STABILISATION PLANS IN ARGENTINA: ¿WHAT HAVE WE LEARNED FROM THWARTED EXPERIENCES?

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ABSTRACT

Argentina is being subject to periods of long lasting high inflation (also known as chronic inflation), in which stabilisation plans, based upon different tools (e.g. interest rates, monetary aggregates) fell short of being successful and various explanations were resorted to for explaining failed experiences; in this regard, whereas the blame was put on fiscal policies favouring high fiscal deficits and excessive money printing, there were also explanations seeking the cause for inflation on the lack of appropriate anchorss, agents´ skepticism about plans effectiveness, let alone other causes. In trying to more precisely enquire over this long lasting economic problem for Argentina, as well as on the reasons for stabilisation plans´ poor performance, the paper includes an anylisis of stylized facts for the period 2007-2023 based upon the theoretical content of G. Calvo´s seminal paper "Fighting Chronic Inflation with Interest Rates" while a number of recommendatios are finally highlighted.

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I. Introduction

Fighting inflation has proven to be quite a difficult task for policy makers, particularly those in developing and emerging economies in which the phenomenon of high and long lasting chronic inflation has fiercely resisted successive attempts to check it despite the use of a variety of stabilisation tools.

Argentina, which is going now through her second decade of almost ininterrumpted growing inflation is a clear example of the mentioned policy failure, despite the attempts of successive economic authorities in different presidential terms, who tried alternative stablizing tools, in all cases with disappointingly and futile results[1].

In this connection, the present paper purports to analize the management (throughout the period 2007-2023) of stabilisation plans based on monetary tools as for instance Taylor-rules like for the rate of interest, central bank's controlled interest rates upon assets yielding utility services, not to mention the control of monetary aggregates but also with an active intervention in the exchange market using pegged nominal exchange rates and later with an extreme intervention called "the cepo"[2].

For that, the analysis of stylized facts will be preceded by the presentation of the theoretical content which is resorted to and based on G. Calvo (2017) solid paper devoted to scrutinize the performance of Interest Rate Based Stabilisation Plans, under varied scenarios, when countries (mainly the emerging ones) are subject to long periods of chronic inflation.

As mentioned above, the analysis of stylized facts will be focused on the performance of a number of policy and macroaggregate variables depicting the

[1] One of these tools, still in use, is the so called "cepo" for which private agents are banned from freely by or sell foreign currency. There is a "blue market", not recognized by economic and monetary authorities and in which the nominal exchange rate is higher.
[2] As defined "the cepo" amounts to a bolt or lock not only upon the nominal rate of exchange but also on capital flows and imports.

Argentine case, in response to diverse stabilisation policies aimed at curbing the persistent high inflation levels. On the basis of the empirical analysis a number of recommendations will be drawn aimed at achieving better and more effective macroeconomic policies.

Following this Introduction, the remainder of the paper is organised as follows: Section 2 describes the theoretical content resorted to in the paper for assessing the performance of stabilisation programmes. Section 3 presents the empirical facts related to the performance of Argentine stabilisation plans. Section 4 concludes including policy recommendations.

II. The theoretical background

The study and assessment of Interest Rate Based Stabilisation Plans (IRBSP) attracted the attention of many an outstanding economist, as for instance G. Calvo whose seminal paper, written in 2017[3], is taken as the main theoretical background upon which the present research rests. To start with, the author dealt with the performance of rational expectations NKM models, under the assumptions of perfect and imperfect credibility and backward-looking inflation to later extend the analysis to the case in which the central bank's policy interest rate corresponds to assets that also yield liquidity services. For the sake of simplification, fiscal revenues, expenditure, debt, etc are nil[4].

By assuming that emerging markets' **perfect credibility scenario** responds here to the assumptions of a small open economy with perfect capital mobility, endogenous nominal money supply, a given international own-rate of interest on tradables ρ *(*also standing por the subjective rate of discount), and in which a indicates representative individuals' backward looking wealth (with m for their stock of money and b for the stock of a perfectly internationally tradable instant-maturity bond they hold, the following equations express individuals' utility function and backwadr looking wealth[5]:

[3] "Fighting Chronic Inflation with Interest Rates. Cutting a Hydra's Heads with a Swiss Army Knife?" www.columbia.edu/~ gc2286, Columbia University.

[4] Calvo explained this assumpption on the need of separating the effects of monetary policy from fiscal considerations and distortions. In this connection, the assumption is held that the government rebates all the seigniorage to the representative individual.

[5] All terms in the equation are expressed in relation to tradables, except the part managed by the central bank which is expressed in the domestic currency (Calvo G-, op. cit., pp. 5-6).

$$\int_0^{\infty} [u(c_t) + v(c_t^*)] \exp(-\rho t) dt \qquad (1)$$

$$a_t = m_t + b_t \qquad (2)$$

The outstanding representative individual's flow budget constraint is in turn reflected by equation 3, in which its components respectively stand for the demand-determined output of home goods (y), the exogenous endowment of tradable goods ($\bar{y}^*$) constant over time, the real exchange rate (e), the domestic currency's rate of devaluation (ε) and the government lump-sum transfers of the seigniorage to the agents (g).

$$\dot{a} = \bar{y}^* + \frac{y_t}{e_t} - c_t^* - \frac{c_t}{e_t} + \rho b_t - \epsilon_t m_t + g_t \qquad (3)$$

Equations (4) to (6) in turn complete the model presentation by respectively standing for the representative individual's cash in advance constraint, for the uncovered (parity) interest rate condition assumed in NKM models for small open economies and for the final overall budget constraint achieved from successive substitutions:

$$m_t \geq \frac{c_t}{e_t} + c_t^* \qquad (4)$$

$$i_t = \rho + \epsilon_t \qquad (5)$$

$$\int_0^{\infty} \left[\bar{y}^* + \frac{y_t}{e_t} - c_t^* - \frac{c_t}{e_t} - i_t m_t + g_t\right] \exp(-\rho t) dt = 0 \qquad (6)$$

After maximizing the representative individual's utility (1), subject to a binding equilibrium cash-in-advance (eq. 3) and the overall budget constraint (eq 6) and assuming a positive nominal interest rate, Calvo gets first order conditions standing in the case of interior solutions.

In his analysis of the '**perfect credibility'** case, Calvo states equations (7)[6] and (8) whereby the increase in inflation $\dot{\pi}$ is a function of the difference between full utilisation output of home goods (constant over time) and actual output, for $b \geq 0$, whereas the rate of increase of a differentiable nominal exchange rate

[6] Equation 7 responds to the assumption that staggered prices follow Calvo, G (1983), "Staggered Prices in a Utility Maximizing Framework", Journal of Mometary Economics, September, pp. 383-398.

responds to the difference between the rate of devaluation of domestic currency and the rate of inflation of home goods:

$$\dot{\pi}_t = b(\bar{y} - y_t) \qquad (7)$$

$$\frac{\dot{e}_t}{e_t} = \epsilon_t + \pi_t \qquad (8)$$

The policy-interest rate follows the Taylor rule indicated below:

$$i_t = \rho + \theta\pi_t \quad , \quad \theta > 1 \qquad (9)$$

which in turn entails, due to the uncovered interest rate condition above, that $\epsilon_t = \theta\pi_t$.

How the Taylor rule should be interpreted in the framework of IRBSP? According to Calvo, the rule implies a devaluation rule going hand in hand with the rate of inflation; that is, a given percent increase (or decrease) in inflation is met by a more than a percent increase (decrease in absolute value) of the rate of devaluation[7].

In ending his theoretic presentation of the Perfect Credibility case Calvo obtains, through successive sibstitutions, the following equations that wholly depict the equilibrium dynamics of the economy for interior solutions[8]:

$$\dot{\pi}_t = b(\bar{y} - C\left(\frac{\lambda}{e_t}(1 + \rho + \theta\pi_t)\right) \qquad (10)$$

$$\frac{\dot{e}_t}{e_t} = (\theta - 1)\pi_t \qquad (11)$$

and, as mathematically shown in his paper[9], by solving the corresponding Jacobean at the steady state two characteristic roots with positive real parts exist, for what local uniqueness is ensured and the equilibrium path is at the steady state. In sum, what has been so far developed favours his conclusion that, **under perfect credibility**, the target inflation can be achieved at once.

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[7] It is to be noticed that in Calvo's paper ϵ rules, conversely to the level of the exchange rate, are not market determined.
[8] In an interior solution $e_t > 0$ and $\theta > 1$, the latter by eq. 9.
[9] Calvo G. (2017), op. cit, p. 8.

