

Louvain School of Management

Dollarisation in Argentina

Is the dollarisation of the Argentine peso a viable response to Argentina's persistent economic instability? A comparative analysis of Ecuador and El Salvador

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Abstract

The election of the libertarian candidate Javier Milei in Argentina in November 2023 marked a significant economic turning point, introducing ambitious reforms such as the closure of the Central Bank of Argentina and the dollarisation of the economy. For decades, Argentine citizens have lost trust in their national currency, exacerbating the phenomenon of dollarisation as a strategy to counter monetary instability (Messari, 2024).

Focusing on full dollarisation, this study explores its theoretical advantages and disadvantages, as well as its impact on economic stability, by examining the cases of Ecuador, highlighting a notable experience in recent years.

Adopting a quantitative approach using linear regression models applied to panel data, the research evaluates the effects of dollarisation on two key indicators: inflation and GDP growth. The aim is to determine to what extent dollarisation can genuinely stabilise these economic indicators through a before-and-after dollarisation analysis.

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Abbreviations and Acronyms

BCRA	Central Bank of the Argentine Republic
CFM	Capital Flow Management
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GFC	Global Financial Crisis
IMF	International Monetary Fund
INDEC	Instituto Nacional de Estadística y Censos
IT	Inflation Targeting
LLC	Levin-Lin-Chu
LLR	Lender of Last Resort
M2	Money Supply
OLS	Ordinary Least Squares
REER	Real effective exchange rate
SCRER	Stable and Competitive Real Exchange Rate
SUR	Seemingly Unrelated Regression
VIF	Variance Inflation Factor

I. Introduction

1. Context of the study

At the end of 2023, Argentina faced its sixteenth economic crisis in 160 years, marked by soaring inflation at 138% annually and a poverty rate affecting 40% of the population, with 10% living in extreme poverty. These circumstances led to the election of libertarian candidate Javier Milei in November 2023, whose campaign centred on radical reforms, including the closure of the Central Bank of Argentina and full dollarisation of the economy. Although these proposals generated significant expectations, Milei's government has since shifted its approach, opting for alternative economic measures instead of full dollarisation. (Messari, 2024). This shift highlights the complexity and challenges associated with implementing such a policy and motivates this study, which examines the economic impacts of dollarisation through the case of Ecuador and El Salvador.

2. Problem statement

Dollarisation is often viewed as a potential solution to stabilise struggling economies, but its adoption raises numerous questions regarding its effectiveness and long-term implications.

For decades, Argentine citizens have lost confidence in their national currency, leading rise of informal dollarisation as a refuge from monetary instability. The election of Javier Milei as president has reignited the debate on full dollarisation—can it truly be a viable solution or is it another illusory promise? Drawing inspiration from Ecuador's experience, Milei has praised its dollarisation as a “model of success,” suggesting that Ecuadorians enjoy a better economic standing compared to Argentines (Dávila Toro, Heredia Logroño & Lóor Gómez, 2024). However, Argentina's unique economic and institutional characteristics demand a nuanced understanding before transferring lessons from other countries. While dollarisation offers theoretical benefits, such as reduced inflation and increased consumer confidence, it also entails significant drawbacks, including the loss of monetary sovereignty, diminished seigniorage revenues, and heightened dependence on foreign monetary policies. The recent political shift in Argentina highlights the practical challenges and uncertainties of adopting dollarisation, making it a topic worthy of in-depth analysis.

This study seeks to determine to what extent full dollarisation can stabilise key economic indicators, specifically inflation and GDP growth. By focusing on a quantitative analysis using linear regression models applied to panel data, the research aims to evaluate the effects of dollarisation before and after its implementation in the experiences of Ecuador and El Salvador. The objective is to assess whether dollarisation can effectively address Argentina's economic stability needs and if it can draw inspiration in other counties experiences.

3. Methodology

This study is organised into several sections, each exploring a specific aspect of dollarisation. The introduction outlines the research context, the motivations behind the choice of the topic, the central research question, the structure of the dissertation, and the challenges encountered during the research process.

The first part of this dissertation is dedicated to a literature review. It begins with a historical and theoretical introduction to dollarisation, including a definition of key concepts, followed by an in-depth exploration of the advantages and disadvantages of full dollarisation. The study then examines the experiences of Ecuador, analysing its economic context before and after the dollarisation while highlighting the associated benefits and costs. Finally, these analyses are placed in perspective with Argentina's economic situation, allowing for an insightful comparison.

The second part of this dissertation adopts a quantitative approach, employing multiple linear regression models applied to panel data from Ecuador and El Salvador. The objective is to assess the impact of dollarisation on two key economic indicators: inflation and GDP growth. Data is collected from reliable sources such as the World Bank, the International Monetary Fund (IMF), and the central banks of the countries concerned, covering periods before and after the adoption of dollarisation. This section includes a theoretical presentation of the statistical tests performed, an explanation of the data preparation process, the econometric model used, as well as tests verifying the model's validity and reliability. An analysis of the results is then conducted, followed by a discussion of the model's limitations and potential improvements. This structure aims to provide a rigorous and comprehensive evaluation of the impact of dollarisation on the economies of Ecuador and El Salvador, offering relevant insights for the Argentine case.

4. Difficulties encountered

The completion of this study encountered several methodological challenges. First, modelling dollarisation was quite complex due to the multifaceted nature of this economic phenomenon, which is difficult to measure. Second, the selection of countries for the panel was constrained by the limited availability of data; for instance, Panama adopted dollarisation early, making comparable data difficult to obtain, while Asian countries exhibit cultural and structural differences that are too pronounced for a coherent analysis. Finally, drawing a meaningful parallel with the Argentine context was challenging due to Argentina's unique economic and political characteristics, which differ significantly from the experiences of Ecuador and El Salvador.

II.

Literature Review

Chapter 1: Dollarisation

This chapter aims to provide a broad understanding of the term ‘dollarisation’.

1.1. Definition

Strictly speaking, dollarisation refers to the process by which the US dollar replaces the national currency as the unit for pricing, a means of payment, and a store of value (Bourguinat & Dohni, 2002). In this rigorous definition, dollarisation is equated with a process of currency substitution, where the dollar increasingly asserts itself as a store of value, unit of account, and sometimes as a medium of exchange (Salama, 1989). This phenomenon, traditionally referred to as currency substitution, is characterised by the use of a foreign currency for transactions and often for pricing goods and services as well as denominating contracts (Bitar, 2022; Ponsot, 2002).

The term “dollarisation” is therefore often used to describe the replacement of the national currency with a foreign currency, as the US dollar is the most commonly used foreign currency (Baliño, 2003). The use of the term “dollarisation” therefore remains somewhat imprecise, with some economists suggesting that it would be more accurate to refer to this phenomenon as “xenomonetisation” or “xenomonetarisation” (Minda, 2005).

According to Ponsot (2002), it is crucial to distinguish between different dollarisation regimes based on an institutionalist monetary approach. These regimes can be classified according to two main criteria: the degree of penetration of the foreign currency into the economy and the level of official recognition of its usage by national authorities. Regarding the first criterion, a distinction must be made between partial and full dollarisation. For the second, a distinction can be drawn between *de facto* (unofficial) and *de jure* (official) dollarisation. This distinction is important because the application and impact of dollarisation can vary depending on whether it is formal or informal, partial or complete.

