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Dollarization: Beneficial or Not? A Study of Two Latin American Countries

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Acknowledgements

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Renzo Fagandini Ruiz

Abstract

This manuscript elaborates on the macroeconomic argument of dollarization. Why would a country even consider giving up its currency for a foreign one (i.e. the US dollar)? Could it really be a solution to its problems?

The last few years have been turbulent. Economically speaking many currencies have lost their purchasing power and people's perceived quality of life seems to have decreased, causing a rising social discontent. Inflation has been at its highest since the 1980 crisis and it seems as if there was no way out but to cope with it. Indeed, it may be the only way, but could have the dollarization adoption and therefore reliance on the central bank from another country improved the economic performance and, in some cases, avoid a free fall for some states? The recent widespread inflation has its origin in diverse phenomena, among them sustained monetary expansion and supply shocks. However, for some countries, this problem is rooted in their institutions, which do not apply possible solutions such as fiscal and monetary tightening. The need to recover credibility and to stop erratic policies may find its place in the dollarization implementation.

First, this study introduces a theoretical framework to model the macroeconomic environment. Subsequently the possible causes to renouncing the own currency are analyzed, to finally discuss the positive and negative consequences on the local economies. Each case has its own characteristics, hence drawing general conclusions can be misleading. However, this study intends to identify signals and features possessed by an economy, in which a measure like the above mentioned one would be most suitable.

In the initial stage a collection of data from the international monetary fund, world bank and different central banks is performed. Then a brief statistical analysis to describe the local economies is carried out. Late on, implementing difference-in-differences we analyze as our subjects of study the cases of countries

such as Ecuador, Panama, El Salvador.

After gathering some conclusions, it is also intended to understand whether the studied phenomenon can become a more recurrent one over time and to comprehend whether it is fit for cases as the Argentinian one.

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Introduction

The last few years have been turbulent. Economically speaking many currencies have lost their purchasing power and people's perceived quality of life seems to have decreased, causing a rising social discontent. Inflation has been at its highest since the 1980 crisis and it seems as if there were no ways to improve the scenario but to accept the instability. Indeed, it may be an option, although could have the dollarization adoption and therefore reliance on the central bank from another country improved the economic performance and, in some cases, avoid a free fall for some states?

As stated, dollarization is the process in which a country gives up its currency in exchange for dollars as their new national tender. During this paper we will employ for simplicity the term dollarization not only for the US currency but also for euroization and any form of replacing the national currency with the one of an anchor currency.

The recent widespread inflation has its origin in diverse phenomena, among them sustained monetary expansion and supply shocks. However, for some countries, this problem is rooted in their institutions, which do not apply possible solutions such as fiscal and monetary tightening. The need to recover credibility and to stop erratic policies may find its place in the dollarization implementation.

This paper investigates the effect of dollarization on a group of countries, analyzing macroeconomic data prior and post the foreign currency implementation. Concurrently the same analysis is run in a parallel and similar set of countries, which are characterized by similar macroeconomic data before the treatment. The aim is to complement the conclusion from the analysis on the first group of states.

During our analysis, we found a strong correlation between dollarization and a decrease in inflation, which significantly impacted the misery index, primarily driven by inflation rather than unemployment. However, we were unable to draw

similar conclusions for gross domestic product (GDP) and the current account balance, as our findings for these variables were not statistically significant.

In section 3 we discuss a general overview of the triggering context that potentially brings a country to give up its currency and how this is measured. The discussion mainly focuses on the drafted conclusions by authors on dollarization, including its benefits and drawbacks. Finally, this section finishes with the description of three different statistical models establishing their features and why we are selecting fixed effects one. In section 4 we describe the independent and dependent variables of our model, giving a brief explanation for each of them, and the time frame in which the study focuses on. The next section describes the collection of data, for that it is mentioned the different sources for the considered parameters, how each of them will be represented in this paper, how are they measured and the type of variable they represent.

Theory and literature review

Currency substitution or also known as dollarization/euroization is either a country-based decision to implement an external currency as the national one, and therefore its adoption as the legal tender for all transactions or in other cases it is just the use of a determined currency by the population. When the dollarization is decided by the authorities of a country, it is known as an official or full one. Whilst in many countries citizens may opt for it, being somehow forced by the economic environment they live in, by their own initiative, we define this type as a partial or unofficial one. In fact, for measuring the level of dollarization of an economy we can make use of two indicators as stated in Quispe-Agnoli (2002), the amount of foreign currency deposits in the money supply and the share of foreign currency deposits in total deposits. Ideally acknowledging the foreign currency deposits made abroad by the residents would provide a more complete set of information to apply a more accurate analysis, but it is hardly quantifiable.

Dollarization may not be the life's elixir for a country but it may help solve many of its problems when the situation seems irreversible, Bogeti (2000) analyzes whether a full dollarization can be successful or not. It can bring stability and low inflation rates, increase in trade with the other countries and specially the anchor one, and also economical growth among other benefits. We pursue to prove the meaningful effects of dollarization that can boost an economy and we begin so by analyzing what experts have first concluded.

Why to dollarize

At a macro level the context for considering applying dollarization is when the financial system of a domestic economy is facing a constant crisis, with high levels of inflation, very low credibility of its institutions, therefore a high risk for getting external sources of finance, low foreign investment, unstable foreign exchange rates

and an outflow of capitals among others. To recover some stability and to converge the rates towards the one of a state that enjoys more prestige and credibility, the government may decide to start a dollarization in the domestic economy, establishing a foreign tender as the official one for all transactions, removing or weakening the central bank and accepting the monetary policies from the anchor country too. In other cases, when the government does not have the initiative to give up the own currency and adopt a foreign one, the residents could really attempt to protect their buying power and assets from the high inflation levels, since the cost of holding the domestic currency becomes too expensive, using a stable foreign currency (e.g. US dollar or euro).

Dollarization is part of the solution especially for a developing country, as studied for emerging economies in Latin American by Rennhack and Nozaki (2006), Antinolfi and Keister (2001), Neanidis and Savva (2009) and Jameson (2003), which also as Guliyeva A. (2018) suggests, it depends on developed countries, to get back on track with its finances. It does provide a series of benefits (explained in the next paragraphs), helping the country to cure its rooted problems in the main financial institutions. By delegating monetary policies to a country with a better reputation, macroeconomic rates are expected to converge to similar values than the anchor's country one. The adoption of a strong and stable foreign currency sets the foundations for economic growth, increasing international trade and opening doors to external funding that before would not be able to access to.

One of the main benefits of giving up one's currency for the one of an anchor country is the major increase in the trade with the latter one, and the ones already present in the economic area of the intended currency. In fact, there is econometric evidence signaling that the trade between two countries sharing the same currency trade substantially more than similar countries with different currencies, as stated in Rose (2002). This occurs due to the elimination or at least decrease of transaction

costs, and also avoiding unstable exchange rates as stated in Grauwe (2000) and Fischer (1982). The aggregated trade found by Rose (2002) between a country that has given up its currency and the anchor one amounted to double with respect to the trade between a non-dollarized economy and the same issuer country. That translates into a higher volume in trade, although some years later the same author published new research stating that "We conclude that it is currently beyond our ability to estimate the effect of currency unions on aggregate trade with much confidence." Analogously, Klein (2002) mentions that there is not much evidence to support that dollarization promotes the trade between the anchor country and non-industrial dollarized economies. Furthermore, Razmi (2018) on his euroization research of Montenegro claims that the local economy is weakly synchronized with the EU one. Moreover, following the same case, he also claims that "there is little evidence that euroization has resulted in greater integration of the economy with the Eurozone. Indeed, if anything, Montenegro has become less integrated by some measures". Another cause for opting for another country's tender is the one of credibility, introduced in Barro and Gordon (1983). That is, when the domestic institutions have repeatedly failed in their purposes of keeping a low inflation rate. Credibility is therefore reinstalled in big part by implementing the foreign tender as the official one and accepting the monetary policies of the anchor country, which is characterized by a low inflation and pertinent decisions, granting the issuer country a great reputation. The economic parameters will tend to converge to the ones of the issuer.

Recovering credibility, having a stable currency, a controlled inflation and equilibrium in economic terms set the ingredients to foster economic growth. Berg and Borensztein (2000) and Hausmann (1999) indeed claim that dollarizing the economy signals an irreversible structural change, fueling a sound fiscal system, accompanied by fiscal compromise, transparency leading to low inflation.

A country in the scenario we are discussing is probably facing a crisis, therefore its institutions are weak and not fulfilling their purposes. Evidence that dollarization brings fiscal discipline can be found in Eichengreen (2002) and Fischer (1982), in the sense of not allowing the state to merely printing money to finance fiscal deficit, as the monetary policies will only be decided by the federal reserve in the case of dollars, or European central bank in the one of euros. Actually, some authors as Cachanosky et al. (2023) propose the elimination of the central bank and banking liberalization in order to have an institutional shock that could be taken advantage of, implementing the necessary reforms.

Another reason to replace the tender is that Euroization/Dollarization leads to a lower risk premia, and that has been the case of El Salvador and Panama as mentioned by Lnnberg et al. (2010), because the domestic currency cannot devalue anymore by having adopted the anchor's country one, as mentioned in Berg and Borensztein (2000). It therefore increases the chances of the country accessing foreign funding, and at a lower price than before. The risk is not completely ruled out since a possibility of de-Dollarization always exists, but as stated by Eduardo Levy Yeyati (2021) this process requires strong decisions and support in his study: "All these interrelationships, and several others mentioned in this study, converge on a general recommendation: de-dollarization implies a contemporaneous political and fiscal cost that demands political support. To be successful, financial de-dollarization must be embraced as a state policy". Although, following what Ocampo (2023) concludes, in practice the obtained economic growth and lower inflation act as two variables that reinforce the medium and long term probability of no reversal. In fact, he proposes that in the case of Argentina, Dollarization among the possible options is the most realistic one proposing stability of prices and economic growth.

Why not to dollarize

Some researchers have conducted analysis on currency substitution, also obtaining negative outcomes, for instance Duffy et al. (2006) mentioned the "traps" of Dollarization. Although, do these ones account for more than the possible benefits? And hence are they a deterrent to not apply euroization/dollarization at all? Some authors as Cachanosky et al. (2023) even affirm that a central bank ran by competent authorities could actually perform better than the achieved benefits of dollarization in the abstract. The problem seems to be again that considering the pessimistic scenario, the country is clearly under mismanagement suffering economic consequences that cannot be traditionally healed. In fact, Ocampo (2023) remarks that in the case of Argentina, given the populism and wrong policies, the country has been pushed to a sub optimal situation, where Dollarization appears as the best of the remaining options on the table, despite the costs it entails. On the other hand, authors as Duncan (2003) were not able to conclude the Dollarization reduces the country risk. Although currency substitution entails negative effects, according to Galindo (2005), the authorities are not taking decisions to stop it, at least in Latin America: "although the authorities in the region have become increasingly aware that high dollarization carries considerable risks and can exacerbate a typical Latin American economys vulnerability to adverse shocks (e.g. sudden stops), there are no current direct policy initiatives to reduce the level of dollarization.)".

A dollarized economy loses the capability of applying monetary policies, being ruled by the federal reserve or central bank from the issuer country. In other words, it loses the available mechanisms for adjusting the economy in the context of asymmetric shocks, and correcting the market equilibrium when the domestic business cycle unsynchronized with the issuing one, as Winkler et al. (2004) claims. The banking may resent currency substitution as treated by Nicol et al. (2005) and Gale and Vives (2002) and it could bring along more consequences, as studied in

Schmitt-Grohe and Uribe (2001).Vieira et al. (2012) brings new empirical evidence on systematic risks that could appear given the currency substitutions. Calvo (2000) affirms that the loss of monetary policy is not significant since its current scope is quite limited. He also mentions that the wrong use of monetary policies by the central bank has contributed to bringing the local economy into a crisis. The mistaken policies and at a given point their loss of power therefore just fuels the decision to dollarize the country. On the other hand Razmi (2018) on his study, reflects that Montenegro suffers from a weak market synchronization with the European union in despite of its euroization, and moreover, given the absence of monetary policies or exchange rate-based stabilization mechanisms, the currency union costs raised.

When a country does not issue a currency anymore the local authorities lose the ability to aid banks that have run out of deposits by injecting liquidity to prevent a default on deposits, Berg and Borensztein (2000) state. Although Calvo (2000) does not completely agree, he proposes that this can be outweighed by a deeper banking integration between domestic and foreign banks as in the case of Panama. Also, the use of external credit lines mitigates the possibility of default and serves as an emergency fund.

Considered as the most direct cost from Dollarization, the country loses seigniorage, in other words the margin between the price of currency production and nominal one. Another indirect cost stated by Berg and Borensztein (2000) is that the initial acquisition of foreign currency to replace the local one can be too expensive, in fact, maybe the funds are not enough to buy its own currency (a good practice would be to devalue the local currency before adopting the foreign one). At the same time, Berg and Borensztein (2000) conclude for countries which possess a high percentage of dollars in the local economy that "For this group, the more the U.S. dollar is already used in their domestic goods and financial markets,

the smaller the advantage of keeping a national currency. For an economy that is already extremely dollarized, seigniorage revenues would be small (and the cost of purchasing the remaining stock of domestic currency also would be small)."

