



Currency substitution in Argentina, 2003-2019: An evaluation of alternative explanations

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Abstract:

Currency substitution defined as the use of foreign currency in the domestic economy is a relatively common phenomenon in developing countries. While mainstream economics has analyzed it in some detail, the same is not the case in heterodox economics. This paper proposes an analytical approach to evaluate the effects of currency substitution and its relationship with exchange rate dynamics; it provides an empirical investigation of orthodox and alternative views for the case of Argentina. The orthodox view emphasizes the role of fiscal deficits financed by monetary emissions, while alternative views emphasize the importance of external vulnerabilities, both associated with current and financial account deficits as the source of currency substitution. We find some support in favor of the alternative or heterodox perspective on currency substitution or dollarization.

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Currency substitution is an important problem in many developing countries. There is a considerable literature on the subject, but it is mostly from a mainstream approach. The mainstream and the heterodox/radical approaches to economics have significant differences—the same applies to currency substitution. We develop an explanation of the theoretical differences between orthodox and heterodox theory and, given the presence of this phenomenon in the case of Argentina, provide an empirical assessment of both approaches that provides some preliminary evidence about the relative importance of both approaches.

In the case of Argentina, the orthodox view is that left of center or populist governments have increased government spending and run fiscal deficits by increasing the money supply, which has led to inflation. In this view, currency substitution is simply a flight to safety. Alternative views emphasize the external problems—related to the absence of dollars—in a country that defaulted in 2002, renegotiated its foreign debt twice (in 2005 and 2010), that only solved the external debt problem with the holdouts or Vulture Funds in 2016, and was forced to reimpose capital controls as the source of currency substitution. In particular, these views emphasize the fact that these problems occurred under both populist and neoliberal governments, since the latter aggravated



the external problems, and even though it lifted the capital controls in 2016, it was forced to reimpose them in 2018 in the context of an International Monetary Fund (IMF) program.

The remainder of this paper is divided into five sections. First, we schematically present both orthodox and heterodox theories on exchange rate determination and currency substitution. Then, we provide a brief description of the process of currency substitution or dollarization in the Argentinian economy and provide a possible political economy explanation for the persistence of that phenomenon, which does not depend on the political party in power. In the subsequent sections we explain the methodology and data sources used; the variables selected for the estimation are presented, followed by the result of our estimatives. A brief conclusion suggests that the heterodox approach provides a slightly better explanation of the dollarization phenomenon in Argentina.

1. Alternative views of currency substitution

The conventional/orthodox explanation for currency substitution is relatively well developed and provides the basis for understanding currency crises, while there is—to some degree—a lack of alternatives in the heterodox view.¹ In this regard, orthodox literature is more coherent, while heterodox considerations on currency substitution are fragmented and do not provide a clear consensual approach. We try to provide a simple analytical presentation of a possible heterodox approach.

Regarding the orthodox view, the most frequently quoted definition of currency substitution is found in Calvo and Vegh (1992, p. 1). They suggest that currency substitution is: “the use in a given country of multiple currencies as media of exchange.” More precisely, currency substitution (CS) is the last stage of the dollarization process where the domestic currency had previously lost the traditional functions of money as medium of exchange, store of value, and unit of account. However, more recent mainstream work has shifted the attention from foreign currency as a medium of exchange to a broader focus on the importance of assets denominated in foreign currency within the domestic economy (Ize and Levy-Yeyati, 2003; MacDonald, 2006).

The origins of CS have been characterized through different explanatory variables in the mainstream literature. In some accounts, CS may be generated by high and volatile inflation levels (Calvo and Vegh, 1992; Kumamoto and Kumamoto, 2014; Rojas-Suarez, 1992), increasing depreciation expectations (Rojas-Suarez, 1992) and the degree of financial liberalization (Calvo and Vegh, 1992). Concerning the effect of CS on exchange rate determination, the conventional argument within the orthodox literature is that this phenomenon increases exchange rate volatility (Akçay et al., 1997). Particularly, keeping interest rate differentials constant, the rate of depreciation is determined by the inflation differentials, following the purchasing power parity (PPP) theory (*ibid.*).² According to Akçay et al., the degree to which the inflation differential increases the depreciation rate is exacerbated in the context of CS since economic agents shift from one currency to the other more quickly.

¹ Girton and Roper (1976, p. 1) provide the seminal paper on currency substitution, which they define as: “the degree that currencies are substitutes in the portfolios of ultimate wealth holders.” Note that the conventional theory of currency crises, developed by Krugman (1979), explicitly cites the work by Girton and Roper on currency substitution. The only formalization of an alternative model of currency crises, as far as we know, is Cline and Vernengo (2016).

² Note that even if one takes the interest rate differentials, there is an equivalency between PPP and the Wicksellian notion of an exchange rate determined by the equilibration of the natural rate of interest between countries (Vernengo, 2001).

