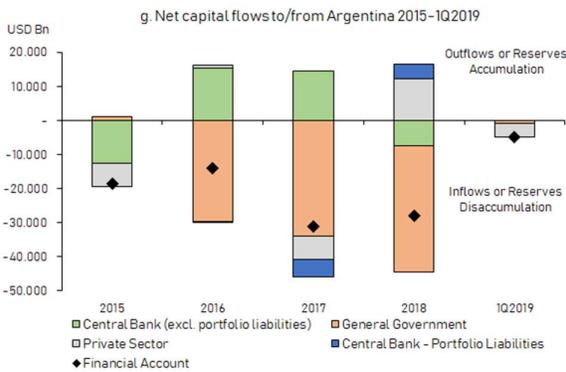
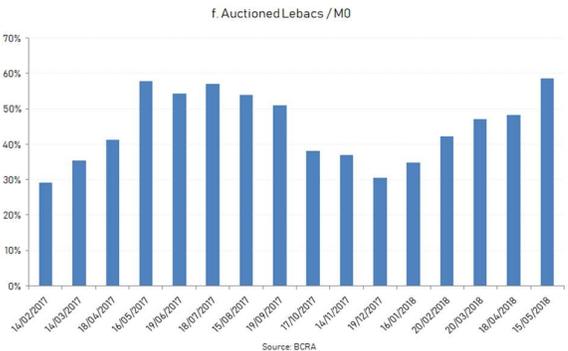
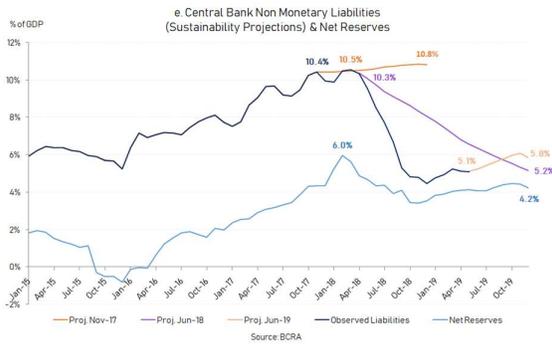
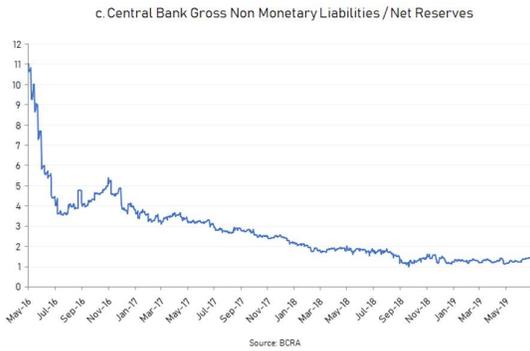
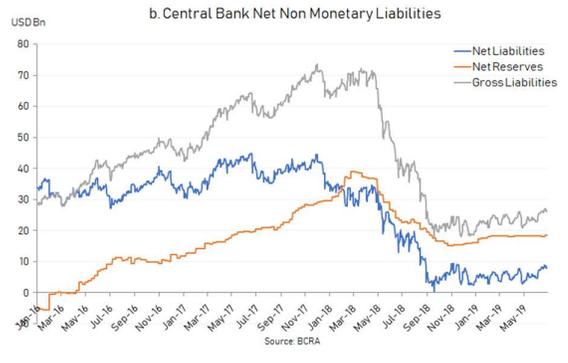
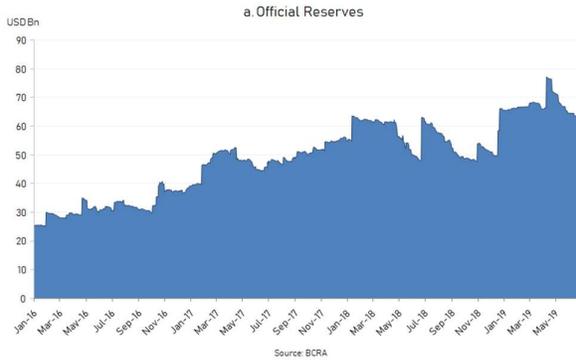
After the agreement with the holdouts, the economy started experiencing a capital inflow process from two sources. One was the external financing of the budget deficit (of both the

³⁶ In the first weeks, the Central Bank and the Treasury agreed to exchange USD 16 bn of Letras Intransferibles for marketable government bonds, somehow compensating part of the deterioration in the balance sheet of previous years (see Figure 2). However, there was an agreement that this debt would not be used for open market operations. As a result, while it significantly improved the balance sheet, it did not preclude the need to issue Central Bank securities for monetary policy.

national government and provinces), which was primarily financed abroad. The second was private sector inflows. While the Central Bank removed the Euroclearability of Lebacs early on in an attempt to fend off private speculative capital inflows, after the Treasury removed the stay period on local investments at the beginning of 2017, inflows increased.

Panels g and h in Figure 9 show the relative importance of both sources of capital inflows, making clear that the lion's share was the government's sector indebtedness. Private sector flows were nonexistent in 2016 and relatively small in 2017. In 2018, the outflows were larger than the inflows of the two previous years, as a large portion of these outflows were from residents. In summary, and contrary to what is believed, the challenge posed by capital flows had more to do with government indebtedness than with hot money (these were probably contained due to the fact that the exchange rate floated).

Figure 9. The Parallel Growth of Reserves and Central Bank Liabilities



The Central Bank confronted government sector indebtedness with an aggressive program of reserves accumulation, buying reserves that were sterilized by issuing peso liabilities (Lebacs)³⁷. By doing so, the currency mismatch of the consolidated government balance sheet and the exchange rate appreciation resulting from the inflows were both reduced, but the inflation objective was made conditional on an exchange rate objective.

Even though the growth in Lebacs had its counterpart in the accumulation of reserves, a debate emerged regarding the growth in the Central Bank's balance sheet, even though, as shown in Figure 9 - Panel c, the ratio of FX backing of Central Bank interest bearing liabilities improved steadily throughout the process. The debate heated up when the real exchange rate appreciated, as this resulted in the Central Bank paying a cost (ex post) in terms of carry that increased the larger the reserves. Figure 9 - Panel d shows that, by the end of 2017, the cumulative ex post return in dollars paid to sterilize reserves reached a maximum of about 20% for the two-year period.

There is extensive literature on reserve accumulation, even when reserves are "borrowed", as was this case. Rodrik (2006) argues that the cost is not large relative to the insurance benefits, while Levy Yeyati (2006 and 2019) argues that the costs are smaller because of their positive effect in country risk. Additionally, historical evidence (see De la Torre, Levy-Yeyati and Pienknagura, 2013) suggests that central banks typically gain from such purchases because they tend to buy reserves at moments of FX appreciation and to sell in moments of turbulence, so that the cost is further decreased by a natural timing to the market of purchases and sales.

In this case, however, given that the financing for reserves was denominated in pesos and not in US dollars, the discussion was whether the stock was unsustainable or whether it was sustainable only in a high inflation/devaluation scenario, along the lines of Calvo (1988, 1991). Alternatively, the discussion was framed as if the interest on Lebacs were a source of inflation itself. According to this view, if the growth in the Lebacs became "money", they could trigger an increase in the inflation rate (as in interest peg runs of Phelan and Bassetto, 2015).

Three arguments suggest that the eventual reduction of Central Bank liabilities needed not be done through inflation. Firstly, central banks' balance sheets do not acknowledge their strongest asset: the net present value of future seigniorage. An estimate of this seigniorage by the Central Bank (BCRA, 2017) placed it at 30% of GDP, much larger than the stock of Lebacs (which reached 11% at its maximum). Secondly, assuming no further purchases of reserves and using market expectations for interest rate, growth and inflation, the stock of Lebacs had stabilized by the end of 2017 (as shown in Figure 9 - Panel b), which suggested a rollover was feasible. Finally, the reserves themselves could be used to cancel these liabilities. For these reasons, the Central Bank considered that the situation was sustainable, a view that was shared by the markets but not by most analysts. Of course, even if inflation was not a foregone result, there was still a latent risk that at some point the government may *decide* to pay for them with inflation.

³⁷ Sturzenegger (2019) provides a justification for reserve accumulation by comparing reserves to those of other Latin American countries. The Central Bank decided to buy these reserves as the government required, not timing it to the developments of the FX market. As a result, these purchases were not disruptive of the functioning of the FX market, which made it possible to sustain a floating exchange rate regime despite large FX purchases.

The question of whether Argentina would have fared better if these reserves and liabilities were not accumulated is not a settled issue. We will come back to this in the final section of this paper.

A final but relevant point refers to the maturity of Central Bank liabilities. During the second half of 2017, concerned with rollover risk, the Central Bank had extended maturities³⁸ by increasing long rates on Lebacs, (see Figure 9 - Panel f, which shows that Lebacs maturing each month had fallen from 60% to 30% of the money base). A long body of literature, starting with Cole & Kehoe (1996) (including the Greenspan-Guidotti rule), pays attention to the relationship between short-term debt and reserves as key for avoiding multiple equilibria.

IV. The Unraveling of the Program

IV. 1 The Change in Targets and the Start of the Crisis

In July 2017, inflation was decreasing relatively quickly, prices had risen by 21% in the previous year (a fall of more than 15 pp relative to six months before) and wholesale prices had increased just shy of 14%. Because of backward indexation of half its spending, this quick reduction in inflation represented a challenge to fiscal accounts as explained above; hence, the Treasury started pushing for setting inflation targets higher to ensure a slower disinflation path³⁹. In addition, the Central Bank had tightened monetary policy in the aftermath of the midterm election, which rallied other actors believing monetary policy was too tight against the Central Bank. As 2017 was coming to an end, the Finance Ministry started doubting whether Argentina would be able to finance the stubborn deficit abroad. The Central Bank's effort to extend maturities and reduce rollover risk had come at the price of increasing longer rates, which made local financing more expensive. By the end of the year, most voices (the Treasury wanting slower disinflation for fiscal reasons; the Ministry of Finance wanting cheaper domestic financing, other members of Cabinet wanting lower interest rates) were challenging the Central Bank's policy.