The most common scenario is *de facto* (or unofficial) dollarisation: one or more foreign currencies coexist with the domestic currency without recognition from the authorities. In other words, *de facto* dollarisation is a general term used to describe the use of a foreign currency in addition to the national currency in situations where the former is not accepted as legal tender (Bitar, 2022). This process is spontaneous, arising from the choice of a country's residents. These individuals hold a significant proportion of their financial assets in foreign currency, even though it is not legally recognised (Minda, 2005).

The second regime, *de jure*, refers to the case when a foreign currency is granted legal tender status, which implies that the foreign currency is used legally for the three functions of money (store of value, unit of account, and medium of exchange) (Canuto & Carranza, 2022). In this

instance, it is therefore an institutional process that is relevant to the selection of monetary authorities, and the use of the foreign currency is officially recognized by the public authorities through the establishment of a legal course (Minda, 2005).

The phenomenon known as full dollarisation occurs when a nation formally abandons its own currency in favor of a more stable one, usually the US dollar, as legal tender. (Berg & Borensztein, 2001). When foreign currency is adopted, it means that it will be used as a single, legal currency that serves all of the purposes of the domestic currency, including reserve value, payment method, and unit of account. Unlike a system of currency board system, this regime deprives the country of any monetary or change policy and makes this decision irrevocable (Quispe-Agnoli & Whisler, 2006; Ponsot, 2024).

Partial dollarisation is defined by the parallel use of an external currency, establishing a bicurrency system in which the national currency is equal but is backed by the dollar, thereby undermining monetary sovereignty (Ponsot, 2024). This type of dollarisation can be divided into three categories: a) dollarisation of transactions or currency substitution, in which payments are made in dollars ; b) dollarisation real, in which prices and salaries are based on the dollar ; and c) dollarisation financial or currency substitution, in which residents retain their assets and liabilities in foreign currencies (Quispe-Agnoli & Whisler, 2006; Castillo, Montoro, & Tuesta, 2013).

The key distinction between official and unofficial dollarisation is whether the foreign currency is formally accepted by the government as legal tender (official) or if residents use it freely despite it not being legal tender (partial). (Bogetic, 2000).

Chapter 2: Benefit-cost analysis of dollarisation

This chapter aims to analyse the theoretical benefits and costs of adopting dollarisation by examining and contrasting the perspectives of multiple authors. It is important to highlight that this analysis focuses specifically on official dollarisation, every time it will mention, it will be regarding the official one.

2.1. Price stabilisation and low inflation

Regarding the effect on inflation in fully dollarised countries, economists appear to have reached a consensus: countries that give up their currency and switch to one of the more developed nations (like the dollar) will see a decrease in inflation.

According to Edwards and Magendzo (2003), abandoning the monetary policy of institutions lacking credibility in favour of the issuing country, such as the USA, can address the inflationary bias. Moreover, empirical findings by the same authors confirm this perspective: “inflation will be lower in dollarised than in non-dollarised nations” (Edwards & Magendzo,

2001). Eduardo Levy Yeyati and Federico Sturzenegger (2002) support this argument by mentioning that a more stable and lower inflation is favoured by fixed exchange rates and the elimination of inflationary biases. According to them, a conservative monetary policy helps avoid the temptation to inflate the economy through unplanned monetary expansions and therefore prevents excessive inflationary pressures caused by these interventions.

However, as Frankel and Rose (2002) point out, the stability gained through dollarisation is itself dependent on the issuing country, since if the adopting country experiences economic shocks that are not closely correlated with those of the issuing country, costs may be incurred. Additionally, the US dollar is a currency that tends to fluctuate against other commonly traded currencies (Berg & Borensztein, 2001).

2.2. Interest Rates, Devaluation, and Default Risk

One of the immediate advantages of full dollarisation is the elimination of exchange rate risk.

According to Berg and Borensztein (2001), reducing this risk may decrease the risk premium associated with foreign loans, thereby lowering interest rates for both governments and private investors. This might indicate a reduction in the cost of borrowing for governments and private investors because lenders would not charge as much to cover the risk of exchange rate volatility. In fact, by borrowing in dollars, the government and private sector can eliminate the risk of devaluation, just as they can decide to settle in a foreign or local currency. They emphasise, however, that the risk premium associated with risk would not be uniformly reduced. Because of the comprehensive dollarisation, the effect on the default risk premium for the dollar-denominated debt is therefore uncertain and does not guarantee a decrease.

Goldfajn and Olivares (2000) support this idea by emphasising that removing the exchange rate risk does not always result in a significant decrease in sovereign rate disparities. For them, the primary factor influencing interest rates is the sovereign default risk, which endures even after dollarisation. They also caution against the possibility that a fully dollarised economy, without monetary policy flexibility, may be more susceptible to severe economic shocks. In the event of a severe recession, decision-makers may be prohibited from prioritising payment default in order to prevent excessively expensive adjustments.

Bogetić (2000) notes that dollarisation can stabilise international capital flows and reduce borrowing costs by lowering premiums associated with monetary risks. However, he implicitly acknowledges that sovereign risk, being distinct from monetary risks, does not disappear. Goldfajn and Olivares (2000) assert that eliminating currency risk is not a straightforward solution and fails to eliminate default risk or the pronounced volatility of sovereign spreads. Indeed, the main factors influencing interest rates are default risks, meaning that removing currency risk has a limited impact on spreads and rates. In a fully

dollarised economy, the lack of exchange rate flexibility could increase the risk of economic failure during a severe downturn.

2.3. Financial trade and banking system

It has been discussed that dollarisation would facilitate financial integration and could strengthen the domestic banking system. According to Berg and Borensztein (2001), it would reduce exchange rate risk, making domestic financial assets more attractive to foreign investors and facilitating international transactions. Frankel and Rose (2002) show that common currencies promote bilateral trade and increase overall economic openness, creating a more stable environment for exchanges and investments.

Dollarisation reduces currency volatility and minimises transaction costs related to currency conversion, while stabilising the currency and attracting a greater influx of foreign investment (Quispe-Agnoli & Whisler, 2006). However, Goldfajn and Olivares (2000) point out that dollarisation does not ensure immediate access to international markets. Similarly, Berg and Borensztein (2001) caution that it does not eliminate the risk of external crises, as investors may still choose to withdraw due to vulnerabilities in the financial system or fiscal imbalances.

Furthermore, dollarisation may restrict the government's ability to respond effectively to financial crises, as highlighted by Sims (2001), by reducing the range of assets available for managing risks. This limitation leaves governments less equipped to stabilise the banking system in the face of economic shocks. Additionally, local banks may lose a significant source of income derived from foreign exchange transactions, potentially weakening their profitability in an increasingly competitive international environment (Bogetić, 2000).

2.4. Loss of seigniorage

The loss of seigniorage is considered as an immediate cost when replacing the national currency with the dollar.

According to Berg and Borensztein (2001), the monetary authorities must buy back the national currency held by the public and banks in order to restore the accumulated seigniorage. In addition to this buyback cost, there is an annual loss of seigniorage revenue. To meet the increased demand for liquidity, the central bank is no longer able to issue new monetary units. This revenue shortfall must be made up for in some other way, maybe by increasing the public debt or cutting back on some expenses.

Yeyati and Sturzenegger (2002) point out that countries with insufficient foreign currency reserves must accumulate them, which comes at an additional cost. In order to do this, excess cash reserves must be collected, which could lower internal investments and slow economic growth. The use of international reserves to convert domestic currency into foreign currency

is a loss because the funds could have been used for other investments to boost economic growth or upgrade infrastructure.