The performance of IRBSP within an **imperfect credibility scenario** is in turn developed under the assumption that agents expect the interest rate based stabilisation plan to be discontinued in $T > 0$ periods[10] and that inflation will in consequence climb to $\pi^H > 0$ (where 0 is the previous target set at the IRBS plan. In drawing the arguments for his analysis, the author resorts to the graphic presentation below, based in Calvo and Végh (1999)[11] where the case of chronic inflation in developing economies (eg Argentina) is extensively treated.

In characterizing the term 'chronic inflation' used in the paper, Calvo and Végh emphasize the fact that high and persistent inflation has been one of distinguishing features in many Latin American countries, ever since the fifties in the twenty century. In this connection, they depart from the more usual term known as 'hyperinflation' and rescue Pazos's[12] coined expression 'çhronic inflation'. The matter is by no means a minor one, as highlighted by the authors on the following two accounts: a) unlike a hyperinflation, whose duration is measured in terms of months, chronic inflation may last for decades; b) countries usually learn how to live with high and persistent inflation by resorting and using indexation mechanisms which fatally tend to perpetuate the inflationary process[13]. It is also here worthwhile to quote, mainly on the basis of Latin American countries' experience, the authors' proven evidence that whenever stabilisation programmes (particularly those relying on pegged exchange rates) failed, or were stopped, countries experienced dramatic balance of payment crises characterized by costly devaluations and losses of international reserves.

As already mentioned above, agents expect that the standing stabilisation plan to be discontinued in $T > 0$ periods and that inflation will then be higher than the the initial target; that is π^H 0. It goes without saying that policy makers will need to resort to a new and credible Taylor rule, as for instance the one depicted by equation 12 below and ensuring that π^H and $\bar{y}$ are the equilibrium inflation and consumption home goods for all $t \geq T$:

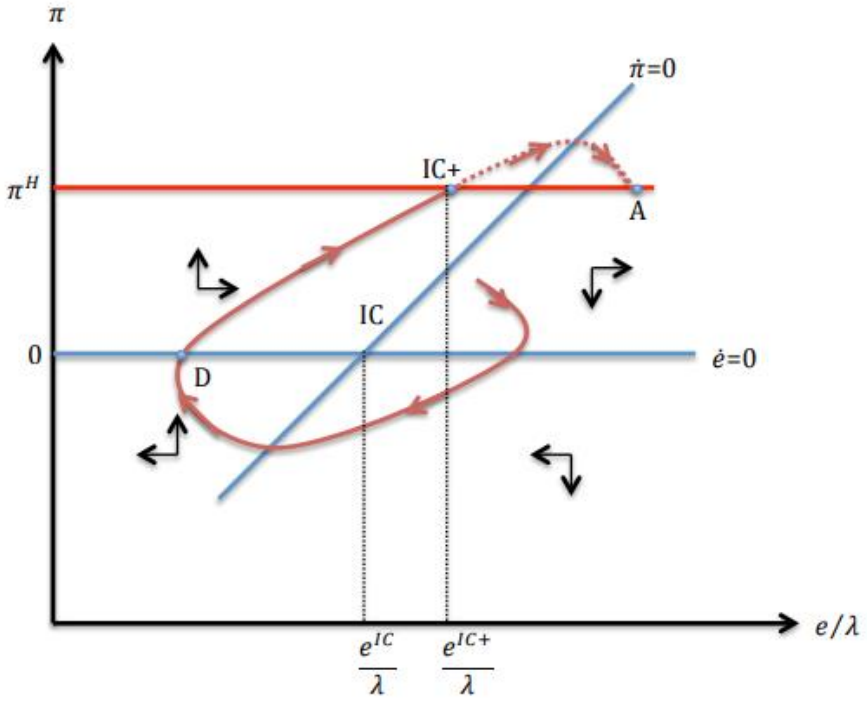
$$i = \rho + \pi^H + \theta(\pi - \pi^H) \qquad (12)$$

[10] Calvo G. (2017), op. cit, p. 8.
[11] Calvo, G. and C. A. Végh (1999), "Inflation Stabilization and and BOP Crises in Developing Countries". (in J.B. Taylor and M, Woodforf, eds.) Handbook of Macroeconomics Volume IC-North-Holland.
[12] Pazos, F. (1972), *Chronic Inflation in Latin America,* New York: Prager Publishers.
[13] Nevertheless, Calvo and Végh (1999, op.cit) emphasize that inflation does not have an inherent propensity to increase and, even if it does soon reaches a new plateau.

Thus far, the only change took place with regard to the Taylor rule, for what the previous equations (10) and (11) maintain their validity (now subject to eq. 12) and, by the previous analysis, the system also converges instantaneously to steady state and there is full utilisation in the home goods sector.

Having said that the following figure 1 depicts the dynamic system under imperfect credibility:

Figure 1. Imperfect Credibility



Source: Calvo (2017)

In analizing the dynamic system represented by the above figure 1, the authors emphasize that although λ it is qualitatevely the same to that of full credibility, (constant along the equilibrium path), it will not be the same[14].

If the Taylor rule depicted by equation 9 held for all t, equations 10 and 11 would still stand for the steady state represented by IC (imperfect credibility) in the diagramme as this intersection denotes 0 inflation rate and 0 increase in the exchange rate. Nevertheless, given the need for a new credible rule such as the one in equation (12) above the system can not start at steady state because of the regime change occurring at T

[14] Without this interfering with the analysis of the dynamic system.

The new Taylor rule[15] thus ensures that π^H and $\bar{y}$ respectively stand for equilibrium inflation and consumption of home goods for all $t \geq T$. Therefore, point IC is not the relevant intersection here as; for reasons given above, there is a regime change at T for what π and e jump to a new steady state, which (according to the authors) cannot hold in interior solutions.

Following the rational lying behind the arrowed line path in Figure 1, which starts somehow below $\pi = 0$ (assuming that the characteristic roots are not real number)[16], it is visually clear that –at the begining- imperfect credibility pushes inflation near the inflation target but it will eventually move away from the positively sloped line towards a higher inflation level, for instance π^H and yields in turn the intersection *IC*+, placed to the right of *IC* and to the left of the 0 inflation line and which also corresponds to the steady state prevailing from time T on,

The path followed by the arrowed line permits to highlight other interesting insights in this imperfect credibility scenario. First, as the line moves to the left the real exchange rate appreciates and, in reaching point D, stagflation sets in; from this point onwards inflation rises and the real exchange rates depreciates. In order to better understand the resulting economic situation it should be noticed that increasing inflation not only accompanies capacity underutilization but it also increases it. Second, although from D to IC+ currency depreciates in real terms this will not permit to restore full employment until the regime change that takes place in time T.

Figure 1 helps also to assess the ambiguous behaviour of current account under imperfect credibility. As pointed out by Calvo, if the equilibrium path started in point D, the initial current account result would be negative given the rising inflation level as well as the appreciation of the real exchanfe rate. Conversely, would the dynamic system start in the proximity of *IC*+ a positive current account could be expected mainly due to the depreciation –in real terms- of the currency. In sum, while initial positive current accounts may be expected for short-lived stabilisation plans, longer-lived ones may be facing current account déficit periods[17].

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[15] By being this the change that took place, the system under perfect credibility still holds, in line with the new Taylor rule and converges instantaneously to steady state.

[16] Otherwise, the arrowed line would start somewhere above the $\pi = 0$.

[17] Calvo (2017, op, cit, p. 10) warns that "…results show that the imperfect credibility scenario could be re-inforced by the adverse phenomena with which is associated and, in a richer model, generate sell-fulfilling stagflation prophecies".

Finally and in line with the previous analysis, Calvo anticipates what could avail a scanty political support for stabilisation plans under imperfect credibility[18] as, at the end of the failed stabilisation plan in time T. perspectives seem to have improved on various accounts: the interest rate falls, the consumption of tradables and domestic goods increase, full capacity utilization again prevails and inflation stops rising according to the arrowed line path (see figure 1).