In summary, Dollarization seems to have some well acknowledged positive effects such as the decrease in inflation and transaction costs, as studied by Guidotti and Rodriguez (1992), and a sustained gain of credibility, sometimes also providing lower costs for foreign funding. Other benefits appear to be ambiguous and there are divided results in the research, it is not clear that trade would increase with the anchor country and there is even evidence that the markets between the anchor country and the one giving up its currency becomes less synchronized. The same story occurs on the negative side, where it is a fact that the impacted country loses its macroeconomics policies, and therefore a tool to respond to economic shocks, replacing them with the ones of the anchor country. Other authors have concluded that the same kind of policies are responsible for the mediocre economic situation the country is in. Not being able to issue currency can also rule out an important mechanism to save the financial system from breakdowns, but at the same time alternative proposals have been put over the table, such as a sounder financial integration with the currency area. And maybe the biggest cost is the loss of seigniorage, that can be mitigated by negotiating with the issuer country to divide the income. E. L. Yeyati (2006) for instance, claims that "Ultimately, the economic implications of financial Dollarization appear to justify the effort. ". Although generally, there are multiple divided conclusions, and no absolute conclusions can be drafted without any deeper analysis, which we will describe better in the following paragraphs.

Research and methodology

Quantitative research will be adopted, allowing us to execute a series of statistical methods to determine the real visible impacts of dollarization on a sample of elements. Two types of countries will be chosen after collecting and observing macroeconomic data. The first category will contain the ones which gave up their currency for a foreign one (treatment group) and the second group will contain countries with non-dollarized economies. The analysis pretends to capture the previous period to dollarization and the subsequent one following a difference in differences method, therefore allowing us to highlight even more the effects of this measure in the considered variables. More specifically, we will be implementing a fixed model effects for data panel. Since we are treating countries and each of them possesses their own inherent characteristics such as population, culture, habits, etc, which can influence our results, it is better to represent them for each of them with their own variable. Another reason why we are picking this methodology and not for instance dynamic models is simply because it is easier to implement given our available resources.

Our main independent variable will be a dummy variable representing the dollarization implementation, while we will have five dependent ones, the misery index (composed by inflation and unemployment rates), current account balance and the GDP. The first one is an economic indicator introduced in the 70s by Arthur Okun.

Misery index is composed of the sum of the seasonal unemployment adjusted rate and the annual inflation rate; its purpose is to measure how the average citizen is economically doing. A higher value of this index represents a higher social cost for the country. As we know, even if we separate the two components, we can understand that a high unemployment by itself does not imply positive effects for the economy as there is a smaller production for what there could be, less

consumption and an aggregated production of goods, because of not fully exploiting the available human resources. While higher inflation means higher prices that make it less affordable to ordinary people and therefore it can end up implying less consumption and a freeze effect of the economy, jeopardizing the effects of monetary policies. We would expect a reduction in inflation after dollarization has become effective, since as previously mentioned it should converge towards the inflation rates of the anchor country.

Current account balance is part of the balance of payments (BoP) of a country which represents the transactions it carries with the rest of the world. The current balance account mirrors the economical activity of the state, being positive when there is an inflow of money and negative when there is an outflow. By sharying the same currency and having lower transaction costs we expect this variable to have an increase, given the more transactions with foreign countries, and especially the anchor one.

The increase of an economy is an important element to analyze when including the treatment of currency substitution to a country. We understand that the better conditions of an economy (and improved by dollarization) should foster growth and this one is represented by the gross domestic product.

We are choosing these dependent variables since we believe they can better give us a snapshot of the economic panorama of a country allowing us to draft some conclusions, they are easy to compute and moreover they should also be more affected by currency replacement than other variables.

Hence the objective is, to analyze and estimate whether dollarization has brought positive impacts and how much does it account for the above-mentioned variables. Does it render countries which have been dollarized better positioned with respect to the non-dollarized ones? Our mission then is to study in a timeframe of 10 years pre-dollarization and 10 post-dollarization how these variables evolved and whether

they were influenced, and how much by the currency substitution.

Models to study the data

For pursuing results on the demonstration whether dollarization may be an apt and beneficial measure we had to chose from many methodologies on disposal, such as a fixed effects model, dynamic effects model, or the Arellano-Bond variant. All of these could be applied to the data panel we will obtain from the data collection process, and it will be formed by a group of countries to be studied on a time series.

The dynamic effects model allows us to establish a regression model including lagged values of the dependent variable or independent ones as regressors. This allows us to have a better understanding of how past values or trends can affect the estimation of the variable. Nickell (1981) discovered and demonstrated a potential bias that can arise when using lagged values of dependent variables in dynamic models, affecting the ordinary least square estimator making it also inconsistent. This bias is the product of a correlation between the lagged dependent variables and the individual-specific effects, and it violates the assumption of exogeneity, or in other words, the non-correlation between regressors and the always present error term. In simple words, this occurs because the dependent variable is already affected or explained in a significant part by the mere characteristics of the individual/subject, which not being represented by a variable itself is contained in the error. Later, when including a lagged dependent variable on our regression, we can observe, therefore, a correlation between the latter and the error term. To avoid the Nickell bias, we will therefore (as stated in the beginning of the section) use the fixed effects model for data panel. An additional limitation we could face apart from the computational complexity, is that when adding more and more lagged dependent variables we may have a phenomenon of "missing data", because we end up with less observations to build our model and make the estimations.

Consequently, the analysis is less robust and uncertain.

To overcome the Nickell Bias, Arellano and Bond (1991) proposed a dynamic model making emphasis on the marginal changes in the value of the dependent variables. To estimate the value at time "n" we only include the lagged value of the dependent variable at time "n-1". This allows us to do the first difference, subtracting the lagged value to the target one, and basically eliminating the variables representing the individual-specific effects, avoiding the bias.

Finally, the fixed effects model (unlike the previous ones) adds for all the individuals a specific variable that will contain the inherent characteristics that do affect the estimated variable. This variable captures the heterogeneity of the individuals in terms of the dependent variable. This model is often used since the models are not able to capture the heterogeneity of the individuals. It is also preferred because making an accurate estimation might require many independent variables which derives in higher expenses. And even if the variables were used to attempt the explanation, how would one understand which one drives the main source of heterogeneity? it can become in a quite complex dilemma.

Data collection

As previously mentioned, the study will focus on a group of around the twenty countries Ecuador, El Salvador, Argentina, Jamaica, Haiti, Chile, Guatemala, Cambodia, Dominican Republic, Nicaragua, Mexico, Albania, Tunisia, Costa Rica, Paraguay, Panama, Bolivia, Kenya, Colombia, and Venezuela. As you can observe most of them are from Latin America but also from southeast Asia, Africa, and the Balkans in Europe. To be able to obtain the first insights we first determined the involved variables; inflation, unemployment, GDP, Dollarization, and current account balance. The first two will compose the misery index which serves us to determine from one side the people's situation of the country. GDP mirrors the overall economic size of a country, and some would argue how this one correlated to the other variables, especially to unemployment. A group of people would think that the lower the unemployment, the larger the GDP is, reaching a maximum quantity of production of goods when the jobless looking to work marginally converges to 0. Others instead, and including our point of view, claim that this is not necessarily true. Could it mean that using all the resources, and in this case the manpower, translates into a waste of labor force? In other words, not everything on disposal needs to be always utilized. Let us remember that the market regulates itself between the labor supply and the offered wages by the companies.

Figure 1: Contries included in the study

Under this paragraph you may notice a summary table for each of the variables or indexes used, their measurement, how are going to be represented on this text, their variable type if any and the source of where we obtained them. As for inflation and GDP the International Monetary Fund provides a complete data set for every country to be studied. It is not the case of unemployment rate, where we had to complement the data set with the provided in the platform "Macrotrends" for the countries Haiti, Guatemala, Cambodia, Dominican Republic, Bolivia, Kenya, and Venezuela. As you may notice, the GDP, misery index are dependent variables, whilst dollarization, our independent and dummy variable will be equal to 1 to indicate whether the country is dollarized and 0 otherwise.

Table 1: Description of Variables

Variable	Unit of measure	Symbol	Type	Source
Inflation	%	μ	Dependent	IMF
Unemployment	%	π	Dependent	IMF & Macrotrends
Misery index	Integer	MI	Dependent	IMF & Macrotrends
GDP	Billion of $	GDP	Dependent	IMF
Dollarization	Binary	D	Independent	IMF & literature review
Current account balance	Billion of $	CAB	Dependent	IMF

Some readers might wonder why the existence of many dependent variables and only one independent one. Well, our only purpose is to understand how the treatment variable, and that is dollarization, affects each single dependent variable, more specifically CAB, GDP and MI. The later is conformed by inflation and unemployment rates, which will serve us to comprehend their level of contribution into the misery index.

Subscripts of regression equations

Before introducing the data analysis the reader should be aware that for every variable above-explained we are running regressions to understand the impact of dollarization on them. In each regression, as in the following one, one can find subscripts, which in the case of i refers to the country while t to the time variable, in this case the year. Instead, ϵ will represent the error for that country at the time t. The f symbolizes that we are taking the variable forwarded of 1 year.

$$\text{Misery index}_{i,t}^{f} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{1}$$

Data analysis

Misery index - Regression

Our first model will include a regression where the dependent variable is going to be explained by the treatment variable and the inherent characteristics of the country. The first regression will have the MI as the explained variable. An interesting observation is that we will consider the MI of the next period by forwarding it. Because it is highly likely that the effects of the treatment are going to be experienced in the future.

$$\text{Misery index}_{i,t}^{f} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{2}$$

Table 2: Regression output with 1 year forwarded MI

Misery index$_f$	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	-21.275	6.785841	-3.14	0.002	(-34.61761,-7.932387)

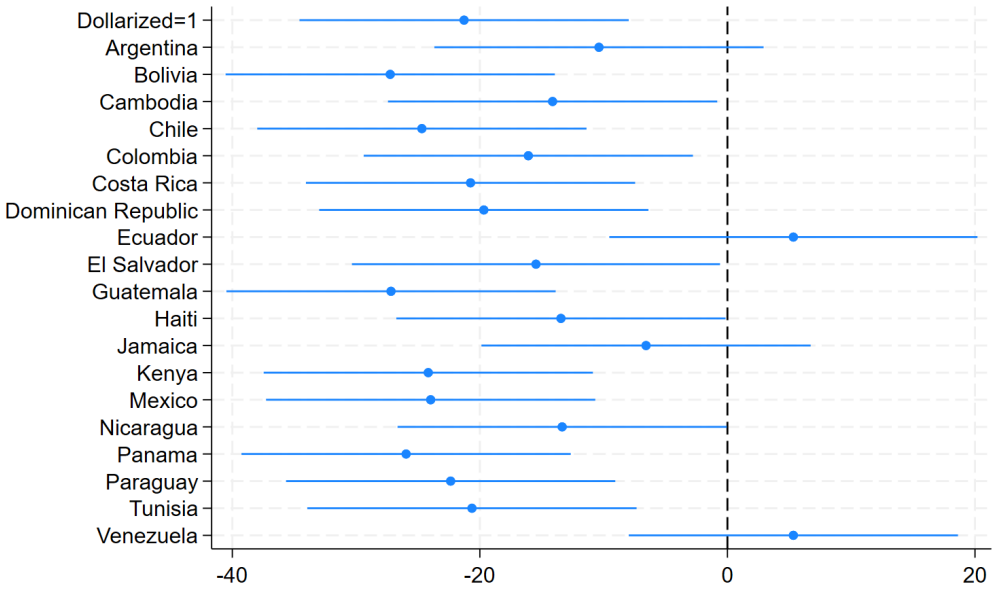

Figure 2: Estimates of coefficients along with confidence intervals for MI forwarded

note: "dollarized" identifies the coefficient of interest. Country coefficients represent the country fixed effects

As we can observe, the regression analysis shows that dollarization is associated with a reduction of 21.275 points in the misery index. With a p-value of 0.002, the result is statistically significant, suggesting that the observed effect is unlikely to have occurred by random chance. Furthermore, the confidence interval for the coefficient of dollarization (-34.61761 to -7.932387) does not include zero. This implies that, at a 5% significance level (alpha), we can reject the null hypothesis that the effect of dollarization on the misery index is zero. In other words, there is evidence to suggest that dollarization has a non-zero effect on the estimated variable.

$$\text{Misery index}_{i,t} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{3}$$

Table 3: Regression output for MI (not lagged nor forwarded)

Misery index	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	-16.34636	57.29987	-0.29	0.776	(-128.9937,96.30101)