As we mentioned before, the heterodox literature on currency substitution is limited and is often part of a broader analysis focused on currency sovereignty and policy space. In particular, according to recent developments within modern money theory (MMT), following Keynes, a sovereign currency would be one that possesses the following four characteristics: the currency must be defined as unit of account by the government, the government must set obligations, these obligations must be denominated in the unit of account previously defined, and debt must be denominated in this currency (Wray, 2015).³ In addition, Wray adds that a country should pursue a flexible exchange rate regime. Under these circumstances MMT authors suggest there would be no need for CS. Critics of MMT have argued that, even in flexible regimes, when central banks set interest rates, they indirectly affect the exchange rate, and, in particular in developing countries—who face an external constraint—the central bank ends up managing the exchange rate. In these cases, there is often a managed or dirty float exchange rate regime.⁴ Besides, most critics would be skeptical about the possibility of depreciations resolving the external constraint problems while maintaining full employment policies. Under these circumstances, the possibility of CS appears in less developed countries, reflecting the impossibility of borrowing in domestic currency in international markets, a phenomenon known as original sin in the literature.

The main difference between the orthodox and heterodox views on CS is related to the causal mechanism connecting the substitution of foreign for domestic currency. Most orthodox dollarization theoretical models follow what could be labelled a Monetarist approach and accept both the quantity theory of money (QTM) and PPP theory. Therefore, money supply or base (MB), through its effects on domestic prices, should determine the nominal exchange rate (NER). In addition, both inflation and exchange rate expectations lead to dollarization or currency substitution (CS). Finally, dollarization decreases the level of international reserves (RES), which might be seen as the harbinger of a currency crisis. Causality can be expressed as following this pattern:

$$\text{MB} \rightarrow \text{NER} \rightarrow \text{CS} \rightarrow \text{RES}$$

The heterodox approach on currency substitution implies that increases in dollarization of assets should decrease the level of international reserves held by the central bank. CS results from a negative interest rate differential—that is, domestic nominal interest rates lower than the sum of external interest rate plus the risk premium, plus the expected nominal devaluation of the domestic currency. This is what makes it advantageous to maintain assets in dollars and explains the fall in dollar reserves. In addition, this decrease in the level of reserves leads to pressures on the balance of payments, which generates the exchange rate depreciation. Finally, the depreciation of the exchange rate is inflationary, and the money supply endogenously responds to the higher price level. Causality is as follows:

$$\text{CS} \rightarrow \text{RES} \rightarrow \text{NER} \rightarrow \text{MB}$$

³ In this sense, the heterodox concept of currency differs from the mainstream one, since the former is focused on the role of unit of account of money, while the latter is focused on the role of medium of exchange. Also, for the MMT approach sovereignty is a political phenomenon that can be defined by the state (Prates, 2020), while for the mainstream approach the process of dollarization and currency substitution is the outcome of the rational actions of independent economic agents.

⁴ While sharing the political considerations of sovereignty many criticisms have been raised by other post-Keynesian/Structuralist authors to the MMT approach. See Lavoie (2013) and Vernengo and Pérez Caldentey (2020).

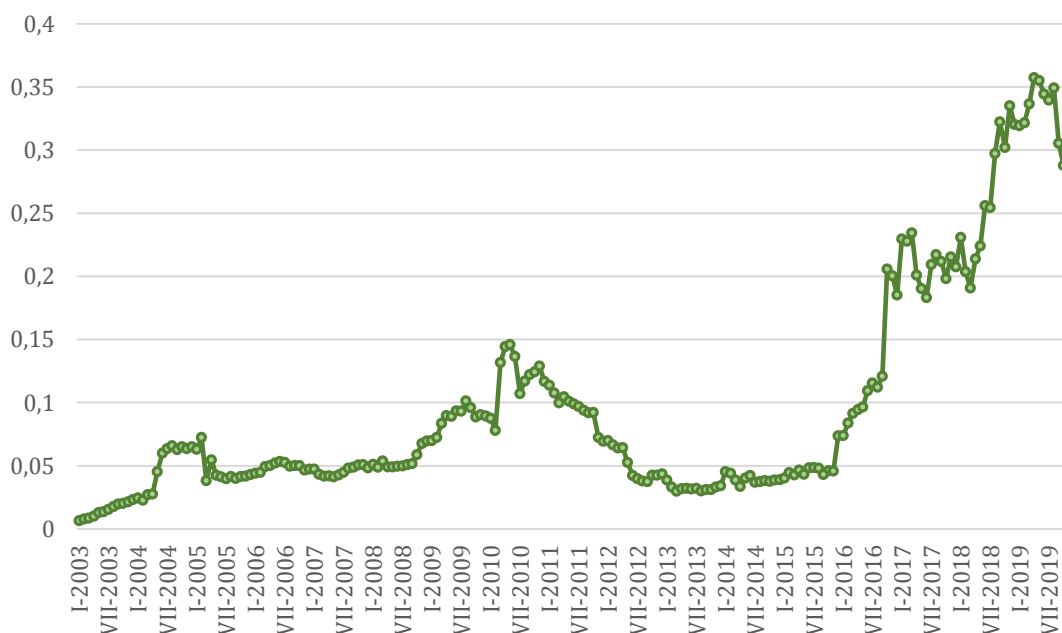
In other words, while CS is the result of a process that is ultimately caused by domestic decisions, and is followed by reduced reserves, the depreciation of the domestic currency and inflation, the origin of the problem is structural, related to lack of a sovereign currency and the external constraint, which are at the root for the need of external reserves. This simple line of reverse causality allows us to empirically analyze the relevance of both approaches. In the following section, we briefly discuss the Argentinean experience.