If, instead of perfect credibility, the prevailing economic scenario were one of '**backward looking inflation[19]** private agents' the following equations (13) and (14) would stand:

$$\pi_t = \omega_t + \alpha(c_t - \bar{y}) \quad , \quad \alpha > 0 \qquad (13)$$

$$\dot{\omega}_t = \gamma(\pi_t - \omega_t) \quad , \quad \gamma > 0 \qquad (14)$$

where ω now representss the backward-looking factor. By successive substitutions, equations (15) and (16) are achieved representing the reduced form of the dynamic system[20] in e and:

$$\frac{\dot{e}_t}{e_t} = (\theta - 1)[\omega_t + \alpha(c_t - \bar{y})] = (\theta - 1)\left[\omega_t + \alpha\left(\phi\left(\frac{\lambda}{e_t}, \omega_t\right) - \bar{y}\right)\right] \qquad (15)$$

$$\dot{\omega}_t = \gamma\alpha\left(\phi\left(\frac{\lambda}{e_t}, \omega_t\right) - \bar{y}\right) \qquad (16)$$

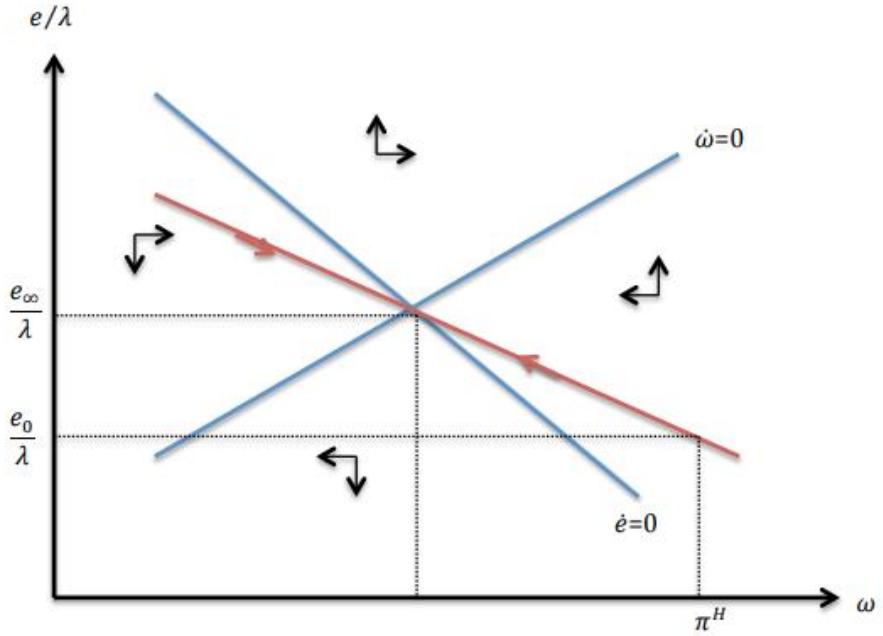
As the saddle-path stability of the above system is a condition for the existence and uniqueness of local convergent equilibrium, Calvo examines in turn the Jacobean of equations (15) and (16) verifying in turn that the condition is met whereas at the same time emphazises the importance of parameter α of equation (13) in so ar it determines the saddle path's slope and, as will be shown below by the diagrammatic analysis, to a smaller α a slower adjustment of inflation to current conditions will take place (and viceversa).

[18] According to Calvo (2017, op. ci., p. 10), there seems to be a vindication of non-vertical Phillips curve in the sense that inflation could be finally a blessing in so far as is suggested that only after very high inflationary levels are reached the economy will be able to recover.

[19] As developed in Calvo, G. and C. A. Végh (1994), "Stabilization Dynamics and Backward Looking Contracts", Journal of Development Economics 43, pp. 59-84.

[20] Here ω_0 is predetermined while e_0 is not.

Figure 2. Backward Looking Inflation. Slow Adjustment



Source: Calvo (2017)

The above graphical analysis considers a small α for what it depicts the case of slow price adjustment. It is assumed that previous to the stabilisation programme the economy already was at steady state with high inflation $\pi^H > 0$, for 0 being the IRBP's target. At the existing steady state, and for the above equation (14), the backward looking factor $\omega = \pi^H$, is predertermined at the beginning of the stabilisation plan.

As figure 2 depicts it, the equilibrium real exchange rate in terms of λ (e_∞/λ) is determined following the announcement of a credible programme, as indicated by the downward section of the arrowed line which ensures a path converging to a new steady state

At the same time, ω monotonically declines towards 0 (upward section of the arrowed line) and this –as shown by Calvo- amounts to saying that the economy will undergo excess capacity or unemployment throughout the stabilisaton programme[21].

A lesson drawn from the preceding graphic analysis is a rise in the real exchange rate in its way to the steady state.

[21] Calvo stresses (p, 12) that due to the decline in ω and in λ/e, c_t will monotonically increase towards steady state $\bar{y}$.

In a scenario of slow price adjustment credibility problems may arise owing to the fact that recession holds during the whole plan; but yet, chances still exist of its getting individuals' support on the basis of rising capacity utulization and the declines over time of inflation and the real interest rate. Nevertheless, Calvo warns that if high price inertia forces inflation to stay high the public may withdraw support to the stabilisation plan if suspicions prevails among agents of enduring capacity underutlization[22].

A similar graphical analysis (not developed here) is carried out for the case of Fast Adjustment; that is, for larger α. Under this assumption in which price setters are sensitive to excess-demand contitions, Calvo proves that the IRBSP pushes inflation below target on impact and "keeps it there all along the equilibrium path"[23]. The previous observation favours the implementation of 'discouraging inflation inertia' policies for rapidly curtailing inflation speed, even when, as also pointed out by Calvo, they imply that effectiveness of stabilisaton plans can be reinforced even by non central bank policies.

The next scenario in which Calvo and Végh (2017) analize the performance of IRBSP is the so called **Liquid Central Bank Policy Assets,** the key assumption being the central bank's controlled interest rate is applied upon assets yielding utility services. For symplification reasons, the authors assumed that money is the only local liquid asset while its interest rate *s* performs as the central bank's policy instrument. Conversely to what was assumed in the previous scenario, the nominal money supply is now exogenous and assumed to grow at a rate μ.

Calvo and Végh resort to a previous paper written in 1995[24] in order to assert that this scenario fits to economies with shallow capital markets where agents hold monetary assets such as fixed term deposits or treasury bills.for their liquidity services; they affirm however that their marginal liquidity may sharply fall with the stock of these assets.

Following the abovementioned new assumptions, the overall budget constraint denoted by equation (6) turns into equation (17), which now includes the new component *s*:

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[22] In this case, the public associatescapacity underutilization to low real exchange rates.
[23] Calvo (2017, op, cit, p, 13).
[24] Calvo, G. and C. A. Végh (1995), "Fighting Inflation with High-Interest Rates: The Small Open Economy with Flexible Prices". Journal of Money, Credit and Banking, 27 pp. 49-66.

$$\int_0^{\infty} \left[\bar{y}^* + \frac{y_t}{e_t} - c_t^* - \frac{c_t}{e_t} - (i_t - s_t)m_t + g_t\right] \exp(-\rho t)dt = 0 \qquad (17)$$

As was already postulated by Calvo the cash-in-advance constraints represented by equation 3 are of no use here and this clearly highlights the difference between interest-rate policies and the management of liquidity aggregates[25]. Therefore, equation 3 is dropped and the utility function for the representative individual is now:

$$\int_0^{\infty} [u(c_t) + v(c_t^*) + z(l_t)] \exp(-\rho t)dt \qquad (18)$$

where $l \equiv me$ stands for real monetary (liquidity) balances in terms of home goods.

Similarly to the preceding cases, maximization of the representative individual's utility (eq, 18) sobject to the overall budget constraint (eq 17) permits to achieve the first order conditions for an interior solution[26].

In considering stabilisation, let it be assumed that *s,* the central bank's policy instrument, satisfies theTaylor-rule like condition below, including $\underline{s}$ and *k* as unrestricted parameters that, prior to the inflation stabiliisation plan are assumed to be equal to 0:

$$s_t = \underline{s} + \widetilde{K} + \Pi_t \qquad (19)$$

Following Calvo's analysis, the following equations are arrived at, the first (eq. 20) showing which, following the existence of a downward sloping function $\mathbb{C}$ indicates that the rate of increase of the exchange rate is equal to the difference between the rate of devaluation of the domestic currency whereas (eq. 21 and 22) respectively stand for the increase of the rate of inflation and for the ratio interest rate/real monetary (liquidity) balances[27]:

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[25] In Calvo's words, this amounts to asume that cash holdings per unit of planned expenditure are not sensitive to interest rates.