Towards the end of the year, the Executive decided to move ahead and change inflation targets, even though the leitmotiv at the Central Bank had been "to change a target is to have no target." The President had decided to fire the Governor if needed to go ahead. The change was a risky gamble. At the time, inflation expectations were 17% for 2018 (with expectations of core inflation at 14.5%) and 10% for 2019, so the disinflation program was pretty consolidated. In fact, the Province of Cordoba had concluded the first wage agreement of 2018 with an 11% annual increase. Economic growth also was expected to continue, with an expected growth rate of about 3% for both 2018 and 2019. Before the change, the economic outlook for the remainder of Marci's presidency was positive.

The change was announced on December 28, 2017 (later on referred to as 28D), in a relatively bizarre twist, as that day Argentina celebrates Fools' Day. To communicate the

³⁸ This strategy was also followed with success by Chile in 2003, reducing exposure to rollover risk. For an analysis of the maturity of central bank securities, see Mohanty & Turner (2005) and Gray & Pongsaparn (2015).

³⁹ It was unclear who determined the inflation targets. But, as in 2015 the Executive had announced the initial targets, the Treasury believed it could unilaterally change them again.

change, the government staged a press conference where it announced that it wanted *more* inflation. In an attempt to counter the impact on credibility, the Executive also announced a 50% reduction in transfers from the Central Bank to the Treasury in 2019 and to the equivalent of seigniorage starting in 2020.

Many countries experience differences relative to their targets (Colombia, for example, did not attain its targets for 6 years in a row), particularly during disinflation episodes. Yet the targets operate as an expectations anchor regardless of whether they are achieved or not. In recent episodes, there are 3 cases of increases in inflation targets: Indonesia in 2005, Brazil in 2003 and Turkey in 2008⁴⁰. The cases of both Indonesia and Brazil occurred after a large devaluation that had gotten the inflation process out of track, causing a significant increase in inflation relative to the previous year. In the case of Indonesia, inflation went up from 6.4% in 2004 to 17% in 2005, so the target for 2006 and 2007 was moved upwards, while keeping the 5% longer run objective fixed. In Brazil, inflation had moved from 5% in 2000 to 12.6% in 2002 (when the target was 3.75%), thus the target was adjusted for 2003. In neither case was there a change in monetary policy. While Indonesia converged to its long-term inflation pretty unscathed, Brazil struggled to reach its targets later on (12 years later, inflation was still above 10%). The case of Turkey is similar to that of Argentina, because the inflation target was changed in the middle of a successful disinflation program. Turkey had started its disinflation program with inflation running at 70%, when it set an initial target of 35%, and three years later had inflation below 10%. But the target of 4% after 2007 became difficult to reach. Thus, the target was reset for 2009, almost doubling it from 4% to 7.5%. The targets for 2010 and 2011 were also raised to 6.5% and 5.5%. The change tried to make the targets more realistic while signaling a continued commitment to stabilization. The result was the opposite: this change had a lasting negative impact on credibility, and Turkey is struggling with a two-digit inflation rate still today.

In summary, the precedents for such a move were not auspicious. Thus, it was not surprising that the market's initial response was one of disbelief. When two weeks after the 28D announcement the Central Bank reduced the interest rate by 75 bps, from 28.75% to 28%, the news was received with a sense of relief, as it was sufficiently moderate to be read as an affirmation of the independence of the Central Bank. The peso appreciated, and spreads stabilized and the government managed to squeeze what would be its final bond issue for USD 9 bn in international markets.

However, when two weeks later the Central Bank implemented an additional reduction of 75 bps, arguing it was the natural response to a softening of the targets, the market reacted as if there had been a large institutional shift. The peso depreciated, and the spread on dollar-denominated government bonds increased. By the end of January the spread of Argentine debt relative to emerging markets had quadrupled. Inflation expectations for 2018, which at the end of 2017 stood at 17.4%, jumped to 19.4% in January, a bigger increase than that of the previous 14 months combined. In fact, even when no further cuts in interest rates were implemented, core inflation continued to increase, and the spread on

⁴⁰ See OECD Economic Surveys (2008) for the cases of Indonesia (p. 32) and Turkey (p. 112). For the case of Brazil, see the letter from Banco Central do Brasil to Ministro de Estado da Fazenda (2003) explaining the deviations from the inflation target, and Garcia (2006). For additional information about Turkey, see Kara (2006, 2007). Romania in 2018 would be an additional case, but the change was not significant, so in practice it is not comparable to these cases.

government bonds continued to climb. The loss of credibility had become a permanent shock.

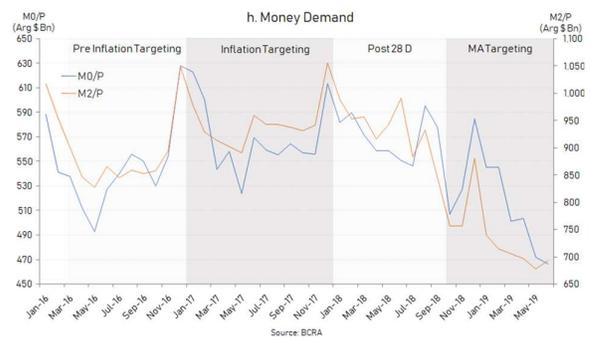
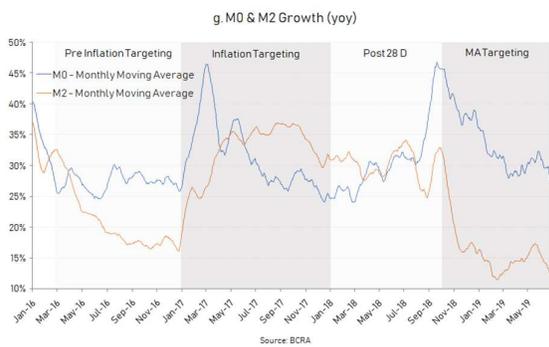
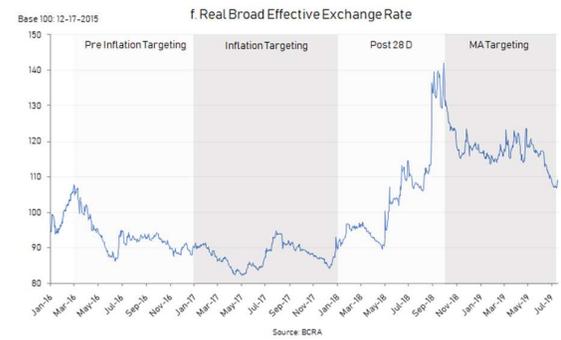
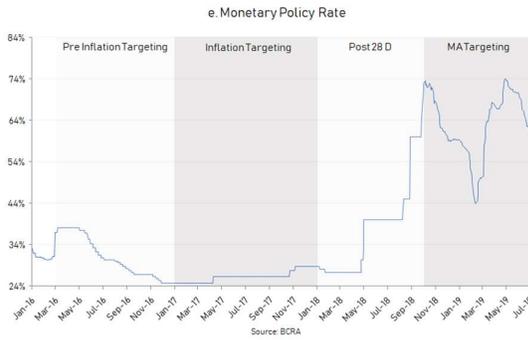
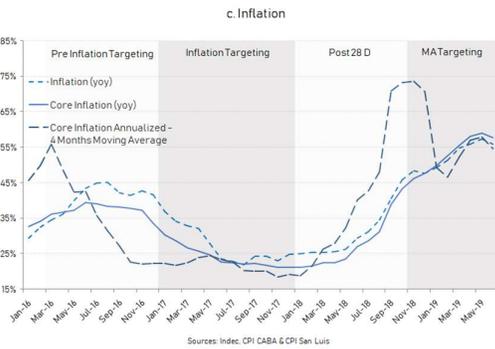
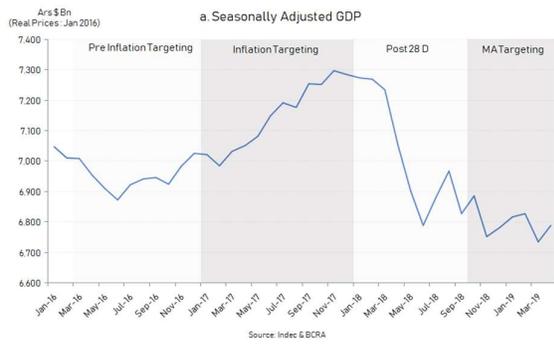
Figure 10 shows how prices and expectations unanchored after 28D. It also shows that country risk started escalating after the change in targets, indicating that the announcement had been read as a change both in fiscal and in monetary policy. The markets had been willing to finance the government while it built political support, but with the midterm elections behind, there were no excuses for further procrastination. The announcement then casted doubts on the intentions of the government to pursue fiscal consolidation.

On 28D, the Central Bank reduced the interest rate on longer Lebac (also as a result of the softening of the targets), and in April announced that it would not issue Lebac with a maturity longer than five months. Both things started piling up the maturities in the short end, reversing the liability management that the Central Bank had achieved in the second half of 2017 and increasing the rollover risk of Lebac. As can be seen in Figure 9 - Panel f, Lebac auctions had been reduced from 60% of the money base to 30% by December 2017, but this process was fully reversed in the first months of 2018. This would turn out to be a costly mistake. In fact, while this had been a policy decision, market participants believed it could only be the response to difficulties in rollover, which worsened market sentiment.

Facing dwindling credibility, the Central Bank and the Executive decided to try to reaffirm it by focusing on the objective that wage negotiations should close in line with the new 15% inflation target, as well as containing the exchange rate, which led to intervention in the FX market during most of March. The Central Bank hoped that the market would read the support of the exchange rate as a precommitment on future monetary policy. However, after two years of almost free floating, the interventions only added to the confusion about the monetary regime. In fact, expectations continued to anticipate a significant loosening of monetary policy. Rates remained unchanged, but this was not enough to change this view.