According to Calvo (2001), removing the government's ability to make money through monetary creation may result in the development of other forms of taxation, such as a wealth tax or financial transactions tax. However, Berg, Borensztein & Mauro (2003) challenge this claim by stating that the loss of seigniorage revenue would be comparatively negligible in economies with a high dollarisation ratio. For these countries, the costs of dollarisation may be reassessed, and the benefits, such as the accumulated monetary stability, could make up for the loss of seigniorage revenues.

2.5. Lender of Last Resort (LLR)

The dollarisation of an economy significantly alters the role of the monetary authority, particularly by restricting its ability to act as a lender of last resort (LLR). As Quispe-Agnoli and Whisler highlight, under full dollarisation, the central bank loses the capacity to issue currency to inject liquidity during a banking crisis. Paradoxically, this limitation of the LLR may increase economic agents' confidence in the domestic banking system, thereby reducing the likelihood of bank runs (Quispe-Agnoli & Whisler, 2006).

Yeyati and Sturzenegger (2002) point out that while mechanisms like international assurances or national assurance funds can partially replace the LLR, they are unreliable and involve moral hazard, which leads financial institutions to adopt more risky practices. Additionally, in the absence of an effective LLR, dollarised countries must accumulate sizeable foreign reserves, which is a significant opportunity cost because the funds could be used to fund productive projects.

In contrast, Calvo (2001) suggests a nuanced view, asserting that the inability to print money does not completely eliminate the possibility of an LLR in a dollarised economy. This could occur through the issuance of sovereign bonds or access to international credit lines. Nevertheless, for emerging countries, this requires advanced planning and the accumulation of significant international reserves, which can increase the cost of dollarisation.

Lawrence H. White offers a different perspective by emphasising that restricting the role of the LLR could limit moral hazard. In the absence of bail-out expectations, banks would be less inclined to take excessive risks. However, this approach does not address all the vulnerabilities of the dollarised banking system. (Lawrence H. White, 2003)

Finally, Goldfajn and Olivares (2000) highlight another consequence: the loss of the LLR role leads local banks to depend more on foreign financing. This dependence favours large international banks while making the national banking system more vulnerable to external shocks. In this context, the liberalisation of the financial sector becomes almost unavoidable, but it also introduces additional risks to national financial stability.

2.6. Elimination of monetary and exchange rate policy

Yeyati and Sturzenegger (2002), Frankel and Rose (2002), as well as Bogetić (2000), agree in highlighting that dollarisation limits a country's ability to adjust its monetary policy in response to specific economic shocks, which can have negative consequences on macroeconomic stability and long-term growth. Yeyati and Sturzenegger note that without the possibility of conducting a counter-cyclical monetary policy, the country can no longer use interest rates or the money supply to stabilise the economy, which increases production volatility and can lead to deeper recessions. Similarly, Frankel and Rose warn that if the country experiences asymmetric shocks that are poorly correlated with those of the issuing country, the loss of the nominal exchange rate as an adjustment tool limits its ability to respond effectively to external disturbances, leading to more pronounced economic fluctuations. Bogetić adds that dollarisation restricts the country's ability to devalue its currency or use inflation to finance budget deficits ; without these instruments, the country cannot tailor its economic policy to specific needs, which is particularly problematic in the case of asymmetric economic shocks.

Nevertheless, Edwards and Magendzo (2003) and Yeyati and Sturzenegger (2002) argue that delegating monetary policy to a credible central bank, such as that of the United States, helps address the inflationary bias of national institutions lacking credibility. Their empirical research shows that dollarised countries tend to have lower and more stable inflation than non-dollarised countries. By aligning the inflation rate with that of the issuing country, economic credibility is strengthened, which can attract investors and stimulate growth.

Calvo (2001) minimises the impact of losing autonomous monetary policy, arguing that emerging economies are already strongly influenced by U.S. monetary policy through fluctuations in U.S. interest rates. He suggests that, in these economies, the depreciation of the national currency often has a contractionary effect, limiting the effectiveness of an independent monetary policy. According to him, the necessary adjustments can be made through prices and wages, and fiscal policy can be used to achieve gains in competitiveness, thus compensating for the loss of monetary flexibility.

Chapter 3: Argentina's historical economic context

This chapter explores the historical economic trajectory of Argentina, highlighting the key events and policies that have shaped its current financial landscape. From periods of significant growth to recurring economic crises, it delves into the factors that have contributed to the country's persistent challenges. Understanding this context is crucial to evaluating the potential impact of dollarisation on Argentina's economy.

3.1. Historical context

From the 1970s onward, in the face of structural crises and poorly managed economic policies, Argentina gradually experienced unofficial dollarisation as a response to persistent inflation and recurrent devaluations. Structural inflation became a concern during this period, as economic agents continuously adjusted prices and contracts in anticipation of ongoing inflation. This high-inflation regime reached its peak in 1975, with a 400% devaluation of the national currency leading to an inflation rate of 186% in the first half of the year (Corso, 2021).

As saving in pesos became increasingly unattractive, individuals turned to tangible assets and foreign currencies, often through illegal markets. This shift was further reinforced by financial deregulation and liberalisation under the military dictatorship in 1977, alongside broader cultural factors, such as the media's growing focus on the dollar exchange rate and the influence of economic experts promoting strategies to cope with inflation (Gaggero & Nemiña, 2022; María Soledad Sánchez, 2024).

The rise of the military dictatorship in 1976 marked a major turning point in the Argentine economy. The Argentine military regime (1976–1983), established after the 1976 *coup d'état*, sought to restructure the economy by adopting liberal policies inspired by principles of privatisation and openness (Corrales, 1997).

Financial liberalisation and trade openness in Argentina, combined with market and credit deregulation, was aimed to promote savings and to reduce inflation through the use of the exchange rate. However, this approach led to an overvaluation of the local currency, redirecting external financing towards the acquisition of private assets abroad rather than productive investments. As a result, the economic measures exacerbated capital flight and reduced the national economy's competitiveness (Calcagno, 2019).

As the government struggled to stabilize inflation, the second phase of the economic plan, from 1979 to 1981, departed from the first and was marked by the introduction of the "tablita", a series of pre-announced devaluations of the exchange rate. These devaluations were designed to gradually diminish uncertainty and inflationary expectations, with the money supply theoretically following the devaluations. However, the "tablita" led to a progressive appreciation of the peso in 1980–81 and ongoing speculation, resulting in severe macroeconomic instability, massive capital flight, and an increase in external debt beyond the country's repayment capacity (Corso, 2021; Hufty, 1993). The following year, these problems were exacerbated by Mexico's debt default¹ and the Falklands War (1982)². In this context, an

¹ Mexico declared a debt repayment cessation in August 1982 as a result of its extreme economic instability. In an effort to stabilize the economy and rectify alleged economic mismanagement, the government nationalized the banking sector shortly after. But these steps made the situation worse by eroding global trust, postponing IMF talks, and decreasing foreign investment. (Zendejas, 2024)

² The Falklands War (April–June 1982) was a conflict between Argentina and Britain over the sovereignty of the Falkland Islands. It began with Argentina's invasion and ended with their surrender, as Britain retained control. (Freedman, 1982)

external debt crisis emerged, with external debt rising from 8.7% of GDP in 1975 to 45% of GDP in 1983, reaching a total of \$25 billion (Calcagno, 2019).