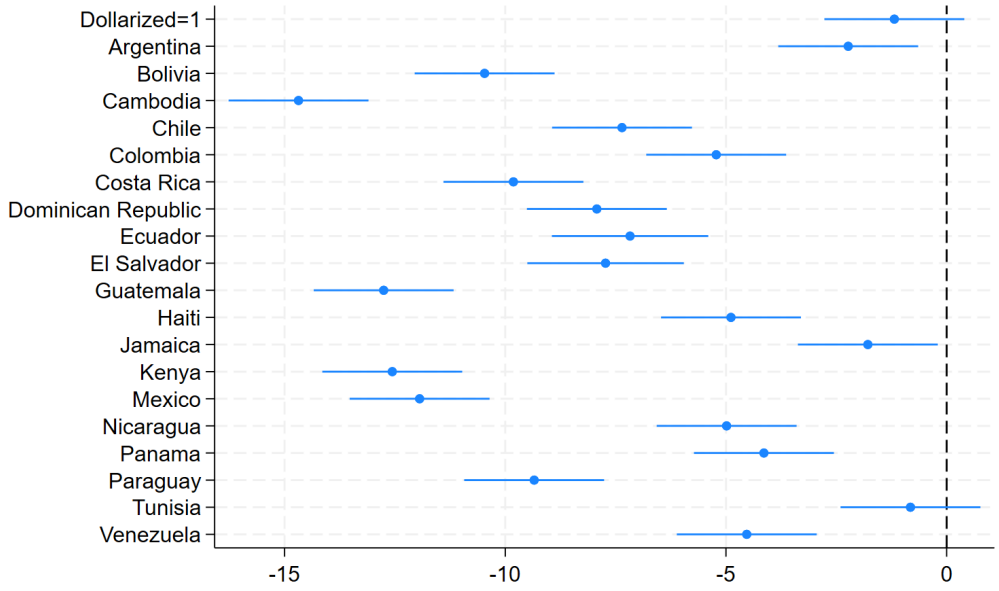

Figure 3: Estimates of coefficients along with confidence intervals for MI

note: "dollarized" identifies the coefficient of interest. Country coefficients represent the country fixed effects

Upon executing the regression for the MI of the same year, the results imply a possible zero effect of dollarization on the dependent variable.

When considering the forwarded MI regression and breaking down the MI into its components (unemployment and inflation) to better understand their weights, we find that unemployment does not significantly get influenced by the treatment, at least statistically. The p-value is 0.144, and the interval slightly contains zero.

$$\text{Unemployment}^{f}_{i,t} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{4}$$

Table 4: Regression output with 1 year forwarded unemployment

μ_f	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	-1.185	.8086272	-1.47	0.144	(-2.774958,.4049576)

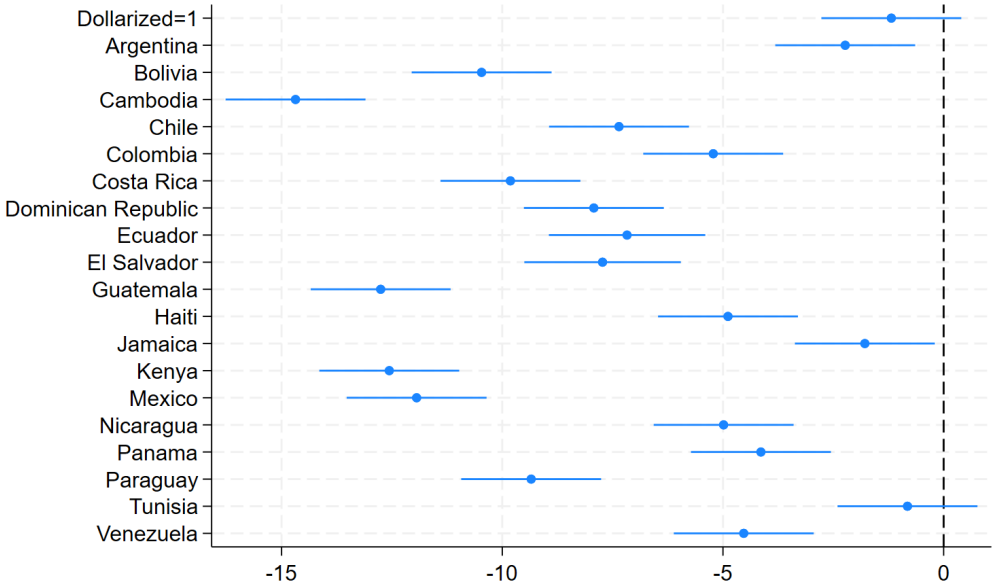

Figure 4: Estimates of coefficients along with confidence intervals for Unemployment forwarded

note: "dollarized" identifies the coefficient of interest. Country coefficients represent the country fixed effects

Regarding inflation, we find a major influence on its value under a dollarized regime, with a decrease of nearly 20 points. The p-value is equal to 0.003, and

the interval does not contain zero, suggesting that the effect from the treatment is unlikely due to random chance.

$$\text{Inflation}_{i,t}^{f} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{5}$$

Table 5: Regression output for the inflation

π_f	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	-20.09	6.692427	-3.00	0.003	(-33.24894,-6.931063)

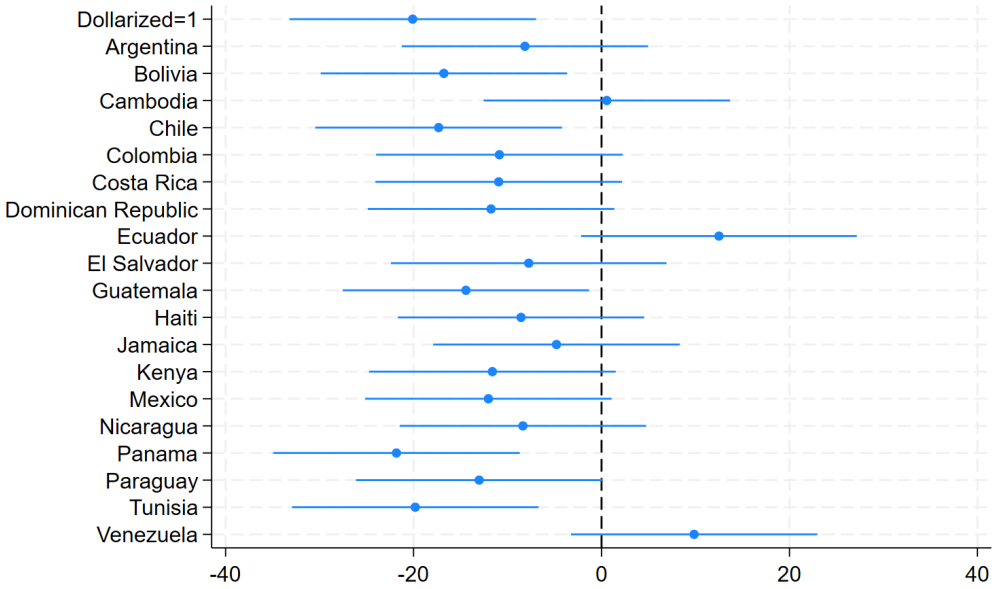

Figure 5: Estimates of coefficients along with confidence intervals for inflation forwarded

note: "dollarized" identifies the coefficient of interest. Country coefficients represent the country fixed effects

Misery index - Difference in differences

The findings from the Difference-in-Differences (DiD) analysis, presented in Table 6, suggest a potential decrease in the misery index (μ) associated with Dollarization, with a negative coefficient of -1.165425. However, this effect does not reach statistical significance at conventional levels (p-value higher than 0.1). Moreover, the wide 95% confidence interval for the coefficient (-15.50919 to 13.17834) indicates considerable uncertainty surrounding the estimated effect of Dollarization on the misery index.

$$\text{Misery index}_{i,t} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{6}$$

Table 6: DiD output for MI

μ_f	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	-1.165425	6.827366	-0.17	0.866	(-15.50919,13.17834)

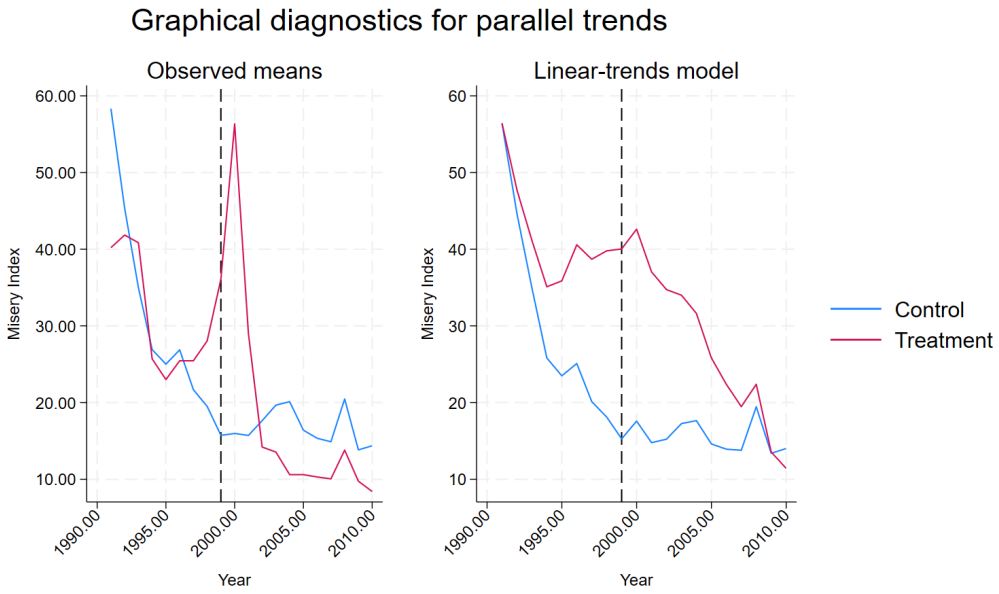

Figure 6: Difference in differences - Misery index

Current balance account

When examining the current account balance, the regression analysis indicates that dollarization is not statistically significant. The coefficient for dollarization is 0.15835, with a standard error of 1.243386, resulting in a t-value of 0.13 and a p-value of 0.899. This suggests that the observed effect of dollarization on the current account balance is likely to have occurred by random chance, as the p-value is far from significant.

$$\text{CBA}_{i,t}^{f} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{7}$$

Table 7: Regression output with 1 year forwarded CBA.

CBA	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	.15835	1.243386	0.13	0.899	(-2.286056,2.602756)

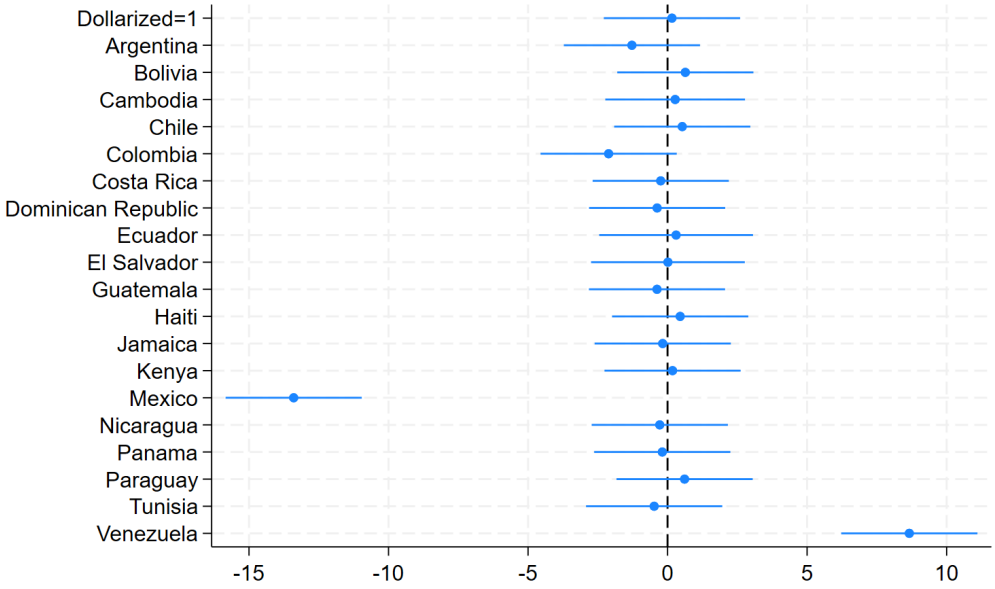

Figure 7: Estimates of coefficients along with confidence intervals for CBA

note: "dollarized" identifies the coefficient of interest. Country coefficients represent the country fixed effects

Upon considering the possibility of delayed effects, a forwarded regression analysis yields similar results. The coefficient for dollarization remains negligible at 0.0453, with a p-value of 0.972 and a confidence interval spanning from -2.508127 to 2.598727, containing the zero value. Therefore, we cannot confidently assert that dollarization influences the current account balance in our dataset.

$$\text{CBA}_{i,t}^{f} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{8}$$

Table 8: DiD output with 1 year forwarded CBA.