[26] It is here worthpointing out that the still λ invariant Lagrange multiplier implies -by the second of first order conditions $v'(c_t^*) = \lambda$ that consumption of tradables is constant over time and by the budget constraint $\int_0^{\infty} \left[\bar{y}^* + \frac{y_t}{e_t} - c_t^* - \frac{c_t}{e_t} - i_t m_t + g_t\right] \exp(-\rho t)\, dt = 0$ involving only tradable goods, that $c_t^* = \bar{y}^*$ for $t \geq 0$, the current accoubt equals 0 over the entire stabilisation plan.

[27] In terms of home goods.

$$\frac{\dot{e}_t}{e_t} = \epsilon_t - \pi_t = \frac{e_t z'(l_t)}{v'(\bar{y}^*)} - \rho - \underline{s} + (k-1)\pi_t \qquad (20)$$

$$\dot{\pi}_t = b\left[\bar{y} - \mathbb{C}\left(\frac{v'(\bar{y}^*)}{e_t}\right)\right] \qquad (21)$$

$$\frac{i_t}{l_t} = \mu - \pi_t \qquad (22)$$

μ standing in eq (22) for the rate of growth of nominal money supply.

As shown by the analysis of the Jacobean carried out by Calvo the system (20-22) not only guarantees the existence of a unique continuous equilibrium path converging to the steady state but also shows that this 'uniqueness' feature holds no matter the central bank follows or not a Taylor rule on *s* (the monetary authority's policy instrument). In this connection, and observing equation (22) Calvo also contends that *the effect of interest-rate rule upon long-run inflation is nil*[28]*.*

In seeking to ascertain whether a stabilisation programme holds chances of checking inflation in a scenario in which **liquid central bank policy assets** exist the following equation 23, resulting from equations 20 and 22 above, is resorted to and in which e_∞[29] and l_∞respectively stand for the steady state level of the real exchange rate and real monetary balances:

$$\frac{e_\infty z'(l_\infty)}{v'(\bar{y}^*)} - \rho + \underline{s}(K-1)\mu \qquad (23)$$

Equation 23 above is crucial to understand the performance of the stabilisation plan: let it be assumed that prior to the programme the economy was at steady state with a positive level of inflation equal to μ for what the monetary authority decided to tighten the Taylor rule (eq, 19) by increasing parameter s, K or both. By expression 23, Calvo shows that the Taylor rule tightening induced a rise in steady state real monetary balances l∞ given that z is strictly concave.

[28] For Calvo this result helps to rationalize the classical monetarist assertion claiming that inflation would persist should the central bank persist in financing fiscal deficits, if the latter were not controlled or somehow aligned with the stabilisation plan.

[29] The steady state level of this variable in independent of the Taylor rule and invariant across steady states.

In consequence, after the anouncement of the new Taylor rule the initial real monetary balances[30] l_0 are smaller than l_∞, the ones at the new steady state. By recalling that all variables in the system (20) – (22) monotonically converge to their steady state levels, this transition to the new one is not possible without a fall –on impact- of π_0 (the rate of inflation)[31]. Calvo's conclusions are however gloomy regarding the stabilization plan's performance in the sense that, and despite signs of success in the short run, inflation will inevitably recover its positive and high level μ prevailing prior to the stabilisation plan.

In moving to the real exchange rate e, Calvo (2017) calls again to mind the assumptions that the economy starts at steady state with a high positive inflation level equal to μ and that e_∞ is invariant across steady states demonstrating (by contradiction) that, on impact, the equilibrium real exchange rate e_0 falls (that is, currency appreciates in real terms).

In closing the analysis, Calvo points out that this scenario is even bleaker than in those under price inertia as while both succeed in momentarily checking inflation, in the present case attempts will be almost futile, let alone the cost to be paid in terms of capacity underutilisation.

III. The analysis of stylized facts

As mentioned in the Introduction, the anaylisis of stabilisation for Argentina will cover 4 presidential terms: Cristina Fermandez de Kirchner (1 and 2), Mauricio Macri and Alberto Fernandez extending from 2007 through 2023, for what the main contributions G. Calvo presented in his seminal paper of 2017 (op. cit) –and allready developed in the previous Section, provide the theoretic background for this paper

It was however deemed particularly useful, before initiating the analysis of stylized facts, to highlight here some of important results derived from the previous analysis, given the policy implications they involve

A first point deserving attention is the assumption that the policy inflation index only included home goods and that the nominal exchange rate was continuous over time, for what equilibrium uniqueness would be ensured in

[30] They are predetermined because nominal money supply and home goods' prices are sticky. Calvo (2017).
[31] See equation 22.

rational expectations New Keynesian Models. In this connection, removing these assumptions can cause that floating exchange rates endanger Taylor-rules's effectiveness to guarantee equilibrium uniqueness and, as Calvo also pointed it out, plausible situations may emerge in which "….anticipated future discontinuous jumps in the exchange rate may occur in perfect-foresight equilibrium paths[32]".

Second, in the third scenario (liquid central bank poicy assets and exogenous stock of money) it is assumed that the equilibrium exchange rate path is continuous; in imperfect credibility (IC) models, with endogenously determined stock of money, the interest rate is the only instrument used by the monetary authority. In this scenario, individuals are able to change their portfolio composition by selling to the central bank, at market prices[33], their entire money stock in exchange[34] for the instant maturity bond b.

In switching entirely to bond b would not however protect individuals from the instantaneous increase of price levels brought about by a maxi devaluation unless the former were indexed to the exchange rate[35]. If the latter did not occur. If, on the other hand, the nominal interest rate i satisfied the Taylor rule in equation (9), and did not compensate bondholders for the effect of a maxi devaluation, bonds would in this case be similar to money; and maxi devaluations could be discarded[36], in turn this policy suggesting that the Taylor rule only applies in situations of moderate inflation.

The above depicted situation may also induce private agents to resort to return-wise international bonds causing in consequence that the policy bond market gradually disappears. But even in that case the management of the nominal interest rate would still be posible by directly managing the rate of devalluation ϵ which appears in the equation for the interest rate parity condition (see eq. (5) above). Nevertheless, and as noted by Calvo, although this procedure somehow fades away the maxi devaluation problem, it involves a dramatic policy change in so far as the central bank manages now the rate of devaluation instead of the nominal rate of interest.

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[32] Calvo (2017, op, cit, p. 17).
[33] It is here worthpointing out that, given bonds'instant maturity feature, private agents could wait until an instant before T to switching to a new portfolio composition, to somehow averting risks of causing money supply excess and setting off a devaluation.
[34] This would in turn entail zero consumption.
[35] As Calvo stated, at least in points in time at which the exchange rate is discontinuous.
[36] Anticipated by P. R. Krugman (1979).

Four, indexation to the exchange rate becomes inevitable if the central bank aims at ensuring that the policy bond and the international one are equally safe. In sum, there is room for the central bank to manage the nominal interest rate i on the policy bond. However, anticipated discontinuous jumps in the nominal exchange rate are still posible if private agents -expecting a maxi devaluation in T- completely switch their portfolios into the policy bond an instant before T to switch them back, after devaluation, to the preferred composition.

Fifth, the thus far not mentioned currency substitution usually taking place in emerging economies subject to high inflation levels during long periods can in turn help equilibrium maxi devaluation to exist. With reference to the model being referred too, currency substitution will imply modifying the cash in advance constraint (equation 4) allowing private agents to resort to foreign currency both as a mean of exchange and as a form of protecting consumption against domestic currency runs.