In 1983, Argentina's president was the democrat Raúl Alfonsín. The economic policy implemented under his leadership aimed to increase wages, reduce the fiscal deficit, and lower interest rates. However, these measures worsened inflation, with monthly rates exceeding 20%, reaching 688% in the first year of his administration. In 1985, the Austral Plan³ was introduced to stabilise inflation through the introduction of a new currency. Temporary measures, such as wage and price freezes and the substitution of indexation with de-indexation, proved short-lived. These measures quickly dissipated, and inflation resurged, exceeding 10% per month by 1987, once again disrupting the country's economy (Sigal & Kessler, 1997; Perelman, 2024).

It was in 1989–1990 that the term hyperinflation took hold in Argentina, defined as "an exponential, uncontrollable, and unpredictable rise in prices ». Inflation soared to record levels of over 3000%. The essential functions of the national currency gradually eroded, while the dollarisation of transactions intensified. The coherence of relative prices vanished, disrupting consumption habits and limiting economic decisions to very short-term horizons (Sigal & Kessler, 1997).

At the same time, the government's external debt rose from \$4 billion in 1975 to \$58 billion in 1989, representing 99% of GDP following significant devaluations. This debt became a double constraint on growth: due to its weight, it caused a substantial transfer of resources abroad and allowed the International Monetary Fund [IMF] to impose its recessionary adjustment policies. The Bonex Plan, introduced by Carlos Menem in 1989, aimed to control inflation by exchanging bank savings for 10-year bonds (which did not provide protection against inflation) (Boyer & César, 2007). The hyperinflation of 1989 and 1990 ultimately provided the impetus for reforms, beginning with the Convertibility Plan of 1991. Also known as the currency board or "*caja de conversión*" primarily aimed to stabilize annual inflation rates which, at some point, reached 2600% in 1989 and 1990 (Pou, 2000).

The currency board was based on the Convertibility Law, which guaranteed a fixed parity between the peso and the dollar at a 1:1 ratio, making devaluation nearly impossible. Specifically, the Convertibility Law also instituted a quasi-currency board, meaning that the central bank could only issue pesos backed by foreign currency reserves. This restriction prevented the financing of government deficits and precluded the central bank from supporting commercial banks facing liquidity problems (O'Connell, 2005). This led to particular regulatory mechanisms, requiring greater price flexibility in protected sectors and strengthening a competitive export base to ensure macroeconomic stability and attract

³ The Austral Plan, implemented in June 1985 in Argentina under President Raúl Alfonsín, aimed to curb rampant hyperinflation and stabilize the economy. The plan included freezing prices and wages, introducing a new currency (the austral), and enforcing strict austerity measures to reduce the public deficit. (Vidal-Duroty, 1986)

international investors (Gérard, 2003). During the early years of the plan, remarkable economic stabilisation occurred. In February 1991, inflation was still at 27% per month, but it decreased to 11% in March and 5.5% in April. Between 1991 and 1998, economic growth accelerated, averaging nearly 6% annually, after a temporary slowdown due to the Tequila Crisis of 1995⁴. Significant capital inflows, including direct investments and portfolio investments, were attracted to the country thanks to an investment-friendly climate (Hufty, 1993; International Monetary Fund [IMF], 2004).

Beyond the initial successes of the reforms, vulnerabilities began to emerge. The fixed parity between the peso and the dollar led to a rapid overvaluation of the currency, significantly reducing the competitiveness of Argentine exports in international markets. The convertibility regime introduced rigidity that prevented any nominal devaluation, even during critical external contexts, such as the sharp devaluation of the Brazilian real in 1999. This situation caused a decline in national production and plunged the economy into deflation, exacerbated by a dependence on foreign capital flows to finance deficits and maintain the appearance of economic stability (Hufty, 1993; Trenta, 2010).

In 1999, Fernando de la Rúa succeeded Menem with the aim of maintaining convertibility through an adjustment plan known as the “*Corralito*”. This plan aimed to achieve a “zero budget deficit” to counter the ever-growing external debt and restore market confidence. However, reductions in public spending exacerbated the economic recession, leading to a decline in fiscal revenues. Depositors, losing confidence in the government’s ability to maintain the exchange rate, withdrew their deposits and converted them into dollars, further depleting reserves. By 2001, in a climate of widespread panic, an increasing number of people began to anticipate “massive losses on all savings in pesos”. In response, the authorities restricted bank withdrawals to 1000 pesos per month, effectively freezing some dollar deposits. In December 2001, under pressure from widespread protests, De la Rúa resigned. Shortly afterwards, the new government declared a partial default on public debt and ended the convertibility regime (Calcagno, 2019; Sgard, 2002).

During the final months of 2001 and early 2002, there was an overwhelming fear of the complete destruction of the national currency and a spontaneous dollarisation of the economy. The choice became increasingly clear: either fully adopt the dollar as the national currency or rebuild a sovereign monetary regime. The government opted for “pesification,” which involved converting assets and liabilities denominated in dollars into pesos. The economic consequences of the subsequent devaluation were dramatic: GDP declined by 16% in the first quarter of 2002, unemployment rose from 16% to 21%, and real wages dropped by 24% over the year (Lo Vuolo, 2007).

⁴ The Tequila Crisis was sparked by the announcement of a nominal devaluation of 15% in December 1994, which culminated in a 43% devaluation of the currency rate by March 1995. (Lederman & al., 2000)

3.2. Recent economic context

3.2.1. From 2002 to 2006

From 2002 to 2006, Argentina's economic crisis transformed into a remarkable recovery. In 2002, Argentina defaulted on over \$100 billion in debt, plunging the country into recession (Ahmad, 2019). Nevertheless, the country experienced strong economic recovery under the administration of Néstor Kirchner (2003–2007) (Wylde, 2011).

The robust recovery was primarily driven by the abandonment of the high real exchange rate policy implemented during the 1990s. The significant devaluation of the peso at the end of 2001, followed by the abandonment of the Convertibility Plan, which had pegged the peso to the dollar at a fixed rate, initially caused a deep crisis. However, by 2003, the industrial sector, supported by a favourable exchange rate, began to grow dynamically. From this point, the official peso exchange rate (ARS/USD) remained stable at around 3 ARS to 1 USD (see appendix 1), ensuring increased price competitiveness for exporters and protecting domestic producers. This favourable environment created a virtuous cycle of growth (Salama, 2011).

Table 1, featuring macroeconomic data, highlights this economic recovery: following a sharp decline in GDP in 2002 (-10.89%), growth rebounded strongly in 2003 to +8.84%, then consistently remained above 8% until 2006, reaching +8.05% that year. During this period, GDP more than doubled, increasing from \$97.7 billion in 2002 to \$232.6 billion in 2006. Similarly, exports of goods and services saw significant growth, rising from \$27.7 billion to over \$53.5 billion, supported by the *Modelo de Acumulación con Matriz Exportadora* ("Accumulation Model with Export Matrix"), which enabled growth based on exports. This success was attributed to maintaining a stable and competitive real exchange rate (SCRER), fostering growth in trade and foreign investment (Finkel, 2017).

Debt also saw notable improvement. According to data from appendix 2, external debt decreased from \$148.3 billion in 2002 to \$118.9 billion in 2006, while the ratio of public debt to GDP dropped from 147.2% to 70.8%. This improvement was largely due to a debt restructuring operation carried out with private creditors in 2005, during which 76.15% of bonds were restructured. In 2006, Argentina fully repaid its debt to the IMF (Gianella & Pupperto, 2016).

The data from appendix 3 on unemployment confirms the virtuous cycle: the unemployment rate fell from 19.59% in 2002 to 10.08% in 2006, while poverty levels also decreased significantly. Economic recovery led to increased employment despite the reduction in real wages caused by the crisis. This rise in employment stimulated consumption, which in turn "drove" growth (Salama, 2011).