CBA_f	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	.0453	1.298633	0.03	0.972	(-2.508127,2.598727)

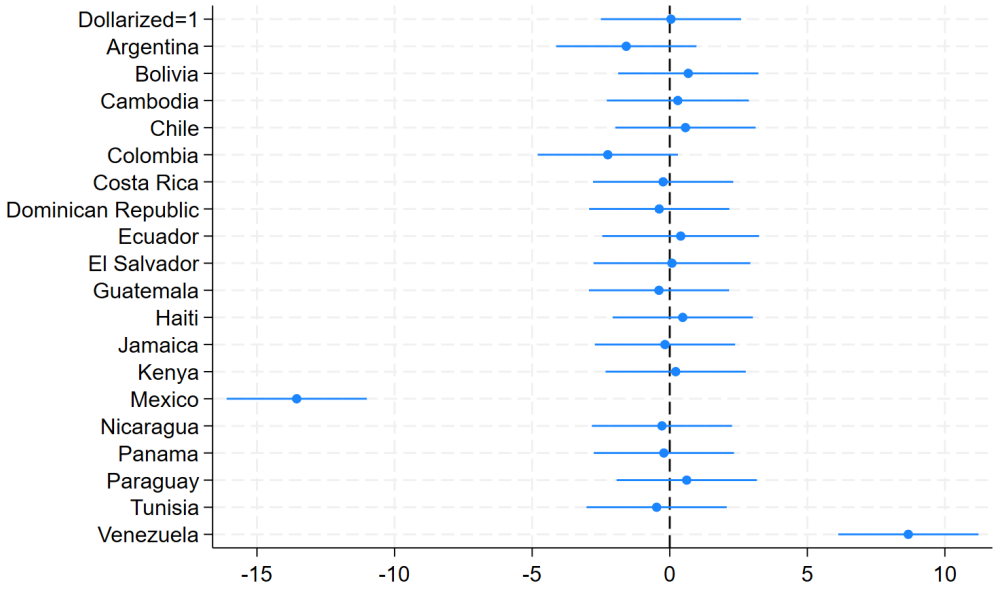

Figure 8: Estimates of coefficients along with confidence intervals for CBA forwarded

note: "dollarized" identifies the coefficient of interest. Country coefficients represent the country fixed effects

Current balance account - Difference in differences

The results from the Difference-in-Differences (DiD) analysis, presented in Table 9, suggest that the coefficient for Dollarization (-1.743686) is negative, indicating a potential decrease in the outcome variable CBA associated with the treatment. However, the coefficient is not statistically significant at conventional levels (p-value

of 0.188), suggesting that the observed effect may be due to random chance. The 95% confidence interval for the coefficient (-4.422981 to .9356093) further supports this interpretation, as it includes zero, indicating that the effect of Dollarization on CBA is uncertain.

$$\text{CBA}_{i,t} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{9}$$

Table 9: DiD output for CBA.

CBA	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	-1.743686	1.275295	-1.37	0.188	(-4.422981,.9356093)

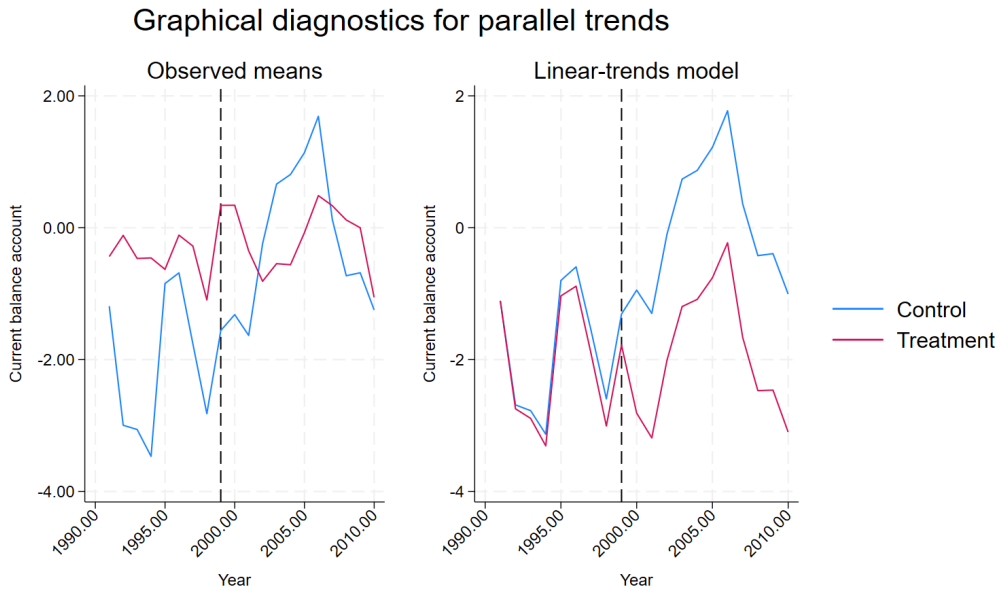

Figure 9: Difference in differences - Current balance account

Gross domestic product

Regarding the gross domestic product, our analysis suggests that dollarization does not have a statistically significant influence on GDP within our dataset. The coefficient for dollarization is 14.93977, with a standard error of 20.89898, resulting in a t-value of 0.71 and a p-value of 0.475. The confidence interval, ranging from -26.14611 to 56.02565, encompasses the zero value, indicating the possibility that the effect of dollarization on GDP is zero.

$$\text{GDP}_{i,t}^{f} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{10}$$

Table 10: Regression output for the GDP.

GDP	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	14.93977	20.89898	0.71	0.475	(-26.14611,56.02565)

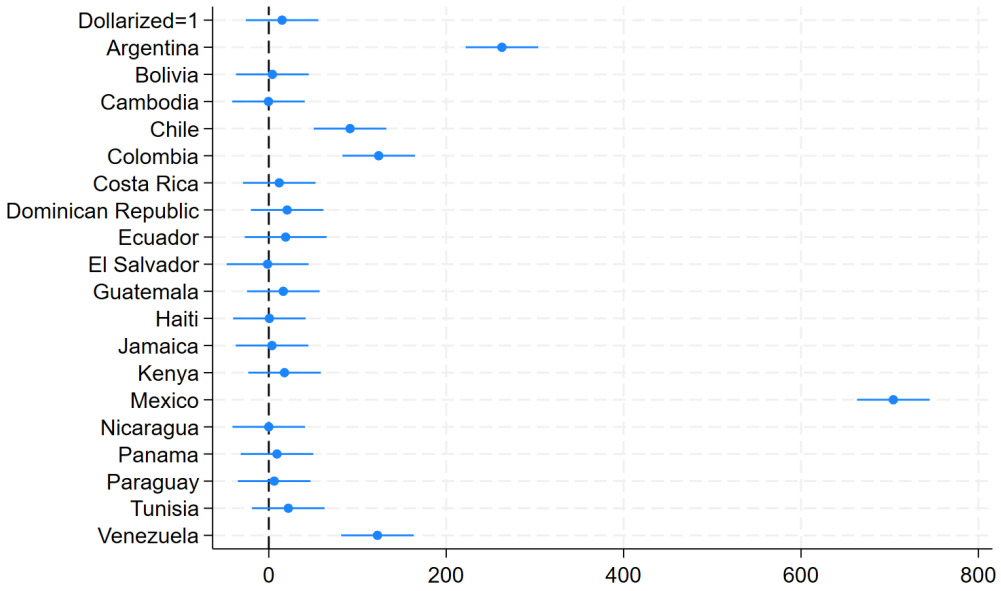

Figure 10: Estimates of coefficients along with confidence intervals for GDP

note: "dollarized" identifies the coefficient of interest. Country coefficients represent the country fixed effects

Similarly, when examining the potential future impact of dollarization on GDP through a forwarded regression, the results remain consistent. The coefficient for dollarization remains non-significant at 15.68645, with a p-value of 0.449 and a confidence interval spanning from -25.03088 to 56.40378.

$$\text{GDP}_{i,t}^{f} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{11}$$

Table 11: Regression output with 1 year forwarded GDP.

GDP_f	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	15.68645	20.70819	0.76	0.449	(-25.03088,56.40378)

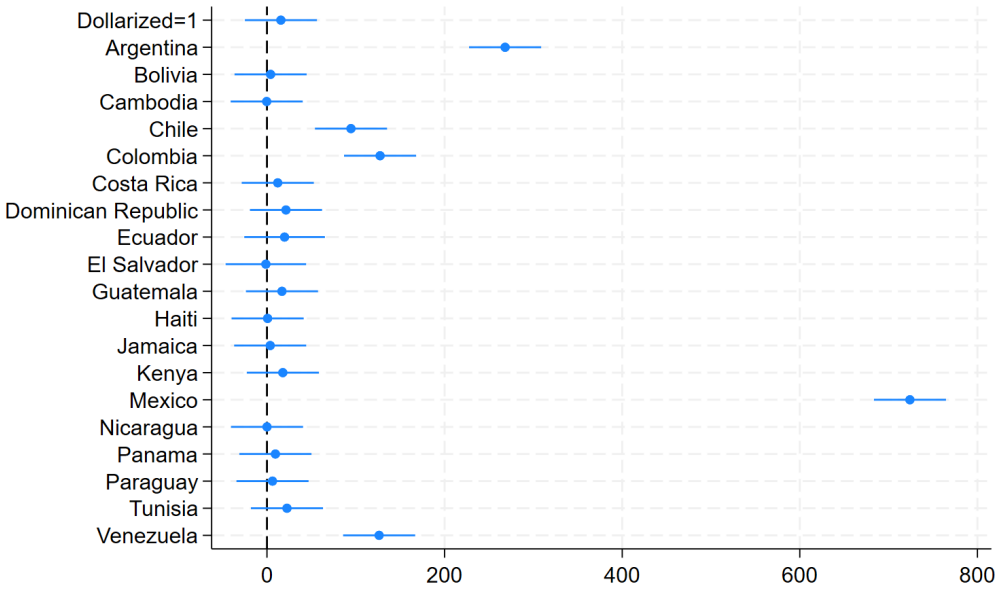

Figure 11: Estimates of coefficients along with confidence intervals for GDP forwarded

note: "dollarized" identifies the coefficient of interest. Country coefficients represent the country fixed effects

Gross domestic product - Difference in differences

The findings from the Difference-in-Differences (DiD) analysis, depicted in Table 11, suggest a potential link between Gross Domestic Product (GDP_f) and Dollarization, with a coefficient estimate of -29.85498. However, this relationship fails to reach statistical significance at conventional thresholds (p-value = 0.282). Furthermore, the broad 95% confidence interval for the coefficient (-86.36011 to 26.65016) indicates considerable uncertainty surrounding the influence of Dollarization on GDP.

$$\text{GDP}^{f}_{i,t} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{12}$$

Table 12: DiD output for GDP

GDP	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	-29.85498	26.8954	-1.11	0.282	(-86.36011, 26.65016)

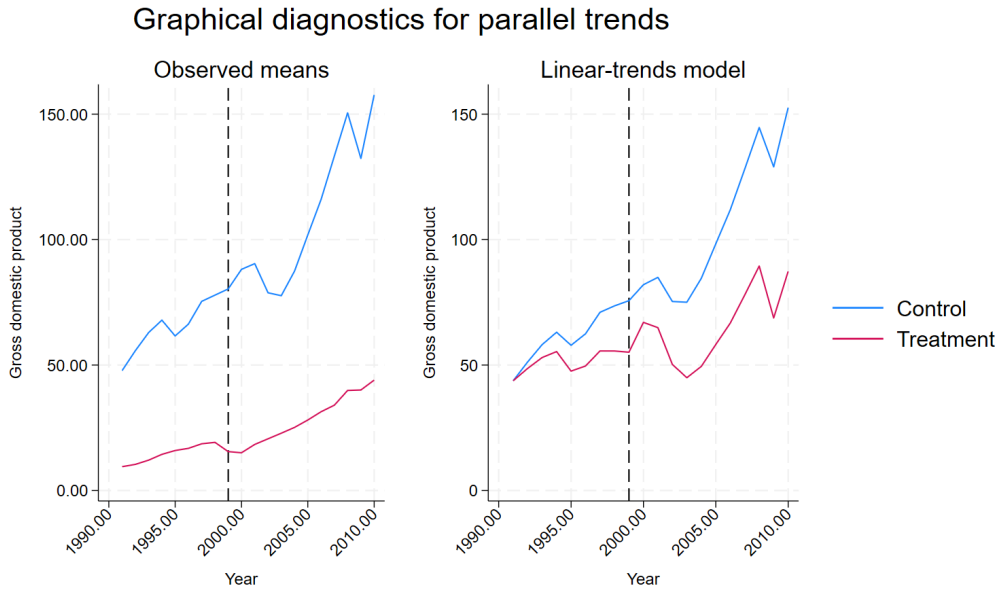

Figure 12: Difference in differences - Gross domestic product

The Difference-in-Differences (DiD) analysis corroborated our previous findings to some extent and highlighted the uncertainty and potential variability in the effects of dollarization. The negative coefficient observed for the forwarded MI in the DiD analysis was not statistically significant, suggesting that the reduction in economic distress could vary depending on other factors not captured in the model.

