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Macri's Macro: The Meandering Road to Stability and Growth

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Macri's Macro
The meandering road to stability and growth[1]

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Abstract

This paper reviews the various macroeconomic stabilization programs 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 fraction of spending, quick disinflations jeopardize fiscal consolidation. Lack of progress in the fiscal front during the first three years of the government 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.

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 longed for his country: a change that was expected to revert Argentina´s decades long decline.

Macri's Presidency also brought 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 full of resources. It had been David vs Goliath. As Argentina slid closer and closer towards becoming a more authoritarian left wing populist country, the world looked in awe. Argentina, a member of the G20, could veer the whole political spectrum in the region. Thus, Macri's triumph, which reversed course, was received with a sense of relief.

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 growth rate of 3% per year, though intimately they believed this was a conservative number. Inflation would

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gradually come down, and they expected that by the end of Macri's first presidency it would be around 5%. As a result of this combination real wages would have grown and populism would have been proven wrong.

Yet by the end of Macri's first presidency, the results had turned very differently. Output would actually decrease 3.4% (in per capita terms close to 8%) and inflation would have added more than 250% to the price level and was still among the highest in the world. By the end of the term, nobody could avoid a sense of frustration. Shouldn't things have turned much better? Did things work out so badly because it was the necessary pain of undertaking inevitable adjustments? What happened was the result of external factors or of self inflicted mistakes? Was it an inevitable consequence of what the government had inherited? Or was this the confirmation that Argentina is a "lost cause", and will never find a mend to its problems? This paper attempts to shed some light on these questions.

The paper proceeds as follows. In Section I we start with an analysis of the initial conditions. Our conclusions is that the starting point was worse than expected and perceived at the time. Section II discusses the main components of the initial plan: gradual fiscal adjustment, inflation targeting and a floating exchange rate, and the reasons 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 to what extent expectations became a driver of the inflation process. We also review the results: a consistent disinflation, which, though proceeding at a pace that was comparable with other experiences, was slower than expected and slower than the pre established targets, while fiscal policy procrastinated eventually leading 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 a disagreement with the speed of disinflation, as a fast disinflation jeopardized fiscal convergence because half of government expenditure 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, lasting until the elections almost two years later. Section V tries to draw some lessons.

I. Initial Conditions

Perhaps a good starting point is to review the conditions inherited by the incoming government at the end of 2015. Despite the fact that the data suggested debt levels had fallen, a more detailed look at the data reveals a more somber picture. Taking a broader perspective of assets and liabilities gives a more pessimistic view of sovereign obligations. In particular, the Central Bank's balance sheet was deteriorating quickly and capital controls contributed to a rising gap between official and black market exchange rates.

The heritage also included four years of stagnation, a large and growing budget deficit, persistent high inflation, a dual exchange rate system, 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 has been growing. Table 1 shows the starting point for these variables among others.

The issue of debt levels requires a discussion, given that it was the centerpiece of the debate on the "legacy" of the previous government. The previous government argued it had managed to produce a strong reduction in the level of debt to GDP and particularly in the

level of debt to GDP owed to market participants. This was supported by official data and shown in the column labeled "official debt" in Table 1 and Figure 1.

Table 1. Initial Conditions[2]

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 some methodological caveats should be made, as some of the changes in debt levels came hand in hand with changes in the assets or liabilities of the government, generating a different dynamic on government´s net worth. Let's provide an illustration. In 2014 the government issued about USD 6.2bn in government bonds to purchase an equity stake of 51% in oil company YPF[3]. But this increase in debt came with a simultaneous increase in assets, and as such does not represent a change in governments net worth. On the contrary, when the government nationalized the pension system, it absorbed all the debt that previous pension firms had accumulated over the previous decade, generating a sharp reduction in the debt owed to third parties. But at the same time the government assumed the liabilities with pensioners that this debt was supposed to finance. As a result there was no change in net indebtedness (unless in the sense that you transform a contractual debt into a government spending obligation). A third relevant adjustment to be considered is how to take into account the role of Central Bank net reserves. If the government cancels debt using Central Bank reserves, it reduces both debt and an assets, without change in net worth. In fact, other countries report debt only net of Central Bank reserves.

Adjusting for 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 assumed by the government when it nationalized the pension system? Can they be defaulted more easily or less easily than contractual debt and does this affect the value of this debt? [4]

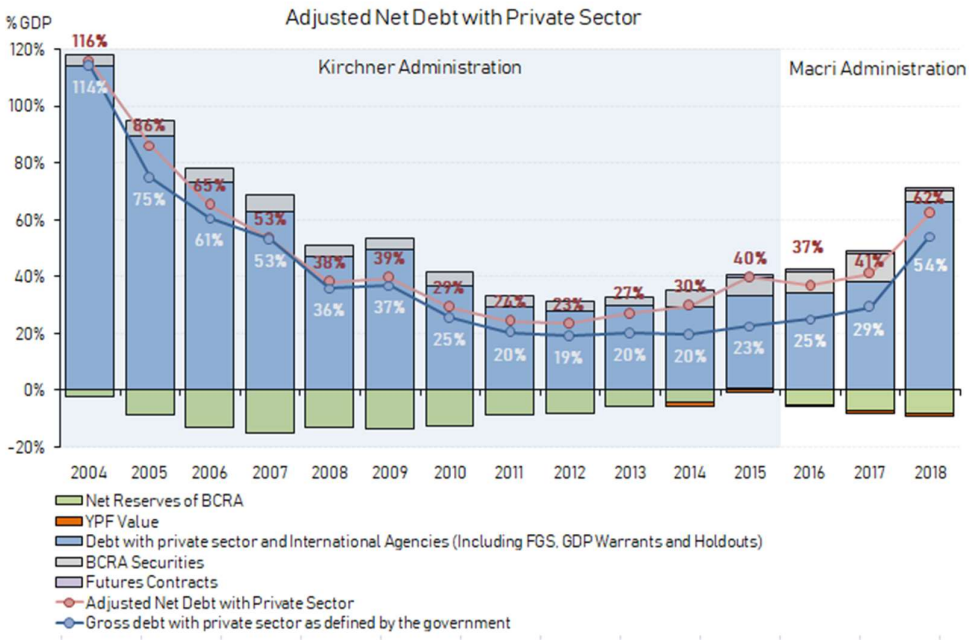
[2] Sources and notes: Inflation: Data from Provincial Statistical Institutes and Congress CPI (for 2011 and the first half of 2012, an average between the San Luis Province CPI and Congress CPI is used; from the second half of 2012 to end-2015, an average between San Luis Province CPI and CABA CPI); 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 computed 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 occured when the price of WTI was 101 dollars per barrel. Five years later the market value of that 51% was just USD 3.7bn.

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

In order to address these issues we make five corrections to the official story. These are not the only possible ones, but these should 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). In third place, we added the debt from the 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 also included an estimate of the debt to holdouts (we also use the numbers agreed in 2016 to cancel these obligations). The results are also shown in Figure 1.

Figure 1

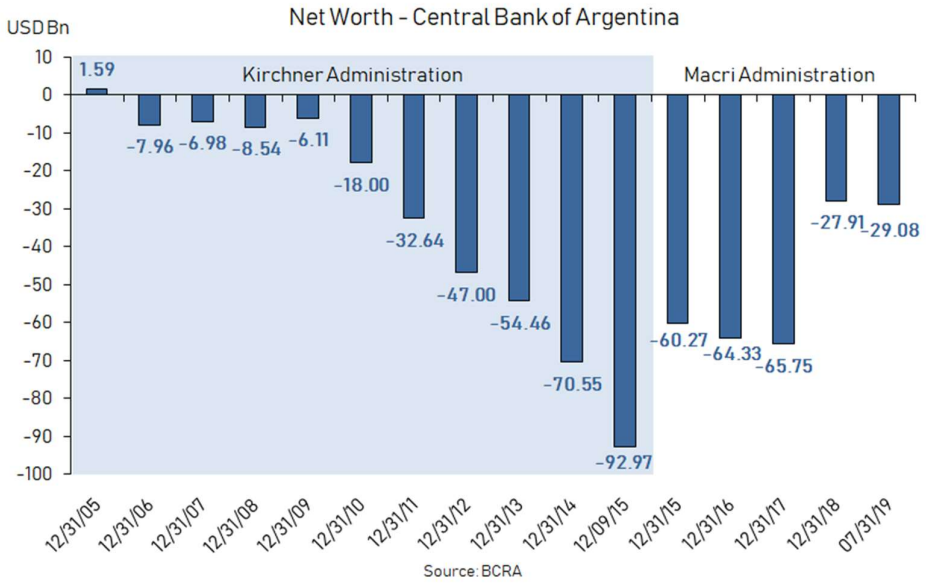


These corrections show that until 2012 there was a substantial reduction in debt, the result of a restructuring in 2005, economic growth, fiscal surpluses and the appreciation of the real exchange rate. Yet starting in 2012 debt had started to creep up again. In fact, between 2012 and 2015 debt to GDP 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 balance sheet of the Central Bank. During the previous years the government had systematically paid back debt using Central Bank reserves. In exchange, the government stashed the Central Bank with dollar-denominated *Letras Intransferibles*, i.e. non-convertible notes. These notes paid a below market rate, and had a ten-year maturity. The first was due in 2016, although the budget law approved in 2015 had extended this maturity an additional 10 years. In short, the NPV of this bill was minimal at most, and had zero liquidity. As a result, the quality of the balance sheet of the Central Bank had deteriorated very rapidly. Netting out the *Letras Intransferibles* and the Domestic Credit account (*Adelantos Transitorios*), the net worth of the Central Bank had taken a nosedive between 2006 and 2015, as shown in Figure 2.

A final relevant point completes the picture. In October 31, 2011, in the face of growing capital flight, the Central Bank had implemented an exchange rate control mechanism (*cepo*) that had increased the black market premium significantly over time.

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, businessmen and government officials had started working in a program in case the elections were won. This group had been given one sole constraint they would have to respect: the reduction of the fiscal déficit would happen only in a gradual manner. Beyond that point 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 political motivation. On the economic front, the consensus was that, as debt was low (even though we saw this statement should be somewhat qualified), there would be financing and it is always better to smooth economic adjustments[5].

But the main objective 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 undo this stigma. The argument was that if the Macri administration was seen as a different political object, this would provide political strength and policy flexibility in turbulent times. In other words, while gradualism entailed the risk

[5] An early such an approach was Thatcher´s program of macroeconomic stabilization. Sargent (1981) says " A hallmark of Mrs. Thatcher´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".

of increasing the level of debt during the initial years, with its risk of a credit event, at the same time, it was argued, not taking this path entailed the risk of weaker political support at the time when a severe adjustment would be needed.

On the fiscal front, the program envisioned an initial correction of the budget of between 1.5/2% of GDP, mostly from a reduction of subsidies, with a slowly declining deficit thereafter. However, the program envisioned a growth rate of about 3% per year. With a tax burden of the national government of around 20% (Ministerio de Hacienda de la Nación Argentina, 2018), this entailed a 0.6% of GDP increase in fiscal resources each year. So, to the extent that real expenditure remained constant, the government could expect to keep its fiscal balance relatively stable as the resources from growth would allow to absorb the biggest fiscal challenge facing the government: the fact that as inflation decelerated pension expenditures 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 constrained by the fact that it was agreed that part of the fiscal deficit would be monetized in order 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 to finance the deficit should not be sterilized, given the weakness of the balance sheet of the Central Bank). Thus the inflation rate the program would have to tolerate would be the one that was consistent with the money printing to the government plus minus any changes in money demand. This led naturally to the idea of having a multi year inflation targeting regime. In all, the program assumed that over the four years inflation would add up to 73%, though it was expected that inflation would be below 5% towards the end of the mandate.