Regarding dollarisation, although Argentina experienced relative "de-dollarisation" following the 2001 crisis, the dollar remained "the reference currency for pricing durable goods (such as real estate) and the preferred vehicle for savings". This indicates that, despite the end of the

convertibility regime, the dollar's role in the Argentine economy did not entirely disappear (Gianella & Pupperto, 2016).

Between 2002 and 2006, private sector deposits and loans grew in both pesos and dollars, reflecting a notable improvement in the economic climate and renewed confidence in the financial system. For example, private sector deposits denominated in ARS increased from 63,350.74 million ARS in 2002 to 107,103.18 million ARS in 2006. Simultaneously, deposits in USD surged from 2,214.29 million to 15,178.41 million USD, nearly a sevenfold increase. This dramatic rise in dollar-denominated deposits suggests that, despite economic recovery and some monetary stability, economic agents continued to regard the dollar as a preferred savings vehicle.

3.2.2. From 2007 to 2012

In 2007, Argentina's GDP growth rate stood at 9.01%, with a total GDP of 287.53 billion USD (see appendix 5). However, in 2009, the country experienced a severe contraction of -5.92%, a consequence of the Global Financial Crisis (GFC). The economy rebounded in 2010 with a spectacular growth rate of 10.13%, followed by 6.00% in 2011, before ending the period with a slight contraction of -1.03% in 2012 (appendix 5). This post-crisis recovery was largely driven by expansionary fiscal policies, increased exports, and foreign investments. However, the recovery was constrained by inflationary pressures and tensions over external solvency (Pesce & Feldman, 2023).

Regarding inflation, appendix 5 shows an oscillation between 8% and 10% from 2007 to 2012, according to official data from Instituto Nacional de Estadística y Censos (INDEC). However, private estimates suggest average figures between 20% and 25%, revealing stronger inflationary pressures than those reflected by official statistics (Llach, 2013).

The inflation rate during this period can be attributed to several factors. First, an expansionary monetary policy: relatively low interest rates (reaching as low as -8.57% in 2010, according to appendix 5). This policy aimed to stimulate the economy, including consumption and investments, but also increased the money supply (Damill & Frenkel, 2013).

Secondly, the depreciation of the peso: the official exchange rate fell from 3.10 ARS/USD in 2007 to 4.54 ARS/USD in 2012 (appendix 5), making imports more expensive and thereby raising the prices of domestic goods and services. In 2011, the government introduced the "*cepo cambiario*" (currency controls), aimed at preventing capital flight and protecting the Central Bank of Argentina's (BCRA) foreign exchange reserves. However, this measure led to a widening gap between the official exchange rate and the parallel market rate (known as the "dollar blue" in Argentina). Indeed, when the official exchange rate is artificially kept low relative to the real demand for foreign currency, a parallel market emerges to reflect the dollar's actual value on the free market. By 2012, the dollar blue reached nearly 15 ARS/USD, compared to the official exchange rate of 4.54 ARS/USD, which was less than a third of

the parallel rate. This divergence highlighted a loss of confidence in the Argentine peso and its value. Both businesses and private individuals sought to hold assets in dollars as a hedge against inflation (Sánchez, 2017).

Additionally, the increased demand for dollars reduced the BCRA's international reserves, limiting its ability to intervene effectively in the foreign exchange market, which further exacerbated inflationary pressures (Pesce & Feldman, 2023).

The dollarisation of private sector portfolios continued to rise, with private sector deposits in dollars nearly doubling between 2007 and 2012 despite the introduction of currency controls. This trend highlights the influence of the parallel market. Negative real interest rates, currency controls, and expansionary monetary policies made the choice of dollar-denominated assets a rational one, further increasing informal dollarisation (Damill & Frenkel, 2013).

As previously mentioned, international reserves decreased, dropping from \$44.7 billion USD in 2007 to \$39.9 billion USD in 2012. This decline limited Argentina's ability to counter external pressures on the peso (Pesce & Feldman, 2023). This inability to stabilise the currency contributed, among other factors, to the rise of partial dollarisation.

Thanks to rigorous fiscal management and a debt restructuring in 2010, public debt improved significantly, falling from 62.13% of GDP in 2007 to 40.43% in 2012 (appendix 6). However, external debt persisted, representing approximately 35% of GDP in 2012, despite a slight reduction due to bond transactions with private creditors (Gianella & Pupperto, 2016).

Between 2007 and 2012, the current account balance shifted from a surplus of \$6.05 billion USD to a deficit of \$2.14 billion USD (appendix 6), reflecting a weakening of external balances. This decline can be attributed to an increase in imports coupled with a decrease in exports, both consequences of the 2008 crisis. After a temporary improvement in 2009 attributed to a drop in imports and a recovery in external trade, the current account balance deteriorated once again. This deterioration was driven by increased domestic demand and the devaluation of the peso, which made imports more expensive while reducing their competitiveness (IMF, 2013).

3.2.3. From 2013 to 2023

Between 2013 and 2023, this period appears to have been characterised by growing debt, exchange rate volatility, and persistent inflation. Indeed, as shown in appendix 9, Argentina experienced a multitude of economic fluctuations. By 2023, GDP reached USD 640.5 billions with a growth rate of -1.55% . The data highlights phases of expansion (2.82% in 2017, 10.72% in 2021) as well as phases of recession (-2.00% in 2019).

During the 2013–2015 period, an expansionary monetary and fiscal policy was implemented to boost domestic demand, with the aim of sustaining growth. Negative real interest rates persisted, accompanied by expansionary fiscal policies. The total deficit (primary deficit)

averaged 2.6% (0.9%) of GDP (appendix 9), financed in part by the BCRA transferring funds to the National Treasury. The economy oscillated between periods of growth and recession, leading to long-term stagnation, with an average annual growth of 0.37% between 2012 and 2015, while inflation stabilised at an annual rate of 25% to 30% (appendix 9). These stimulus measures reignited the economy but simultaneously exerted upward pressure on prices (Pesce & Feldman, 2023).

At the end of 2015, Macri's government came to power, with its first major decision being the introduction of Inflation Targeting (IT) and a change in the direction of the BCRA. Under this framework, the exchange rate was allowed to float. The IT regime aimed to control inflation stemming from increased demand and rapid economic growth, rather than cost-push inflation. As noted by Santiago Graña-Colella and Matías Vernengo (2024), this framework stipulated that “the Central Bank would raise interest rates whenever inflation exceeded the targets”. However, this approach led to a significant increase in domestic interest rates, while international interest rates remained exceptionally low.

Simultaneously, Argentina's access to international capital markets was restored in early 2016 following an agreement with holdout creditors. This lifting of capital flow management (CFMs) measures and the reopening of access to international markets led to significant financial inflows between 2016 and 2017. However, the initial 40% devaluation of the peso and the increase in public costs drove inflation up to 39.4% in 2016 (initial target: 25%) (Pesce & Feldman, 2023).

According to Hellmund, Arnaud, Abreu, & Colmenarez (2023), the massive influx of capital led to a rapid increase in sovereign debt, but also heightened the risk of sudden outflows when confidence waned. Attracted by high returns in pesos, international capital flowed into Argentina. Data reveals a significant shift in foreign-currency-denominated debt: the complete opening of the capital account, combined with high interest rates, had far-reaching effects. In 2016, the fiscal deficit rose from 2.7% of GDP to 4.8% in 2017 and 5% in 2018 (appendix 10). By 2017, demand for foreign assets surged, exceeding 4% of GDP. Between December 2015 and March 2018, foreign-currency debt increased by 54%, as Argentina became the largest issuer of sovereign bonds among emerging markets between January 2016 and April 2018 (Pesce & Feldman, 2023).