2. Key economic features of the post-currency board era

During Néstor Kirchner's administration (2003-2007), in a relatively positive international environment with high commodity prices that favored exports and reduced the external problems, a series of expansionary macroeconomic policies and redistributive policies that increased real wages were applied (Amico, 2013; Kulfas, 2008). The economy was coming out of the Convertibility crisis of 2001-2002, when external default and pesification of the economy were forced by one of the worst crises in the country's history. Interestingly enough, during this period, currency substitution or dollarization increased significantly, at least when measured as the share of foreign currency deposits over M2 (figure 1).

The measure is a simplified one, and it is clear that it underestimates the CS phenomenon, since the risk associated with deposits in dollars is well known to Argentines, who have suffered previous process of pesification of banking accounts. At any rate, the index provides a first approximation to the problem, and it would be reasonable to assume that if the dollarization of banking deposits went up, there would be also the case with broader measures of dollarization.

Figure 1 - *Currency substitution for the period 2003-2019*



Source: based on Central Bank of the Argentinian Republic (BCRA) (2024; [available online](#)).

During the subsequent administration of Cristina Kirchner (2007-2015), the country started to face the effects of the balance of payment constraint in its process of economic growth along with the effects of the 2008 international financial crisis, in particular after 2011 when the limits of the current account had been reached (Kulfas, 2014; Manzanelli and Basualdo, 2016). Faced with increasing capital flight and lower external reserves, the government opted to implement controls in the foreign exchange market in 2011, which led temporarily to a reduction of dollarization, as can be observed in figure 1. However, at the end of 2015, with the election of Mauricio Macri, and the elimination of capital controls, dollarization of banking deposits went up again.

Macri liberalized the exchange rate market, to unify the official and parallel rates, and the central bank adopted an inflation targeting policy to control inflation. In the conventional view, this would lead to reduce monetary emissions, lower inflation, a more stable exchange rate and reduced dollarization levels. However, this policy did not stop the persistent depreciation of the exchange rate, both of the official and the parallel exchange rate, or dollar blue, that emerged in 2011 once capital controls were implemented. In fact, depreciation and dollarization increased during Macri's administration. Particularly, during his administration, the liberalization of the financial and exchange rate markets led to the development of a carry trade system, which led to an increase in capital flight (Barrera and Bona, 2018; David, 2019). For our purposes, it is clear that the process of CS expanded in Argentina since the end of Convertibility in 2002, and that it accelerated in the last decade, in particular since 2015.

It is important to note that since the external problems became more acute, when the external constraint associated with current account imbalances, persistent capital flight, and low levels of reserves held by the central bank became chronic, the Argentine economy was unable to grow, with the average growth rate being 0.5% per year. In other words, the economy has stagnated for more than a decade. Although these problems became more acute starting in 2011, when a left of center government was in power, they persisted with changes in the political landscape.