It was also agreed that Argentina would pursue a floating exchange rate regime. The consensus on this, to a significant extent, 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, it´s inability to generate an adjustment of relative prices after the Russian default of 1998 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, probably because of its ability to smooth out external shocks, and were thought to deliver higher growth and lower volatility in output[6].

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] There is a large 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 Predictions of the team 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 was no liquid reserves to tap, and, as the government had campaigned on the promise to unify the exchange rate market, exporters were expecting a depreciation of the currency, so exports had dwindled to zero[7]. Any attempt to delay a solution would just postpone the resolution of the issue, while the government would lose momentum, and would renege on one of its fundamental campaign promises. D date was decided for a week later.

It was decided that lifting capital controls would not be "big bang" but would be done gradually. Two main reasons supported the view that a gradual opening should be undertaken. The first was that there was no clear idea of how money demand would react

[7] On December 10th 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 to go through the transition without disruptions in the functioning of the financial sector.

after four years of forced peso savings, and the second, that there was, allegedly, a large stock of pending import payments and dividends 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 as the Central Bank were negative (see Figure 8 - Panel b).

The desired impact would be obtained by two features: all comercial flows would be freed immediately, and no authorization would be required to buy FX for up to 2 million dollars per day. This number was sufficiently unexpected (some analysts were expecting the government could allow buying 30.000 or 60.000 dollars), that the team believed that it would generate the perception of a substantial change. Requests to pay for "previous" imports would be authorized gradually over time with a queue that respected the original day of the request. The freeing of the demand for this purpose was expected to be fully completed by mid year.

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

D date was the 17th. The night before the Central Bank agreed with the People's Bank of China an immediate disbursement of a loan for USD 3.1bn by converting the equivalent amount of yuans for a currency swap into USD. This was announced the day before of the exchange rate liberalization. In addition, the day before the grain exporters offered a guarantee to sell USD 330mm per day on the market for three weeks, a very significant amount considering that the FX market operated about double this amount. These two announcements tried to provide some tranquility to a market that the following day would operate freely for the first time in four years.

Net reserves were negative, and liquid resources available to the Central Bank that day were just a mere 400 million dollars. The market opened at 13.90 ARS/USD in its first operation, and then appreciated slightly, a price between the previous official price of 9 and the black market price of 16. By noon the market was operating alone and closed at 13.30. The Central Bank did not intervene that day, and in the following days the exchange rate moved freely around this value. In all, this was seen 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 amount of future contracts, due through June 2016 at off market prices. The Central Bank's short position on FX futures was approximately USD 17,400 millions which comparing the fixing price and the informal exchange rate, delivered an expected cost of 62,750 million pesos (11.2% of 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 the 29th of September of 2015 (it was assumed that after this date participants had engaged only for "speculative reasons)" this reduced the cost in about 11,085 million pesos. The cost of other operations done over the counter (OTC) by the banks, was partially compensated by purchasing the FX position of banks described above which saved an additional 6,900 million. All in all, the costs were reduced in nearly ARS 18,000 million and the total effective cost for the BCRA of these futures 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 zaga had ended with a ruling in favor of holdouts on the basis of a *pari passu* clause that precluded payments to restructured debt if payments were not made to holdouts. This had motivated the previous government to default on the entire debt. The Treasury started working on this and reached an agreement in April. Given the complexity of this negotiation, we defer the details to Appendix 1. The overall payment to settle with holdouts was USD 9.3bn. Together with the removal of capital controls and the resolution of the futures issue, this entailed a significant normalization of the economy.

The objective of the Central Bank was to sustain a strongly contractionary monetary policy to insure a controlled 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 or a bank holiday. These resources had not been used given that the transition was smoother than expected, so they found themselves covering in December most of the reserve requirements through February. The implication 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 as it contracted 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 run by using reserves (which had started to grow since the opening of the exchange rate controls) were not successful, and only quelled when interest rates were increased to 38% at the beginning of March.

By then the real amount of money had fallen 16.4% substantially more than what the government had anticipated. To avoid the jump in the exchange rate monetary policy should have been significantly tighter in these first months (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, the 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 April[8], the month in which 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 process of convergence to an inflation targeting regime (IT). We divide our discussion of the regime around four main questions. First, was there a rationale for using inflation targeting in Argentina? Second, were the preconditions met to launch an inflation targeting regime? Third, what was the adequate speed of disinflation and how was it chosen? And, finally, what were the results? This discussion is split between a discussion of the transmission mechanism and the policy response. We then briefly discuss the evolution of fiscal accounts and the balance sheet of the Central Bank, two factors that built up tensions that were relevant in the eventual undoing of the program.

III. 1. A framework to assess inflation targeting

The choice of a disinflation program requires a discussion of how to coordinate expectations along the disinflation path. While consistent monetary and fiscal policies cannot be avoided, the alternatives includes a plethora of possibilities: using the exchange rate as anchors, using incomes policies, reverting to more basic monetary aggregates, or the more conventional (at least at the time) framework of inflation targeting. A large literature discusses the merits and benefits of each. Exchange rates typically help to coordinate expectations, and had been used in many successful stabilization episodes, not only in well known successful stabilizations of the 1980s and early 1990s (Convertibility in Argentina, the Plan Real in Brazil or the Israel Stabilization[9]), but also in more recent experiences such as that of Chile and Israel[10]. In addition a large literature suggests that exchange rate based stabilizations lead to initial booms (Calvo & Vegh, 1993) thus helping build political support for reforms. However, the team disregarded these arguments on the basis of need of a shock absorber in a small open economy, and were willing to forego the initial benefits to build this adjustment mechanism[11]. The team also argued that it would be easier to build credibility by using a framework that was mainstream, in line with the idea of the normalization of Argentina. This was basically also the reason why the use of incomes policies were discarded, though other arguments were that the government did not want to sit "the old-politics" players at the decision table and that utility price adjustments would take a long time. Additionally, income policies would seem similar to some of the policies implemented by the previous administration with which the current administration wanted to provide a clean distinction. Indexation also had been banned from labor contracts, so past contracts written at a higher inflation rate would also not be a problem. The fact that government spending was indexed and therefore some sort of

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

[9] See Dornbusch & Fisher (1988).

[10] De Gregorio (2004) and Frenkel (1996).

[11] Sturzenegger (2016) makes this case explicitly, and also used the argument of Tornell and Velasco (2000): floating rates by revealing quickly the effects of policies induces more fiscal discipline.

income policies to deal with the impact of disinflation on the real spending was disregarded believing it could be absorbed by the budget.

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

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

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

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

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

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

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

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 regimes amplifies) and demand and money demand shocks (which an inflation targeting regime smoothes out).

We confront this basic framework with the data in the following way. In order to identify the volatility in real money demand we identify periods of constant interest rates in inflation targeting regimes. Given that money supply is endogenous, changes in the stock of money can only be associated with changes in money demand and thus provides a valid identification mechanism for money demand shocks[12].. 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 were 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, mostly, changes in the supply conditions of these goods. The results are

[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.

summarized in Table 3 which shows that Argentina exhibits an unusually high volatility both in money demand as well as in supply shocks.

Table 3. Money demand and supply prices volatility[13]

SE Ln (M2/P) in comparable periods of fixed monetary policy rate

SE Ln (M2/P)	Country	Years
0.0431	Argentina	2016/2017
0.0416	Peru	2011/2012
0.0325	Peru	2004/2005
0.0285	Chile	2012/2013
0.0282	Chile	2002/2003
0.0223	Chile	2017/2018
0.0186	US	2010/2011
0.0180	Brasil	2015/2016
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

SE Ln (CPI* / CPI)
Period: 2016 to 2018

Country	CPI*	
	Housing, water, electricity, gas and other fuels	Transport
Argentina	0.1307	0.0428
Brasil	0.0596**	0.0087
Peru	0.0319**	0.0091
Mexico	0.0198	0.0412
Chile	0.0155	0.0136
US	0.0095	0.0178
Colombia	0.0081	0.0227

(**) only fuels

In all, this does not provide conclusive evidence on the benefits of either regime, though it stresses that dealing with the volatility of money demand presents a particular challenge in Argentina[14]. Regarding supply shocks, they appear very high in 2016 but were about half the size in 2017, when they appear more in line with those of other countries. Thus, it could be argued, that leaving behind the initial large shock in regulated prices implemented in April of 2016[15] the volatility of money demand provided a rationale for adopting IT in Argentina. At any rate, while the initial program had already planned an IT framework, the volatility in the money market in the initial months had reinforced this view.

While the benefits of smoothing monetary shocks appear clear, a drawback of an IT regime is that the target is not something under full control of the authorities; placing them in a

[13] The table in the left compares the Standard Error of M2/P across different Latin American countries and 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 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, incentivated 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 250%, natural gas prices 195%, water distribution 300%, and transportation 100%.

constant tension between defending the targets to align expectations and not taking them too seriously to avoid credibility losses[16]. In an inflation targeting regime 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 sufficiently committed to fighting inflation. In a process with many anticipated but uncertain changes in regulated prices, this would later on turn out to be a significant 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 virtually unanchored, unless there is a strong policy reaction[17].

At any rate, as mentioned the experience of the first few months with its unwieldy monetary shocks, tipped the balance in favor of the IT regime.

III. 2. Preconditions for inflation targeting

The challenges of implementing IT starting at high inflations were 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 multiyear targets, c) avoiding a range allowing volatility, d) and having a reasonable pace of disinflation.

These points were addressed by initially allowing for a transition to IT, though it was announced it would be short (less than a year), and by setting multiyear targets with a pace associated to the agreed transfer to the Treasury. Contrary to the recommendation, a range was established, and, in fact, turned useless as expectations coordinated on the upper bound (this was changed briefly in 2018)[18].

A large literature also discusses the conditions required for effective inflation targeting[19]. 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 accountability[20].

The team conceived the IT regime as a way to focus the attention of the Central Bank on inflation, allowing it to use all the relevant tools to bring inflation down. In order to

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[16] An alternative view is that inflation targeting has to be understood as a "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 were larger than expected and require permanent explications 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 was actually 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).

coordinate expectations, they believed, the only way was to take ownership of the fight against inflation and to be totally committed to that objective.
There is a discussion of how much should the exchange rate participate in the objective function of the Central Bank. A discussion that had its empirical counterpart in many early experiences allowing for an exchange rate band to accompany the consolidation of disinflation (Chile and Israel are two well known examples). There is also a 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). In the case of Argentina while many observers suggested this point was key to coordinate expectations, the Central Bank argued the opposite, that in order to lower passthrough levels, it was important that the Central Bank stated that it did not care about the exchange rate at all. We come back to this point below.

By allowing a floating rate, 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 met little credibility initially, credibility build up pretty quickly as the government sticked to the announcements. One important flaw, that would turn critical later on was that the regime was lacking Central Bank independence, as the President can easily remove the Central Bank governor, but the team believed that results would strengthen their independence, generating the support for an institutional improvement later on.

One recurrent discussion had to do with the fact that Argentina started its disinflation program with a relatively high inflation rate and that inflation targeting regimes typically take over at lower rates.[21] An alternative criticism is that many programs used the help of other nominal anchors such as the exchange rate.