At the end of 2017, the government instructed the Central Bank to significantly lower interest rates, aiming to encourage further depreciation of the peso and partly to achieve lower real wages. This reduction in interest rates, coupled with a rise in adjusted external rates, triggered accelerated capital flight and a reduction in international reserves, leading to a rush towards the dollar (Graña-Colella & Vernengo, 2024).

The data in the tables aligns with these observations: in 2017, the Argentine peso fluctuated between 15 and 20 ARS/USD, while inflation reached 24.8%, far exceeding the initial targets of 13% to 17%. Increased demand for foreign assets exceeded 4% of GDP that same year

(Pesce & Feldman, 2023). At the same time, the current account deficit widened, from 2.7% of GDP in 2016 to 4.8% in 2017, highlighting the growing vulnerability of the Argentine economy to capital outflows.

This capital flight and the continued depreciation of the peso placed significant pressure on international reserves. Consequently, the government turned to the IMF in 2018 for emergency funding (Graña-Colella & Vernengo, 2024). The goal was to restore confidence and halt the outflow of capital. The IMF approved the largest loan in its history: USD 57 billion, with the majority (88%) intended for use before the October 2019 elections (Calcagno, 2019).

In 2018, the US Federal Reserve's increase in interest rates reduced the attractiveness of Argentine bonds on the international market, exacerbating concerns about the sustainability of the country's public debt. These factors triggered a sudden reversal of capital flows, characterised by massive outflows. As a result, the Argentine peso experienced a sharp depreciation, further worsening inflation. The rising volatility in emerging markets and growing concerns about the sustainability of Argentina's public debt had a significant impact on the foreign exchange market (Pesce & Feldman, 2023).

The capital flight and continued depreciation of the peso placed severe pressure on international reserves. Consequently, the government turned to the IMF in 2018 for emergency funding (Graña-Colella & Vernengo, 2024). The objective was to restore confidence and halt the capital flight. The IMF approved the largest loan in its history: USD 57 billion, with the majority (88%) earmarked for use before the October 2019 elections (Calcagno, 2019). During this period, public debt soared, rising from 52.6% of GDP in 2015 to 82% in 2018 (appendix 10). This rapid increase was driven by a combination of factors: the inability to reduce public spending, a contraction in GDP, rising debt servicing costs, and successive depreciations of the peso (Salama, 2019).

As part of the Stand-By Agreement⁵ with the IMF, Argentina replaced inflation targeting with monetary base control and fiscal consolidation. Despite these measures, inflation surged to 47.6% in 2018 and 53.8% in 2019, while the peso depreciated by 196% against the dollar. Over this period, GDP contracted by 4.5%, deepening the economic crisis. At the end of 2019, a new government abandoned monetary base control.

The new government, which took office in December 2019, faced the Covid-19 crisis: in 2020, GDP contracted by -9.9%, while the state increased its support spending (appendix 9). The policy response to the pandemic was heavily influenced by the pre-existing economic situation. To counter the effects of the health shock, fiscal measures equivalent to approximately 5% of GDP were implemented. This led to a rise in the primary fiscal deficit, which reached 6.4% of GDP (Pesce & Feldman, 2023).

⁵ The Stand-by Arrangement (SBA) offers nations with balance of payments issues short-term financial support. (IMF)

In 2020, inflation temporarily slowed to 42%, while international reserves remained very low at USD 35.6 billion (Appendix 9). The exchange rate soared, climbing from 48 ARS/USD to 70 ARS/USD that year. The economy experienced a 9.9% contraction in GDP due to the Covid-19 pandemic but rebounded with growth of 10.4% in 2021 and 5.2% in 2022 (Appendix 9). However, an exceptional drought in 2023 resulted in estimated trade losses of USD 20 billion, a decline in fiscal revenues from exports (-0.6% of GDP), and tighter controls on accounts to preserve international reserves (Carluccio & Cezar, 2021).

At the same time, inflation and the fiscal deficit persisted. In 2020, the fiscal deficit reached 6.4% of GDP before narrowing to -1.8% in 2022. Inflation, which had fallen to 36.1% in 2020, surged to 50.9% in 2021 and 94.8% in 2022, eventually peaking at 214.4% by the end of 2023. This sharp rise was driven by substantial monetary issuance to finance the Treasury (Sembler et al., 2024). Finally, in 2023, Argentina faced a severe economic crisis, described as one of the worst in its history. By the end of the year, approximately 40% of Argentinians were living in poverty, while 10% were in a state of indigence. (Messari, 2024)

Argentina's economic trajectory, characterised by recurring crises, structural inflation, and episodes of hyperinflation, underscores the complexity of addressing its financial challenges. The instability, alongside unsustainable debt, fiscal deficits, and a reliance on foreign capital, has increased informal dollarisation as a coping mechanism for economic agents.

Chapter 4: The case study of Ecuador

After permanently abandoning its native currency in favor of the U.S. dollar in 2000, Ecuador makes an interesting case study. This country is now a prominent example of a nation that chose to adopt a completely dollarised system in the face of inflationary pressures and several monetary crises.

4.1. Economic situation before dollarisation

It is essential to first examine the economic situation Ecuador faced to understand what led to its decision to adopt full dollarisation.

During the 1990s, Ecuador experienced a series of economic turbulences that gradually eroded the country's financial stability. Since 1994, Ecuador had been experiencing a monthly inflation rate of 4%, which led to the emergence of unofficial dollarisation. Alongside this, non-banking institutions issued quasi-money⁶, as they lacked the dollars needed to pay their workers and bills. This de facto dollarisation already indicated a gradual shift towards the use of the US dollar, reflecting the population's loss of confidence in the national currency. This was followed by a massive capital flight, which further exacerbated the depreciation of the Sucre (Ecuadorian currency before dollarisation) and, in turn, triggered an economic and fiscal crisis. Public deficits deepened, with public debt increasing from 48% to 72% of GDP within just four years between 1995 and 1999 (Connolly, 2024).

This situation plunged Ecuador into an economic and political crisis, described by some as the most severe in its history. The crisis was caused by a combination of internal and external shocks, including a sharp drop in oil prices⁷, the El Niño weather phenomenon⁸, and the Asian financial crisis⁹. The banking crisis led to massive withdrawals and the freezing of bank accounts, further amplifying the general mistrust in the financial system. As a result, more than half of the country's banks either went bankrupt or required government bailouts. By the end of 1999, the majority of major transactions were already being conducted in US dollars, even before official dollarisation was announced. This crisis resulted in a contraction of the Ecuadorian economy, with GDP growth dropping from 3.3% in 1998 to -4.7% in 1999 (see table 1). Furthermore, inflation reached 60% in the same year, and by 2000, the Sucre had depreciated by almost 200% against the US dollar, while the Central Bank of Ecuador ran out of international reserves. As highlighted in the table 1, reserves declined from \$1.6 billion in 1999 to \$0.95 billion in 2000 (Beckerman & Solimano, 2002).

⁶ "Quasi-money" refers to financial assets that are not directly usable as a medium of exchange (like cash or demand deposits) but can easily be converted into money. These assets include savings accounts, time deposits, and other highly liquid financial instruments (Cartas & Harutyunyan, 2017).