3. The political economy of dollarization in Argentina

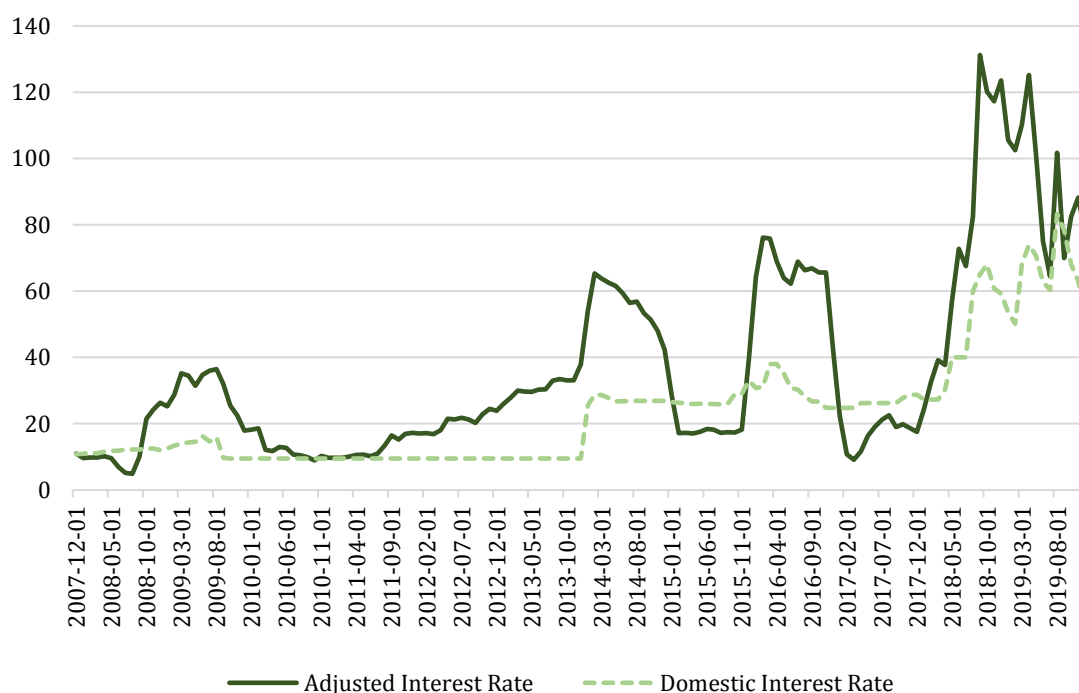
In the conventional view, the degree of CS should be very different in left and right of center governments, since the latter would be more concerned with inflation, would control money supply, and maintain higher interest rates, which should preclude inflation, depreciation and dollarization. The opposite is expected of left of center governments. Yet, in Argentina dollarization increased with both the Néstor and Cristina Kirchner governments, and with Mauricio Macri government. In our view, the negative interest rate differential, that is, domestic nominal interest rates lower than the sum of external interest rate plus the risk premium, plus the expected nominal devaluation, was the cause of dollarization in both periods. In the case of Argentina this interest rate differential has been almost always negative, as shown in figure 2. This made it rational to choose to maintain assets in dollars and explains the fall in dollar reserves.

Negative nominal interest rate differentials are the *raison d'être* for dollarization, and these, in Argentina, have been maintained both by left of center populist governments, and by those seeking a neoliberal alternative. That is, arguably, the only common point between these two groups. But the reasons for the low rates that generate negative remuneration differentials are based on alternative political reasons.

Among the left of center groups within the Peronist party, closer to Cristina Kirchner, and for a good part of the heterodox economists, low domestic interest rates are seen as a way to reduce

the returns of financial capital and as a necessary condition to promote the expansion of the economy and a better distribution of income. A hike in interest rates, it is presumed, would have a negative effect on credit and on business investment and on economic activity. However, private investment is not a function of the interest rate, but rather depends on the expected effective demand. In addition, the government could always subsidize credit through public banks.

Figure 2 - Interest rate differential 2007-2019



Another group, the so-called New Developmentalists, see a depreciated or competitive and stable real exchange rate as a precondition for industrial growth and development, and they assume that high interest rates would have the effect of reducing the pace of nominal exchange rate devaluations, leading to an overvaluation of the real exchange rate, reducing exports, with negative effects on growth. The perception, in this view, is that the depreciated real exchange rate is favorable to growth, but since there is wage resistance, in compensation there would be a higher inflation.

But there is another more relevant tradeoff to understand the Argentine situation, which is not between a depreciated real exchange rate to grow and an appreciated exchange rate to stabilize and keep prices under control. The central tradeoff is distributive, between the exchange rate and wages, a tradeoff that casts doubt on the positive effect of the depreciated real exchange rate on growth. In countries that predominantly export commodities, which are price takers in international markets, the real exchange rate has little effect on the volume exported⁵. The main effect of the depreciation of the real exchange rate is distributive. A currency depreciation has

⁵ See Cuevas-Ahumada (2011) and Zack and Dale (2015) for the case of Argentina.

contractionary effects on the economy, not only in the level of activity, but also on the rate of growth, because it reduces real wages. The worsening of the position of workers – who have a greater propensity to spend – implies, for equivalent levels of autonomous spending, lower levels of effective demand and induced investment.

It would be expected that, among the more conservative groups, the concern with inflation would lead them to have the opposite perspective on the interest rate (Levy-Yeyati et al., 2012). And it is true that once the economy had begun to recover in 2017, the Argentine Central Bank raised rates to stop the inflationary acceleration in the first years of the Macri government. In fact, in December 2015, an inflation targeting regime was established, according to which the central bank would raise the interest rate when inflation was above the target. At the beginning of 2016, the basic interest rate was briefly above the foreign rate adjusted to risk, but that was short lived (see figure 2).

This presented two problems for the then government. On the one hand, a high interest rate was seen – by these neoliberal groups – as contractionary due to its presumed effects on private investment. But this proved to be incorrect and in fact private activity and investment increased in 2017 despite the increase in the real interest rate. On the other hand, at the end of 2017 the government forced the central bank to further reduce the interest rate to stimulate further depreciation, in part to promote lower real wages.