As uncertainty on the economic program mounted, worries grew on Argentina's ability to roll over its debt. Most indebtedness had been made in external debt denominated in dollars, thus making the fiscal situation itself vulnerable to a large devaluation. In this unfavorable context, on April 24 a new tax on financial income, approved as part of the fiscal reform at the end of the previous year came into effect. The first tranche was a tax on non-residents, on all instruments, including Central Bank securities. The result was a massive exit from government paper and Lebac. The Central Bank interpreted this as a specific portfolio shift and decided to redeem the Lebac in exchange for dollars, avoiding an exchange rate jump. The Central Bank sold USD 1.5 bn on April 25 and USD 5.3 bn in the first week of the crisis. The stock of Lebac fell by ARS 137 bn, roughly an equivalent amount.

Figure 10. Main Variables after 28D



Concerned with the inflationary process, the initial sales were made at the ongoing exchange rate. The Central Bank argued that the peso had depreciated significantly relative to other currencies since the end of 2017, so it was not clear that a further adjustment would be necessary. In this view, the sale of reserves was a way of accommodating the portfolio shift, avoiding excessive volatility in the exchange rate. It took less than a day for the Central Bank to realize that much more was at stake, as other currencies, particularly the Brazilian Real and the Turkish Lira, also came under attack, probably in response to tightening interest rates in the US.

This put the Central Bank in a bind: it was using the exchange rate as a substitute anchor, given that its credibility had been worn out by the 28D announcements, but that conflicted with the need to adjust the exchange rate in a deteriorating context, where two exogenous factors became more visible: a severe drought, the largest in 70 years, coupled with the hike in interest rates in the US. Therefore, the Central Bank moved to a strategy of leaning against the wind in an attempt to smooth the exchange rate market, while not necessarily going against an adjustment of the real exchange rate that it would not be able to put off. Simultaneously, along the way, it would use the sale of reserves as a way of cancelling Central Bank liabilities. This strategy would continue until October, when the Central Bank exited the FX market. By then, it would have sold USD 13.5 bn of reserves and would have reduced its Lebac stock by ARS 617 bn (Figure 9 panel b), about half the stock that the Central Bank had a few months earlier.

The combination of the peso depreciation, the increase in country risk and the drought led to a sharp contraction in economic activity. By May, as the exchange rate continued to search for a new equilibrium, the sudden stop aggravated. The lack of clarity in exchange rate policy did not help align expectations. With the access to markets closed, as was made clear by a couple of unsuccessful government debt auctions, the government acted swiftly and sought help from the IMF. Yet the announcement did little to calm the market.

In the meantime, the policy rate was increased to 40% with only partial success. During this time, the Central Bank continued to sell dollars against Lebac. In the weeks that followed, however, the climate continued to deteriorate, and the rollover of Lebac became a source of concern. In order to calm expectations, on May 14 the Central Bank committed USD 5 bn dollars at a rate of 25 ARS/USD (a value more than 40% above the level of mid-December), thus imposing an upper band to the exchange rate.

This commitment brought some relief and allowed for a new issue of USD 3.0 bn in peso-denominated bonds on May 16. It was decided that the proceeds would be sold by the Treasury rather than bought by the Central Bank, as had been the case throughout the first two years. But these resources quickly dwindled, while the authorities of the Central Bank tried to bridge the time gap to an agreement with the IMF minimizing Central Bank FX intervention.

Two sources of concern started mounting, both related to the ongoing discussions with the IMF. First, it was believed that the IMF thought a much higher exchange rate was needed to deal with the sudden stop; second, it was understood that the IMF would constrain the use of Central Bank reserves. In that context, the policy of redeeming Lebac with reserves could be discontinued. Both ideas increased the run on Lebac and the pressure on the FX market in anticipation of the IMF deal.

While the Central Bank had piled up reserves, a concern had been that reserves may be used for other purposes and the backing of the Lebac's spent away, forcing the Central Bank to monetize its liabilities. In reality, the opposite occurred. A strong social and media pressure developed to "protect" the reserves, as if society preferred to reduce its liabilities through inflation rather than relinquishing this asset. Thus, as the Central Bank continued to reduce the stock of Lebac's against the sale of reserves, it started receiving growing criticism. This added to the arguments suggesting that the Central Bank may eventually stop selling reserves and accelerated the run. Paradoxically, the accumulation of reserves did not serve to ease fears of potential instabilities, but neither did the reduction in the liabilities that were the source of concern in the first place.

IV. 2 The IMF Program

The IMF believed that Argentina had suffered a sudden stop as a result of slow fiscal consolidation, together with an institutional deterioration in monetary institutions as a result of 28D. Thus, naturally, the focus was placed on improving fiscal accounts and recovering the Central Bank's credibility.

The agreement with the IMF led to relatively timid adjustments in fiscal numbers (primary deficits of 2.7% of GDP in 2018 and 1.3% in 2019 were allowed, only reaching equilibrium in 2020), while transfers from the Central Bank would be forbidden. To avoid further interference with the Central Bank, a new bill enshrining the independence of the Central Bank would be sent to Congress. In addition, the government committed to buying back some of the debt issued to the Central Bank to strengthen its balance sheet. The expected impact on the evolution of Lebac's is shown in Figure 9 - Panel e.

The program was sufficiently large to allow Argentina to rollover most of its debt and finance its transitory deficit, and became the largest program in the IMF's history, committing USD 50 bn. It maintained the main tenets of the macro framework, inflation targeting and floating rates. However, given the acceleration of inflation, as in the case of Ukraine, no inflation target was established for the first year of the program. The target for 2019 would be 17%, the original upper bound of the 2017 target. There would be minimal intervention in the exchange rate market and, if needed, it would be implemented through transparent auctions.

While the Central Bank intervened sporadically to maintain the exchange rate within check until the program was launched, at the start of which the Central Bank eliminated the cap on the exchange rate at 25 pesos per dollar and exited the exchange rate market. The exchange rate experienced a significant jump that day, which was considered unacceptable to the Executive and led to Governor's replacement.

IV. 3 Monetary Experiments

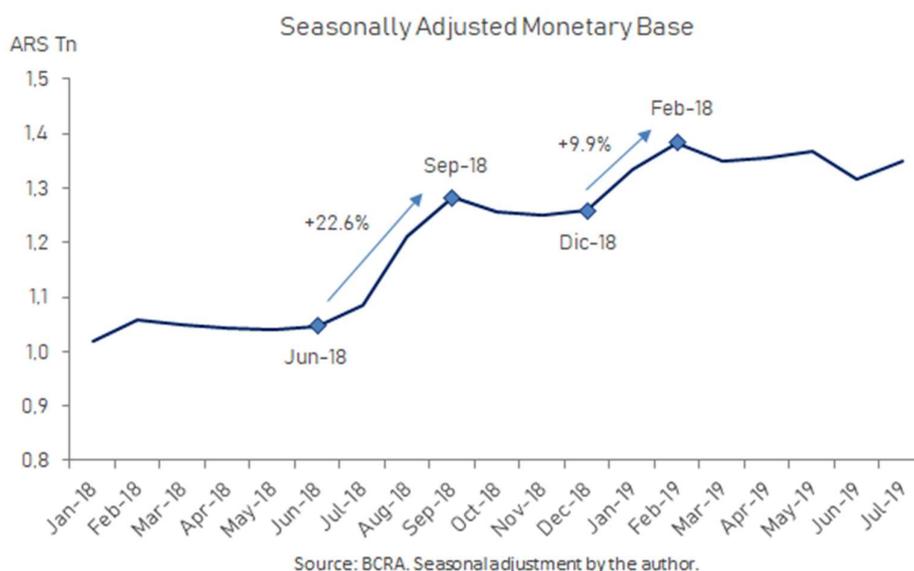
The new Governor had two views. The first was that the exchange rate could be placed at whatever level the authorities desired, irrespective of monetary policy or expectations. All that was required was a smart way of intervening in the market, squeezing the shorts out of their positions and disciplining traders with surprise interventions. His second belief

was that the government could aid in the sterilization efforts so that, with appropriate coordination, Lebac's could be paid back in pesos and replaced by government debt.

There is extensive literature on exchange rate interventions⁴¹ and there is evidence that intervention through reserve accumulation affects the real exchange rate in the short and medium term. It has also been shown that intervention may help reduce the volatility of exchange rate fluctuations. Carstens (2019) provides a recent review. But there is little literature, if any, that focuses on intraday intervention, which was the tool the Central Bank argued would be used to affect exchange rate dynamics.

In fact, interventions became somewhat self-defeating, as the irruption of the Central Bank as an additional player tended to dry liquidity, as market participants retrenched until they could better assess what this "large" player was doing. In fact, to avoid this, the IMF argued that interventions should occur through auctions, since transparent interventions would be less disruptive of the market.

Figure 11. Two Monetary Experiments



In order to address the run on Lebac's, the Central Bank increased interest rates further, eliminated the upper band of the repo corridor, and increased reserve requirements (3 pp on June 21, 3 pp on July 2, and 2 pp on July 18). In addition during 2018 the government partially honored its commitment to cancel some of its debt with the Central Bank (ARS 39.4 bn).

However, the turning point occurred in August, when the Central Bank designed a strategy to reduce the stock of Lebac's. The idea was that the government would issue debt to "sterilize" the money printed, as Lebac's were paid out at a preestablished pace. The Central Bank was ready to sell dollars, if necessary, to contain money supply growth. In addition, banks were not allowed to renew their Lebac holdings, forcing them to move to Leliqs,

⁴¹ A good survey is Chamon et al. (2019) and Agénor and Pereira da Silva (2019).

another Central Bank liability, although these had a 7-day maturity and could only be held by financial institutions⁴².

On August 15, the Central Bank allowed ARS 100 bn (USD 3.3 bn) to mature, but then only sold USD 1 bn in the FX market to compensate the monetary effect. The released stock of pesos represented a jump in the monetary base of 16% that day (see Figure 10), which shortly after fueled a run on the exchange rate, hiking from 30 ARS/USD to 39.60 ARS/USD in the month, and further unanchored prices (see Figure 10). The end result was a reduction in the real value of Lebac through an inflation shock.