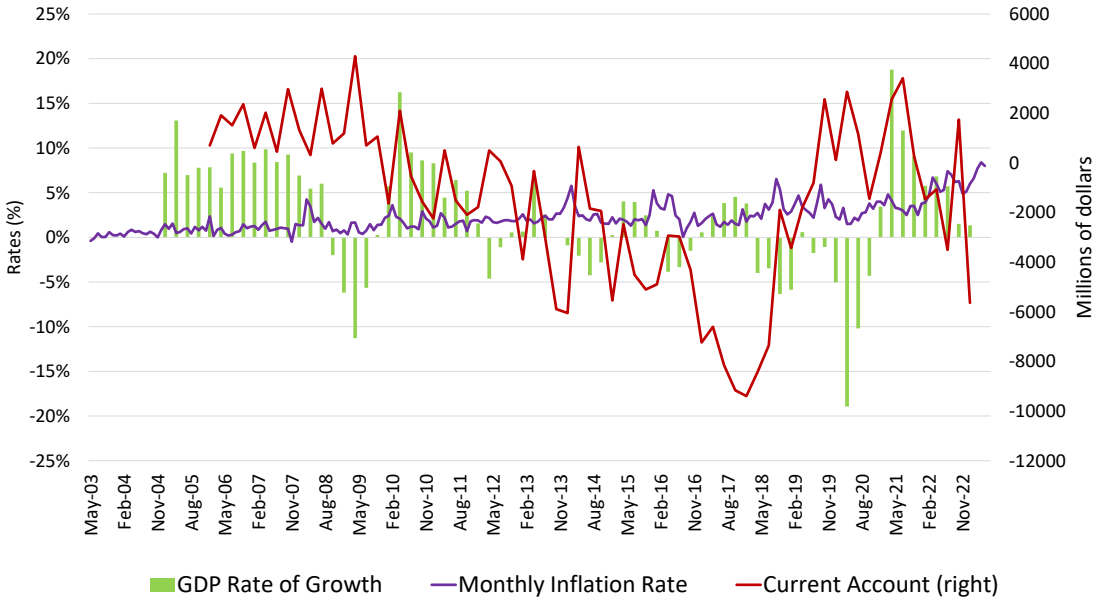
Sixth, in the analysis and discussion over IRBS's performance and effectiveness, under flexible exchange rates and endogenous money supply, Calvo insists on that reliance only on Tayler-type rules may not suffice for what support from other nominal anchors should be sought, as for instance the exchange rate, whose management by central banks should avoid very large fluctuations with the purpose of preventing sell fulfilling expectations equilibria to occur[37].

Seventh, it is clear that, conversely to the case of precise interest rate rules, central banks are less willing to inform what they will do in the event of highly volatile exchange rates. This counterproductive behaviour is not devoid of problems at least on the following two accounts: the monetary authority may stabiliza the exchange rate and even bring about capital flights if individuals believe that the loss of international reserves respondes to a balance of payment crisis whereas if the central bank does nothing, non uniqueness problems can not be ruled out.It seems therefore wiser -for the health of inflation stabilisation plans- to inform private agents that central banks' intervention in the foreign exchange market could be possible if certain events occurred.

[37] Calvo (2017, p. 21) pointed out that this may occur if central Banks fail to convince private agents that the exchange rate will not exhibit maxi-revaluation.

In starting with the analysis of the stylized facts, the information given by Figure 3 is particularly interesting in so far as it yields clear evidences of the Argentine economic situation as of 2007 through 2023:

Figure 3. GDP Rate of Growth and monthly Inflation Rate vs Current Account. May 2003-June 2023



Source: Own elaboration on the basis of data from Ministry of Economy of Argentina, INDEC, and IERAL

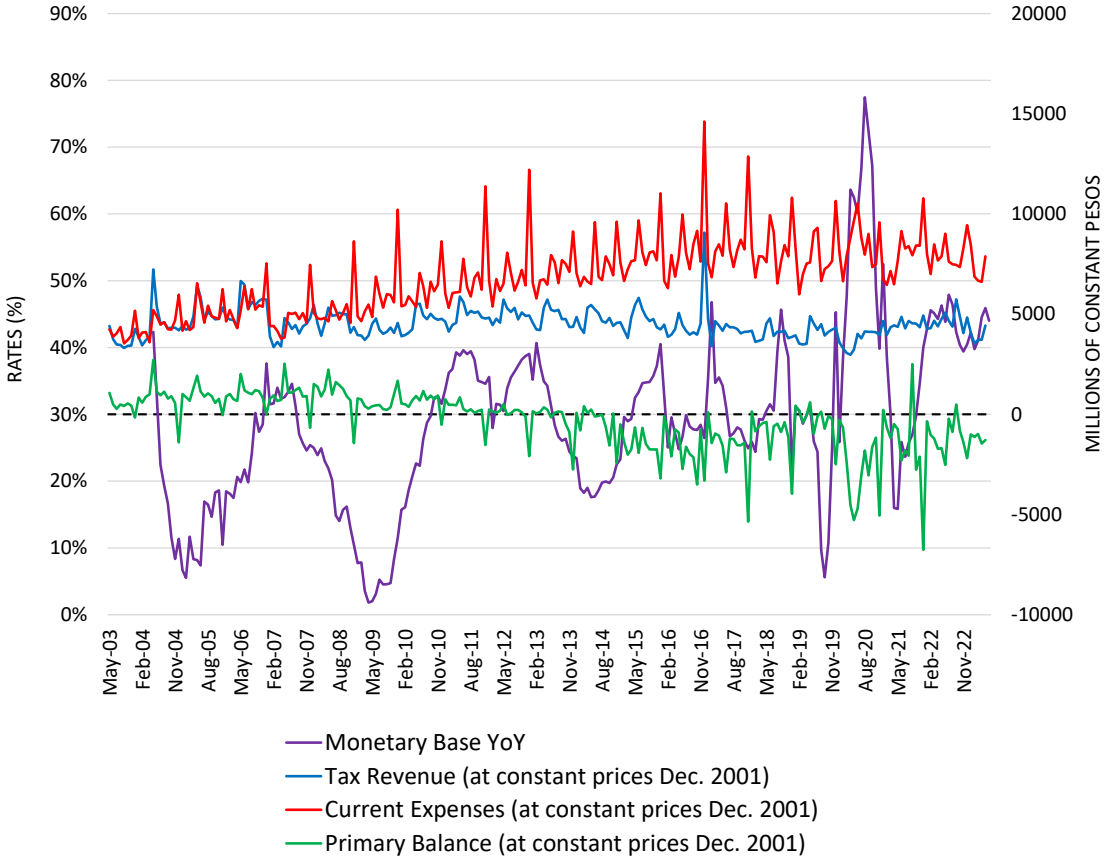
To start with, it confirms that the period was subject to what Pazos (1972) defined as a situation of chronic inflation, with monthly figures averaging 2% - 3% but recentlly climbing to 6%-8%. It is however worthpointing out that the mentioned feature was and still is (save for exceptional years) accompanied by declining or nil GDP´growth rates and current account deficits favouring what Calvo (2017) defined as closed to ´stagflation´ in his models of price inertia[38]. It transpires from figure 3 that, either stabilisation plans failed to check inflation or, even worse, no plans at all existed, hypotheses upon which some light is expected to be shed in the rest of this section.

The noteworthy information from Figure 4 clearly depicts the situation of the ´fiscal front´, particularly during the period of ´chronic inflation´ under review. As shown, in none of the four presidential terms since 2007 through 2023 (safe for a few exceptions) the public sector could run primary surpluses (green line).

[38] See scenarios of Imperfect Credibility and Backward Looking Inflation in Section II above.

It accounted for that the steady increasing path shown by constant current public expenses (upper red line) vis-a-vis the practically stagnated path of constant tax revenues (second light blue line). Needless to emphasize Argentine economic authorities, far from seeking to regain fiscal sustainability by curtailing public sector expenses, generally resorted to money printing by forcing a not independent central bank[39] to very often increase the monetary base (violet line) beyond prudent limits.

Figure 4. Tax Revenues, Public Expeditures and Primary Balance vs Interannual Variation of the Monetary Base. May 2003-June 2023