The result of the reduction of the interest rate, in combination with the higher adjusted external rates, was the acceleration of capital flight, and the decrease in international reserves, leading to a run on the currency. The government was forced to seek financing from the IMF, leaving a situation close to a default. Ultimately all groups, on the left and on the right, saw low interest rates as necessary or at any rate as not being instrumental in explaining dollarization. The left for the most part explained it as a cultural phenomenon, while the right saw it fundamentally as a result of money printing and the fiscal deficits that caused it, even though some also emphasized the cultural tendency of Argentines to save in dollars.

4. Data and estimation strategy

Several studies assessing the relationship between exchange rate and currency substitution for the Argentinean case can be found in mainstream literature (table 1). On the other hand, we found no previous empirical work concerned with the heterodox approach. Most studies assess the relationship between exchange rate volatility and CS variables through the estimation of autoregressive conditional heteroskedasticity (ARCH) or generalized autoregressive conditional heteroskedasticity (GARCH) models. Currency substitution does not appear as an explanatory variable in studies of the estimations of exchange rate determination. Most of these papers, which accept PPP theory, try to find long term relationships between relative prices and exchange rate through cointegration tests, vector error correction (VEC) models and/or performing unit root tests (Acar, 2020; Dal Bianco, 2008; Holmes, 2008; Uz and Bildir, 2009). Additionally, there is a series of studies that follow a similar methodology and theoretical framework, but their focus is on the effect that the commodity price boom had on the exchange rate determination of developing countries (Aizenman et al., 2012; Ahumada and Cornejo, 2015).⁶

⁶ See all the studies in table 1.

Table 1 - *Previous studies on exchange rate determination for the Argentinian case of study*

Work	Time Frame*	Methodology	Variables	Dependent Variable	Heterodox
Aizenman, Edwards and Riera-Crichton (2012)	1970-2007 q	Cointegration Analysis	Commodity terms of trade; world inflation, government expenditure; trade openness, interest rate spreads, gross private capital flows	RER	NO
Ahumada and Cornejo (2015)	1993-2013 q	VEqCM	Exports, commodity prices, real exchange rate, agriculture GDP, domestic consumption, oil imports, GDP, oil prices	RER	NO
Dal Bianco (2008)	1900-2006 a	Cointegration Analysis	RER, prices and wholesale price index	RER	NO
Acar (2020)	2004-2018 q	ARDL	INTd, GDP differentials, money supply differentials	NER	NO
Holmes (2008)	1973-2005 q	MS-ADF	RER	RER	NO
Uz Akdogan and Dalan Bildir (2009)	1977-2006 q	Cointegration Analysis; VEC	Price differential, INTd, real income differential and money supply differential	NER	NO

* The letters next to the time frame refer to the frequency of the data, where a stands for annual and q for quarterly.

We estimate a VAR model that goes beyond the simple application of cointegration or unit root tests, allowing us to obtain large amounts of information through impulse response functions (IRFs) and forecasting errors variance decomposition (FEVDs). Moreover, the VAR methodology allows performing the estimation of the model without setting the structure of the model beforehand (Zack et al., 2018). However, this methodology is not free of limitations. Particularly, different from cointegration tests, this methodology does not allow to study of long-run relationships. In this regard, a possible alternative would be to estimate a VEC model, which allows applying the already mentioned econometric tools and studying cointegration relationships. Nevertheless, the results of the unit root test (see table A2 in the appendix) do not allow the application of this methodology. Furthermore, another limitation of VAR models is that parameters increase geometrically as more variables and lags are added (López Galván, 2021; Stock and Watson, 2008) and, consequently, the possible number of control variables to include is reduced.

The variables included in the model (table A1 in the appendix), beyond a currency substitution index and the exchange rate, include the interest differentials between Argentina and the United States, the level of reserves in foreign currency held by the Central Bank of Argentina and the money supply. The interest rate differential may have implications for both orthodox and heterodox literature on the topic under analysis. Additionally, the level of reserves is included in

the model since it reflects the need of developing countries to protect themselves against the vulnerability generated by asymmetries in the international financial and monetary system. The money supply was included since—according to orthodox literature—on currency substitution, this variable is the main generator of inflation and, through the PPP, of the exchange rate fluctuations. Finally, the currency substitution index is measured as the share of foreign currency deposits over M2, the variable most frequently used to assess this phenomenon (Tweneboah-Koduah and Farley, 2016).