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

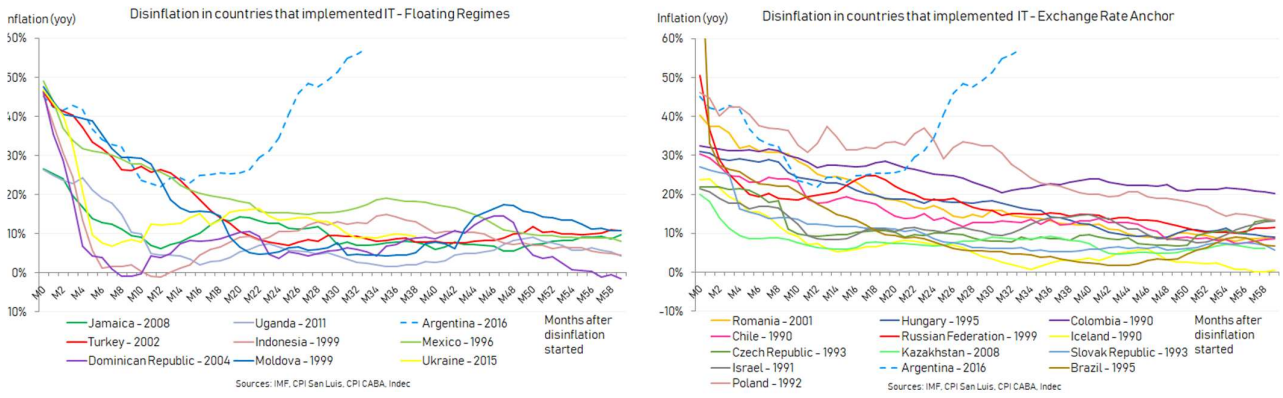
The graph distinguishes those cases that implemented the disinflation through a pure float and those that used some sort of exchange rate anchor during the initial phases of the disinflation. We disregard incomes policies, as only one country used them in this sample (Iceland in 1989).

Figure 3 shows that countries that opted for a mostly floating rate, started at inflation rates similar to those of Argentina, and that the exchange rate anchor seems not to be necessary

[21] Much of the arguments that inflation targeting takes off at lower rates consist merely in a denomination issue. In the 90s and 00s, 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.

for a successful stabilization. Many countries with lower inflation rates did use the exchange rate tool, and in most cases the stabilization processes were slower[22].

Figure 3. The path of Disinflation in IT experiences[23]



In summary, neither the level of inflation nor the choice of a floating regime seemed to have been factors that doomed the chosen strategy.

III. 3. The discussion on speed and other implementation details

The speed of disinflation proposed in the inflation targets, was, somewhat surprisingly, the source of much debate. The general consensus was that the targets were too aggressive and unrealistic. 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 argued that the targets were too aggressive for Argentina, given its history of inertia and chronic inflation.

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 inflation[24].

Yet the weakness in the balance sheet of the Central Bank made this tax smoothing approach too risky in the view of the Central Bank. So only part of the fiscal deficit was

[22] In some cases the float allowed to accelerate the stabilization, as in the case of Indonesia where the Rupiah appreciated from 14.900 to approximately 7.000 per USD or Dominican Republic where the Dominican Peso appreciated from 48,67 to 28.55 per USD.

[23] The countries were selected from IMF (2019), 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, Russian Federation and Kazakhstan would be classified as floats at the begininng of the disinflation process, including some degree of exchange rate anchor during the following 5 years. This remark does not change the conclusions.

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

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 determine, roughly, 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] The linking of the targets to the growth in money from transfers, did, however, reduce to a minimum the margin of the Central Bank to improve its balance sheet throughout the process. This would become a heavy burden later on.

Two additional decisions also became problems later on. 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. Thailand had moved away from core to overall inflation arguing that this is a measure more easily identified by the population, yet large disinflations with large changes in relative prices may be better served by using core inflation (the Czech Republic example being the clearest; for detailed review of this case[26]). So, while overall inflation is a more palpable, measure for the target, it is more volatile making it more difficult to control.

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 generating 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 the targets on a yearly basis). On the other hand Gibbs & Kulish (2017), provide a model of disinflation in an inflation target framework with imperfect credibility of the Central banker. Their findings suggest that announcing a preestablished 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 issuing such a negative signal if the targets at any point were changed. Alternatively, the targets could have been interpreted more softly, thus reducing their coordination power, but diluting the credibility costs of not achieving their value. All these issues suggest that the choice of targets requires very special 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

[25] A point of contention was on 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 from the start the credibility of the Central Bank. The Central Bank suggested that the inflation targets should be defined once money demand stabilized in April or May. However, the Executive announced the targets in January. Eventually, the Central Bank never endorsed 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.

[26] See Adrian, Laxton and Obstfeld (2018).

2018 and 4-6% for 2019[27]. After the launch of 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 oscillating between 25 and 40%, the first measure of inflation expectations in June 2016, reported expected inflation for 2017 of 19.0% and for 24 months ahead of 15.7%. In October 2016, when the Central Bank survey asked for the first time a multiyear expectation of inflation, the expectation for 2017 was 19.7%, for 2018 was 14.8% and for 2019 below 10%. Figure 4 shows that 12-month forward inflation expectation decreased systematically[28].

Inflation was 5.2% in April, 4.2% in May, 3.1% in June, 2.0% in July and 0.9% in August when there was a temporary reversal of some of the tariff hikes of April. Inflation remained subdued in the second half of the year, when it totalized 8.9% averaging 1,4% per month. Inflation in December and January were 1.2% and 1.6% (m-o-m).

The disinflation met continuous criticism from Treasury on interest rates. This discussion was particularly strong between March and May when the interest rate remained at 38%, but did not abate even after the Central Bank started reducing interest rates. In addition, in July[29], the Treasury managed to secure a Presidential decree requesting USD 4bn from Central Bank reserves which the Central Bank blocked. In all, these conflicts helped the Central Bank to gain credibility and reaffirm its independence and commitment to lowering inflation.

During this period, the Central Bank pushed for further opening of the capital account. In fact, by April 2016, the demand for past imports was fully freed. In addition the USD 2mn cap for FX purchases was increased to USD 5mn in May 2016, 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 procedure in Central Banking and generate a more direct link with rates in the financial sector.

The reduction in inflation during this period had an impact in the bond market. In October 2016 Argentina placed USD 8.3bn in peso bonds at 5, 7 and 10 years at a nominal annual rates of 18.2%, 16% and 15.5%, which measures the confidence in the stabilization program. This issue would have been unimaginable a few months earlier.

In spite of the fears of inertial inflation, the reduction in inflation was rather quick, though year on year numbers remained big, due to the big spike of earlier months. Perhaps the

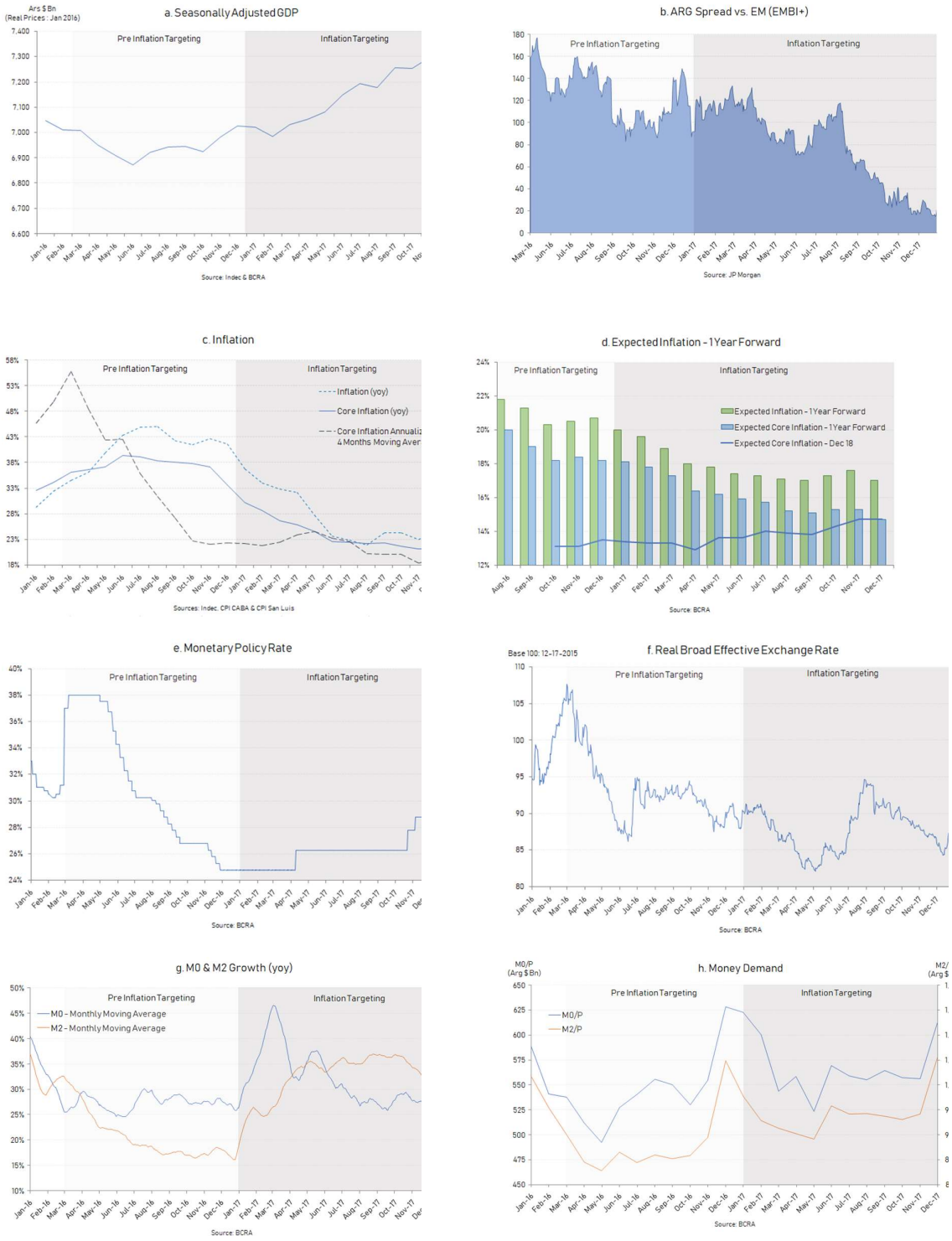
[27] A curiosity of the Argentinean experience is that the inflation targeting regime was launched when Argentina had no inflation number, as official statistics had become unreliable and were in the process of being reestablished. The first inflation number was published in May 2016. For previous months City of Buenos Aires and San Luis province numbers were used.

[28] Due to the lack of a national (core and general) price index at the beginning of Macri's administration, the reported series use 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).

[29] Decree 834/2016.

only sour spot in this process was that core inflation did remain somewhat higher, at 10.8%, in the second half of 2016[30] (1,7% monthly).

Figure 4. The economy during the IT phase



[30] IPC-GBA INDEC, the only core inflation available until 2017.

III.4.a What was the disinflation mechanism?

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

Due to lack of data little research in Argentina has focused on the role of expectations in the inflation process. As shown in Figure 5, prices, expectations, the FX and regulated prices all move together. Thus, it easy to see causality from either of these variables to the inflation process. But how do each variable play out when taking into account the others?

We address this question by running a VECM of weekly core prices, FX and regulated prices and inflation expectations, not to provide a model of 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 the expectations of inflation at one month and twelve month horizon. The results show that during the IT period, once expectations are considered, the statistical relation between prices and FX and utility prices virtually disappears. This result weakens when the sample is extended to 2019 when the inflation process had unanchored and inflation targeting abandoned. Figure 6, shows the variance decompositions. It shows that inflation has an inertial component but, again, for the IT period expectations appear to have been a fundamental driver of price dynamics, while the exchange rate becomes relevant only when the regime is abandoned. Other results (see Appendix 3) show that during the IT regime a jump in regulated prices affected core prices in the short run (a result found also in Navajas, 2019 and consistent with Alvarez et al (2019). that show the price adjustments are rather fixed in size and only change in frequency).