Additionally, our investigation into the current account balance (CBA) showed no significant influence of dollarization, neither in the immediate term nor in the forwarded regression analysis. This suggests that dollarization does not substantially alter a country's trade balance or its financial transactions with the rest of the

world.

Similarly, the impact of dollarization on Gross Domestic Product (GDP) was not statistically significant. Both the immediate and forwarded regression analyses indicated that the adoption of a foreign currency does not have a clear or direct effect on a country's economic output within our dataset.

In summary, while dollarization appears to significantly reduce future economic distress and inflation, its effects on unemployment, the current account balance, and GDP are less clear and statistically non-significant. These findings underscore the complexity of attributing economic improvements solely to dollarization without considering the broader economic context and other influencing factors. Further rigorous empirical analysis is necessary to draw more definitive conclusions about the causal impacts of dollarization on macroeconomic outcomes.

Robustness checks and placebo effects

Relatively low inflation, low unemployment, an increase in exports, or growth in gross domestic product (GDP) could potentially be influenced by a variety of factors other than dollarization. Determining causality with certainty is inherently complex, as numerous other economic, political, and social factors can simultaneously affect these macroeconomic variables. For instance, favorable global economic conditions, changes in trade policies, technological advancements, foreign direct investment, and domestic fiscal and monetary policies can all play significant roles in shaping these economic outcomes.

Moreover, structural reforms, improvements in governance, and increases in political stability can enhance economic performance independently of the adoption of a foreign currency. For example, a country that implements robust economic reforms to improve the business environment may experience increased investment and economic growth, which could coincide with the period of dollarization but not necessarily result from it. Similarly, changes in global commodity prices can impact export revenues and economic growth, especially for countries heavily reliant on specific exports.

The placebo effect in this context refers to the possibility that observed economic improvements might be wrongly attributed to dollarization when, in fact, they are the result of other concurrent positive developments. For example, if a country undertakes significant infrastructure projects or education reforms around the same time it adopts dollarization, the resulting economic benefits might be incorrectly ascribed to dollarization rather than these substantive changes.

Additionally, external economic shocks, such as fluctuations in international interest rates, changes in the terms of trade, or shifts in investor sentiment, can significantly influence domestic economic indicators. These factors add layers of complexity to isolating the impact of dollarization on key economic metrics. The

interplay of these various influences makes it challenging to establish a clear causal link between Dollarization and economic outcomes without extensive and rigorous empirical analysis.

Given this multifaceted nature of economic influences, attributing improvements such as lower inflation, reduced unemployment, increased exports, or GDP growth solely to Dollarization requires cautious interpretation. It necessitates considering the broader economic context and potential confounding variables that might drive these outcomes. Therefore, while Dollarization may contribute to certain macroeconomic benefits, it is essential to recognize and account for other underlying factors that could similarly impact these economic indicators. This nuanced understanding is crucial for forming accurate and reliable conclusions about the effects of Dollarization.

With our available resources we executed two placebo tests to evaluate the robustness of our analysis. The first test consisted only of a "shift" in the years of dollarization for Ecuador and El Salvador, specifically we determined 5 years prior could imply a larger variation in the output. The model still shares many of the timeframe with the above-ran one, and therefore we still do not expect such a big variation in the outcome. While in the more robust type of test, we manually dollarized some control countries as Jamaica, Albania and Argentina in random years, dollarization dates would be 2004, 2006 and 1995 respectively. The idea is to understand whether the model would still capture the effect of Dollarization correctly, when there are more treated countries. We then ran the same above-ran analysis for each of the variables which the reader can find in separated subsections.

The results of the tests were mainly similar to the ones aboved-obtained, and this implies that adding an extra variable with random attributed values did not support our findings. We expected to have only non significant results for the regressions, in order to claim that the effect was being captured by the variables

we had already implemented. However, in the case of delayed unemployment and inflation we did obtain statistically significant results, weakening the drafted conclusions after the first round of analysis.

Misery index - 5 years shift

A similar regression analysis was conducted to examine the relationship between Dollarization and the Misery Index (MI) one year forward (Misery index_f). The results show a statistically association. This indicates that, on average, a one-unit increase in Dollarization is associated with a decrease of 14.21 units in the Misery Index forwarded of 1 year. The confidence interval is from -29.7491 to 1.329096 and does contain the zero value, suggesting a less robust significance of the effect of Dollarization on MI. Compared to the normal regression, the coefficient in this placebo effect is less negative, the p-value is larger, being equal to 0.073 and the coefficient encompasses the zero. At the moment we could state that our initial result is capturing the effects correctly.

$$\text{Misery index}^{f}_{i,t} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{13}$$

Table 13: Regression output with 1 year forwarded MI

Misery index$_f$	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	-14.21	7.902938	-1.80	0.073	(-29.7491, 1.329096)

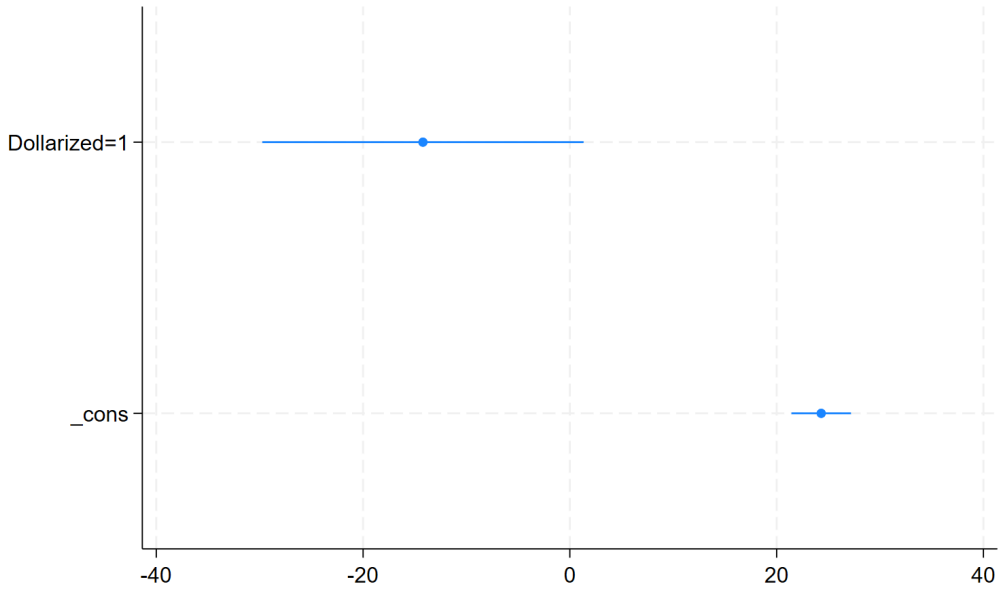

Figure 13: Estimates of coefficients along with confidence intervals for MI forwarded

After analysing the effect on MI we then move to understand how its components affect the index, we begin then with forwarded inflation (Inflation_f), the regression analysis reveals a lesser statistically significant negative relationship. In other words, for a dollarized economy, future inflation tends to decrease by an average of -13.66667 units. In this case, the confidence interval (-28.97879, 1.645455) which does contain zero does not allow us to fully confirm the null hypothesis. The p-value is 0.08 and is smaller than 0.10, the standard statistical level, but it is interesting to note that is larger than the 0.003 previously obtained, as well for the confidence intervals, which now result wider and containing the null value.

$$\text{Inflation}^{f}_{i,t} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{14}$$

Table 14: Regression output for the inflation

π_f	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	-13.66667	7.787502	-1.75	0.08	(-28.97879,1.645455)

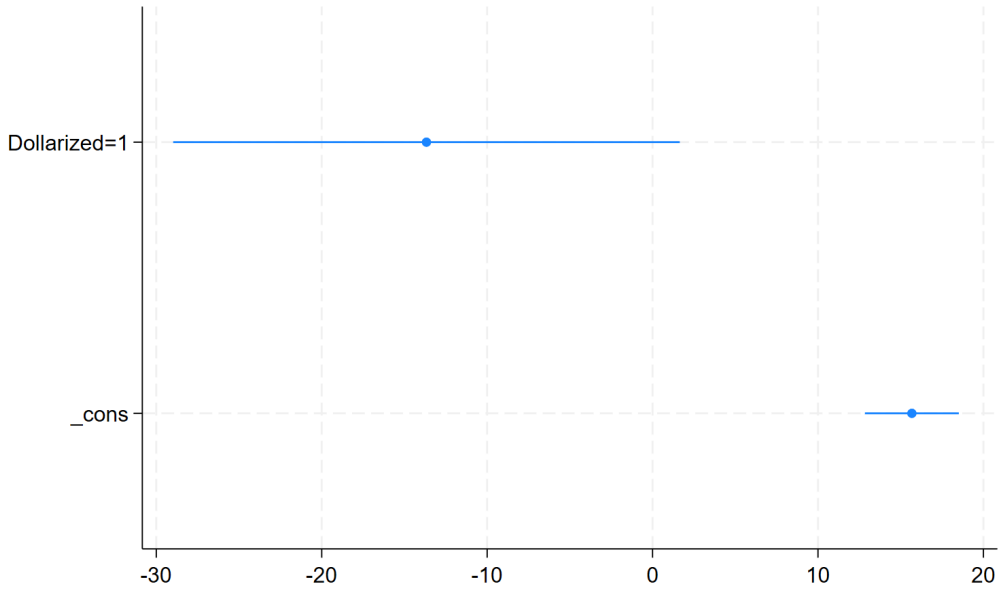

Figure 14: Estimates of coefficients along with confidence intervals for inflation forwarded

Investigating instead the influence of Dollarization on future unemployment, the other component of Misery index, the regression analysis yielded a result that is not statistically significant since the p-value is 0.564, larger than the 0.10 accepted value. It is also important to underline that 0.564 is almost four times 0.144, the previous obtained p-value for Unemployment. This suggests that a dollarized domestic economy is not necessarily be associated with a definitive change in unemployment one year later, on average. The coefficient for Dollarization is .5433333 with a standard error of .9359479. The confidence interval (-2.383634,

1.296968) at a 95% level reflects the uncertainty surrounding this relationship. While a slight positive association is present, it is not statistically strong enough to draw conclusive evidence from this model.

$$\text{Unemployment}_{i,t}^{f} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{15}$$

Table 15: Regression output with 1 year forwarded unemployment

μ_f	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	.5433333	.9359479	-0.58	0.562	(-2.383634, 1.296968)

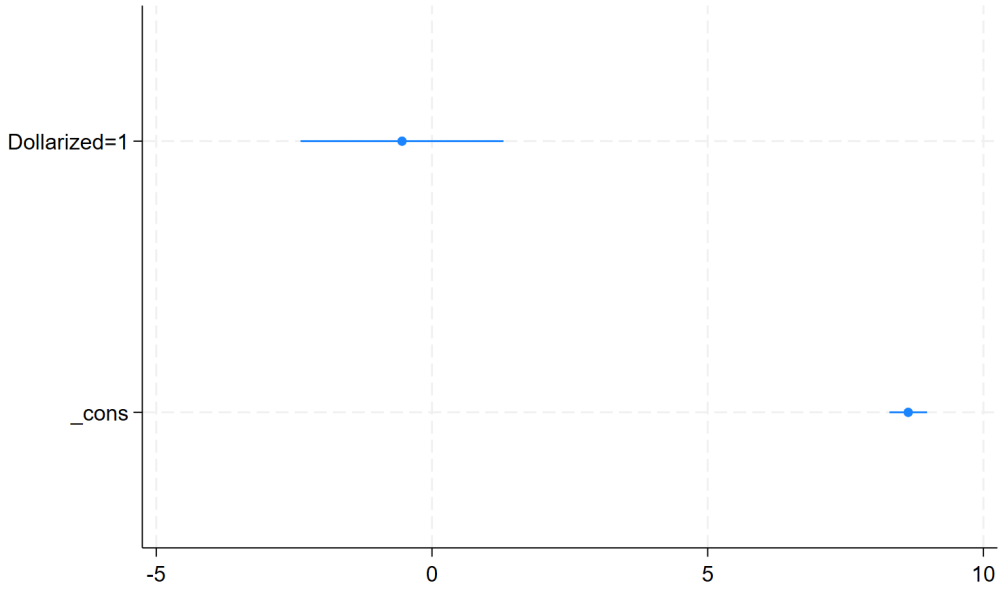

Figure 15: Estimates of coefficients along with confidence intervals for Unemployment forwarded

Misery index - Treated countries

The results shown in 16 show a statistically significant negative association. This means, on average, that a one-unit increase in Dollarization is related to a variation of -24.4065 units in the future MI. The confidence interval is from -37.1435 to -13.92621 and does not include the statistical zero, this means a more robust negative effect of Dollarization on future Misery Index levels.