⁷ From 18 dollars per barrel in 1996 to 9.2 in 1998 Larrea, C. (2004)

⁸The first shock emerged from the most severe floods ever recorded in the Coast, as a result of a devastating "El Niño" phenomenon in 1998. Larrea, C. (2004)

⁹The effect in Latin America was a sudden and massive withdrawal of short-term capital from the region. Larrea, C. (2004)

4.2. Motivations for dollarisation

The aim was to stabilise the economy by controlling inflation, restoring confidence in the financial system, and attracting new capital (Connolly, 2024). The implementation of dollarisation was intended to address inflation, ending speculative attacks on the national currency, and tackling the ongoing issues of budgetary deficits and poor monetary management in Ecuador (Cueva & Diaz, 2019).

Dollarisation was therefore seen as the only means of rescuing the country from the political and economic instability that had impoverished it since the early 1990s. Confidence in the Sucre had plummeted to such a degree that by the end of 1999, most large transactions were already being conducted in US dollars, even before the official dollarisation policy was announced (Jacome, 2004). By December 1999, loans in US dollars accounted for 89% of all loans, while dollar-denominated deposits rose to 66.6% of total deposits (Ares, 2001).

Dollarisation was thus perceived as the sole pathway to extricate the country from the political and economic instability that had plagued it since the early 1990s. On 9 January 2000, President Jamil Mahuad announced the dollarisation of the Ecuadorian economy, converting all Sucre deposits into US dollars at an exchange rate of 25,000 Sucres per dollar (Cueva & Diaz, 2019).

4.3. Costs and challenges of dollarisation

In the case of Ecuador, the implementation of dollarisation meant that the country could no longer pursue its own monetary policy, becoming entirely dependent on the monetary policy of the United States. As a result, the central bank was unable to respond to internal or external economic shocks with tailored monetary measures (Beckerman & Solimano, 2002).

This lack of monetary policy has led to several notable challenges following dollarisation, particularly regarding public debt and exports. Unconventional measures, such as central bank loans to the government, characterised Ecuador's economic management under dollarisation, weakening confidence in this system (Carpio Vinueza, 2022). Between 2007 and 2017, public spending rose from 16% to 23.5% of GDP, resulting in a tripling of external debt to \$31.5 billion, often contracted under unfavourable conditions. These challenges highlight the limitations of dollarisation, exacerbated by average budget deficits of 3.5% of GDP and external factors (Cueva, 2022). Moreover, dollarisation weakened Ecuador's competitiveness compared to other South American economies that retained the ability to devalue their currencies. This disadvantage particularly affected non-oil exports, as Ecuador was unable to adjust its exchange rate to sustain competitiveness in global markets (Álvarez-Vásquez et al., 2018).

Regarding the inevitable loss of seigniorage (discussed in Chapter 2: Benefit-cost analysis of dollarisation), Ecuador lost approximately \$20 billion in seigniorage revenue to the US Treasury over a period of 20 years. By 2023, the estimated cost of lost seigniorage and the

inflation tax was slightly more than 1% of its GDP (Connolly, 2024). Additionally, the initial costs of ensuring an effective transition to the dollar amounted to \$534 million, including menu costs for updating IT systems, accounting frameworks, and cash registers (Carpio Vinueza, 2022).

4.4. Benefits

Despite the costs and challenges, dollarisation has brought several notable benefits to Ecuador.

Firstly, as discussed in Chapter 2, one widely agreed advantage in the literature is the stabilisation of inflation. Ecuador saw its inflation drop significantly, from 60% in 1999 to 9% in 2002 (appendix 18). Furthermore, the economy resumed growth, with GDP increasing from -4% in 1999 to 4% in 2001, maintaining annual growth for five consecutive years (appendix 18). Additionally, a marked reduction in interest rates was observed: while rates hovered around 90% in January 2000, borrowing rates fell to approximately 15% (Ares, 2001). This price stabilisation restored confidence and attracted investors to the Ecuadorian economy (Beckerman & Solimano, 2002). Notably, since dollarisation, Ecuador has not experienced high inflation rates, indicating a lasting impact (Cachanosky et al., 2024).

Another significant benefit has been the growth in Foreign Direct Investment (FDI), facilitated by the elimination of exchange rate risk. By eliminating this risk, Ecuador became more attractive to foreign investors, stimulating the national economy and strengthening the country's ability to attract foreign capital (Carpio Vinueza, 2022).

4.4.1. Comparison with Argentina

The table below presents Ecuador's economic indicators prior to dollarisation alongside their corresponding values in 2023.

Economic indicators	1999	2023
Inflation rate (%)	60.7	1.3
GDP growth (%)	-4.739	2.355
Unemployment rate (%)	4.642	3.367
M2 (in billion of USD)	13.15	53.29
Reserves (billion USD)	1,6	2,7
Current balance (% of GDP)	4.9 (-8 in 1998)	1.9
Public debt (% of GDP)	72.1	60.5
Foreign currency reserves (in millions of USD)	350	8300

Foreign direct investment, net inflows (% of GDP)	3.30	0.32
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Table 1: Economic indicators in Ecuador (1990-2023), source: IMF, Wold Bank, ECLAC

The Ecuador's experience shows that full dollarisation can result in significant economic stabilisation, including a significant decrease in inflation. In fact, the economy was able to lower its inflation rate from 60.7% in 1999 to just 1.35% in 2023 following the official adoption of the US dollar in January 2000 (Castillo-Ponce, Truong & Rodriguez-Espinosa, 2021). In addition to restoring investor and citizen confidence, this stabilisation has supported economic growth, as seen by the GDP's increase from -4,739% in 1999 to 2,355% in 2023 (Dávila Toro, Heredia Logroño & Loor Gómez, 2024).

However, this shift to dollarisation has not been without its challenges. Strict fiscal management and the strengthening of monetary institutions have been necessary to maintain stability over the long run. The economist had to implement strict fiscal reforms to control the public debt, which increased from 48% to 72% of the GDP between 1995 and 1999 (Dávila Toro et al., 2024). Although dollarisation has provided price stability, it has not resolved structural financial imbalances, as evidenced by the fact that in 2023, the public debt remains high at 60% of the GDP, highlighting the fact that price stability alone is insufficient to address serious economic issues (Cachanosky et al., 2024).

Additionally, over a 20-year period, the country had to deal with a loss of seigniorage of about \$20 billion and initial transition costs of \$534 million, including updating accounting and computer systems. These actions have been essential to ensure an efficient management of reserves in terms of instruments, strengthening the economy's resilience to external shocks (Connolly, 2024; Carpio Vinueza, 2022).

The table below compares Ecuador's economic situation prior to dollarization with Argentina's situation in 2023.

	Ecuador	Argentina
Economic indiators	1999	2023
Monetary regime	Dirty float	Exchange control
Inflation rate (%)	60.7	133.5
GDP growth (%)	-4.739	-1.55
Unemployment rate (%)	4.642	6.178
Reserves (billion USD)	1,6	19
Current balance (% of GDP)	4.9	-3.24
Public debt (% of GDP)	72.1	88

Dollar deposits/total deposits (%)	66.6	24.3
Monetary Reserve at Dollarisation (in millions of dollars)	872,726	27,955
Broad money (% of GDP)	13.15	36.01
Broad money to total reserves (%)	1.37	10.08
Foreign direct investment, net inflows (% of GDP)	3.30	3.69

Table 2: Comparison of indicators in Ecuador vs Argentina (1990-2023), source: IMF, Wold Bank, ECLAC

In contrast, Argentina faces comparable economic challenges in the form of high inflation (133.5% in 2023) and recession (-1.55 percent of the GDP). In contrast to the Ecuador, Argentina maintains an informal dollarisation, with just 24.3% of its deposits in dollars compared to 66.6% prior to its dollarisation (Fernandez Pereira, 2024). Furthermore, Argentina's public debt is 88% of the GDP, which is far higher than the Ecuador's, and the current negative balance of -3.24% of the GDP highlights more severe economic and physical imbalances (Castillo-Ponce, Truong, & Rodriguez-Espinosa, 2021).