The initial time frame selected, the period between 2003-2019 using monthly data, avoids the shock of the Covid crisis after 2019 and the problems associated to the fact that, before 2003, the exchange rate was fixed. However, after performing the structural breaks and stationary tests, the period under analysis was shortened to January 2003-October 2011. The Bai-Perron test was estimated, finding several structural breaks in the period 2003-2019. To have more robust stationarity test results, on top of estimating the ADF test, the AZ test was estimated. As shown in table A2 (see appendix) all variables are integrated order one following the ADF test and the AZ test, except for the RES and NER following the latter test. Due to the results of the stationarity and structural break tests, the variables were included in first logarithmic difference and the period was shortened to January 2003-October 2011. Additionally, assessing this period of time presents the advantage of avoiding the presence of a foreign exchange parallel market.

Figure 3 – Responses of NER to impulses in other variables (monetarist ordering)

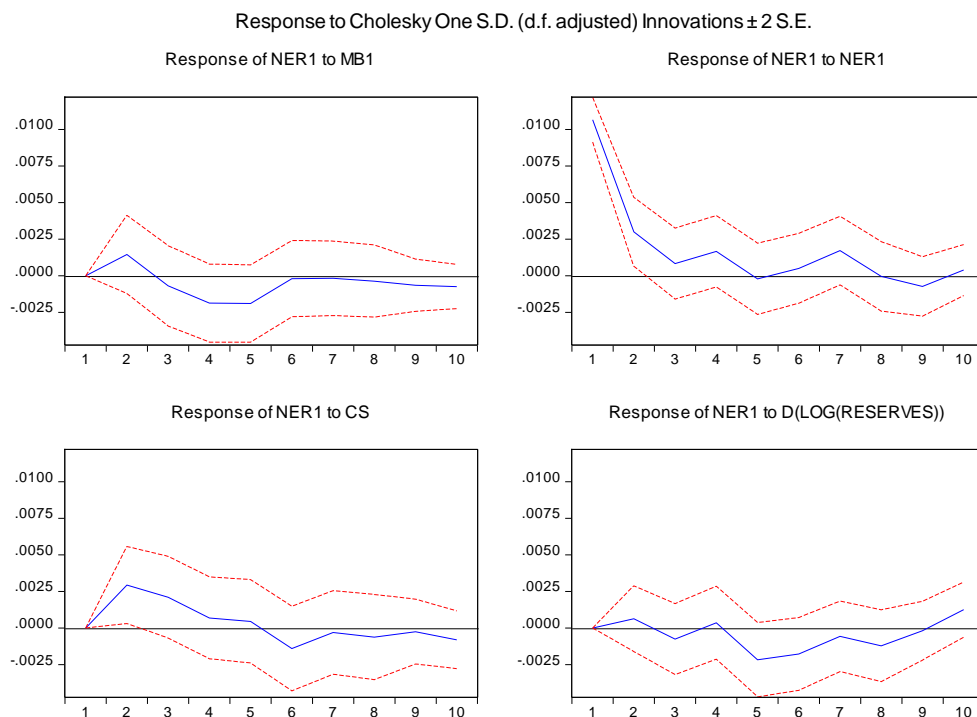


Figure 4 – Responses of NER to impulses in other variables (post-Keynesian ordering)