$$\text{Misery index}_{i,t}^{f} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{16}$$

Table 16: Regression output with 1 year forwarded MI

Misery index$_f$	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	-24.4065	6.475523	-3.77	0.000	(-37.1435,-13.92621)

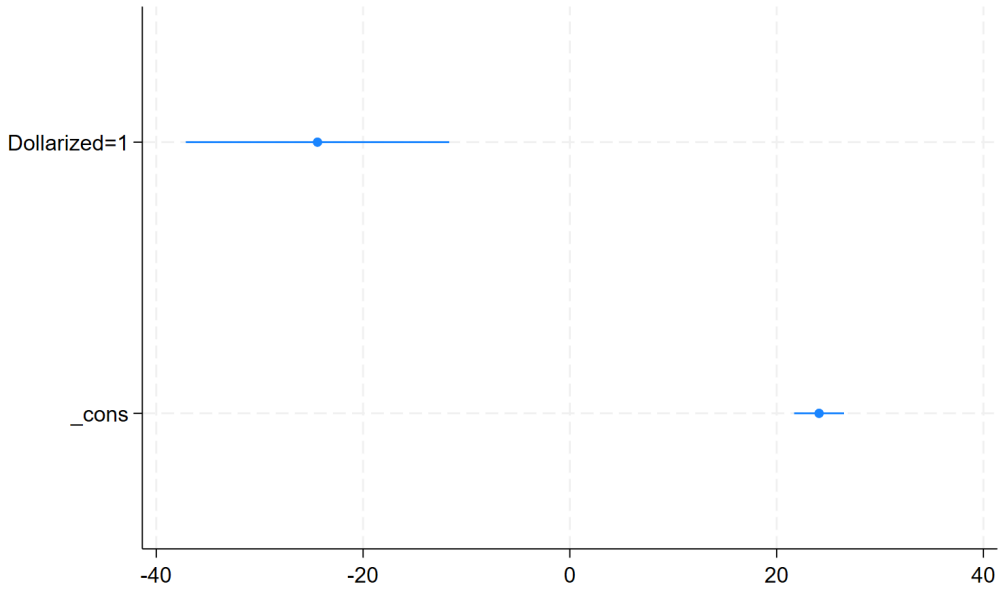

Figure 16: Estimates of coefficients along with confidence intervals for MI forwarded

Without the initially dollarized countries, the regression analysis reveals a statistically (in this case the p-value equals 0) significant negative relationship with inflation. In other words, when there is Dollarization, future inflation tends to decrease by an average of -22.97466 units. In this case, the confidence interval (-35.57125, -10.37808) which does not contain the zero further underscores this negative association between Dollarization and future inflation levels.

$$\text{Inflation}_{i,t}^{f} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{17}$$

Table 17: Regression output for the inflation

π_f	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	-22.97466	6.404135	-3.59	0.000	(-35.57125,-10.37808)

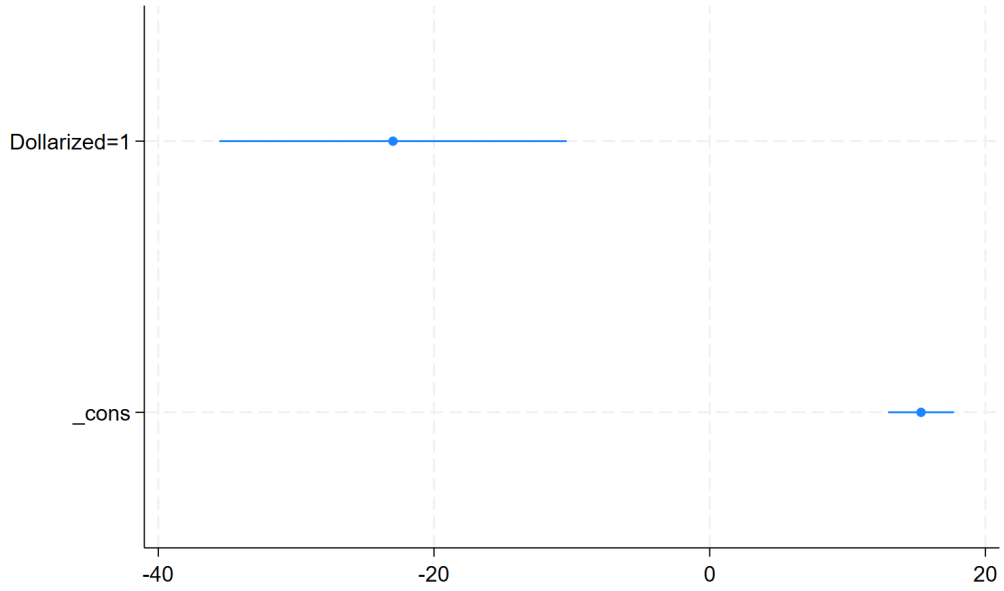

Figure 17: Estimates of coefficients along with confidence intervals for inflation forwarded

While considering how the treatment impacts the future unemployment, the regression analysis states that there is a statistically significant influence, given that the p-value is under 0.10. This suggests that currency substitution does decrease the rate by -1.131513. The confidence interval (-2.987338, .1236612) at a 95% level reflects partially the certainty reinforcing the association.

$$\text{Unemployment}_{i,t}^{f} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{18}$$

Table 18: Regression output with 1 year forwarded unemployment

μ_f	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	-1.431839	.7908201	-1.81	0.071	(-2.987338,.1236612)

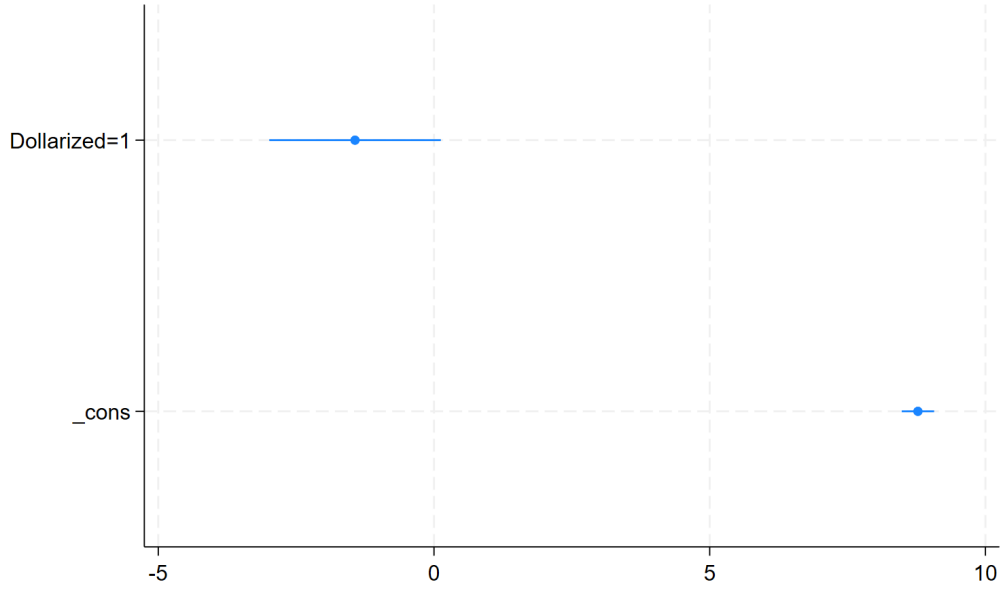

Figure 18: Estimates of coefficients along with confidence intervals for Unemployment forwarded

Current balance account - 5 years shift

The results indicate that currency substitution, does not imply a statistically significant effect on the current account. The coefficient on the dollarization variable is .204, with a very high p-value (0.892) and a confidence interval encompassing zero. These findings suggest that we cannot accept the null hypothesis of association between dollarization and the current balance account. In other words, based on this data and model, there is no clear evidence to support that dollarization

impacts the current account balance in a statistically meaningful way.

$$\text{CBA}_{i,t}^{f} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{19}$$

Table 19: Regression output with 1 year forwarded CBA.

CBA_f	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	.204	1.501473	0.14	0.892	(-2.748286, 3.156286)

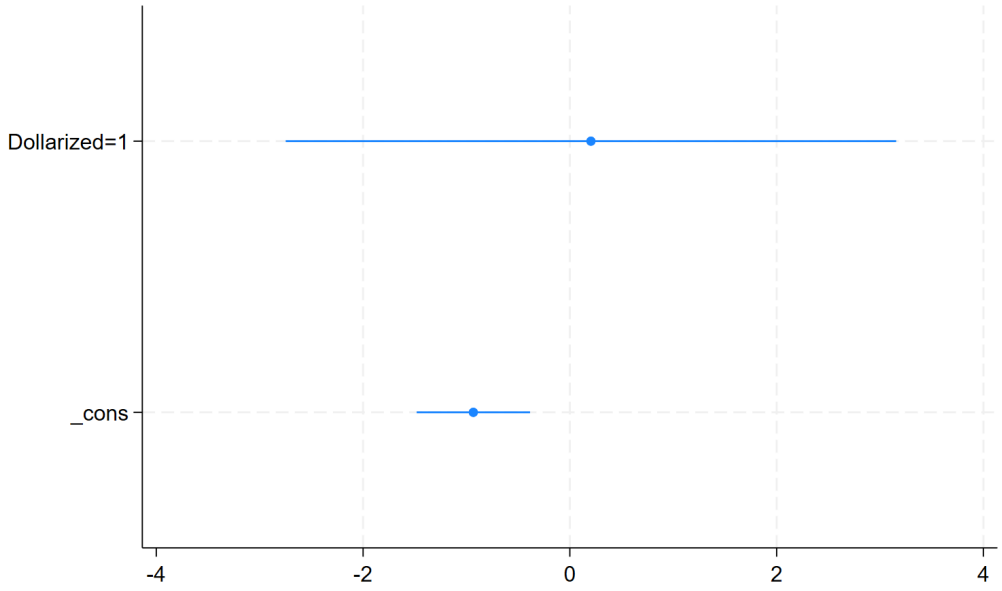

Figure 19: Estimates of coefficients along with confidence intervals for CBA forwarded

Current balance account - Treated countries

During the addition of dollarized countries the regression analysis indicates that the current balance account would increase by 1.013933. This result is not statistically

significant due to the elevated p-value and the confidence interval containing the zero.

$$\text{CBA}_{i,t}^{f} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{20}$$

Table 20: Regression output with 1 year forwarded CBA.

CBA_f	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	1.013933	1.294521	0.78	0.434	(-1.532346, 3.560211)

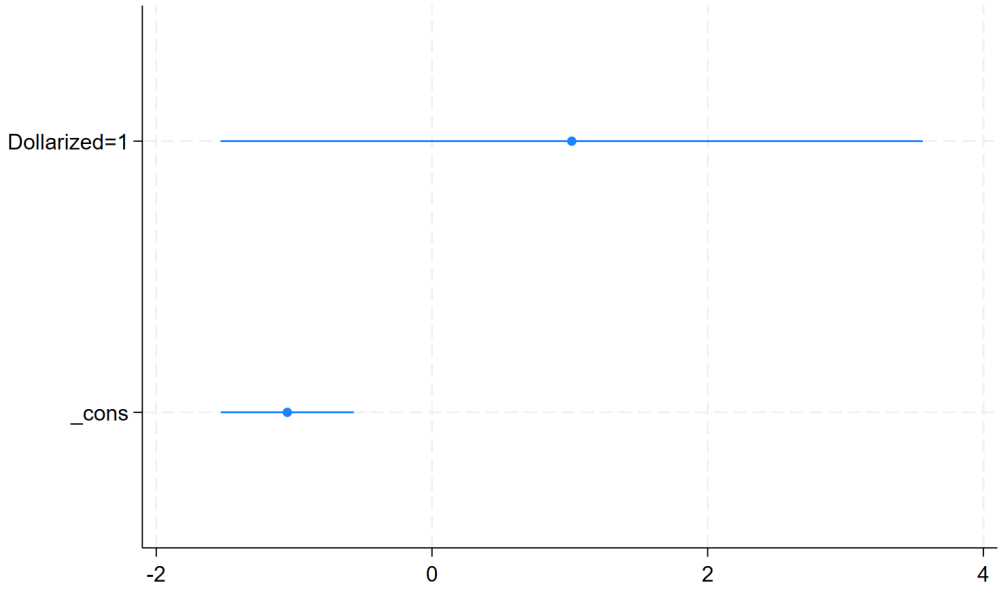

Figure 20: Estimates of coefficients along with confidence intervals for CBA forwarded

Gross domestic product - 5 years shift

After running the regression with the shift, we can conclude that the treatment does not have a statistically significant influence on GDP. The coefficient associated with the dollarization variable is 13.50103, but the high p-value (0.573) and the wider confidence interval that includes zero (ranging from -32.5311 to 56.40378) indicate a lack of statistically meaningful association. In simpler terms, based on this evidence, we are not able to claim that dollarization definitively impacts a country's GDP.

$$\text{GDP}_{i,t}^{f} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{21}$$

Table 21: Regression output with 1 year forwarded GDP.