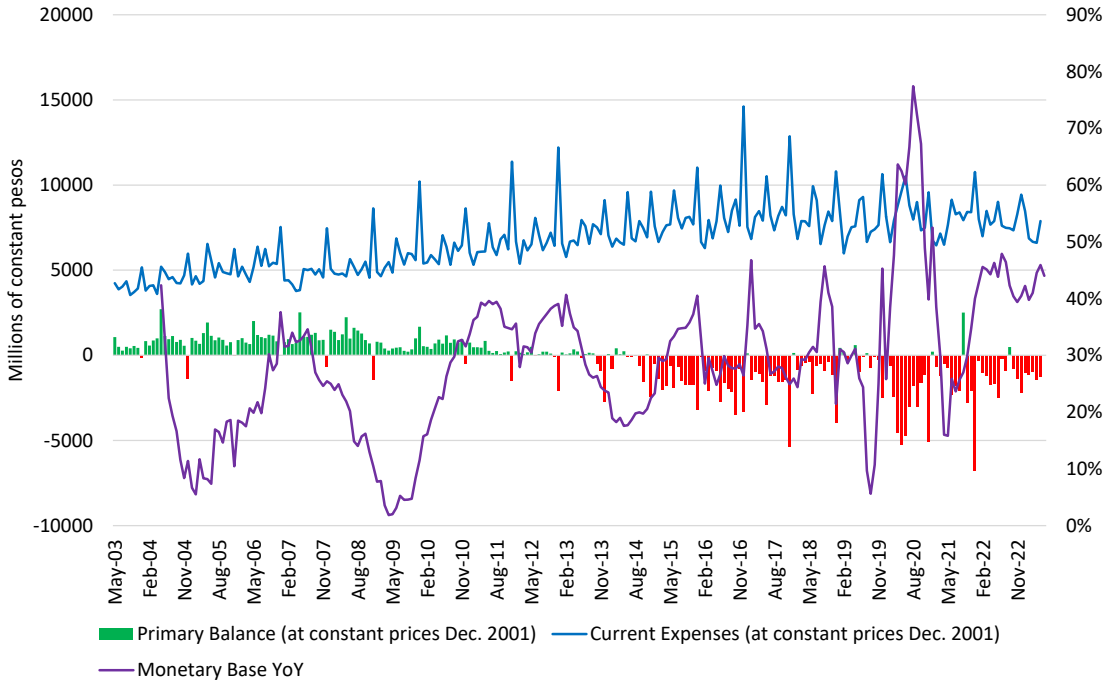
Source: Own elaboration on the basis of data from Ministry of Economy of Argentina and BCRA

As figure 4 shows, the basis for the previous assertion is more visually evident as of May 2009, with the exception of marked troughs in 2014, 2019 and 2020 respectively. However, figure 5 reveals an important feature concerning anti

[39]Paradoxically, F. Sturzenegger himself (2019), appointed Central Bank´s Chairman in 2015, acknowleged that failure in guaranteeing Central Bank´s Independence became a major hindrance to stabilisation policies.

inflationary tools in so far as the negative interanual variations of the monetary base, occurring at the beginning and at the end of Macri´s presidential term, seem to show a return to monetary aggregates as the anchor for stabilisation.

Figure 5. Interannual variation of monetary base vs current public expenditures and primary balance. May 2003-June 2003



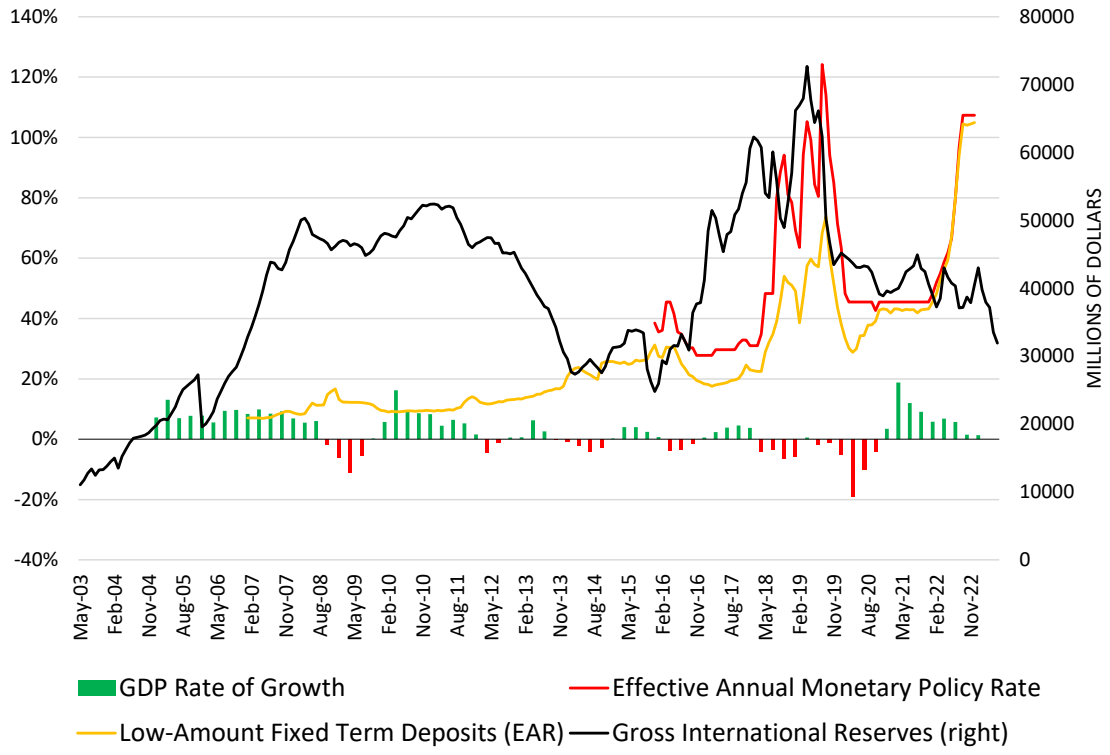
Source: Own elaboration on the basis of data from Ministry of Economy, BCRA, INDEC and IERAL

Nothing akin to a solid stabilisation plan was seriously implemented during the analyzed period, save for the first years of Macri´s term (even though fell short of being successful) when interest rates were in general used as the main antiinflationary tool (inflation targetting[40]), including the central bank´s interest rates applied upon assets yielding utility services. This fits in part with what Calvo called ´Central Bank Liquid Assets´ scenario (see Section II) as the recourse to central banks´ rates contributed more to the problem than to its solution as will be illustrated with the ensuing figures.

[40] The recourse to Taylor-rules like by Sturzenegger was severely critiziced by Di Tella (2019) on grounds that there was not an explanation on the manner that the decided high interest rates would achieve a reduction of inflation, particularly in a moment at which the Argentine economy was undergoing very high inflationary levels.

Figure 6 shows that that the rate of increase of central bank´s controlled interest rates, particularly those applied to low-amount fixed term deposits (blue line) and loans and the effective annual monetary policy rate (red line) swiftly climbed since 2017 2019 and later in 2022/23 in line (in the first case) with inflation targetting mechanisms and, in the second case, with the aim of disuading individuals leaving the peso to seek refuge in foreign currencies (mainly the U.S. dollar). As expected, increased interest rates for loans (followed from the previous raising of fixed term deposit´s ones) together with the purposedly maintained appreciation of the nominal exchange rate accounted for the recession shown by low positive and even negative GDP growth rates in figure 3, which alongside with sustained inflation rates brought about the above mentioned periods of stagflation characterized –as expected- by lower levels of private investment and senseless actions seeking to boost consumption which in turn increased inflation (see the violet line in figure 3).

Figura 6. GDP rate of growth and gross international reservs vs interest rates. May 2003-June 2023



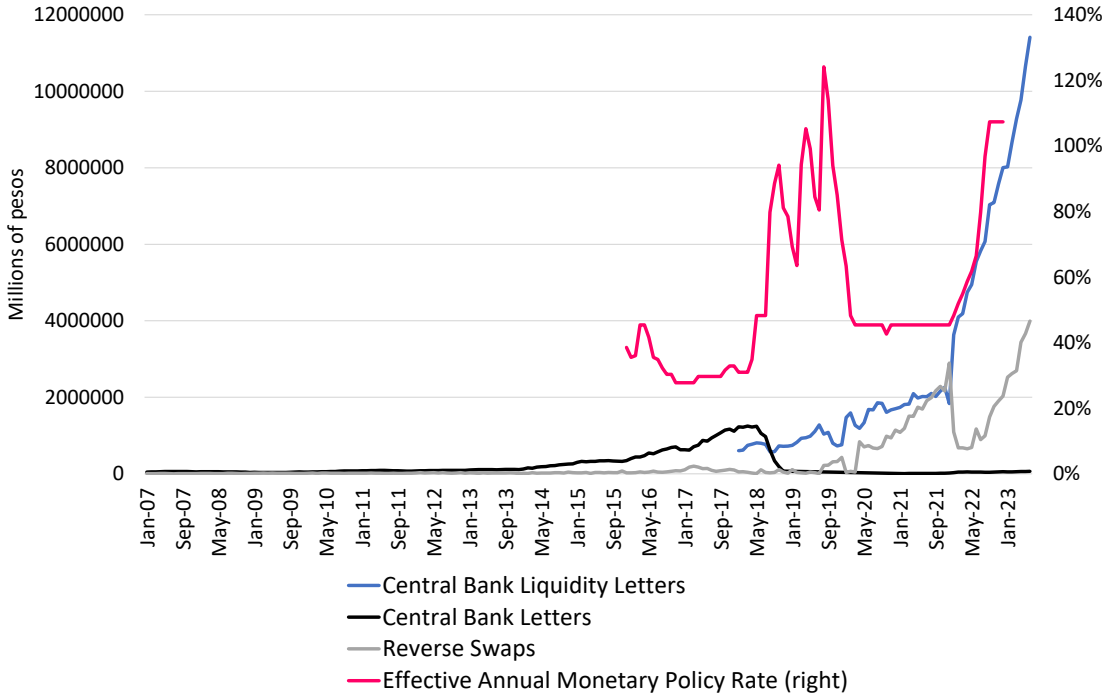
Source: Own elaboration on the basis of data from Ministry of Economy and BCRA