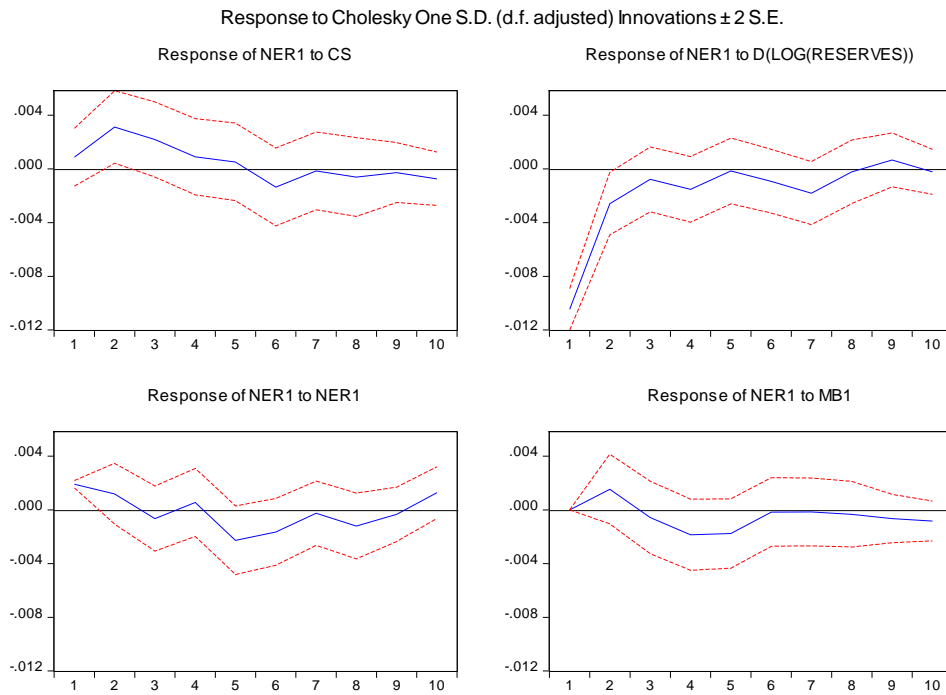
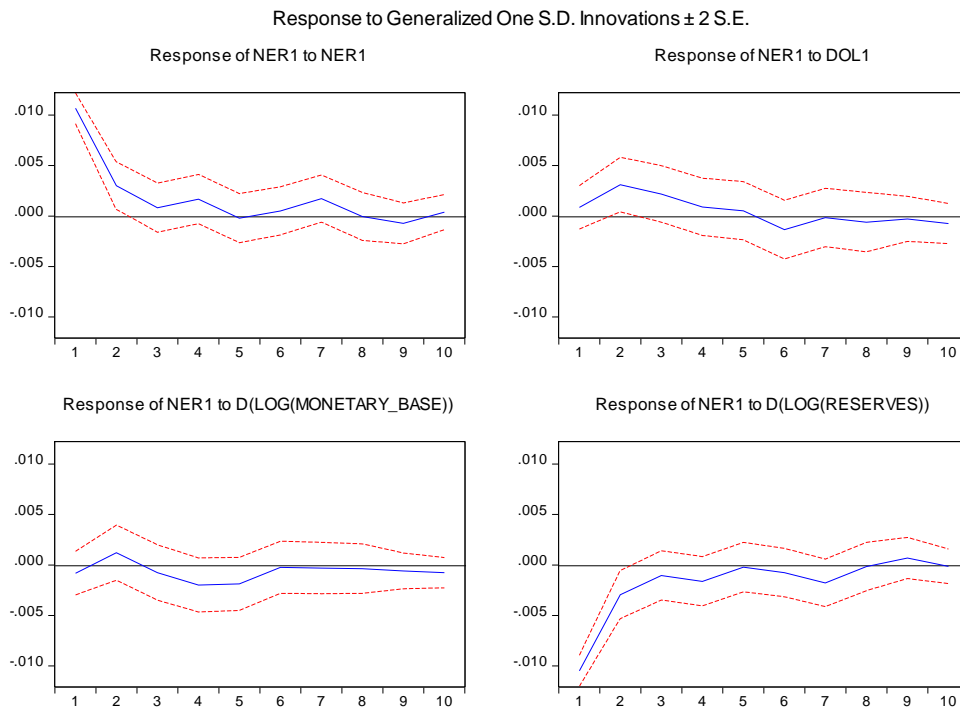


Figure 5 – Responses of NER to impulses in other variables (GIRFs)



5. Empirical results

In order to be able to calculate the IRFs, which show the response of the exchange rate to the impulses of the remaining variables and variance decomposition, an ordering must be defined.⁷ Figures 3 and 4 present the IRFs of the model under analysis. As can be observed, following the orthodox causality, MB and RES IRFs are not significant, CS has a significant mild effect in the first two periods and the lag of the exchange rate presents a large effect in the same periods. Similarly, following the heterodox ordering, MB IRF is not significant, while CS has a significant effect in the second period. However, differently, the NER impulses are non-significant, while RES presents large and significant effects over the exchange rate. Finally, the GIRF is presented, which has the particularity of not needing a specific ordering to be calculated.

As can be observed in figure 5, both the lag of the exchange rate and the level of reserves present significant effects over the exchange rate in the first periods, while MB shows to be non-significant for all the periods. CS maintains its significant effect in the second period.

Concerning the variance decomposition analysis, similar results to the ones of the IRFs are found (tables A3, A4 and A5 in the appendix). Particularly, the most important explanatory variables are RES and the lag of the exchange rate, while MB is the least important variable. Regarding CS, it explains between 6 and 11% of the exchange variance depending on the ordering and around 6% per cent according to the GIRFs. Finally, the IRFs also show that with the monetarist ordering the lag of the exchange rate is a highly relevant variable, while RES only explains a small amount of the exchange rate's variance decomposition. In this regard, as in the IRFs, the opposite results are found following the post-Keynesian ordering.

The Granger causality tests indicate that CS Granger-causes the remaining variables. The results shown in this section presents evidence that does not support the orthodox theory. According to one version of this approach, the money supply should have a positive effect on the exchange rate, and dollarization should increase exchange rate volatility, but it should not affect its level, which depends on the inflationary differential (Akçay et al., 1997). However, the empirical evidence does not provide support for these claims. In this regard, the money supply IRFs is not significant, it represents a small share of the exchange rate's FEVD and it does not Granger-cause the exchange rate.

Also, the results provide some support for the heterodox perspective. Particularly, this approach claims that, since developing countries often present a balance of payment constraint, currency substitution should precede exchange rate depreciation and the increase in the money supply. This result is observed in the Granger causality test, the FEVD and the IRFs. Moreover, the results show that, on top of affecting exchange rate volatility, the accumulation of reserves affects the exchange rate level, which is observed following the heterodox causality.