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

But we also include these estimates to address the fundamental question of the transmission mechanisms for achieving disinflation in the IT regime. It appears that the coordination of expectations played a fundamental role, allowing to generate convergence in the inflation dynamics without need to exert an excessively contractionary monetary policy. These results were probably aided by the fact that Argentina has no formal indexation of contracts, which reduces the drag of inertia. In fact wage negotiations were quite forward looking. For example, consider the transition from 2016 to 2017. Inflation finalized 2016 at 36.6% and the Central Bank inflation target for 2017 went up to 17%. Wage negotiations finalized in the 20/25% range, which corresponds to a contract consistent with the inflation target[31]. Thus, to some extent, the inflation target acted as a substitute for incomes policy.

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

Figure 5. The comovement of prices and expectations

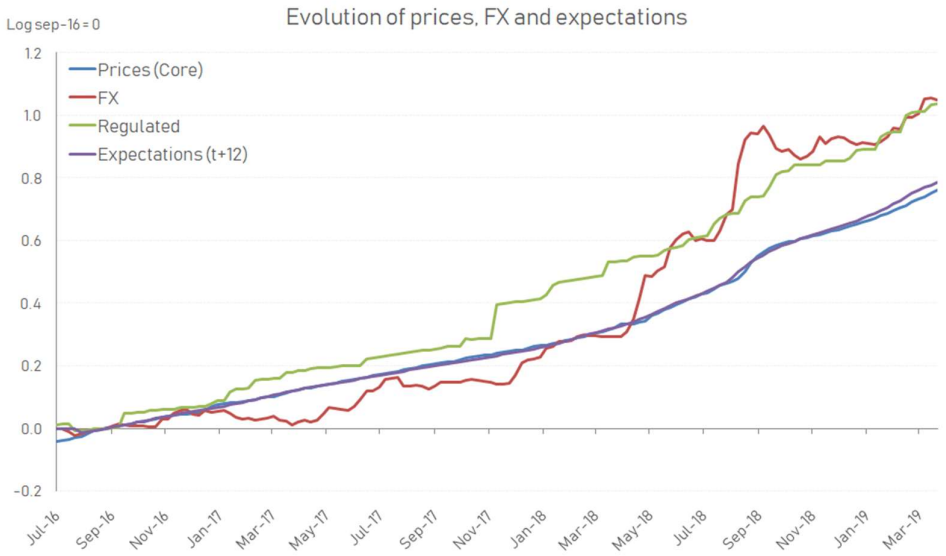


Table 4. VECM model for inflation in Argentina. Cointegrating Vector.

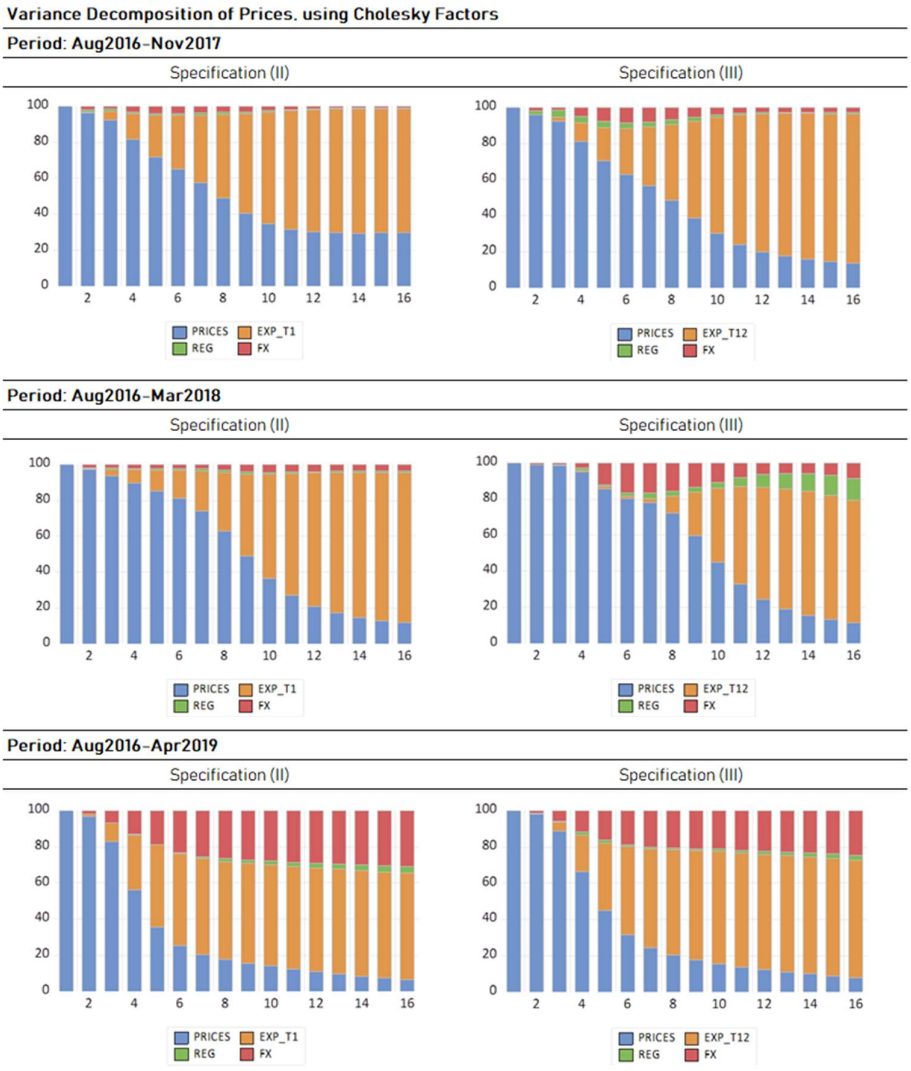
Period	Ago2016-Nov2017			Ago2016-Mar2018			Ago2016-Apr2019		
Frequency of data	Weekly			Weekly			Weekly		
	(I)	(II)	(III)	(I)	(II)	(III)	(I)	(II)	(III)
Prices	1	1	1	1	1	1	1	1	1
FX	-0.3566**	-0.0268	-0.0194	-0.3268	-0.0235*	-0.0233*	-1.1840**	-0.0822**	-0.1831**
	(0.1270)	(0.0153)	(0.0157)	(0.3692)	(0.0111)	(0.0109)	(0.4395)	(0.0263)	(0.0478)
Reg	-0.7186**	0.0275	0.0030	-0.6434**	-0.0006	-0.0373	0.0753	-0.0612	-0.1759*
	(0.0812)	-0.0574	(0.0521)	(0.2322)	(0.0167)	(0.0201)	(0.4764)	(0.0451)	(0.0815)
Exp (t+1)		-1.0356**			-0.9978**			-0.7991**	
		(0.0784)			(0.0244)			(0.0774)	
Exp (t+12)			-1.0141**			-0.9517**			-0.5739**
			(0.0728)			(0.0286)			(0.1380)
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*signficant 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

Figure 6. 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 reduced from 38% to 24.75%. In January, when the transition was made to a formal inflation targeting regime, an additional technical problem emerged. Repos paid a local city tax which the Lebacs did not, and as the policy rate was kept constant relative to the previous Lebac rate, this led by arbitrage to an abrupt fall in the Lebac rate that had not been anticipated nor desired by the authorities. The Central Bank delayed a solution, allowing a de facto easing of monetary policy beyond it would have been desired.

In addition in January 2017 a new Treasury Minister made a small but substantial regulatory. The last remaining vestiges of capital controls were a 4-month stay on investments in pesos. The four month stay imposed a sizable amount of currency risk on any bet on the argentinian peso. The Treasury decided to collapse this period to zero, thus

in practice freeing all capital flows. The Central bank seconded this move, as it allowed eliminating the last vestiges of capital controls, which was a required registration (needed to be able to track this 4 month period). As a result, capital flows started to increase, thus pushing an appreciation of the peso. 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 the inflation signals at the beginning of the year turned out to be difficult.

In February, as the government resumed utility price adjustments[32], inflation picked up again signalling to 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, the Central bank started tightening monetary conditions by pushing upwards the Lebac curve starting late February and then moving the policy rate upwards in April[33].

Inflation increased somewhat in the February-April period, but by mid-2017, monetary tightness appeared to be working again and inflation was abating pretty quickly. By July inflation had reached a y-o-y rate of 21.4% the lowest in 7 years, while wholesale prices had moved 13.9% in the previous year.

In fact in the second half of 2017, while overall disinflation stalled and even had a spike in December resulting from a large adjustment in utility prices, disinflation continued in core inflation. In the last quarter of the year, core inflation had stabilized at an annualized rate of 18% (1,4% monthly), and expected core inflation for 2018 was just 14.7%. However, inflation expectations for 2018 had increased 2.3p.p. in the previous 14 months, which, together with the fact that the target for 2017 would be missed by a margin that widened towards the end of the year led to continued doubts about the success of the disinflation program.

Even though core inflation had actually decreased, a inflation remained above the target, the Central Bank implemented a tightening of monetary policy shortly after the midterm elections of 2017 (with two hikes, one of 150 bps and one of 100bps two weeks later). The intention was to keep the disinflation process moving ahead. What the Central Bank did not know is that by doing so it had fueled an opposition to its policies within the government that would shortly after unravel the program.

Throughout this period, as inflation decreased, output recovery had been pretty consistent, and had strengthened in 2017, which ended with a growth rate of 4% eop. (Figure 4 - Panel c) capping seven quarters of sustained growth. Credit growth seemed to support the claim. It had also accelerated in 2017, reaching 20% growth in real terms by the end of the year. The growth in credit responded to a series of deregulation measures taken to improve the working of the financial sector. The question of whether this in turn jeopardized the

[32] Electricity prices were increased 90%, natural gas prices 30% and water distribution 20%, between February and April.

[33] Monetary growth also had picked up at the end of the previous year, hand in hand with a tax amnesty for non declared capital abroad which required funneling the tax payments through the financial sector. This, combined with an abnormal reduction in the money base in previous February propelled the year on year money growth rate briefly to nearly 50% (see Figure 4 - Panel g), before normalizing at a 34% year on year rate by May. The Central Bank disregarded these numbers using the argument that money demand was endogenous, but this anyhow stirred renewed criticism on the Central Bank arguing its monetary policy was inconsistent with the disinflation path

disinflation process was again disregarded at the time by the Central Bank on the argument of the endogeneity of money, but may also have played a role in slowing somewhat the disinflation path.

III. 5 The evolution of fiscal accounts

So far we have focused on monetary policy, but to understand why the disinflation 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 from a reduction in subsidies but then was unambitious (see Table 2). But even this plan got quickly off track for three main reasons: output did not grow as expected, taxes were cut, and expenditures were increased in unanticipated ways. These effects were only partially offset by the income of a tax amnesty which added 1.2% of GDP in 2016 and 0.3% in 2017.

That the fiscal situation would be more challenging than anticipated 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 extended to other provinces). Galiani (2018) estimates an impact of 1.6% of GDP on the government's accounts between 2016 and 2018, and a steady state impact of 1% annually. 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 automotive industry. Towards of the end of 2016 the government also increased the minimum income required to pay the income tax and indexed this amount. This cost the budget an additional 0.6% of GDP. In all tax reductions added up to 2.2% of GDP.

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

While utility price adjustments provided additional resources, the deficit, rather than decreasing actually *increased* (Table 2). The tax amnesty of 2016 provided some relief but just enough to avoid a dramatic deterioration of the fiscal situation. No significant developments changed this picture in 2017, and while such inaction appears difficult to explain, the markets did not appear overly concerned as country risk continued to fall (Figure 4, panel b).