As the FX depreciated, the value of Central Bank liabilities in dollars decreased from about USD 70 bn to USD 20 bn in December. This resulted from a reduction in the sale of reserves (USD 15.9 bn) and from the devaluation itself (USD 35.4 bn). The combination wiped out the full stock of unbacked liabilities as seen in Figure 9 panel b, dramatically improving the balance sheet of the Central Bank (Figure 2).

As a result of the large monetary shock, inflation moved a step upwards. It had been higher than 3% since June, but reached 6.5% in September and 5.4% in October. The combination of the de-anchoring of prices, the jump in the exchange rate, and continued discretionary interventions in the FX market in violation of the agreement with the Fund led to the ousting of the Governor, as the government realized it needed to implement a new revision in the program with the IMF to calm expectations. However, the decision to reduce the burden of peso liabilities through a significant jump in prices would create a lingering cost: by undermining credibility, the market requested extremely high nominal and real interest rates going forward, thus thwarting any possibility of economic recovery.

VI. 4. The IMF II Program

The new program with the IMF agreed on a faster disbursement of funds, in exchange for tighter monetary and fiscal policy. The target for the primary fiscal result for 2019 was improved from -1.3% to 0%, which would come mostly from tax hikes. On the monetary side, the program fixed monetary aggregates. As discussed in Section II, fixing monetary aggregates needs to deal with the volatility in money demand, which appears to be exceptionally high in the case of Argentina⁴³. These uncertainties imply that any program focused on stabilizing monetary aggregates could face substantial deviations in terms of its objective to achieve disinflation.

The program was marketed as one where base money growth would be zero, but it started immediately after the big shock in money supply in August, and allowed an additional increase in money supply in December for seasonal reasons, which needed not be reverted later on. Therefore, the initial monetary conditions turned out to be relatively lax. The program, nevertheless, was an initial success. Inflation dynamics not only stabilized but reversed, as reflected by a sharp drop in running weekly inflation, as well as in inflation expectations (Figure 10 - Panel c and Panel d). According to weekly data, inflation in November was only slightly above 1%. At the same time, the interest rate, now

⁴² From then onwards, investments in pesos had to be done through financial institutions, which later bought the Leliqs. This implied that the volatility of carry trade was transferred to the financial sector. Towards the end of the term, this became a source of concern.

⁴³ See footnote 13.

endogenous, started above 70%. As the economy persisted in its deep recession, the conditions for quick disinflation were in place.

A wide band was established within which exchange rate fluctuations would be allowed, but with a monthly depreciation trend of 3%. For a couple of weeks, the government seemed to buy into the program by stating that wage negotiations would be free, but that agents should take into consideration the fact that money supply would not grow the following year. However, shortly after, it started suggesting wage negotiations in the 20/25% range, inconsistent with the monetary target. In fact, Central Bank officials commented that after the November disinflation, the Treasury had asked the Central Bank to increase the inflation rate to avoid the lagged effect on pensions that could compromise the fiscal objective (a discussion on the speed of disinflation reminiscent of the one that led to the change in inflation targets a year before). Thus, the Central Bank extended the high rate of depreciation for the first quarter of the year (2% monthly). The confirmation of this large expected depreciation into 2019 was very detrimental to expectations (see Figure 10), as it implied that the Central Bank itself did not believe disinflation was possible.

The large jump in money supply of August and December was not reversed in January and February, when money demand usually falls. The fact that the Central Bank allowed the interest rate to plunge (it fell from 59.25% at the end of 2018 to 44.21% on February 15 2019), implied that it did not absorb this overhang, leading to a sharp increase in money supply (deseasonalized) in January and February (see Figure 11). The result was a sharp depreciation in March and April, and a very steep increase in inflation, that reached 4.7% in March. This caused a political earthquake and seriously compromised the government's prospects for an election that was now only six months away.

By early March, and as political uncertainty increased, the Central Bank realized that its monetary targets were too lax and started contracting the money supply and increasing the interest rate regardless of the target. In April, it froze the exchange rate bands through the rest of the year, while committing to freeze money supply until December. At the same time, it started sustaining a more stable path for the interest rate. Therefore, in a few months the Central Bank had come full swing back to a program with exchange rate targeting and interest rates as its primary policy instrument.

However, the exchange rate remained unstable. On April 29, the Central Bank announced that it had obtained a waiver from the IMF and had been allowed to intervene within the exchange rate band. However, the Central Bank made sure that no intervention was necessary by keeping rates high. As inflation remained high, the resulting increase in money demand clashed with a program that required keeping money supply constant. In June, the Central Bank reacted by reducing reserve requirements. This allowed it to keep compliant with the program (which only fixes base money), though easing monetary policy. At the beginning of July, it further reduced reserve requirements to deal with the high positive seasonality of money demand, but simultaneously committed to reduce the monetary targets by an equivalent amount two months later. However, when it was unable to meet the monthly target, it announced that the target would become bimonthly. Later, it increased the target for September and October. These permanent changes in the monetary framework hindered the recovery of credibility and, as a result, interest rates remained very high. The open primaries in August delivered a heavy blow to the government and increased uncertainty. With that, the end of the four-year term was marked by a sharp depreciation of the peso and accelerating inflation, which forced the government, in an almost ironic turn of events, to resort again to capital controls and a default on local debt.

V. Lessons learned

In a nutshell, the Macri administration implemented a lax fiscal program financed with short-term external debt, together with an IT program with a flexible exchange rate. While the inflation targets has been set to be consistent with fiscal needs, fiscal consolidation lagged, and disinflation compromised further improvements in fiscal results as lagged indexation of about half the spending entailed an increase in real spending. This led to a conflict between the Central Bank and the Treasury that was settled with a change in inflation targets. The uncertainties this created in the macroeconomic framework coincided with a tightening of rates in the US and a severe drought. Combined, these factors produced the ingredients for a sudden stop that led to a sharp recession and an abrupt adjustment of the exchange rate, while the government, slowly at first, but decidedly in 2019, tackled fiscal consolidation. While the consolidation of fiscal policy provided a chance at stabilization, lax monetary policy and the withdrawal of political support in the primary elections, combined with doubts about the policies of the future government, precipitated the economy again into turmoil towards the end of the term. This summarizes the story of Macri's macro.

From a policy perspective, these four years pose a number of questions. Was fiscal gradualism a mistake? Was fiscal policy adequate? Was IT too fast and aggressive? Was the change in targets justified? Was aiming for a floating rate a mistake? Was the accumulation of reserves (and Lebac or Leliqs) excessive? Was the financing structure of fiscal deficits correct? Was the reaction to the sudden stop adequate? Were the poor results derived from domestic or external factors, or were they just a product of bad luck? This paper has tried to provide evidence and an analysis with these questions in mind. In what follows, we try to summarize possible answers to these questions.

Was gradualism a mistake? As we mentioned, gradualism was more of a political choice than an economic one. The risks of gradualism, higher debt and a larger risk of a credit event, were well understood. The goal of gradualism was to build political capital, which could be handy in times of need. The markets approved the strategy, and country risk actually decreased throughout the first two years, reaching a minimum after the midterm elections. Thus, gradualism provided a feasible path for reform. Yet, after the midterm elections, when the political thesis had been proven correct, the government relaxed both fiscal and monetary policies. This led to a quick reversal of expectations, which is responsible for the turnaround, not gradualism per se.

Was fiscal policy adequate? Even if gradualism may have been the correct strategy, we showed that fiscal policy actually moved in the opposite direction. Rather than implementing an actual gradual deficit reduction, the deficit initially *increased* (with unclear political and economic benefits). Even though markets were complacent with this situation, it built significant risks. It not only required stronger actions down the road, but the sustained weakness in fiscal policy was ultimately responsible for the change in inflation targets, undermining the credibility of the whole program. Fiscal dominance was "contained" by fixing the transfers from the Central Bank, yet a different sort of fiscal dominance emerged: the need for a slower path of disinflation to avoid a large fiscal effect from backward indexation. The inconsistency between the speed of actual disinflation and fiscal needs led to a reversal of the two stabilization programs, first in the form of a change in the inflation targets and second, after the IMF II, by setting a large rate of depreciation.

In this sense, lack of progress on the fiscal front played a key role in undermining stabilization attempts. In short, it is difficult not to point to fiscal policy as the main reason for the program's collapse.

Was IT too fast and aggressive? The analysis of section III helped us discuss this issue. We showed that other countries implemented IT or a path to IT at inflation rates similar to those of Argentina, and that the path of disinflation chosen was very much in line with the international experience. We also showed that a framework with floating rates (the norm after the 2000s) in some cases even accelerated the disinflation by allowing large appreciations.

Some analysts have suggested that IT was too aggressive because interest rates were too high, leading to an exchange rate appreciation that meant that the successful disinflation of 2016-2017 was unsustainable. But this view is contradictory with inflation expectations for 2018 and 2019⁴⁴, which, prior to the change in targets, suggested the disinflation (and growth) process would continue into the future.

We did, however, point out several drawbacks in implementation. 3-digit utility price adjustments spiked inflation, which led to continuously miss the target and undermine credibility, particularly when overall inflation, rather than core inflation, had been chosen. There was no institutional framework to correct the inflation targets and, while disinflation was steady, monetary policy ended up being not as tight as required to achieve the targets, leading to deviations. Trying to show its commitment to disinflation, the Central Bank focused on these misses, without realizing that, in doing so, it was eroding its own credibility.

A point not to be missed is that IT regimes in particular, and disinflation in general, presuppose Central Bank's independence and a lack of fiscal dominance. In fact, had the Central Bank been independent, the turnaround in policies and unanchoring of expectations following 28D would not have occurred, and the turmoil of the final months of the administration would have also been avoided as nobody would have thought that there would be big changes in monetary policy as a result of an election outcome. However, the failed experiences of these two disinflation attempts do not seem to have convinced the general public regarding the need for an independent Central Bank.