This is clearer shown by figure 7, in which the pink line standing for the rate payed on interest bearing liabilities of the central bank (first Lebacs and now Lelics) in 2018/20 and 2022 and on liquidity letters in 2022 climbed abruptly, making posible a spurious public sector´s financing by resorting to mandatory

bank reserves which amounted at the end to an increased poblic sector domestic debt, let alone the almost unbearable weight of its services. Nevertheless, F. Surzenegger, the outgoing chairman to the central bank judged it as a mistake[41] the abrupt reduction in interest rates (see figure 7) performed by his successor in 2918.

In terms of stabilisation performance, plans based on Taylor-rules like using central bank´s interest rates instead of the uncovered interest rate condition, did not succeed either as can be simply verified by observing the increasing path of inflation in figure 3 above. Let it be recalled thar this conclusion was also anticipated by Calvo (see Section II) when analyzing equation (22) as he already asserted that in this scenario interest rate rules -even when momentarily succeeded- would not have effect upon long run inflation, the cost being the brought about capacity underutilization (see annual GDP growth rates in figure 6) and also and most likely credibility problems.

Figure 7. Stock of interest-bearing liabilities vs interest rate. January 2007 – June 2023



Source: Own elaboration on the basis of data from BCRA

Let it be recalled that in the theoretical analysis over IRBS´s performance and effectiveness, under flexible exchange rates, Calvo insisted on that the

[41] See Sturzenegger (2019).

exclusive reliance on Taylor-type rules might not suffice to stabilize, for what support from other nominal anchors should be sought as for instance the nominal exchange rate or monetary aggregates. In this respect, as the latter were only sporadically used during the period (2007-2023) efforts will be devoted from now on to analyzing the former one´s perfomance in the light of new prevaiiing conditions imposed upon the exchange market as of October 2011.

The reasons leading Argentine economic authorities to strenghten their intervention upon the exchange market deserve being analyzed, in as much as not only this market´s funtioning was altered but also chances of the rate of exchange for performing as an anchor in IRBS plans were impaired. As figure 6 shows, the rate of exchange´s nominal value rested on the known crawling peg mechanism whereby policymakers somehow define its adjustment[42].

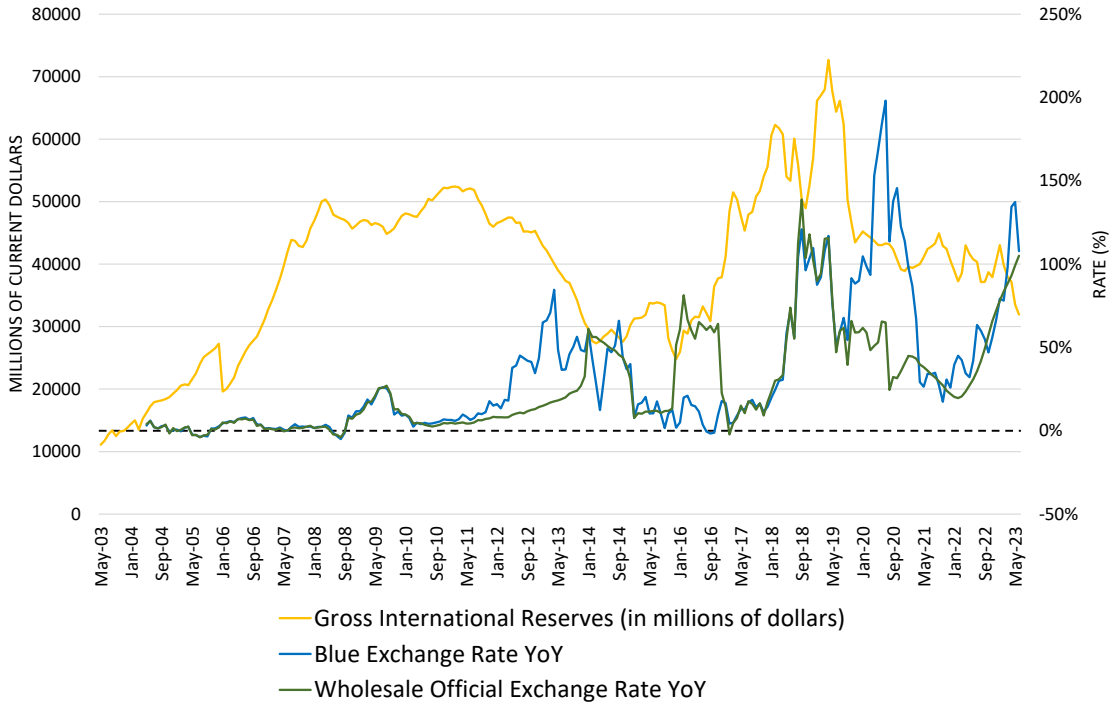
Accordng to what the figure 8 depicts, the appreciaton of the pegged rate of exchange was already noticeable as earlier as in 2010 (see the path of the so called ´blue exchange rate´), as well as the incipient drop in international reserves. By fearing that individuals, anticipating a devaluation massively forsake the peso, the authoriies re-introduced the so called ´cepo´[43] on 31 October 2011 whereby a number of restrictions were applied to exchange market operations, as for instance: limits (in relation to wages) to the amount of foreign currency that individuals could monthly buy[44]. The ´cepo´ also introduced restrictions to firms as for instance the previous Central Bank´s approval to acceding to foreign currency needed to pay imports or for benefits remmitance, all this added to restrictions and surcharges to credit cards´operations with foreign currency.

The evolution of the external sector following the introduction of the ´cepo´ is also depicted by figure 8 in which the appreciation of the nominal exchange rate, resulting ftom pegged adjustments lagging behind the inflation immediately resulted in an increased demand of the so called ´blue´dollar. Various stages are here worthmentioning in relation the blue dollar path: while its nominal value abruptly shrinked after January 2014 devaluation, the former coincides with the pegged exchange rate since December 2015 (when the cepo was lifted) and

[42] Except of course for abrupt jumps caused by devaluations like the one in January 23 (2014), when the difference with the ´blue´ amounted to 43%.
[43] Exchange lock or bolt.
[44] This restriction was extended later to include the máximum amount individuals could monthly buy.

diverges again as of September 2019 when exchange rate restrictions came again into being.

Figure 8. Gross international reserves vs interannual variation of blue and wholesale official exchange rate



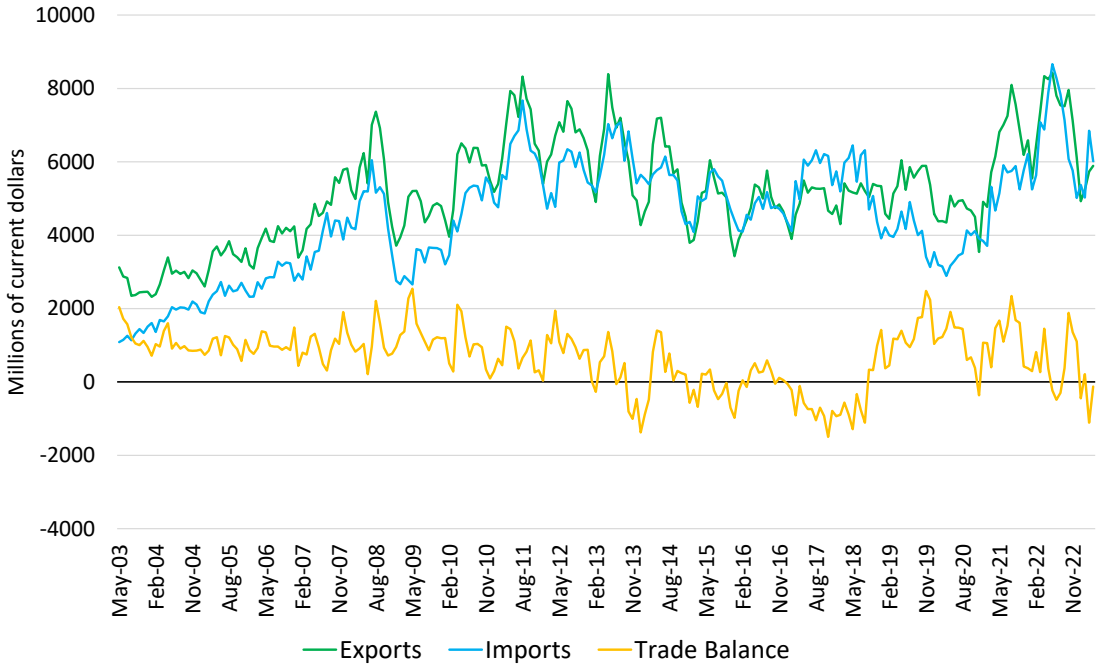
Source: Own elaboration on the basis of data from BCRA, ámbito financiero