GDP_f	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	13.50103	23.9198	0.56	0.573	(-32.5311,56.40378)

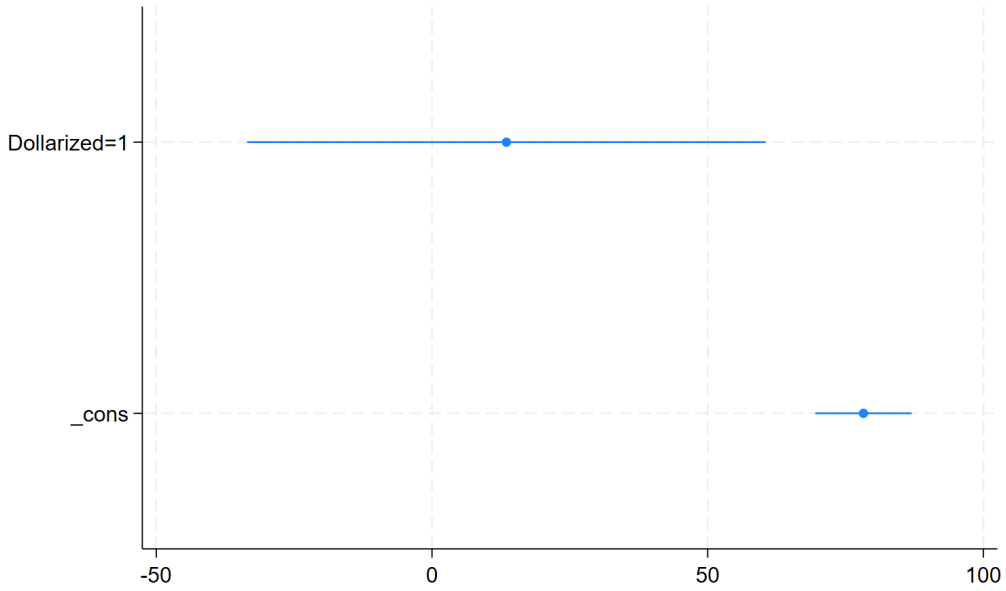

Figure 21: Estimates of coefficients along with confidence intervals for GDP forwarded

Gross domestic product - Treated countries

The results from our model with a larger amount of treated countries indicates a statistically insignificant influence on the GDP value. Dollarization increases the gross domestic product by 9.483139. We cannot confirm the significancy, given the high p-value (0.646) and the confidence interval that includes zero (ranging from -31.12981 to 50.09609).

$$\text{GDP}_{i,t}^{f} = \alpha + \beta_{i,t} \cdot \text{Dollarization} + \epsilon_{i,t} \tag{22}$$

Table 22: Regression output with 1 year forwarded GDP.

GDP_f	Coef.	Std. err.	t	P>|t|	[95% conf. interval]
Dollarization	9.483139	20.64773	0.46	0.646	(-31.12981,50.09609)

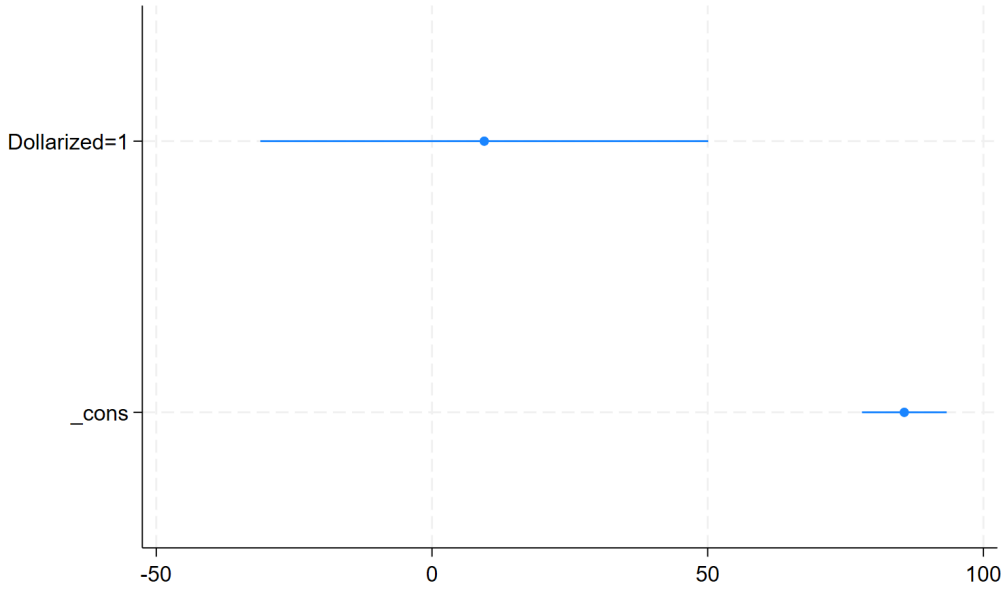

Figure 22: Estimates of coefficients along with confidence intervals for GDP forwarded

Robustness checks: discussion

As previously exposed, our analysis drafts some interesting results. When we determined the impact of the treatment in the misery index we had some clear insights, currency substitution would determine a decrease of around -21.275 points in the future value. This makes sense considering that the effects of decisions taken today would not have an immediate impact but a postponed one. Now, understanding that the composition of the MI is the inflation and unemployment we

wanted to determine which of these variables would be more affected by dollarization. Following the same methodology and regression with each variable it is inflation which would see itself decreased by around -20.09 points, while for the unemployment only around -1.185 points but with a higher p-value.

Subsequently we implemented a difference in differences method to understand how the treated countries would react after dollarization for each of the studied variables. In the case of MI we discovered a potential decrease of -9.628 points for treated countries, which cannot be considered significant due to the p-value of 0.419 and wide confidence interval containing the zero.

The next variable we studied was the current balance account, and following the same reasoning with the case of MI we studied the postponed effect of dollarization. Although the results do not let us confirm our hypothesis of an expected increase for the trade of the countries, since the p-value is quite large and the confidence intervals contains the statistical zero.

For the DID analysis we cannot conclude differently from the regression output, again considering dollarization effect not statistically significant.

At the beginning of our paper research we imagined the GDP increasing after dollarization, given the increasing trade with foreign countries, especially the anchor one, given the lower transaction costs, but we cannot confirm that the treatment does provide to this. Theoretically it could add up to around 15 points to the value of the gross domestic product, although one more time, the p-value is near 0.475 and the CI quite wide, not establishing certainty.

For the DID analysis we are not able to conclude otherwise, there should be a decrease of around -9.62 points for the treated countries, but statistically speaking, we cannot confirm it.

Our two placebo tests revealed mixed and ambiguous results. The first one, consisting on a shift of 5 years to understand whether the results would be similar to

the original model did unveil a similar behavior, some of them being less significant but on the same line, supporting our findings. On the other hand, the second and more robust test, where we removed the dollarized countries and fictiously added Jamaica, Argentina and Albania as treated countries, returned significant results and similar, if not more significant, to the ones of our initial and first model. All in all, these checks suggest that the results presented earlier are less robust to various forms of checks and manipulations than we had expected, suggesting that further research is needed to understand the impact of dollarization on economies. In this regard, it will be interesting to analyze the specific case of Argentina more in detail, as introduced in the next chapter.

In general, our mixed results suggest that dollarization, if successful, cannot happen in a vacuum, but needs to be complemented by a series of fiscal policies and responsible authorities. As a corollary to this empirical work, in the next paragraphs we discuss a series of policy implications, fruit of dollarization. We breefly discuss the Argentinian case which consists of a process similar to dollarization and why it failed, learning lessons for the currency substitution context, we mention a series of limitation which could have contributed into more and strongest findings, before finishing we discuss the placebo study in more detail.

Lessons for the Argentinian case

Argentina is definitively one of the countries which seriously consider implementing dollarization. The liberal candidate Javier Milei won the elections in 2023 and one of his promises was to dollarize the economy. This is understandable considering that the country has been suffering decades of mismanagement and erratic policies which have caused national unhappiness, driven by a high inflation and an increase of public debt. The IMF has agreed an economic plan with Argentina in order to recover the country's economy, following a series of steps and further reviews. If these ones end up in a positive balance, accomplishing the established targets the IMF then provides loans so Argentina can keep carrying on the plan. The later includes a series of fiscal , monetary , structural policies which intend to stabilize the south American economy. To understand how Argentina arrived to today's situation we can review about their erratic policies. Starting from 1980, the markets crashed due to tightening monetary policies by the US after an energy crisis in 1979, in order to contain a steadily increasing inflation which soared until 13.5%. Argentinian financial markets collapsed and prices rose due to a depreciation of the "Argentinian peso". Given the hard panorama many capitals flew from the country seeking for safer places. Public companies had their deficits largely increased and therefore the state was collecting less and less taxes. It was a devastating scenario and in an attempt to revert it they turned to the central bank for financial aid. This evidently drove to a higher circulation of money and hence a larger inflation which during this years soared up to 2600% at the end of the decade. All the attempts to contain the critical situation saw failure and this led to implement the "Convertibility plan" in 1991.

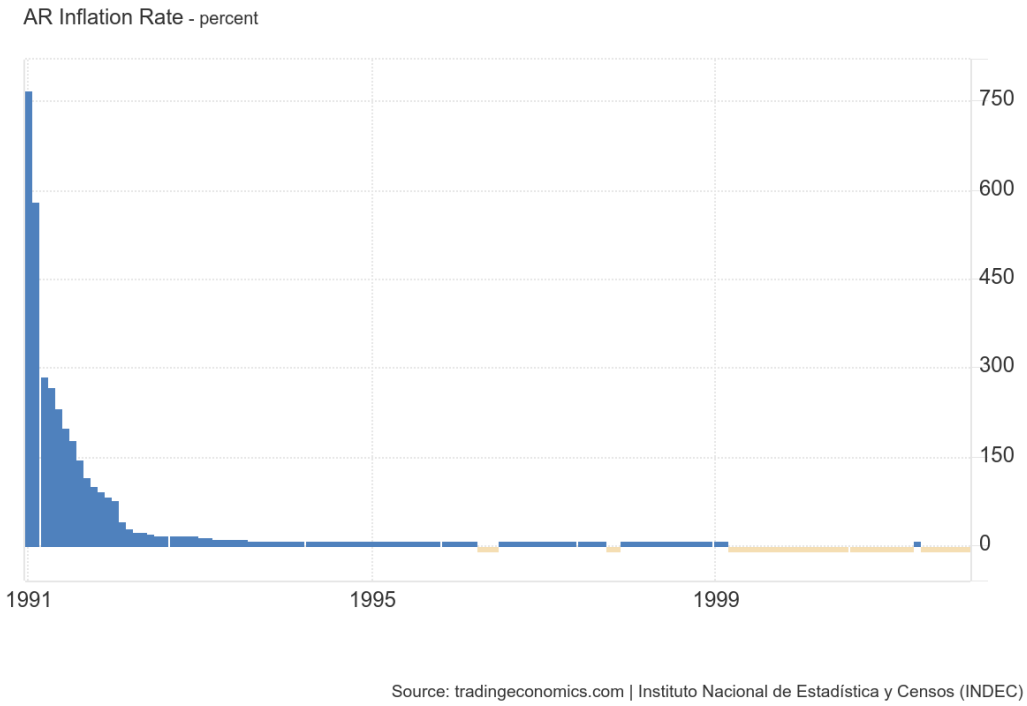

Figure 23: Argentinian inflation rate

The reforms that took place at the beginning of the 90s looked to liberalize the economy. Most restrictions on trade and capital movements were removed such as export and import taxes, along with a free entry and exit of capital and direct investment. The public sector reform privatized many of the major public companies, allowing to inject less subsidies onto them (which also saw their performance improved, since a private company needs to be efficient to "survive" and can not depend anymore on state aid) and conversely having more funds to cover the public debt. The taxes reform caused an increased consumption and elimination of obstructive taxes such as the one present on exports. The regulations became stronger, which led to a decrease in tax evasion while public revenues saw an increase thanks to a growing GDP. The public pay-as-you-go pension plan was replaced by an hybrid system of public contributions and private capitalization. The effects of all these reforms were to allow the country to pay back their voluntary

public debt. The convertibility law imposed an exchange 1 to 1 of dollars and pesos and required the central bank to back two thirds of the monetary base with international reserves. This fixed exchange rate ruled out the possibility of inflationary financing to cover government deficit. The central bank became independent and it's main target was to keep the value of the local currency. The banking system saw the competition increased, restrictions policies for the entrance of foreigner banks were lifted up as well for domestic banks to open new branches. Capital requirement were set above the 11.5%, much above the 8% agreed by the Basel committee as recommendation. The capital reserves requirements were set high, around 40%. To prevent moral hazard the convertibility law deprived the central bank from it's function of lending of last resort which would also happen in the case of dollarization Broda and Eduardo Levy Yeyati (2002), as an disincentive for moral hazard decisions to be made in the financial system.