Therefore, one possible conclusion is not that the inflation program was excessively ambitious, but that neither the fiscal nor the institutional preconditions were present. Of course, this does not mean that another disinflation program would have performed better. It simply states that those preconditions should have been addressed more forcefully. In fact, in our opinion, the main lesson from this experience going forward is that it is key to create a much stronger institutional framework for macroeconomic policy: an independent Central Bank and some sort of fiscal rule, perhaps along the lines of the structural fiscal surplus that Chile implemented in the 1990s.

Was the change in targets justified? Much of this paper's analysis placed the change in targets as central to the turnaround in expectations, as it meant a debasement of the

⁴⁴ This also holds for inflation expectations computed from bond prices. Corso and Matarrelli (2019) show that by end of 2017, inflation expectations for 2019 were close to 10%, similar to that of analysts.

Central Bank's credibility. This debasement, in turn, unanchored the disinflation process, and, sooner than later, required higher interest rates, aborting the economic recovery and opening the room for multiple equilibria. Of course, had fiscal consolidation not occurred, the program would eventually have faced a financing reckoning. But the change of targets virtually exhausted any remaining buffer that the market was willing to provide, thus precipitating the crisis.

Was aiming for a floating rate a mistake? An issue of much discussion was whether a floating exchange rate was an appropriate choice, particularly in a country with such a long history of inflation and dollarization. We discussed this from different perspectives. On the one hand, we showed that other countries floated their exchange rates in disinflation processes similar to that of Argentina, which typically helped accelerate disinflations. On the other hand, we demonstrated that the exchange rate played a limited role in price dynamics, particularly during the IT regime period, when expectations drove most of the process. This can be considered a success of the IT framework and confirms that Argentina is normal in all possible ways: faced with a credible monetary policy, pricing behavior immediately changed, even relative to decade-long practices.

At the same time, a floating rate may have provided a buffer both in the period of capital inflows and in the sudden stop. In fact, towards the end of the term, employment was growing, even amid a protracted recession, thus suggesting that the depreciation was helping reduce the impact of the shocks in the labor market. While our analysis suggests that seeking a floating rate may have not been an unreasonable choice, by implementing a floating rate, the government also gave away the benefits of a larger economic boom at the outset of the program. If this boom would have provided more room for implementing reforms or accelerating fiscal convergence remains an open question. However, this idea can be turned upside down arguing that the problem was that the government did not implement a *sufficiently* floating rate. If the Central Bank had not purchased reserves in the face of the inflows driven by the fiscal deficit, the exchange rate would have plunged; this could have provided a quicker success in the inflation front, which may have also helped provide political support for reforms.

Before moving on, it is worth mentioning another relevant advantage of flexible rates: the flexibility it provides is not only economic, but also institutional. A fixed exchange rate, being a government commitment, creates a sense of obligation to compensate losers if a devaluation occurs, which is not present with floating rates. Thus, it is much easier to adjust to shocks "without changing the rules of the game" with floating rates than with fixed rates. Argentina was able to go through a large sudden stop in 2018 and 2019 without fundamentally changing contracts, something that may help build confidence and reduce risks going forward.

Was the accumulation of reserves (and Lebacs) excessive? During the initial phase of the program, the Central Bank acquired the dollars brought by the government to finance its deficit issuing short-term Central Bank paper to sterilize the monetary effect of these purchases. Was this a mistake? While *prima facie* it would seem obvious that without reserves some should be accumulated, the fact that they were purchased with short-term peso debt increased the temptation of an inflationary dilution. Calvo (1988, 1991) provides a simple specification. In his model, government finances debt in local currency. In the absence of a precommitment the market chooses the interest rate, and the government

decides whether to default or not on the debt. His main idea is that there are multiple equilibria, depending on how the government internalizes costs and benefits for default. At low interest rates, the cost of servicing the debt is low, and the unique equilibrium is no default. At very high rates, taxes required to service the debt are larger, and the government may find an incentive to default.

During 2018, several developments increased the possibility of a bad equilibrium. On the one hand, the size of reserves and debt had increased; on the other, 28D had broken the precommitment equilibrium by signaling that the government assigned a lower cost to inflation than previously expected. As a result, the private sector asked for a higher rate *ex-ante*, and the higher rate increased the incentives to default. In that sense, the initial increase in the interest rate to 40% (and subsequent increases) was a double-edged sword. It was necessary to reduce the required sales of reserves, but it also created multiple equilibria.

The accumulation of reserves also hindered a quicker disinflation. Had the Central Bank not intervened, a larger appreciation and maybe a faster disinflation would have occurred? Would this have allowed for more political support and a faster convergence to a low inflation equilibrium? Would it have allowed the Central Bank to achieve its inflation target, thus improving credibility and easing the disinflation process? We will never know the answer to these counterfactual exercises. Regarding the incentives for fiscal imbalance, had the Central Bank not purchased the reserves, probably the government would have found a limit to its indebtedness earlier on. This may have pushed for faster fiscal consolidation and, through that channel, it may have induced a better outcome.

Is this enough to conclude that the process of reserve accumulation was too large or inconvenient? This remains an open question. The reserve accumulation reduced vulnerabilities, and the counterfactual of facing the sudden stop without reserves would also have to be evaluated. It also contained the exchange rate appreciation resulting from the government deficit reducing the current account deficit, which even *with* the intervention was considered a source of concern.

While it is difficult to assess the relative benefits and costs, towards the end of the presidential term, everything seemed to hinge on the availability of reserves, thus suggesting that accumulating them earlier on may have provided a valuable insurance mechanism.

Was the financing structure of fiscal deficits correct? The financing of the deficit was done with short-term external debt in foreign currency, which led to substantial vulnerabilities: a larger real exchange rate appreciation, a bigger current account deficit and a currency mismatch in case of a real exchange rate depreciation. While the Central Bank tried to reduce the currency mismatch by accumulating dollars (a policy that worked as expected producing a significant reduction in its liabilities in 2018 and 2019), the reversal of its 2017 strategy to extend maturities on Central Bank paper added to the rollover risk of the consolidated public sector debt. While the Treasury attempted some domestic currency issues, these became unfeasible as instability mounted, and during the term there were no serious attempts to reprofile the debt, including some obvious alternatives, such as transforming debt owned by the public sector into peso-indexed debt with longer maturities and lower rollover risk. In all, the financing structure added significant volatility. And, as mentioned above, focusing on the domestic market would have shown the limits to debt financing earlier on and would have led to more fiscal discipline.

Was the reaction to the sudden stop the adequate one? Once faced with the sudden stop, it is necessary to decide the best way to deal with it (see Cavallo, 2019 for a recent review). Table 5 shows performance in a sudden stop as a result of policy responses. The dependent variable is the change in output and the explanatory variables are global growth, terms-of-trade shocks, interest rates, openness and the exchange rate regime⁴⁵. The results here are relatively standard. Floating rates and lower interest rates provide the best recipe for dealing with the sudden stop,⁴⁶ in line with Ortiz et al (2009); the ability to implement countercyclical fiscal and monetary policy in those events improves output performance.

How do these results help understand Argentina's experience? Once the sudden stop started, because prices had unanchored due to the 28D announcements, the Central Bank initially did not allow the exchange rate to fully float and sharply increased the interest rate. This policy response was suboptimal. The first IMF program was thought to provide room for a better response: to avoid an excessively procyclical fiscal policy and to recover credibility as a way of allowing the exchange rate to do its job. But the program failed to deliver this change of expectations. In 2019, fiscal policy became very contractionary and, while its effects were somewhat buffered by the floating exchange rate, the economy could not recover.

Table 5. Effects of Sudden Stops

OLS	Var GDP - growth		OLS	Var GDP - growth	
	(i)	(ii)		(i)	(ii)
Floating	0.0196** (0.0078)	0.0186** (0.0080)	Floating	0.0301*** (0.0093)	0.0291*** (0.0094)
Deposit Rate	-0.0017*** (0.0002)	-0.0016*** (0.0002)	Deposit Rate	-0.0016*** (0.0002)	-0.0016*** (0.0003)
World Exports	0.0719** (0.0311)	0.0710** (0.0321)	World Exports	0.0846** (0.0366)	0.0861** (0.0390)
Terms of trade	0.0963** (0.0379)	0.0971** (0.0397)	Terms of trade	0.0953** (0.0432)	0.0949** (0.0460)
Openness	0.0131 (0.0083)	0.0125 (0.0100)	Openness	0.0121 (0.0085)	0.0115 (0.0101)
Regional Dummies	No	Yes	Regional Dummies	No	Yes
Observations	81	81	Observations	64	64

Sample: Countries that experienced a Financial Account contraction (yoy) larger than one standard error below its sample mean and larger than 3% of GDP and an adjustment of the Current Account of more than 2% of GDP in the same year, the following year or accumulated between those two years.

Sample: Countries that experienced a Financial Account contraction (yoy) larger than one standard error below its sample mean and larger than 5% of GDP and an adjustment of the Current Account of more than 2% of GDP in the same year, the following year or accumulated between those two years.

Variables: Var GDP - growth: Variation of Real GDP (yoy) - Real GDP Long Rung Trend from 1970 to 2018. IMF Data. Floating: Dummy Variable = 1 in countries with Floating Regime as defined in Levy-Yeyati & Sturzenegger (2016) for years 2001 to 2013, and IMF Annual Report on Exchange Arrangement and Exchange Restrictions for years 2014 to 2018. Deposit Rate: Variation (yoy). IMF Data. World Exports: Var yoy. IMF Data. Terms of trade: Logarithmic difference of terms of trade, Exports as a capacity to import. WDI Data. Regional Dummies: Latam, Africa, Asia and Other, which contains Pacific Ocean, Eastern Europe and Middle East. The Current Account, Net Financial Account (Excluding Exceptional Financing), the GDP in national currency and the exchange rate were retrieved from IMF Data. Robust standard errors.

*significant at 10%. **significant at 5%. ***significant at 1%. Standard Deviation in ()

⁴⁵ See Guidotti et al (2004).

⁴⁶ For an analysis of the effects of the exchange rate policy, see Levy Yeyati (2019); for an analysis of sudden stops dynamics, see Calvo (1998).