By judging their impact upon the current account and the balance of payments the conclusion is that neither of restrictions had positive effects. Apart from individuals´difficultis to freely accessing to foreign currency figure 9 below shows the bolt´s impact upon the current account balance was negative. As a result of the mentioned appreciation of the pegged nominal exchange rate throughout the period two distorting situations emerge: exports were in the first place discouraged or delayed, In expectations of better conditions, whereas there were on the ither side strong incentives for certain economic sectors to increase their imports. Finally, restrictions impaired the balance of payment situation, particularly during A. Fernandez presidential term, as clearly shown by figure 8.

The poor performance of the current account is in turn corroborated by figure 9 as its balance (yellow line), apart from being steadily decreasing, also

shows negative figures between 2014 and 2018. This pattern was somehow countervailed helped by the performance of the agricultural sector (crops and prices) and its contribution to exports.

Figure 9. Exports, imports and trade balance. May 2003-April 2003



Source: Own elaboration on the basis of data from Ministry of Economy

IV. What have we (or should we have) learned from thwarted experiences?

In going rhrough the performance of the Argentine economy during the period analyzed (Section III) the first evident conclusion (or recomendation) is that chronic inflation will not be defeated unless solid and lasting stabilisation plans are implemented and periodically revised[45], taking into account indoviduals´expectations in order to avoid falling in disruptive situations of self-fulfilled expectations, as exemplified below.

In the second place and as shown by Calvo (2017), no plan holds chances of succeeding (unless permanently) if the supporting theoretical content is either

[45] It is worthwhile to quote, in this connection, the Study conducted by Palazzo, P, Rapetti, M. and J, Walman (2023) on Stabilisation Plans (paper next to be published) in which they assert that launching the plan is not the arrival point but the departure one.

wrong or ignored. In this regard, IRBSP for small open economies, with endogenous money supply (and parity interest rates), flexible exchange rates and in which Taylor-rules like are resorted to may, under perfect credibility, check inflation at once whereas for scenarios falling short of the former (as for instance when imperfect credibilty and/or backward looking inflation prevail) results are much more dubious. Under imperfect credibilty Calvo showed that situations of stagflation could arise and even some stabilisation might be achieved at the cost pf higher inflation levels configurating thus a dangerous Phillips curve outcome; in running counter the previous conclusion, the situation might be worse in the case of backward lookimg inflation with recession prevailing during the entire plan, despite some decrease in the inflarion path only due to the exchange rate appreciation. The situation is far from being better in a scenario in which liquid central bank´s policy assets exist and a Taylor-rule like is set in which the policy instrument is the CB rate of interest (as occurred mainly during parts of Macri´s and Fernandez´ presidential terms, years in which stabilisation efforts turned out to be practically ineffective.

In the third place, stabilisation plans should include the public sector too. The analysis of stylized facts showed (figure 2) that public finances were seldom aligned with the needs of stabilisation, and an almost permanent primary deficit -depicted by the green line- privailed. Fiscal policies running counter stabilisation objectives may be considered as one of the main causes (if not the main one) preventing stabilisation goals to be reached; thais was also pointed out by Di Tella (2019) by asserting that a credible fiscal trajectory clearly helps to anchor expectations throughout the stabilization plan. Contrariwise, stylized facts showed (see figure 3) how excessive public spending defrayed by money issuing led to disproportionate monetary base expansions. The increased money supply push, on the one side, inflation up (due to a scanty production of private goods[46]) and, on the other, favoured indivuals´ decision to get rid of the peso in anticipation of devaluation of the appreciated exchange rate.

As a fourth important conclusion, facts reveal the validity of the argument widely sustained by a majority of outstanding economists[47] that, except for exceptional cases of very low inflation levels, stabilisation plans should rely less on Taylor rules like tools based on interest rates. In this regard, it is not still clear

[46] Both for the recession affecting GDP and restrictions placed upon imports.
[47] G. Calvo among them.

how inflation targeting mechanisms (using hight interest rates) would succeed in moderating inflation

The above mentioned weakness ot interest rates as the solely tool to check inflation, particularly in the case of developing countries, explain why the support from other nominal anchors is usually required..By concentrating the analysis on the nominal rate of exchange, as the recourse to monetary aggregates was only sporadic in the period considered, a first highlighting point is that the anchor´s effectiveness is not divorced from good fundamentals at the external sector taking into consideration that most experts agree in that stabilisation plans may first cause an appreciation of the exchange rate, followed by underutilized capacity in the real sector. Needless to emphasize, good fundamentals at the external sector do not seem to have characterized the Argentine case, according to stylized facts. It accounted for that the exchange rate pegged adjustment followed which throughout the period, except for two devaluation episodes, resulted in a sustained appreciation of the nominal exchange rate permanently boosting the demand for foreign currency. It was not oblivious to the problem the introduction of the so called ´cepo´ (exchange lock or bolt) whose effect was noticed in exports as well as in imports and resulted at the end in current account desequilibria as well as in balance of payments problems and a shrink of the stock of international reserves which in turn endangered external sustainability. As already said, the exchange rate could well perform the role of an effective nominal anchor provided that, and as Calvo (2017) asserted, its fluctuations are mantained within reasonable bounds (to prevent self fulfilling expectatons equilibria resulting from the exchange rate revaluations).

A fifth relevant result concerning stabilization, and particularly highlighted by Calvo refers to the case in which private agents, anticipating maxi devaluations, almost totally switched to international bonds in place of the domestic policy bond Had this situation happened, there would be still chances for the Central Bank to indirectly manage interest rates by directly managing the rate of devaluation (instead of the interest rate) which is in turn included in the interest parity condition[48].

Last but not least, when this anchor is resorted to, is that the Central Bank somehow inform the public the procedure to be followed in case that the rate of exchange becomes more volatile. This will help to enhance stablisation plans´

[48] As suggested by Calvo (2017), indexation to the exchange rate is mandatory for making domestic policy bonds as safe as international bonds.

effectiveness by averting self-fulfilled prophecies to become true due to individuals´expectations fed by exchange uncertainty.

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REFERENCES

Calvo, G (1983), Staggered Prices in a Utility Maximizing Framework, *Journal of Monetary Economics*, September, pp. 383-398.

Calvo, G (2017), Fighting Chronic Inflation with Interest Rates. Cutting a Hydra´s Head with a Swiss Army Knive? *www.columbia.edu/~gc2286*

Calvo, G. and C. A. Végh (1994), Stabilization Dynamics and Backward-Looking Contracts*, Journal of Development Economics* 43, pp. 59-84.

Calvo, G. and C. A. Végh (1999), Inflation Stabilization and BOP Crises in Developing Countries, in (J.B. Taylor and M. Woodford, eds.) *Handbook of Macroeconomics* Volume 1C, North-Holland.

Di Tella, R. (2019), Comentarios sobre “La Macroeconomía de Macri” de Federico Sturzenegger, *Working Paper 20-025 NBER y Harvard University*.

Krugman, P. R. (1979, A Model of Balance of Payment Crisis, *Journal of Credit and Banking 11,* August, pp. 311-325.

Palazzo, P., Rappetti, M. y J. Waldman (2023), Planes de Estabilización en América Latina ¿Que distingue a los casos exitosos? artículo próximo a aparecer.

Pazos, F (1972), Chronic Inflation in Latin America*, New York: Prager Publishers*.

Sturzenegger, F. (2019)