With a promising beginning, the convertibility plan had managed to reduce the public sector employment by 20%, exports to be increased by an 8% per year until the end of the decade, a accumulated raise of 30% of the GDP in 1999, and considerably reduced inflation averaging 1%. Although the real exchange rate drastically appreciated at the end of the decade and determined a negative effect on the balance account which undermined the convertibility plan. It basically rendered it more difficult to earn the necessary sums to pay back for the debt obligations. The state attempted to attract foreign direct investment to outweigh the critical situation, ultimately not attaining the sufficient amount needed. From 1991 to 2000, the outflows of Argentina were represented in a 42% of the total by debt. All of the above-mentioned increased the risk premium, which translated into higher interests for the debt flows, which conversely represented an even higher stake of the outflows.

Prez-Caldentey and Vernengo (2007) state that the fiscal accounts initially

increased and then deteriorated: "From 1991 to 1994, the consolidated fiscal accounts improved due to the temporary return of macroeconomic stability and the privatization process. Thereafter these began to deteriorate. The public deficit of the consolidated public sector expanded from -5 to -21 and -46 billion US$ for the periods 1991-1994; 1995-1997 and 1998-2001. This was the result of increased social security expenditures and lower taxation (1994 to 1997), contraction of output (1998-2001) and most important the rise in interest rate payments for the whole period and especially from 1995 onwards". They also claim that the most important raises of interest rates came as a consequence of the "Mexican Tequila" crisis in 1994-1995, the Asian and Russian crisis of 1998-1999 and the devaluation of the Brazilian Real in 1999.

In simple terms, the convertibility plan saw growth in the GDP as long as foreign direct investment was entering the country. As soon as the crisis hit the global economy and the money inflows from abroad stopped, Argentina experienced recessions. Because the domestic currency was over valued (a similar case was studied by Caravello et al. (2023), the competitiveness was low and thus exports as well. The later combined with increasing debt to survive the recessions also fueled by a low tax collection created a combination that the plan could not survive. Furthermore, another trigger for the plan to see failure was the lack of domestic flexibility and erratic fiscal policies. As the International Monetary Fund declares, most of the fiscal sector lacked of discipline at the provincial level, sharpened by a transfer of responsibilities from the federal to the provincial government. The consolidated balance was still negative around 2.5 points even at the peak of the GDP at the end of the decade. Another critical fact was the difference between the private and public sector payment, where the private employees in 1994 would earn in average a 25% more, whilst in 1998 the difference would be of 45%. At the same time the public sector was composed of many more workers as the adjacent

countries, which around a 12% compared to Brazil or Chile which had only a 7%. When it comes to the debt, Argentina saw it increased from 33% of GDP in 1990 to 41% in 1998. The country did not have the capability of raising tax revenues as other ones. Most of the debt was issued in foreign currency, which would make it more difficult, since the export to GDP ratio was very low, while also being vulnerable to external shocks. In the year 2000 the debt raised to 50%, introducing more fear to the markets, that believed no strong policies could detain the steadily increasing debt. By the end of 2001, the ratio achieved a 130%. The International Monetary Fund claims that the fiscal entity was too soft and should have urged in forceful actions.

The difference between a currency board and dollarization is that during a crisis, the central bank can always reverse the parity of the currencies, while in dollarization is nearly impossible and If it occurred, it is much more difficult to reverse an official dollarization because de-dollarization requires to create demand for a new domestic currency which already proved to not be viable to Nayib Bukele in El Salvador and Correa in Ecuador. But currency substitution requires fiscal discipline which Argentina has only had during a few years, it requires credibility which has not been restored and even an implementation of foreign currency may not be enough. Ocampo (2023) claims that one of the best insurances against de-dollarization is the strong voter support. Because many of the fiscal and structural policies to accompany the process require time, they cannot be done in only a few years. For example, in Ecuador it has lasted more than two decades as well in El Salvador, in Panama many decades. In his final remarks Ocampo (2023) supports the idea of Argentina adopting the dollar by saying "Chronic populism has pushed Argentina into a sub-optimal situation in which there is a very limited menu of viable options to stabilize the economy with any chance of success. Among such options, dollarization offers the most realistic chance of delivering lasting price

stability and sustained economic growth. As to the costs it might entail, it is hard to imagine they could be higher than those imposed by discretionary policies, particularly in the case of Argentina." and we cannot but to agree with him.

Conclusions

We started this paper wanting to prove whether dollarization was beneficial for a country, in terms of better performing indexes. During the literature review we analyzed a substantial amount of pros and counters of currency substitution. we explored this research question by means of a fixed effects panel model covering countries from Latin America, which was appropriate given the amount of countries we selected and how much their inherent characteristics could affect the final outcomes. we focused on three main variables, Okun's Misery index, the country's current balance account and the gross domestic product, the first one being composed by inflation and unemployment. This decision helped us to generate an idea of a country's economic performance, giving our limited resources. We executed regressions for each of them, as well a difference in differences analysis for the indexes. The only real significant result we managed to obtain is a decrease of inflation when there is dollarization, which is in accordance to the literature. Despite this in-depth research, we did not find a significant impact on gross domestic product or current balance account, our results were therefore non significant. In order to increase the robustness of our findings we included two placebo tests. The first one were we shifted the dollarization dates of 5 years in advance for Ecuador and El Salvador. Whilst the second one consisted of including Argentina, Jamaica and Albania as dollarized economies. Both tests delivered mixed results and did not contribute robustness to our study.

To achieve more precise results, we would have preferred to expand our analysis to include a larger number of countries, both those that have adopted dollarization and those that have not. Our current sample comprises approximately twenty countries, which limits the robustness of our regression and difference-in-differences analyses. Specifically, we were only able to gather comprehensive data for two dollarized countries within the specified time frame, as countries like Bosnia and

Montenegro lacked data prior to the year 2000. The case of Panama presents a unique challenge, as there is no available data from the period before it adopted the US dollar, a process that took place at the beginning of the 20^{th} century. This historical gap prevents us from conducting a difference-in-differences analysis to compare the economic conditions before and after dollarization in Panama.

The literature and studies on dollarization are relatively sparse, likely because dollarization is not widely implemented in practice. For instance, in Latin America, only three countries: Ecuador, El Salvador, and Panama have adopted dollarization. This limited pool of case studies poses additional challenges to our analysis, as it restricts the availability of comparable data and comprehensive research findings. The scarcity of literature makes it difficult to draw definitive conclusions and highlights the need for further empirical studies in this area.

Furthermore, while it would have been ideal to examine additional macroeconomic indicators in detail, such as public debt, interest rates, and foreign direct investment, our available resources constrained the scope of our analysis. Investigating these indicators could provide a more holistic understanding of the economic impacts of dollarization. For example, public debt levels and their sustainability could be crucial in understanding fiscal policy adjustments post-dollarization. Similarly, changes in interest rates could reveal shifts in monetary policy and financial stability, while trends in foreign direct investment might indicate investor confidence and economic openness.

The limited resources also impacted our ability to conduct more granular and region-specific analyses, which could have uncovered nuanced effects of dollarization across different economic contexts. As a result, our study, while informative, remains somewhat constrained in its ability to fully capture the multifaceted impacts of dollarization on macroeconomic stability and growth. Future research with expanded datasets and more extensive resources would be valuable in providing

deeper insights into the complex dynamics at play.

As we have already discussed, dollarization brings along considerable effects that need to be carefully weighed by the authorities considering its adoption. While some impacts can significantly benefit the local economy, others entail substantial trade-offs beyond merely relinquishing the local currency.

According to the literature, inflation rates in dollarized countries tend to converge to the levels of the anchor country. Our analysis supports this, showing that countries adopting dollarization typically experience a decrease in inflation by an average of 20 percentage points. For instance, the inflation rates in El Salvador, Ecuador, and the United States have stabilized between 2% and 4%, with the notable exception of the 2008 financial crisis. This convergence helps in establishing price stability and increasing economic predictability, which are crucial for long-term economic planning and growth.

One of the most straightforward yet profound impacts of dollarization is the stabilization of the exchange rate. This stability eliminates exchange rate risk, fostering a more predictable economic environment for investors. Consequently, this can lead to an increase in foreign direct investment (FDI), as investors gain confidence in the reduced currency risk. Moreover, the stability also reduces the cost of foreign debt, making it cheaper for governments and businesses to borrow internationally.

Once dollarization is implemented, the government loses the ability to print money as a short-term economic stimulus. This limitation can act as a catalyst for improved fiscal discipline. Without the option of monetizing debt, authorities are compelled to pursue more prudent fiscal policies, ensuring sustainable public finances. This can potentially lead to more responsible government spending and better economic management, reducing the risk of fiscal crises.

One of the most significant drawbacks of dollarization is the loss of independent

monetary policy. The country cedes its ability to adjust interest rates or conduct other monetary interventions to respond to specific domestic economic conditions. For example, during economic downturns, the inability to devalue the currency to boost exports or stimulate the economy can be a critical disadvantage. This lack of flexibility becomes particularly problematic during asymmetrical shocks, where the economic conditions of the dollarized country diverge from those of the anchor country.

Another notable cost is the loss of seigniorage revenue, which is the profit made from issuing currency. As our literature review indicates, seigniorage can represent a significant portion of GDP in some countries. By adopting a foreign currency, a country forfeits this source of revenue, which could otherwise be used for public spending or investment. This loss necessitates finding alternative revenue streams, which could involve higher taxes or reduced public services.

Dollarization is often expected to enhance economic integration, increasing trade with other countries by simplifying transactions and reducing currency-related barriers. However, our analysis of the current account balance did not reveal any significant correlation with dollarization. This finding suggests that while dollarization may facilitate trade, it does not necessarily guarantee an improvement in the trade balance. Other factors, such as comparative advantage, trade policies, and global economic conditions, also play crucial roles in determining trade outcomes.

While dollarization offers several benefits, including inflation control, exchange rate stability, and enhanced fiscal discipline, it also imposes significant costs, such as the loss of monetary policy autonomy and seigniorage. Policymakers must carefully consider these trade-offs in the context of their specific economic conditions and long-term objectives before deciding to adopt dollarization. Future research with more extensive datasets and a broader range of macroeconomic indicators could provide deeper insights into these complex dynamics, helping to inform more

nuanced policy decisions.

It is recommended to accompany dollarization with other fiscal policies that can stabilize the economy, as explained in "To ensure the sustainability of the dollarization system, policymakers passed a series of fiscal responsibility laws that limited the annual growth rate of real central government expenditures to 3.5 percent and capped the debt-to-GDP ratio at 40 percent. Additionally, a number of oil stabilization funds were created in order to force government savings (though a portion of these funds were earmarked for a variety of projects other than savings; for details see Cueva, 2008). Finally, also in 2000, the authorities reached an agreement with international lenders to restructure the government's foreign debt, which Ecuador had defaulted on the year before. The restructuring lowered the face value of the debt by 40 percent" by Cueva and Daz (1960).

Our placebo tests could not add robustness of our analysis. The regressions yielded mixed findings for our study. Firstly, both regressions (shifted years and treated countries) indicated a negative effect of dollarization, suggesting that adopting a foreign currency can lead to a reduction in the Misery index. The first one having a larger p-value than the original model, but following the same pattern. While the second test did return a coefficient of almost -23, with a p-value equals to zero. The confidence interval was more significant than the initially calculated. Given that by modifying our model by adding fictional countries as dollarized and removing the officially dollarized ones, we expected to obtain non significant results, which was not the case. Therefore the second test does not support our first findings and decreases theirrobustness. In both tests, the regressions for CBA were aligned with the previously estimated one, not adding robustness to our hypothesis. Same case was the one for GDP, the confidence intervals ended up having a wider range and larger p-values.

This paper studied and focused on the cases of Ecuador and El Salvador as dollarized countries to understand whether their economic performance got benefits from the dollarization process or not. We also included Panama, but not as an active country, since the currency substitution dates back to the beginning of the last century. After reviewing literature and theory, choosing a fixed effects model for our available resources, we then estimated, with regressions and a difference in differences method, the values of macroeconomic indexes as misery index, current balance account and gross domestic product, to assess the economic performance of treated countries. Our findings confirm an important decrease of inflation as the literature anticipated. Although we could not confirm any causality or correlation of improvement for GDP and CBA. To add robustness to our results, we implemented two placebo effects. The first one consisting of a shift in advance of 5 years and execution of the same regressions as in the original model. This test did align with the already found results, having a similar pattern, and hance reinforcing our study. Whilst the second test, which consisted of removing Ecuador and El Salvador, but adding this time Argentina, Jamaica and Albania as dollarized countries, did not support our hypothesis, decreasing the robustness of our findings and providing mixed results, were we expected no find mostly and only non significant results. We are not able to strongly confirm any effects of dollarization on countries other than the decrease of dollarization, which as previously said, aligns with the reviewed literature. With more available resources a deeper research can be implemented, obtaining more significant results, and probably new findings.

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