Finally, were the poor results derived from history, self-created mistakes, external factors or just bad luck? While the macroeconomic heritage received by the government was not ideal, it is difficult to blame the results on it. The start of the program was relatively successful, and the economy grew healthily in the first two years. In fact, by the end of the second year, growth expectations were solid at 3% per year for the remaining two years. If heritage did not constrain such a positive start, why would it constrain what happened afterwards? Luck played its role, primarily because of a large drought that shaved 2% of GDP in early 2018, which in turn coincided with a tightening of external conditions due to the interest rate hikes associated to the reversal of QE policies in the US. However, this shock affected many countries without the same consequences. Thus, it is difficult to associate the bad performance to luck or external conditions.

In the end, the blame resides in the policies that were introduced: fiscal policy deterioration at the beginning of the administration and betting more on short-run growth, even at the expense of monetary institutions and inflation. Slackening the fight against inflation appears to have been a costly and obvious political mistake in a country that rewards achieving stabilization in the polls. This mistake seems paradoxical for a team that had showed significant professionalism in its evaluation of political risks and benefits and had seen the political benefits of disinflation in the midterm elections of 2017.

At the end, quite ironically, Macri's presidency failed from an excess of populism: lax fiscal policies and an inability to build macroeconomic institutions, in particular, undermining the Central Bank. In the end, the experience suggests that institutional build-up is an essential prerequisite for a successful stabilization and growth process. Even in this basic lesson Argentina is conventional.

Appendix 1. The Holdouts Problem

In 2016, Argentina closed one of its chapters in its long saga of debt defaults. Argentina had run into debt problems in 2001, as a result of a long recession that had started in 1998. An attempt to extend maturities at market rates by mid-2001 was not enough to calm the markets. Therefore, the government implemented an aggressive restructuring of domestic debt at the end of 2001, with haircuts between 40% and 60%, but shortly after declared a default on external debt. The result was tackled in 2005 with an again aggressive debt restructuring (where haircuts on some bonds ran as high as 88%)⁴⁷. This initial restructuring, harsh as it was, was able to entice about 76.1% of participation. To entice participation the government also issued a law that forbid any future deal with any bondholder that decided not to participate (the so called "*lock law*"). However, given that the bonds did not have collective action clauses, a number of holdouts remained. Over the years, these holdouts attempted to attach several assets, always unsuccessfully (the most bizarre attempt was the attachment of a military school ship, *Fragata Libertad*, in the port of Tema, in Ghana; it was held for a couple of weeks before it was released).

In 2010, the government issued a second call for participation in the same terms of the original deal, though forfeiting the accrue of some payments since 2005. This second attempt had reasonable success, bringing participation in the restructuring deal to 92.4%.

⁴⁷ For the results and details of both restructurings, see Sturzenegger and Zettelmeyer (2006, 2007, 2008) as well as Cruces and Trebesch (2013).

Up to that point, Judge Griesa from the Second Circuit Court of Appeals in New York, who was in charge of the case, had somewhat procrastinated, allowing Argentina time to make a reasonable offer to bondholders at large and holdouts in particular. Once this second deal had been sealed, it summoned Argentine authorities asking them to put forward a proposal for the remaining holdouts. At that point, the authorities said that the law precluded them from making any offer, and that no payment would be forthcoming regardless of the court's decision. The court's reaction was to issue a ruling arguing that the "lock law" violated the *pari passu* clause contained in the defaulted bonds. According to the judge, the "lock law" violated the *pari passu* clause, which is defined as the obligation to allow any bondholder to participate in a restructuring. It ruled that, as a result, no payment could be done to any other bondholder, unless payments were not done pro-rata to holdout creditors. Argentina tried to coerce the paying agents to still pay to restructured bondholders, but they declined, so Argentina defaulted on restructured bondholders again. This was the state of affairs when the government took office.⁴⁸

Macri's government attempted to normalize the situation by offering a reasonable solution that was acceptable to the Judge. Argentina offered to pay 150% of the capital at stake or 75% of the litigation ruling (in case the bondholder had been awarded a settlement amount). Some funds had litigated and obtained rulings early on. After a judgement, amounts are adjusted at a rate associated to US court rates. Thus, for these funds, the 150% offer represented more than their actual ruling obligation established in 2016. These funds immediately accepted Argentina's generous offer.

However, other savvy participants had taken another route, buying some peculiar bonds that Argentina had issued in 1998. Among them, the most prominent was the FRAN, that was issued paying a return equivalent to Argentina's country risk. As Argentina plunged into default in early 2002, these bonds started paying the implicit yield on defaulted bonds, a three-digit interest rate. This rate continued to accrue while bondholders did not have a ruling, even beyond the actual original expiration date. NML, a distressed debtholder, for example, had litigated on a small share of its holdings and obtained a ruling which wanted to apply to all its holdings. For FRAN holders, the claim was very high, in some cases reaching 20 times the original capital⁴⁹. For these bondholders, the offer of 150% not even closely met their claims. Thus, the holdouts pushed forward and attempted a negotiation to improve this number. However, they met with stiff resistance from the judge's negotiator, Dan Pollack, who considered that Argentina's offer was at this point more than reasonable⁵⁰. With the support of the court's negotiator, Argentina's proposal was accepted. At any rate, the USD 300 million original issue of FRAN bonds ended up representing a liability of nearly USD 6 billion.

The overall payment amounted to USD 9.3 bn; it was made to the creditors in cash and financed with the issuance of new bonds. At any rate, after the many years that Argentina had lived under the specter of this default, its resolution was considered a big success.

⁴⁸ The government argued that it could not make any deal with the holdouts because bondholders that had participated in the exchanges had the right to a RUFO clause (Rights Upon Future Offers), thus impeding a betterment of options to remaining holdouts. At any rate, these clauses expired on 12/31/2014.

⁴⁹ A detailed computation can be found at: <https://www.bloomberg.com/opinion/articles/2016-02-08/argentina-s-bond-fight-comes-down-to-its-worst-bonds>.

⁵⁰ It is said that at one hearing, the holdouts brought a document explaining what they were owed. Pollack browsed through it and, with a smile, said "this is where this is going" and threw it into the garbage bin.

Appendix 2. Case-by-case Analysis for Countries that Introduced Inflation Targeting

Brazil

As part of the “Real Plan” stabilization program, Brazil adopted a crawling peg exchange rate regime from 1994 to 1999. The repeated financial crisis and the Russian crisis forced Brazil to abandon the fixed exchange regime. In 1999, after a devaluation of 57% of exchange rate, Brazil adopted a floating exchange rate and an inflation targeting regime. The IT regime’s main features included a multiyear targets scheme, the regular publication of inflation reports and the minutes of the board meetings. Flynn (1996), Arestis, de Paula & Ferrari-Filho (2011) and Barbosa-Filho (2008).

Chile

In 1990, the Central Bank of Chile started publishing its projections of inflation and adopted a pegging regime with bands of +/- 2%, using exchange rate as anchor (bands widened to +/- 10% in 1992 and to +/- 12.5% in 1997). In September 1990, the Central Bank of Chile published its first inflation target, a 15-20% target range, later lowering gradually the inflation target. In 1999, with an inflation of 3%, Chile adopted a full-fledged Inflation Target and floating regime. Policy transparency was raised significantly in 2000 with publication of a regular inflation report, a calendar for monetary policy meetings, and the minutes of policy meetings (published with a 3-month delay). Rojas (2000), Massad (2001), Morandé (2001), De Gregorio et al. (2005) and Schmidt-Hebbel & Tapia (2002).

Colombia

After a new Constitution in 1991, which granted autonomy to the Central Bank, the disinflation process started with a crawling peg in 1991, which was changed to a crawling peg with bands in 1994 (bands expanded multiple times until eventually disappeared). In 1999, Colombia adopted a full-fledged inflation-targeting regime with a floating exchange rate and the short-term interest rate as the main instrument, establishing an inflation target of 2-4 %. Carrasquilla (1995), Urrutia (2005), (Giraldo, Misas y Villa, 2011) and Perez-Reyna & Osorio-Rodriguez (2016).

Czech Republic

The stability of the Czech koruna has been the monetary policy target of the Czech National Bank (CNB) 1993. During 1993–1997, the CNB the koruna was pegged to a basket of currencies, and bands widened from 0.5% in 1993 to 7.5% in 1997. In 1996, short term rates were used as main instrument for the first time, and in December 1997, after an episode of sharp exchange rate turbulence, CNB introduced inflation targeting (IT) as its monetary policy regime with a managed floating regime without explicit bands for interventions. Šmídková & Hrnčíř (2000), Bažantová (2017) and Rusnok (2018).

Dominican Republic

Until the end of 2002, the Dominican Republic maintained several exchange markets. In 2002, the Monetary and Financial Law established a floating exchange rate, with price stability as the main mandate of the Central Bank. Starting in 2004, the Central Bank moved away from exchange rate targeting and transitioned to monetary targeting, creating a corridor for the interbank rate which served as signal of the monetary policy stance. This process anticipated the transition to the inflation targeting regime, which was finally adopted in 2012. Starting in February 2013, the authorities introduced the monetary policy rate as the benchmark rate. A 4% inflation target from 2015 onwards has been set, with a +/- 1% tolerance band. OAE (2008), Rodriguez (2008) and Grigoli & Mota (2017).

Hungary

After the use of an adjustable peg relative to a basket of currencies (weighted by their importance in Hungarian trade), Hungary adopted a crawling band exchange rate system as main pillar of its stabilization program in 1995. The currency basket was modified and initial bands of +/- 2.25% were later widened to +/- 15% in 2001. In June 2001, an inflation targeting framework was adopted, and the crawling band system was substituted with a target zone system against Euro, with bands of +/-15%. The authorities set a 7% inflation target by December 2001, 4.5% by December 2002 and 2% long-run objective, and the new monetary policy scheme included the publication of inflation forecasts and inflation reports. In February 2008, the Hungarian National Bank chose to abandon the target zone against Euro and let the forint float freely on the market. Zoican (2009), Siklos & Ábel (2002) and Golinelli & Rovelli (2002).