6. Conclusion

This paper empirically assesses the relationship between currency substitution and exchange rates to evaluate orthodox and heterodox theories of currency substitution or dollarization. In particular, this work contributes to the relatively underdeveloped empirical literature on currency substitution that evaluates heterodox views of dollarization. It should be noted that the

⁷ The model passed the heteroskedasticity and autocorrelation test with 7 lags. Additionally, the model passed the unit root stability test. The variables in the exchange rate determination model are measured as the first difference of their logarithms.

measurement of currency substitution and the availability of data that are inherent in this kind of work imposes some limitations.

It is found that CS has a significant short-run positive effect on the exchange rate level. Therefore, the results provide favorable evidence for heterodox views, which consider that due to the characteristic of developing countries' economic structure CS would cause a pressure on the balance of payment leading to currency depreciation. There is no support for the conventional or orthodox view that money supply causes inflation and that this, in turn, is at the heart of currency substitution in the Argentine case.

This view suggests that what caused the rising levels of dollarization in the Argentine economy were associated with a macroeconomic policy mix that maintained low interest rates domestically, and promoted a persistent crawling peg of the official exchange rate, which led to a negative interest rate differential. This occurred both under so-called populist and neoliberal governments.

Appendix

Table A1 – *Data sources*

Variable	Abbreviation	Definition	Source
Interest rate differentials	INTd	Difference between the Argentinian and the American Central Bank policy rate	IMF: 2003-2011
Currency Substitution	CS	Deposits in foreign currency/M2	BCRA: 2003-2011
Monetary base	MB	Monetary base at the end of period in domestic currency	BCRA: 2003-2011
Nominal exchange rate*	NER	Average nominal exchange rate between the Argentinian peso and the American dollar	IMF: 2003-2011
Foreign exchange reserves**	RES	Ratio between the level of reserves and the GDP, in dollars	BCRA: 2003-2011 INDEC: 2003-2011

* The exchange rate is expressed as the amount of domestic currency needed to acquire a unit of foreign currency.

** The monthly GDP was obtained by applying the Denton method.

Table A2 – *Results of unit root tests*

Variable/Test and Transformation	ADF Levels	ADF difference of the logarithm	ZA Levels	ZA difference of the logarithm
NER	-0.1422	-5.2722*	-6.4674*	----
CS	-1.7362	-7.0059*	-4.6241	-7.1779*
MB	-1.8144	-7.2501*	-2.5778	-10.4468*
RES	-3e-04	-5.485*	-6.6045*	----
INTd	-1.1224	-6.1575*	-4.0158	-7.8967*

* means that the result is significant at the 1% level. For the ADF test, twelve lags were used, and the results exposed in this table show the BIC criterium and the inclusion of both a trend and a constant. Nevertheless, the results are the same if the AIC criterium is considered and the trend is excluded from the test. The result of the AZ reflects the inclusion of structural breaks both in intercept and in trend. The results of MB and CS, the rest of the variables share the same results if only the intercept is considered, if not they are I (0).

Table A3 – FEVD (monetarist ordering)

Period	NER	MB	CS	RES
1	99.42218	0.577818	0.000000	0.000000
2	91.67616	1.601189	6.426075	0.296579
3	88.07476	1.939246	9.290915	0.695078
4	85.51966	4.548065	9.180729	0.751549
5	80.90240	6.561943	8.808774	3.726880
6	78.32075	6.374353	9.745397	5.559504
7	78.46227	6.300361	9.598026	5.639345
8	77.52138	6.303161	9.716845	6.458614
9	77.39601	6.473210	9.692758	6.438018
10	76.11971	6.709406	9.912563	7.258322

Table A4 - FEVD (post-Keynesian ordering)

Period	NER	MB	CS	RES
1	3.203132	0.000000	0.656464	96.14040
2	3.784586	1.764451	7.760766	86.69020
3	3.928695	1.918961	10.83203	83.32032
4	3.951636	4.173909	10.87570	80.99875
5	7.041236	5.951372	10.44659	76.56081
6	8.487364	5.767119	11.23409	74.51143
7	8.350294	5.663488	11.01503	74.97118
8	9.132531	5.660596	11.10641	74.10046
9	9.144401	5.877120	11.08365	73.89482
10	9.948896	6.187438	11.21953	72.64414

Table A5 – Variance decomposition of the generalized IRFs

Period	NER1	CS1	MB1	RES1
1	0.51	0.00	0.00	0.49
2	0.48	0.04	0.01	0.47
3	0.47	0.06	0.01	0.46
4	0.47	0.06	0.02	0.45
5	0.46	0.06	0.04	0.44
6	0.46	0.07	0.04	0.44
7	0.46	0.06	0.04	0.44
8	0.46	0.06	0.04	0.44
9	0.45	0.06	0.04	0.44
10	0.45	0.07	0.04	0.44

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