Only after its success in the mid-term elections, the government made its first moves to improve the fiscal situation by passing a tax and pension reform. But the tax reform, while improving the efficiency and distributive impact of taxes implied a *reduction* of taxes going forward[34]. The two cost saving features came from the pension reform. One was that

[34] The tax reform included a reduction in corporate income tax (though increasing taxes on distribution of dividends), the introduction of a tax on financial investment income, 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. 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 reaching 2.9% of GDP

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 generate much controversy. In practice it extended the working age around 3 years (women were previously allowed to retire between 60 and 65 years, and the average retirement age was 63).

The other was related to pension indexation. 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. Actually, it represented an indexation of pensions to nominal GDP, thus triggering an unsustainable dynamic, particularly if Argentina was to start growing again. The government pushed for a change in the indexation formula that 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.

In fact, the impact of lagged indexation on pensions and social programs is so relevant, that in order to analyze more objectively the evolution of fiscal performance it is useful to implement two adjustments. The first is to correct for the cyclical movements of the economy[35]. The second adjustment corrects for 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 disinflation. A rough estimate is that the budget improves (deteriorates) about 0.4% for each increase (fall) in yearly inflation. Thus, an additional relevant concept in Argentina is the "cyclically adjusted inflation-constant" budget deficit. Figure 7 shows the results (Appendix 3 discusses the methodology).

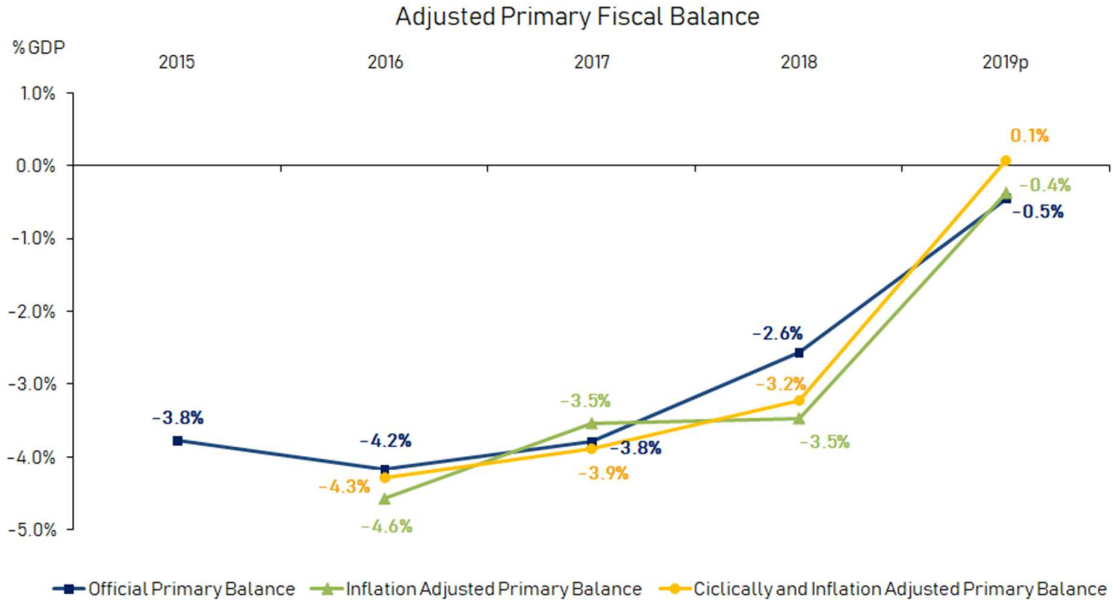
The conclusion of Figure 7 is that the government showed significant procrastination in the fiscal front, even through 2018. Taking into account the effect of inflation, the figure shows there was some improvement in 2017 when fiscal accounts absorbed the increase in pensions resulting from the disinflation, but no effective progress in 2018, when the improvement in fiscal account can be fully associated to the acceleration of inflation of that year. A substantial adjustment only came in 2019.

The lack of adjustment in the fiscal accounts, plus a change in the private sector savings decision (from a large surplus to a small surplus), led to a significant deterioration of the current account. For many, this was the weakest link in the program, and what rendered it unsustainable.

by 2022. The reform also solved a two-decades-long conflict with the Province of Buenos Aires, whose transfers of income tax had been capped and, in practice, had been phased out to automatic tax transfers from the income tax. In all, this initial adjustment was paid by the national government, though future flows would accrue on a more balanced nature.

[35] 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)

Figure 7. How fiscal adjustment came only in 2019



III. 6 The Balance sheet of the Central Bank and the issue of the Lebacs

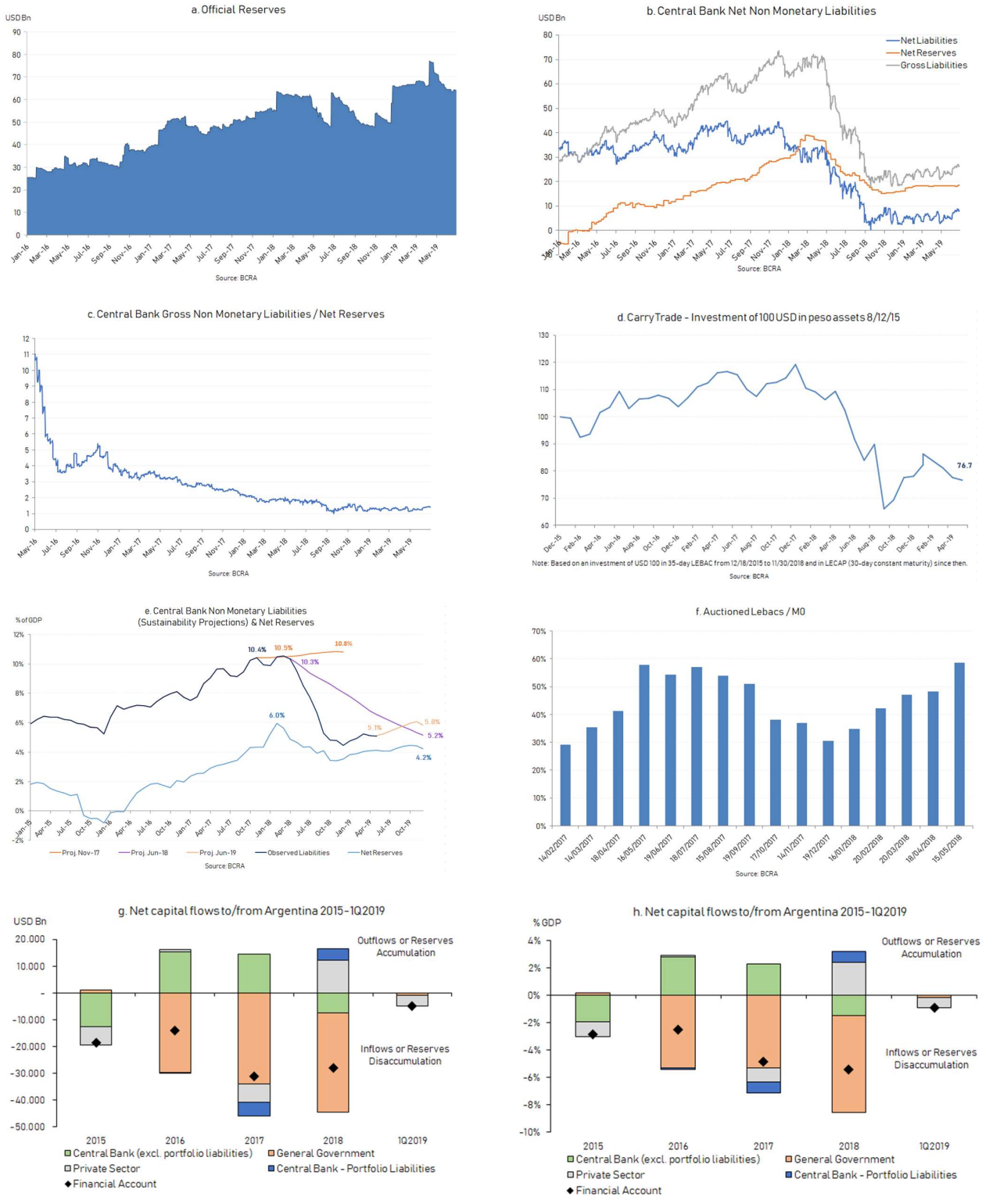
The program started with a weak Central Bank (Figure 2), with net worth, net of Letras Intransferibles and Adelantos Transitorios, a mind-boggling USD 93 bn negative. The Central Bank balance carried liabilities of 5.7% of GDP in Lebacs and repos, a number that grew to 6.9% in March of 2016 when the Central Bank had sterilized the bulk of issuance arising from the dollar futures liabilities and at least part of the monetary overhang[36].

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

Panel g and Panel h in Figure 8 show the sources of this capital inflows, showing that the lion's share where the result of capital inflows from the government 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, the challenge posed by capital flows was more an issue of government indebtedness than a hot money issue, these probably contained by the fact that the exchange rate floated.

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

Figure 8. 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 which it sterilized by issuing peso liabilities (called Lebacs)[37]. Doing so reduced the currency mismatch of the consolidated government balance sheet, and also reduced the exchange rate appreciation resulting from the inflows, but also, in doing so, conditioned the inflation objective to 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 balance sheet of the Central Bank, even while, as shown in Figure 8 - Panel c, the ratio of FX backing of Central Bank interest bearing liabilities improved steadily throughout the process.

The debate heated up, particularly when the real exchange rate appreciated, as this resulted in the Central Bank paying a cost (ex post) in terms of carry, a cost that increased the bigger the reserves. Figure 8 - 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 years.

There is a large literature on reserve accumulation, even for the case in which reserves are "borrowed" as was this case. Rodrik (2006) argues the cost is not large relative to the insurance benefits, Levy Yeyati (2006 and 2019) argues the costs is 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 peso and not dollar debt, 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, requiring a distinction between the Central Bank quasi-fiscal deficit (which, as mentioned before, typically ended in a surplus) and the cash quasi-fiscal deficit which was the amount of pesos issued regardless of the asset side of the balance sheet. According to this view, if the growth in the Lebacs became "money" they could trigger an increase in the inflation rate (as in Phelan and Basetto, 2015). The question boils down to whether remunerated liabilities would be paid through an increase in the price level or absorbed through the monetization of future increases in the demand for real money.

Three arguments suggest that the reduction of Central Bank liabilities needed not be done through inflation. First, that Central Banks balance sheet 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). Second, that 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 8 - Panel b). Finally, that

[37] Sturzenegger (2019) provides a justification 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, this allowed to sustain the idea of a floating exchange rate regime in spite of large purchases of FX.

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 the majority of analysts. So the question was not so much whether Central Bank liabilities would create inflation per se, but whether the government would decide to pay them with inflation tax rather than with seigniorage.

While the accumulation of reserves during this period was not controversial, its counterpart, the accumulation of liabilities that financed the accumulation was controversial. 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 the 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 maturities[38] by increasing long rates on Lebacs, (see Figure 8 - Panel f, that shows that Lebacs maturing each month had fallen from 60 to 30% of the money base). A long literature starting with Cole & Kehoe (1996), (including the Greenspan-Guidotti rule) pay attention to the relationship between short term debt and reserves as key for avoiding multiple equilibria. In the next section we discuss the implications of the decision to shorten these maturities.

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 21% in the previous year (a fall of more than 15pp relative to six months before). and wholesale prices just shy of 14%. This quick reduction in inflation represented a challenge to fiscal accounts because of the dynamics of backward indexation on half its spending. Hence, the Treasury started pushing for increasing inflation targets to ensure a slower disinflation path[39]. In addition, the Central Bank had tightened monetary policy in the aftermath of a successful midterm election, which rallied other actors believing monetary policy was to tight, against the Central Bank.