Iceland

During the nineties, Iceland used a hard peg attached to a basket of 17 currencies, with a band of +/- 2.25%. Bands changed several times during the period until February 2000, when the band was once again widened to +/- 9% relative to the basket target (which had been redefined for last time in 1996). In March 2001 the exchange rate target was eliminated in favor of a floating exchange rate, and an inflation-targeting framework was introduced, establishing a target of 2.5%. That 2.5% target was reached in late 2002. Gu (1997), Matthiasson (2008), OECD Survey (2017), Edwards (2018) and Pétursson (2018).

Indonesia

Before the currency crisis in 1997, monetary policy was conducted mainly by using base money as the operational instrument. The anchor of monetary policy during this period was the nominal exchange rate, which was managed through a crawling band exchange-rate regime. The crisis led to the adoption of a floating exchange rate in 1997. The enactment of a new Central Bank law in May 1999 gave full autonomy to Bank of Indonesia in implementing monetary policy, establishing its independence, and allowing it to set an inflation target every year. The exchange rate was regarded only as an information variable and the base money was set as the operational instrument. First target of 3%–5% for core inflation was announced in early 2000. At the beginning of 2002, the BI moved to the conventional practice of setting long-term targets. BI set a longer-term target of 8% from 2002 to 2006, which was mostly achieved until the establishment of a new IT framework in 2004, when the government was put in charge of setting the target. The government issued its first inflation target for 2005 to 2007. In July 2005 BI officially moved from base money to interest rates as its operational target starting a full-fledged inflation targeting. Central Bank of Indonesia (2005), Ramayandi & Rosario (2010), Kenward (2013) and (Alamsya et al., 2001).

Israel

In mid-1985, in a context of an annual inflation rate of 450%, the government implemented a stabilization program that succeeded to quickly reduce inflation to 16-20% between 1986-1991. The stabilization plan was based on a mix of policies that included a tightening of monetary policy, a wage freeze, and a temporary price freeze on various goods and services, as well as the freeze of the exchange rate, used as nominal anchor. In late 1991, Israel adopted a crawling exchange rate band and set its first inflation target for 1992 at a rate of 14 to 15% as part of the new crawling band system. Gradually, the

interest rate became the main instrument of monetary policy, together with an increased flexibility of the nominal exchange rate regime through a gradual widening of the bands. Klein (1998), Maman & Rosenhek (2009), Bufman & Leiderman (1998) and Leiderman & Bar Or (2010).

Jamaica

Jamaica adopted a flexible exchange rate system in September 1991. In September 2017, Bank of Jamaica adopted an inflation targeting framework, and since then conducts monetary policy with the objective of attaining its long run inflation target of 4-6%, intervening eventually in the FX market in order to smooth the volatility in the exchange rate. IMF (2009), Bank of Jamaica (2009, 2010, 2011, 2017) and Barrett (2014).

Kazakhstan

Kazakhstan pursued the stability of exchange rate as main objective of monetary policy during the post-Soviet period. In 1999, after a devaluation, a path for the floating of the Tenge was designed. An implicit corridor was established, with bands of +/- 3%. This near-fixed exchange rate ended abruptly in February 2009, with a devaluation of about 25%. The February 2009 devaluation was followed by a new corridor for the dollar/tenge exchange rate, and then in March 2011 by a managed float centered on the dollar until September 2013, when the National Bank of Kazakhstan switched to the use of a multi-currency basket target. The currency corridor was canceled in May 2015, when National Bank moved to a freely floating currency. In August 2015 the National Bank moved to the inflation targeting regime, adopting the short-term interest rate in the money market as main instrument. Frankel (2013), Epstein & Portillo (2014), National Bank of the Republic of Kazakhstan (2015) and Zholamanova et al. (2018).

Mexico

By the end of 1994, due to the financial crisis, Mexico was forced to float the currency and abandon a target zone for the exchange rate. In 1995 Bank of México defined as main instrument to affect interest rates the cumulative balance of commercial banks' current accounts at the Central Bank. By 1998, announcements of changes in the instrument began to be accompanied with a discussion of the reasons behind the decision to modify it, enhancing transparency in the implementation of monetary policy. In 2000 the Central Bank started publishing quarterly inflation reports. This transparency process was reinforced in 2001, when Banco de México announced that it was formally adopting an inflation targeting framework. Then, in 2002 a long-term inflation target was defined at 3 percent for CPI inflation, with an interval of variability of +/- 1 percentage. Since 2003 monetary policy announcements have been made at preestablished dates. Martínez et al. (2001) and Francia & Torres (2005).

Moldova

Until 1998, the exchange rate policy included an official exchange rate for bank transactions, and an exchange rate for cash transactions, which was freely determined. In 1998, due to the Russian crisis, the National Bank of Moldova (NBM) gave up its policy and moved to a floating exchange rate regime. At the same time, the foreign exchange policy was targeted at avoiding the excess fluctuations of the official nominal exchange. In 2006, the NBM changed its aim to price stability. With the global financial crisis of 2008, the NBM intervened to avoid the excessive depreciation of national currency. Interventions were reduced gradually, and in 2013 the NBM adopted an inflation targeting framework, setting a 3.5–6.5% inflation target. National Bank of Moldova (2010, 2011) and Petroia (2013).

Poland

In 1990, in a context of high inflation, Poland abolished its old multiple exchange rate system and adopted a unified fixed exchange rate against the US dollar. In May 1991, after a devaluation, authorities shifted from a dollar peg to a basket peg, and in October the fixed peg was replaced by a crawling peg regime, initially with a monthly declining rate of devaluation. The exchange rate worked during this period as nominal anchor. In May 1995, Poland introduced a crawling band with a fluctuation band increasing from +/- 7% to +/- 15% in 1999, keeping a decreasing monthly devaluation rate, which was reduced to 0.3% by March 1999. In September 1998, Poland announced its decision to shift to an inflation-targeting framework, establishing an inflation target of 8% to 8.5% for 1999 and the interest rate on short-term open market operations as main instrument of monetary policy. In April 2000, Poland adopted a floating exchange rate regime. Since 2004 the inflation target is 2.5% with a +/-1% fluctuation band. Gottschalk & Moore (2001), Kokoszczynski (2001) and Polański (2004).

Romania

Starting from 1999, National Bank of Romania (NBR) used the exchange rate as nominal anchor. In July 2005, NBR shifted from a monetary policy frame based on the exchange rate towards an inflation targeting scheme. This framework has been combined with a managed float exchange rate regime, where the NBR has intervened in repeated opportunities. Dobrota (2007), Daianu & Kallai (2008) and Niculina & Catalina (2009).

Russian Federation

During the post-Soviet period of 1992–98, the monetary policy of the Bank of Russia was essentially exchange rate-oriented due to overall economic and financial instability combined with hyperinflation (1992–94) and high inflation (1995–98). An exchange rate corridor system was introduced in 1995, and later the government debt crisis of 1998 triggered a shift to a managed floating exchange rate. The exchange rate continued to be tightly managed until 2005, when the Bank of Russia introduced a dual-currency basket (US dollar and euro) as the operational indicator for its exchange rate policy. In 2007, the price stability was explicitly stated as a primary policy objective. Since 2009, the flexibility of the exchange rate policy was increased, and the intervention volumes decreased steadily. In 2014, Bank of Russia abolished the exchange rate policy mechanism creating the conditions for a transition to a fully floating exchange rate regime by 2015 and the adoption of a full-fledged inflation targeting regime, setting the consumer price index as operating landmark. The current inflation target is 4%. Korhonen & Nuutilainen (2017) and Central Bank of Russian Federation (2013).

Slovak Republic

After its independence in 1993, National Bank of Slovakia conducted monetary policy based on the regulation of M2. The objective was to achieve currency stability by reducing inflation and maintaining a fixed exchange rate of Slovak koruna within a fluctuation band of $\pm 0.5\%$, while the fixed exchange regime served as the nominal. By 1997/98, the target zone exchange rate system became unsustainable, and the Central Bank adopted a managed floating system. The year 2000 brought the adoption of an implicit inflation targeting regime, and Central Bank shifted to a qualitative management of the monetary policy until 2004, when Slovak Republic joined the European Union and inflation targets were established so as to fulfill the Maastricht criterion to adopt euro as common currency. Beblavy (2002) and Nagy (2016).

Turkey

In the aftermath of a significant macroeconomic crisis and after a standby program with IMF, in 2001, Turkey adopted a floating regime and a reform of the Central Bank. In the beginning of 2002, CBRT announced the adoption of an implicit inflation targeting with targets of 35%, 20% and 12% for the following 3 years using short-term interest rate as main policy instrument. Base money and inflation targets were used together as anchors to affect expectations, and the rationale behind interest rate decisions was explained in press releases. In 2006, the CRBT adopted a full-fledged Inflation targeting framework. Over time, discretion regarding monetary decisions was reduced and the communication of the Central Bank, as well as the disinflation mechanisms was improved. After an initial success, Turkey had problems to reduce its inflation to a single digit and achieve its targets, which were changed in 2008. Serdengeçti & Dervis (2001), Ersel & Özatay (2008), Culha et al. (2008) and Central Bank of Turkey (2019).

Uganda

Following the liberalizations of the financial sector in 1993, Uganda adopted a floating exchange rate regime. Since then the foreign exchange rate has remained market determined, though it intervenes in the foreign exchange market to help stabilize exchange rates in times of high volatility, which arise due to seasonal effects. In June 2011, Uganda moved from money growth targeting to inflation targeting as monetary policy framework. The Central Bank rate was adopted as the main instrument and is set in order to achieve an inflation target of 5% over the medium term. Anguyo (2017), Katusiime & Agbola (2018).

Ukraine

Until 2014, the stability of the exchange rate was the key anchor in Ukraine with intense FX interventions. In February 2014 when international reserves were depleted to critical levels, the NBU adopted a floating exchange rate. After floating the exchange rate, the NBU adopted an interest rate based monetary policy framework with targets for the NBU's net domestic assets and net international reserves, and instituted reforms to transition to inflation targeting. The NBU formally adopted an inflation-targeting framework in December 2016, setting a medium-term inflation objective of 5%. Khutorna & Bartosh (2015), Grui & Lepushynskyi (2016), IMF (2016, 2017 & 2019), National Bank of Ukraine (2015, 2016.a, 2016.b, 2016.c).

Appendix 3. VECM Estimation

Table 4 displays the resulting estimates of the cointegrating equations derived from a standard Vector Error Correction Model (VECM), based on the interaction between prices (*Prices*), the exchange rate (*FX*), regulated prices (*Reg*) and inflation expectations (*Exp*). The general specification applied is the usual:

$$\Delta y_t = \alpha\beta' y_{t-1} + \Gamma X_{t-1} + u_t$$

Where $\Gamma = [\Gamma_1, \dots, \Gamma_{p-1}]$, and $X_{t-1} = \begin{pmatrix} \Delta y_{t-1} \\ \vdots \\ \Delta y_{t-p+1} \end{pmatrix}$

In this specification, y_t is the vector of four variables mentioned above, while Γ_i stands for the coefficients associated with the lagged differentiated variables (the matrix X_{t-1}). The term $\alpha\beta'y_{t-1}$ represents the so-called "Error Correction Term", which describes the long-run relationship among the cointegrated variables ($\beta'y_{t-1}$) and the speed of adjustment to

it (α). More specifically, Table 4 shows the coefficients corresponding to the long-run cointegrating equation (β') for the different time periods and variables included.

The data used has weekly frequency. The sources of data are the following: *Prices* is derived from the Pricestats Index, *Reg* comes from the weekly series of the consulting firm Elysis, *FX* is obtained from the BCRA's Com. A3500, and *Exp* from the BCRA's Market Expectations Survey (REM). For *Exp*, two different variables were alternatively included: 1) one-month-ahead expectations, and 2) 12-month-ahead expectations, and their levels were computed based on the actual level of the CPI in each moment (monthly expectations data was interpolated daily with an exponential trend, and weekly averages were computed). All the variables were included as the natural logarithm of their levels.

The stationarity of the series was examined by ADF tests. We verified that all of them are clearly I (1), except for the expectations, in which case there is some evidence pointing to the fact that they may be I (2). This problem could possibly arise from the small size of the sample under analysis, which makes it impossible to carry out a comprehensive study of the series and also diminishes the power of the tests. The cointegrating relationships were tested by standard Johansen Tests, while the absence of autocorrelation was tested by LM tests and the absence of Heteroskedasticity, by White's tests. The optimal lag structure for the short-run coefficients was selected by optimizing the Akaike Information Criterion (AIC), and afterwards excluding the non-significant lags according to Wald tests (the significance of each lag was tested jointly for all variables at each moment of time t).

The following table shows the other coefficients of the equation corresponding to *Prices* within the VECM, i.e., the adjustment coefficient (α) and the coefficients associated with the short-run effects estimated by the model:

Table A1. VECM Model for Inflation in Argentina. Short-Run Coefficients.

Dependent variable: $\Delta Prices$									
Period	Aug2016 - Nov2017			Aug2016 - Mar2018			Aug2016 - Apr2019		
Specification	(I)	(II)	(III)	(I)	(II)	(III)	(I)	(II)	(III)
Observations	58	58	58	75	75	75	130	130	130
α	-0.0403***	-0.4777***	-0.5051***	-0.0161***	-0.3824***	-0.4134***	-0.0062***	-0.0504**	0.0048
$\Delta Prices (-1)$	0.2753**	0.3601**	0.3635***	0.1443	0.3089***	0.2648***	0.2989***	0.062	0.0858
$\Delta Prices (-2)$		0.1622	0.1677*	-0.0679	0.0511	0.0163	0.0981	-0.0107	0.0010
$\Delta Prices (-3)$		0.1025	0.0999	-0.0141	0.0240	0.1225	-0.0712	-0.1776**	-0.1517**
$\Delta Prices (-4)$				-0.1263		-0.1099			
$\Delta Prices (-5)$				-0.1410*					
$\Delta FX (-1)$	0.0190	0.0140	0.0146	0.0007	0.0151	0.0044	0.0486***	0.0204**	0.0251**
$\Delta FX (-2)$		-0.0400**	-0.0377**	-0.0290**	-0.0226*	-0.0300**	0.0267**	0.0157	0.0265**
$\Delta FX (-3)$		-0.0396**	-0.0431**	-0.0208*	-0.0275**	-0.0271**	0.0105	-0.0013	0.0075
$\Delta FX (-4)$				-0.0259**		-0.0418***			
$\Delta FX (-5)$				0.0072					
$\Delta Reg (-1)$	-0.0041	0.0548*	0.0394*	-0.0193*	0.0113	-0.0079	0.0180	0.0112	0.0086
$\Delta Reg (-2)$		0.0292	0.0294	-0.0340***	0.0050	-0.0116	-0.0070	-0.0099	-0.0116
$\Delta Reg (-3)$		-0.0093	-0.0097	-0.0294**	0.0037	-0.0107	-0.0232*	-0.0272**	-0.0282**
$\Delta Reg (-4)$				-0.0317***		-0.0236**			
$\Delta Reg (-5)$				0.0013					
$\Delta Exp t+1 (-1)$		0.3600			0.1313			0.2953*	
$\Delta Exp t+1 (-2)$		-0.2632			-0.4654			0.3252	
$\Delta Exp t+1 (-3)$		-0.9602			-0.7723			0.2251	
$\Delta Exp t+12 (-1)$			-0.3144			-0.4356			0.2472
$\Delta Exp t+12 (-2)$			0.4704			-0.0583			0.6798*
$\Delta Exp t+12 (-3)$			-1.5260**			-0.9468			0.1136
$\Delta Exp t+12 (-4)$						-0.1908			

*p-value<0.1, **p-value<0.05, ***p<0.01

Additionally, aiming to assess the joint significance of the lags associated with each variable as a group, block exogeneity Wald tests were performed for each variable in each specification (Table A2).

Table A2. Block Exogeneity Wald Tests. Joint Significance of Short-Run Coefficients.

Block Exogeneity Wald Tests (p-values)									
Null Hypothesis: Joint non-significance									
Period	Aug2016 - Nov2017			Aug2016 - Mar2018			Aug2016 - Apr2019		
Specification	(I)	(II)	(III)	(I)	(II)	(III)	(I)	(II)	(III)
Observations	58	58	58	75	75	75	130	130	130
Δ FX	0.2369	0.0132	0.0051	0.0330	0.0709	0.0014	0.00004	0.1304	0.0025
Δ Reg	0.8656	0.3412	0.2380	0.0071	0.8794	0.2026	0.2762	0.2196	0.2294
Δ Exp t+1		0.3110			0.0508			0.0008	
Δ Exp t+12			0.0306			0.0349			0.0004
All	0.4905	0.0957	0.0087	0.0082	0.1120	0.0054	0.00008	0.0001	0.00001

Note: Dependent variable: Δ Prices

From the resulting estimates, it can be derived that inflation expectations appear to be significant (in block) to explain the short-run evolution of Prices in almost every specification (12-month-ahead expectations are significant in all the regressions).

It is worth noting that all the results reported are robust regarding changes in the order of variables for the Cholesky factorization. Neither the variance decompositions nor the values of the coefficients experience significant modifications.

Appendix 4. Cyclically and Inflation-Adjusted Primary Fiscal Balance

Two technical adjustments were made to the primary fiscal balance reported by the Ministry of Finance. The first was a relatively standard cyclical adjustment to take account of the effects on the fiscal result derived from GDP cycles. The second was a more country-specific adjustment for the case of Argentina to consider the impact that accelerations or decelerations in inflation produce on the portion of government spending devoted to pensions and social transfers. The results are shown in Figure 7.

For the cyclical adjustment, the methodology applied follows Escolano (2010). First, based on the seasonally adjusted series of real GDP (y) published by INDEC, the potential GDP (\underline{y}) was computed by a Hodrick-Prescott filter. The output gap (γ) is defined as:

$$\gamma = \frac{y - \underline{y}}{\underline{y}}$$

After that, real series were converted to nominal series (Y and \underline{Y} , respectively) applying the corresponding GDP deflator. Fiscal revenues (R) and expenditures (G) were corrected by applying the following equations:

$$\begin{aligned} R^* &= R(1 + \gamma)^{-\mu}, \\ G^* &= G(1 + \gamma)^{-\kappa}. \end{aligned}$$

As mentioned in Escolano (2010), international evidence found that, in practice, the elasticity of revenues (μ) is typically slightly above, but close to, 1. Also, the elasticity of expenditure (κ) is estimated near zero for many countries. The latter is the case because, by definition, κ should reflect only the fiscal automatic stabilizers from the expenditure perspective (e.g., unemployment insurance), which are typically a small fraction of spending (as it happens in Argentina), and should not reflect discretionary actions, even if these are motivated by cyclical developments.

Hence, $\kappa=0$ was used. But to compute the response of government income to the GDP cycle more precisely, the elasticity of tax revenues was estimated separately from the elasticity of social and employment contributions. Using data published by AFIP for the different types of revenues and from INDEC for nominal GDP (from 2010 to 2018), a regression of this form was computed in order to estimate the different elasticities:

$$\ln X = \mu \ln Y + \text{constant}$$

Here, X was alternatively the tax revenues or the social contributions. The resulting elasticities were 1 and 1.2, so those numbers were applied to correct the revenues according to potential GDP.

The inflation adjustment was based on a comparison between the evolution of the observed spending on pensions and indexed social assistance (which are indexed to past inflation and wages, according to National Laws N° 26417 and 27426), and the evolution that they would follow in the case they were contemporaneously indexed to current inflation. In years of accelerating inflation, real expenditure decreases because of this lagged indexation, while, in the case of disinflation, expenditure increases in real terms for the same reason.

Thus, in Figure 7, the fiscal balance was adjusted to take account of these effects, correcting the spending on pensions and social assistance, as if they followed current inflation perfectly (and not past inflation, as they actually did). This adjustment allows a visualization of the real dynamics of the fiscal budget without considering the impact of mere temporary changes in the level of inflation.

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