As 2017 came to an end, the Finance Minister started doubting whether it would be able to finance abroad the stubborn deficit and the Central Bank´s effort to extend maturities and reduce rollover risk had come at the price of increasing longer rates, making local financing more expensive.

By the end of the year most voices (Treasury wanting slower disinflation for fiscal reasons, Finance wanting cheaper domestic financing, other members of Cabinet wanting lower interest rates) were challenging Central Bank policies.

[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. In 2015 the Executive had announced the initial targets.

After a strong show of support in the midterm elections of 2017 the Executive decided to move ahead and change the inflation targets, even though the leit-motiv at the Central Bank had been that "to change a target is not to have one".

The change in the targets was announced December 28th, 2017, in a relatively bizarre twist, as that day Argentina celebrates "fools day". To communicate the change the government staged a press conference where it announced that it wanted *more* inflation. The President had decided to fire the Governor if needed to go ahead. In an attempt to contain the credibility effect a reduction in transfers from the Central Bank to the Treasury to half in 2019 and to the equivalent of seigniorage starting in 2020 was also announced.

Many countries experience differences relative to their targets (Colombia, for example, sustained deviations for 6 years in a row), particularly during disinflation episodes. Yet the targets operate as an expectations anchor regardless if they are achieved or not. In recent episodes, there are 3 cases of increases in inflation targets. Indonesia in 2005, Brazil in 2003, Turkey in 2008[40]. Both the cases of Indonesia and Brazil occurred after a large devaluation that had gotten the inflation process out of track, generating a significant increase in inflation relative to the previous year. In the case of Indonesia, inflation had been 17% in 2005, so the target for 2006 and 2007 was moved upwards, while keeping fixed the 5% longer run objective. 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. And 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 a target of 35% (20% and 12% for the following two years). By the year 2008, the target was 4%, but, as finally the inflation went up that year from 8.4% in 2007 to 10%, they decided to change their target. They nearly doubled it for 2009, from 4% to 7.5%, and also raised to 6.5% and 5.5% the targets for 2010 and 2011. This changes had a lasting impact on credibility and Turkey is still today struggling to attain its inflation target.

In summary, the precedents for such a move were not auspicious. Thus, it was not surprising that the initial response of the market was of disbelief. When two weeks after the announcement the Central Bank reduced the interest rate 75bps from 28.75% to 28%, the news were received by the market 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. The government managed to squeeze what would be its final bond issue for USD 9bn in international markets.

However, when, the Central Bank implemented an additional reduction of 75bps two weeks later, 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 again, and the spread on dollar denominated government bonds increased. By the end of the month the

[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 of Turkey see Kara (2006, 2007). Romania in 2018 would be an additional case, but the change was not significant, so in practice non comparable to these cases.

spread of Argentine debt relative to emerging markets had quadrupled. Inflation expectations for 2018 with stood at the end of 2017 at 17.4% for overall inflation, jumped in January, to 19.4%, an increase that was larger than that of the previous 14 months combined. In fact, even when no further cuts in interest rates were implemented afterwards, core inflation continued to increase and the spread on government bonds continued to raise. The loss of credibility had become a permanent shock.

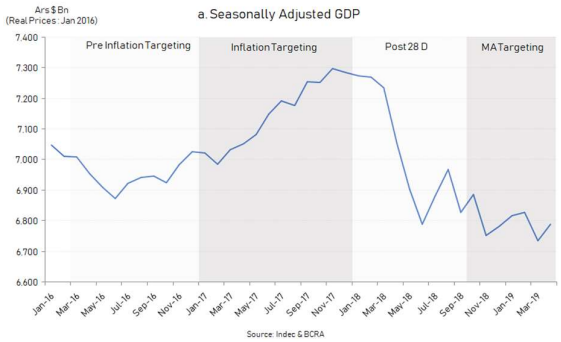
Figure 9 shows how prices and expectations unanchored after 28D. It also shows that country risk started escalating after the change in targets indicating that the announcement had been read as change both in fiscal as well as in monetary policy.

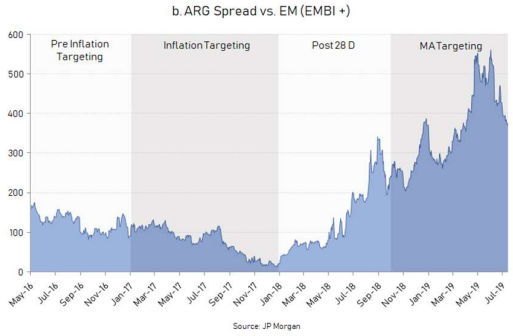
On 28D the Central Bank reduced the interest rate on longer Lebacs (also as a result of the softening of the targets), and in April announced that it would not issue Lebacs longer than five months. Both things started piling up the maturities in the short end, reversing the liability management that the Central Bank had achieved in the second half of 2017 and increasing the rollover risk of Lebacs. As can be seen in Figure 8 - Panel f , Lebac auctions had been reduced from 60% of money base to 30% by December 2017, but this process was fully reversed in first months of 2018. This would turn out to be a costly mistake, in fact, while this had been a policy decision, market participants read it as a reaction to difficulties in rollover, thus the move fed itself into this perception.

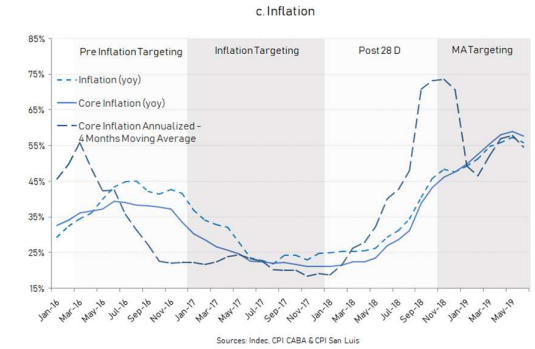
Facing dwindling credibility the Central Bank and the Executive decided to try to reaffirm credibility by focusing on the objective that wage negotiations should close in line with the new 15% inflation target, as well as containing the exchange rate, which led to intervention in the FX market during 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. But after two years of almost free floating, the interventions only increased 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.

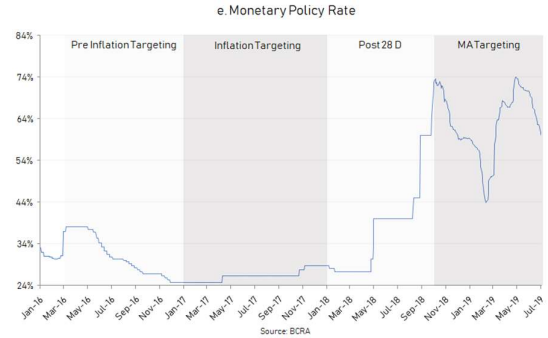
As uncertainty on the economic program mounted, there were growing worries on the feasibility of Argentina rolling over its debt. In this unfavorable context, on April 24 a new tax on financial income approved in the fiscal reform at the end of the previous year, came into effect. The first tranche to be implemented was a tax on non-residents, on all instruments, including Central Bank securities. The result was a massive exit from government paper and Lebacs. The Central Bank interpreted this as a specific portfolio shift and decided to redeem the Lebacs in exchange for dollars, avoiding an exchange rate jump. The Central Bank sold USD 1.472mn on April 25th and USD 5.3bn in the first week of the crisis. The stock of Lebacs fell ARS 137.000 bn, roughly an equivalent amount.

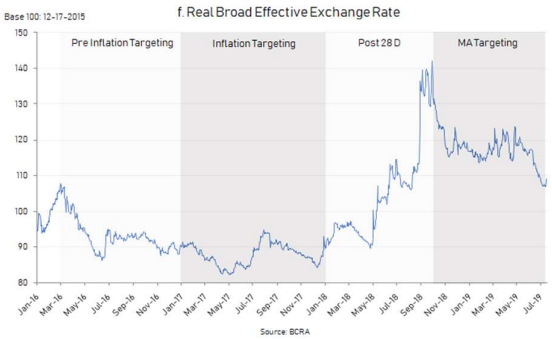
Figure 9. Main Variables after 28D

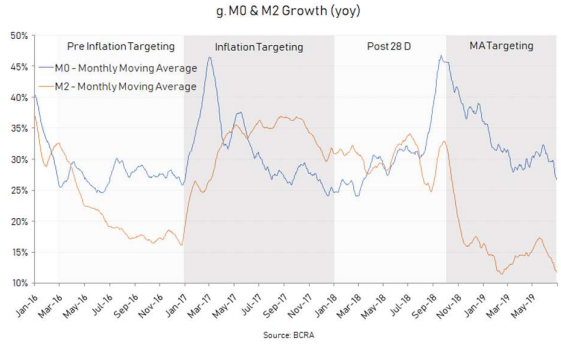


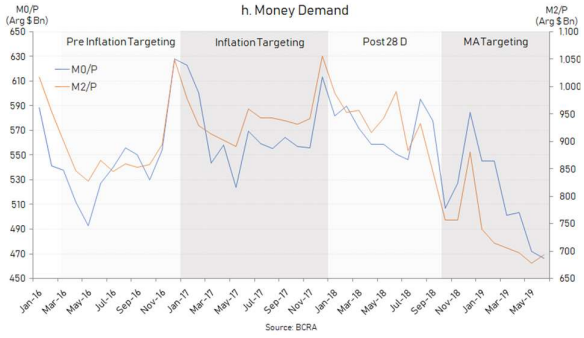












Concerned with the inflation process, the initial sales were done at the ongoing exchange rate. The Central Bank argued that the peso had depreciated significantly relative to other currencies since the end of 2017, so that it was not clear that a further adjustment would be necessary. In this view the 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 a process of tightening of interest rates in the US.

This put the Central Bank in a bind: it was using the exchange as a substitute anchor, given that its credibility had been worn out by the announcements of the 28D, 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, in addition to the hike in interest rates in the US. So 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 13.5bn USD of reserves, and would have reduced its Lebac stock by 617bn ARS.

The combination of the depreciation, the increase in country risk, and the drought, led to 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 allow to coordinate expectations. With access to markets closed, as was made clear by a couple of unsuccessful government debt auctions, the government swiftly acted 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% in an attempt to calm the turbulence with only partial success. During this time the Central Bank continued to sell dollars against Lebacs. In the weeks that followed, however, the climate continued to deteriorate and the rollover of Lebacs became a source of concern. In order to qualm expectations, on May 14 the Central Bank committed USD 5bn 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 16th. 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, that it was believed that the IMF thought a much higher exchange rate was needed to deal with the sudden stop, and second that it was understood that the IMF would constrain the use of Central Bank reserves. In that context, the policy of redeeming Lebacs with reserves could be discontinued. Both ideas increased the run on Lebacs and the pressure on the FX market in anticipation of the IMF deal.

While the Central Bank had piled reserves a concern had been that reserves may be used for other purposes and the backing of the Lebacs spent away, forcing the Central Bank to monetize its liabilities. Actually 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 Lebacs against the sale of reserves it started to receive growing criticism. This added to the arguments suggesting that the Central Bank may eventually stop selling reserves, accelerating 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 in improving fiscal accounts and recomposing the credibility of the Central Bank.

The agreement with the IMF led to relatively timid adjustments in fiscal numbers (a primary deficit of 2.7% of GDP in 2018 would be reduced to 1.3% in 2019, reaching equilibrium in 2020) in the short run, while transfers from the Central Bank would be forbidden. To avoid further interference with the Central Bank, a new law enshrining the independence of the Central Bank would be sent to Congress. In addition the government committed itself to buy back some of the debt issued to the Central Bank to strengthen its balance sheet. The expected impact on the evolution of Lebacs is shown in Figure 8 - 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, commiting USD 50 bn.

The program maintained the main tenets of the macro framework, inflation targeting and floating rates. But, given the acceleration of inflation with the crisis, no inflation target was established for the remainder of the year (only a projection). The target for end-2019 would be 17% the original upper bound of the target for 2017. There would be minimal intervention in the exchange rate market and if needed implemented through transparent auctions.

While the Central Bank intervened sporadically to maintain the exchange rate within check until the launch of the program, at the start of the program 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 the replacement of the Governor of the Central Bank.

IV. 3 Monetary experiments

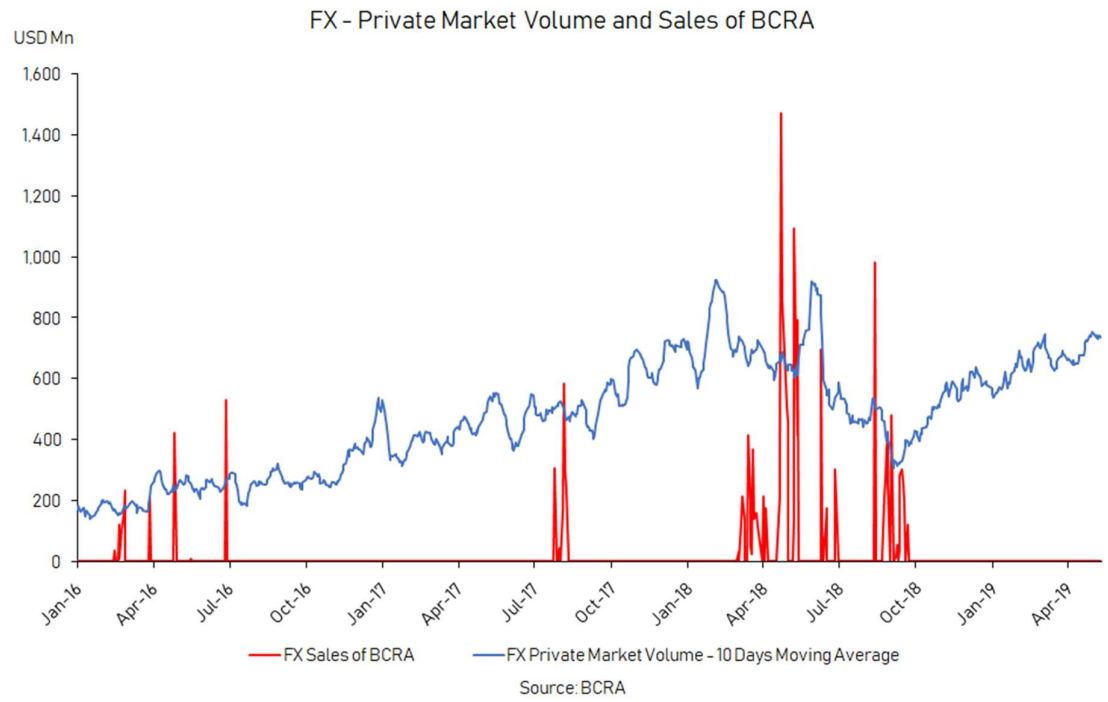
The new governor had two views. The first, that the exchange rate could be placed at whatever level the authorities desired, irrespective of monetary policy or expectations. All

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. The second belief was that the government could aid in the sterilization efforts, so that with appropriate coordination Lebacs could be paid back in pesos and replaced by government debt.

There is a large literature on exchange rate interventions[41] and there is evidence that intervention through reserve accumulation affects the real exchange rate in the short and medium term. Also 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 the within day strategy of intervention which was the tool the Central Bank argued would be used to affect exchange rate dynamics.

Figure 10 tries to shed some light on the issue by showing the traded volume in the market by private parties since the opening of the exchange rate controls at the end of 2015. In 2018 discretionary interventions led to an increasing loss of liquidity. Thus, the attempt to provide liquidity to the market, one of the objectives of intervention, became somewhat self defeating, as the irrumption 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. While the above, cannot address causality, or be conclusive on this point, it suggests that discretion in interventions may be in themselves highly disruptive of the market. In fact the IMF argued that interventions should occur through auctions, as transparent interventions would be less disruptive of the market.

Figure 10. How intervention dries the market



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

In order to address the run on Lebacs the Central Bank increased interest rates further, eliminated the upper band of the repo corridor and reserve requirements were sharply increased (3p.p. on June 21st, 3p.p. on July 2nd, and 2p.p. on July 18th). The government honored partially its commitment to cancel some of its debt with the Central Bank (ARS 39.4bn during 2018).

But the turning point occurred in August when the Central Bank designed a strategy to reduce the stock of Lebacs. The idea was that the government would issue debt to "sterilize" the money printed as Lebacs were paid out at a preestablished pace. The Central Bank it was ready to sell dollars if necessary to contain money supply growth. In addition banks were not allowed to renew Lebac purchases, forcing them to move to Leliqs, another Central Bank liability, but that had a 7-day maturity and could only be held by financial institutions[42].

On August 15 the Central Bank allowed ARS 100bn (USD 3.3bn) to mature, but then only sold USD 1bn in the FX market to compensate the monetary effect. The released stock of pesos represented a jump in the monetary base of 16%, that shortly after fuelled a run on the exchange rate that jumped from 30 ARS/USD to 39.60 ARS/USD, and further unanchored prices (see Table 5 and Figure 9) . The end result was that the government reduced the stock of Lebacs through an inflation shock.

As the FX depreciated the value of Central Bank liabilities in dollars decreased from about USD 70bn to USD 20bn in December. This resulted from a reduction from the sale of reserves (USD 15.9bn) and from the devaluation itself (USD 35.4bn). The combination, wiped out the full stock of unbacked liabilities as seen in Figure 8.

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 intervention 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. By then, the decision to reduce the burden of peso liabilities through a significant jump in prices came at a cost in terms of a further deterioration of credibility and the need to keep 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 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%. 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, that appears to be exceptionally high in the case of Argentina[43]. These uncertainties imply that any program focused in stabilizing aggregates could face substantial deviations in terms of its objective to achieve disinflation.

[42] From then onwards, investments in pesos had to be done in financial institutions who 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.

The program, was marketed as a program where base money growth would be zero, but it started immediately after the big shock in money supply of August, and allowed an additional increase in money supply in December for seasonal reasons, but which needed not be reverted later on. So 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 9 - 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 endogenous, started above 70%. At the economy, persisted in its deep recession all the conditions for a 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. But shortly after 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 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 9), as it implied that the Central Bank itself did not believed a disinflation was possible (or that it had been compromised by an exchange rate objective).

The large jump in money supply of August and December was not reversed in January and February, when money demand 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 15th 2019), implied that it did not absorb this overhang. The result was a sharp depreciation in March and April, and a very steep increase in inflation, that reached 4.7% in March generating a political earthquake and seriously compromising the government's election 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, and 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 generating a more stable path for the interest rate. So 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, so, in April 29th, 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. A few days later, the government announced a VP candidate that was well received by the market, thus started a brief cycle of stabilization and disinflation.

At the time of the writing, the Central Bank faced the challenge of an increase in money demand as a result of inflation 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, after seasonality abated. This measure entailed a sharp contrast with what had been done in December, when aggregates had increased but not reversed later on, and strengthened the commitment of the Central Bank to a tight monetary policy. As a result inflation rate started abating, reaching 2.2% in July, the lowest number in a year. However, the open primaries in August delivered a heavy blow to the government and increased uncertainty. As Macri´s government seemed to be heading to a loss in the polls, the end of the four years were marked by accelerating inflation and depreciation as the monetary framework again seemed uncertain.

V. Lessons learned

The Macri administration implemented a lax fiscal program financed with short term external debt, together with an IT program with a flexible exchange rate. Fiscal consolidation lagged, while the disinflation compromised further improvements in fiscal results as a product of lagged indexation of about half the spending. This led to a change in the disinflation program implemented through a change in inflation targets. The uncertainties this generated on the macroeconomic framework, coincided with a tightening of rates in the US and a severe drought. These factors, combined, generated 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 very decidedly in 2019, tackled fiscal consolidation. And while this seemed to provide a chance at stabilization, the withdrawal of political support and doubts about the policies of the future government precipitated the economy again into turmoil towards the end of the term.

From a policy perspective. The four years of Macri's presidency 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 Lebacs) 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 just bad luck? This paper has tried to provide evidence and analysis with these questions in mind. In what follow we try to summarize possible answers to these questions.

Was gradualism a mistake? As we mentioned, gradualism was more 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 objective of gradualism was to build a different sort of capital, a political capital, that 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. So, gradualism provided a feasible path for reform. After the midterm elections the government relaxed both fiscal and monetary policy. 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 a feasible and correct choice, we showed that fiscal policy actually moved in the opposite direction. Rather than implementing an actual gradual reduction in the deficit, the deficit initially *increased*, and even while markets were condescendent with this, it build significant risks: on the one hand, it not only required stronger action down the road, but the sustained weakness in fiscal policy forced the change in inflation targets, undermining the credibility of the whole program. While fiscal dominance was "contained" by fixing the transfers from the Central Bank, a different sort of fiscal dominance emerged, and turned to be critical: the need for the path of disinflation to be slow 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, turned to be essential for undermining the stabilization attempts. In fact, the deviation was so large relative to the anticipated path, that we showed (Figure 7) that, taking into consideration inflation effects, fiscal convergence was nonexistent until 2019, when events forced the government to do a very large adjustment in an election year which further debased its support. In short, it is difficult not to point to fiscal policy as the main responsible of the collapse of the program.

Was IT too fast and aggressive? The analysis of section III helped us discuss this issue. We showed that countries implemented IT or a path to IT at inflation rates similar to those of Argentina, and that the path of disinflation in this case was very much in line with international experience. We also showed that a framework with floating rates, was not uncommon at the inflation rates at which Argentina started and in some cases even accelerated the disinflation.

But we also pointed out several drawbacks in implementation. Utility price adjustments in the 3 digits, moved inflation upwards by spikes which led to continuous misses of the target undermining credibility, particularly when overall inflation and not 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, leading to deviations, with the Central Bank amplifying the drama as way of showing its commitment to disinflation 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 independence of the Central Bank, and 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 occured. Had the Central Bank been independent, the turmoil of the final months of the administration would also have been avoided, as nobody would have thought that big changes would be associated to monetary policy as a result of an election outcome. However, the failed experiences of these two disinflations attempts do not seem to have convinced the general public that inflation is a monetary phenomenon, nor have they led to a stronger belief regarding the need for an independent Central Bank.

So one possible conclusion was not that the inflation program was excessively ambitious, but that neither the fiscal nor the institutional preconditions were met. 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.

Was the change in targets justified? Much of the analysis of this paper placed the change in target as centerpiece of the turnaround of expectations. Of course the change in targets was not an isolated event. It was implemented for several reasons, fiscal procrastination, and also the desire to accelerate economic growth through a reduction of the interest rate. The (negative) signals it provided in terms of the willingness to pursue fiscal reform, the reduction in the maturities of the Lebacs and foregoing an independent monetary policy became a drag on the program which was impossible to revert.

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 process similar to that of Argentina, and we showed that the exchange rate played a limited role in price dynamics, particularly during the IT regime period when expectations drove most of the process. At the same time, a floating rate may have provided a buffer both in the period of capital inflows as well as in the sudden stop. While our analysis suggests then a floating rate may have not been an unreasonable choice, by implementing a floating rate, the government gave away the benefits of a larger economic boom at the outset of the program. If this boom would have provided more room implementing reforms or accelerating fiscal convergence remains an open question.

Before moving on, it is worth mentioning another advantage of flexible rates: the fact that the flexibility provided by a floating rate 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 transit a large sudden stop in 2018 without fundamentally changing contracts, something that may help to build confidence and reduce risks going forward.

Was the accumulation of reserves (and Lebacs) excessive? During 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. Was this a mistake? In doing so, the Central Bank, increased the ratio of backing of its liabilities, but also 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 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 date are larger and the government may find an incentive to default.

During 2018 several developments increased the possibility of the bad equilibrium. On the one hand, the size of reserves and debt had increased, on the other, the 28D had signalled

that the government assigned a lower cost to inflation than previously expected. This implied that the equilibrium default rate becomes larger and the private sector would ask for a higher rate ex-ante.

Hence, an increase in the interest rate, in this context, could be interpreted as a signal that the government would default. In that sense the initial increase in the interest rate to 40% (and the subsequent increases) was a double-edged sword. On the one hand it was necessary to reduce the required sales of reserves, but simultaneously generated larger uncertainties about the future.

Is this enough to conclude that the process of reserve accumulation was to large or inconvenient? This remains an open question. Sturzenegger (2019) argues that Argentina started with reserves level substantially below those of comparable countries. The reserve accumulation reduced vulnerabilities and reduced the exchange rate appreciation, but conditioned the inflation objective. Not intervening would have allowed for a faster disinflation, at the expense of a larger appreciation and more vulnerabilities. With no intervention the government would have found a limit to its indebtedness early on, this may have pushed for faster fiscal consolidation and through that channel may have provided a better outcome. While, it is difficult to assess the relative benefits and costs, it appears that not purchasing the reserves would increased vulnerabilities and delivered a worse outcome.

Was the financing structure of fiscal deficits correct? A key factor in understanding the vulnerabilities relate to the fact that the financing of the deficit was done with short term external debt, 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, the request to have the Central Bank reduce the maturity of the its own debt constituted a serious mistake, thus abruptly increasing rollover risks.

Was the reaction to the sudden stop the adequate one? Once faced with the sudden stop, the issue is what is the best way to deal with it (see Cavallo, 2019 for a recent review). Table 5 shows how countries perform in a sudden stop. The dependent variable is the change in output change and the explanatory variables are world growth, terms of trade shocks, interest rates, openness and the exchange rate regime [44]. The results here are also predictable. Floating rates, and lower interest rates, provide the best recipe for dealing with the sudden stop,[45] in line with Ortiz et al (2009) who study "systemic sudden stops", (i.e. those not related to shocks in individual countries), showing that the ability of implementing countercyclical fiscal and monetary policy in the event improve the output performance.

How do these results help to understand Argentina's experience? Once the sudden stop started, the Central Bank initially did not allow the exchange rate to fully float and increased sharply the interest rate. After two years of fiscal procrastination and with prices unanchored due to the announcement of 28D, the policy response was suboptimal. The

[44] See Guidotti et al (2004).

[45] For an analysis of effects of the exchange rate policy see Levy Yeyati (2019), for analysis Sudden Stops dynamics see Calvo (1998).

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, without relying so heavily on the interest rate. But the first IMF program failed to deliver this change of expectations. In 2019 fiscal policy became very contractionary, and while its effects were somewhat muted by the floating exchange rate, the economy could not recover.

Table 5. Effects of Sudden Stops

OLS	Var GDP - growth	
	(i)	(ii)
Floating	0.0196**	0.0186**
	(0.0078)	(0.0080)
Deposit Rate	-0.0017***	-0.0016***
	(0.0002)	(0.0002)
World Exports	0.0719**	0.0710**
	(0.0311)	(0.0321)
Terms of trade	0.0963**	0.0971**
	(0.0379)	(0.0397)
Openness	0.0131	0.0125
	(0.0083)	(0.0100)
Regional Dummies	No	Yes
Observations	81	81

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.

OLS	Var GDP - growth	
	(i)	(ii)
Floating	0.0301***	0.0291***
	(0.0093)	(0.0094)
Deposit Rate	-0.0016***	-0.0016***
	(0.0002)	(0.0003)
World Exports	0.0846**	0.0861**
	(0.0366)	(0.0390)
Terms of trade	0.0953**	0.0949**
	(0.0432)	(0.0460)
Openness	0.0121	0.0115
	(0.0085)	(0.0101)
Regional Dummies	No	Yes
Observations	64	64

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 ()

Finally, *were the poor results derived from history, self made 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 them. 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 expectations of growth was solid at 3% per year for the remaining two years. Luck played its role, but primarily with 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. But this shock affected many countries without the same consequences. Thus, it is difficult to associate the performance to luck or external conditions.

At the end the blame resides in the policies that were decided. Fiscal policy deterioration in the first place and then, the choice of betting on more short run growth, even at the expense of monetary institutions and inflation. Weakening the fight against inflation,

appears to have been a costly and obvious political mistake in a country that rewards in the polls achieving stabilization, a mistake that appears 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 any rate, all the experience seems to suggest that institutional build-up is an essential prerequisite of a successful stabilization and growth process. Even in this lesson Argentina is conventional.

Appendix 1. The holdouts problem

Argentina in 2016 was also about to finalize its long zaga of debt defaults. Argentina had ran into debt problems in 2001, as the 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. So 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 again an aggressive debt restructuring (haircuts on some bonds running as high as 88%)[46]. This initial restructuring, harsh as it was, was able to entice about 76.1% participation. 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*) for a couple of weeks in the port of Tema in Ghana before it was released).

In 2010, the government issued a second call for participation, in the same terms of the original deal though forfeiting some payments made since then. This second attempt had reasonable success bringing participation in the restructuring deal to 92.4%. However, the law that allowed this second call also forbid any future deal to any bondholder that decided not to participate (the so called "*lock law*")[47].

Up to that point Judge Griesa, from the 2nd Circuit NY, 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 completed, it summoned Argentine authorities asking them to put forward a proposal for remaining holdouts. At that point the authorities said that the law precluded them of making any offer, and that no payment would be forthcoming regardless of the disposition of the court. The reaction of the court 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 banks to still pay to restructured bondholders, but banks declined, so Argentina fell again in default with restructured bondholders. This was the state of affairs when the government assumed.

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

[47] The government argued that it could not make any deal with 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 holdout. At any rate these clauses had an expiration date on 12/31/2014.

The government needed to normalize the situation by offering a reasonable solution that would be acceptable to the Judge. Argentina offered a payment of 150% of the capital at stake or 75% of the litigation ruling (in case the bondholder had a settlement amount). Some funds had litigated and obtained rulings early on. After ruling, settlement obligations amounts where adjusted at a rate associated to US rates. Thus for these funds, the 150% offer represented more than their actual ruling obligation brought up to 2016. These funds immediately accepted Argentina´s generous offer (in fact Argentina was offering more than they were legally entitled to).

But other more savvy participants had taken another route, using 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, actually even beyond the actual original expiration date of the bond. NML, for example, litigated on a small share of its holdings and had obtained a ruling which wanted applied to their whole holdings. For the FRAN holder the claim was very high, in some cases reaching 20 times the original capital[48]. For these bondholders, the offer of 150% not even closely met their claims. Thus, holdouts pushed forward and attempted a negotiation to improve on this number, but this met stiff resistance from the judge's negotiator Dan Pollack, who considered that Argentina's offer was at this point more than reasonable[49]. With the support of the court's negotiator Argentina's proposal was accepted. At any rate the 300 million original issue of FRAN bonds, ended up representing a liability of close to USD 6 billion.

The overall payment was USD 9.3bn, which was made to the creditors cash, and financed with the issue of a market bond. At any rate, after the many years that Argentina had lived under the spectre of this default, the resolution of this default was considered a second big success of the government.

Appendix 2. VECM Estimation

The 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*), exchange rate (*FX*), regulated prices (*Reg*) and inflation expectations (*Exp*). The general specification applied is the usual:

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

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

[48] A detailed computation can be find at: https://www.bloomberg.com/opinion/articles/2016-02-08/argentina-s-bond-fight-comes-down-to-its-worst-bonds.

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

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 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 Elypsis, *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-months-ahead expectations, and their levels were computed based on the actual level of the CPI in each moment. 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: Δ *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
Δ Prices (-1)	0.2753**	0.3601**	0.3635***	0.1443	0.3089***	0.2648***	0.2989***	0.062	0.0858
Δ Prices (-2)		0.1622	0.1677*	-0.0679	0.0511	0.0163	0.0981	-0.0107	0.0010
Δ Prices (-3)		0.1025	0.0999	-0.0141	0.0240	0.1225	-0.0712	-0.1776**	-0.1517**
Δ Prices (-4)				-0.1263		-0.1099			
Δ Prices (-5)				-0.1410*					
Δ FX (-1)	0.0190	0.0140	0.0146	0.0007	0.0151	0.0044	0.0486***	0.0204**	0.0251**
Δ FX (-2)		-0.0400**	-0.0377**	-0.0290**	-0.0226*	-0.0300**	0.0267**	0.0157	0.0265**
Δ FX (-3)		-0.0396**	-0.0431**	-0.0208*	-0.0275**	-0.0271**	0.0105	-0.0013	0.0075
Δ FX (-4)				-0.0259**		-0.0418***			
Δ FX (-5)				0.0072					
Δ Reg (-1)	-0.0041	0.0548*	0.0394*	-0.0193*	0.0113	-0.0079	0.0180	0.0112	0.0086
Δ Reg (-2)		0.0292	0.0294	-0.0340***	0.0050	-0.0116	-0.0070	-0.0099	-0.0116
Δ Reg (-3)		-0.0093	-0.0097	-0.0294**	0.0037	-0.0107	-0.0232*	-0.0272**	-0.0282**
Δ Reg (-4)				-0.0317***		-0.0236**			
Δ Reg (-5)				0.0013					
Δ Exp t+1 (-1)		0.3600			0.1313			0.2953*	
Δ Exp t+1 (-2)		-0.2632			-0.4654			0.3252	
Δ Exp t+1 (-3)		-0.9602			-0.7723			0.2251	
Δ Exp t+12 (-1)			-0.3144			-0.4356			0.2472
Δ Exp t+12 (-2)			0.4704			-0.0583			0.6798*
Δ Exp t+12 (-3)			-1.5260**			-0.9468			0.1136
Δ Exp t+12 (-4)						-0.1908			

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

Additionally, with the aim of assessing 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 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 to changes in the order of variables for the Cholesky factorization. Neither the variance decompositions nor the values of the coefficients experience significant modifications.

Appendix 3. 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 the GDP cycles. The second was a more country-specific adjustment for the case of Argentina, to consider the impact that accelerations or decelerations of inflation produce on the 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:

$$R^* = R(1+\gamma)^{-\mu}$$
$$G^* = G(1+\gamma)^{-\kappa}$$

As mentioned in Escolano (2010), the 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, κ=0 was used. But to compute more precisely the response of government income to GDP cycle, 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:

$$lnX = \mu\, lnY + constant$$

Where 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 in comparing the evolution of the observed spending on pensions and indexed social assistance (which are indexed to past inflation and wages, according to National Laws No. 26417 and 27426) with the evolution that they would follow in the case they were contemporaneously indexed to current inflation. In years of acceleration of inflation, real expenditures decrease because of this lagged indexation, while, in the case of a disinflation, expenditures increase in real terms because of the same cause.

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 to visualize the real dynamics of fiscal budget without considering the impact of mere temporary changes in the level of inflation.

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