The comparative table highlights a number of structurally significant differences between the two countries. While the Ecuador was able to stabilise its economy through a high percentage of dollar deposits and strict fiscal management, Argentina, with a higher currency offer and relatively low devise reserves compared to its GDP, may face similar challenges to the Ecuador prior to dollarisation (Fernandez Pereira, 2024). The Milei team estimated that it would take about \$35 billion to implement a full dollarisation without requiring further evaluation (Dávila Toro et al., 2024). Furthermore, Argentina's experience with the 1991 Convertibility Plan has shown that monetary rigidity can lead to an overvaluation of the currency, reducing the competitiveness of exports and exacerbating budget and current account deficits, ultimately leading to default and triple-digit inflation in 2023 (see Chapter 3: Argentina's historical economic context).

Ecuador's experience shows that full dollarisation can be an effective solution for stabilising an economy in crisis, provided that it is accompanied by rigorous fiscal reforms and a strengthening of monetary institutions. For Argentina, although dollarisation could bring similar benefits, such as a rapid stabilisation of inflation and a restoration of economic confidence, it must take account of the country's specific structural features and the lessons learned from the Ecuadorian case. In particular, it is crucial to avoid inefficient fiscal management and over-reliance on foreign exchange reserves. The comparative table underlines the decisive role of rigorous fiscal management, an adequate level of foreign exchange reserves and increased economic competitiveness in ensuring the success of dollarisation. Therefore, any assessment of the viability and potential impacts of full dollarisation in Argentina must be based on a careful adaptation of these factors to its specific economic and social context (Dávila Toro et al., 2024).

III. Research question and hypothesis

After thoroughly analysing the theoretical advantages and disadvantages of full dollarisation, with a particular focus on the case study of Ecuador, and assessing its impact on key economic indicators, we are now in a position to formulate a relevant research question:

To what extent could the adoption of full dollarisation stabilise the Argentine economy, drawing inspiration from the experiences of Ecuador and El Salvador?

In the first part of the literature review, we defined full dollarisation and distinguished its various regimes (de facto vs de jure, partial vs full). We then explored the theoretical advantages and disadvantages of full dollarisation and conducted an in-depth analysis of Argentina's economic context.

Full dollarisation appears to offer significant theoretical benefits, notably price stabilisation through reduced inflation (Edwards & Magendzo, 2001; Levy Yeyati & Sturzenegger, 2002). It also enhances monetary credibility, fostering foreign investment and boosting economic growth (Berg & Borensztein, 2001; Quispe-Agnoli & Whisler, 2006). However, it also comes with substantial drawbacks, such as the loss of monetary sovereignty, which limits a country's ability to conduct independent monetary policies to respond to internal and external economic shocks (Goldfajn & Olivares, 2000; Bogetić, 2000). Additionally, dollarisation imposes fiscal constraints and increases the dependency on foreign currency reserves, potentially exacerbating budgetary imbalances and limiting the government's fiscal flexibility (Cueva & Diaz, 2019; Calvo, 2001). Following a theoretical analysis, the case study of Ecuador provided practical insights into the implications of full dollarisation in real-world contexts. In Ecuador, full dollarisation resulted in a drastic reduction in inflation and notable economic recovery but also led to an increase in public debt and a loss of seigniorage revenue. (*Fernandez Pereira, 2024*). After analysing Ecuador's experience, we compared the country's post-dollarisation situation to Argentina's current economic situation in 2023. This comparison highlights certain similarities, such as high inflation and significant public debt, but also notable differences, such as economic and institutional structures.

Based on these observations, we propose the following hypothesis:

The adoption of full dollarisation could significantly reduce inflation and promote GDP growth in Argentina, thereby contributing to greater economic stability.

This study aims to examine the impact of full dollarisation on economic stability by focusing on the cases of Ecuador and El Salvador, two nations that have adopted this regime. The primary objective is to determine to what extent the adoption of dollarisation could stabilise Argentina's economy, drawing inspiration from the successes and challenges experienced by Ecuador and El Salvador.

IV.

Quantitative study

Chapter 5: Objectives and methodology

5.1. Purpose of the study

Academic literature suggests that dollarisation may have a positive effect on inflation. Additionally, according to some economists, it might provide greater economic stability (this subject has already been covered in detail; see section 2.3). Argentina, a country marked by decades of macroeconomic instability, chronic inflation, and frequent recessions, has considered dollarisation on multiple occasions, particularly since the introduction of the currency board (*caja de conversión*) (Gianella & Pupperto, 2016).

It is essential to empirically assess whether the implied effects of dollarisation actually materialise in comparable contexts before implementing such a measure. In this regard, the experiences of El Salvador and Ecuador, two nations that already adopted dollarisation at the beginning of the 2000s, provide relevant case studies for analysing the actual effects of this monetary regime (Minda, 2005).

In countries that have already been dollarised, namely Ecuador and El Salvador, this study aims to assess the effects of full dollarisation on two key economic indicators: inflation and GDP. More specifically, the goal is to ascertain whether the introduction of dollarisation has resulted in supported economic growth and a significant decline in inflation rates, as some economic theories suggest. The next step is to use the findings from the Ecuador and El Salvador cases to predict the possible effects of dollarisation in Argentina.

The study adopts a quantitative approach, using annual data from 1990 to 2023 to examine the long-term effects of dollarisation. Due to the challenges of obtaining detailed data for this entire period, the study prioritises the use of annual data, which are more accessible and quantifiable. Ecuador and El Salvador are included in the panel dataset, enabling an analysis of their specific trajectories over time. Panel data provide the advantage of tracking individual trends while examining the relationships between variables across time. By incorporating a temporal dimension, this approach facilitates a better understanding of causality and the sequence of events (Smith, Berrington, & Sturgis, 2006).

Two models will therefore be estimated using multiple linear regression analysis:

1. Inflation: examines how dollarisation affects inflation rates by using an indicator that reflects the dollarisation regime.
2. GDP growth: evaluates the effect of dollarisation on economic growth by taking the GDP growth into account as a dependent variable.

In addition to the independent variables described in the next section, these models will also include an indicator variable that represents the dollarisation regime (0 or 1 for each year, depending on when dollarisation was adopted). To ensure the validity of our models, additional statistical tests will be conducted following the data cleaning and the implementation of our linear regressions. The studies will be conducted using RStudio, a statistical calculation program known for its flexibility and robustness (Paradis, 2005).

5.2. Description of the databases used

Data collection plays a crucial role in regression analysis, as the reliability of any regression model is directly dependent on the quality of the data used. Effective data collection ensures that the model is both simplified and more applicable, particularly when conducting a retrospective study based on historical data.

To enhance clarity, it is important to provide a detailed description of each database utilised in this study. As emphasised, the reliability of regression analysis is contingent upon the quality of the data, and thus, a robust and well-chosen dataset is fundamental to producing accurate and applicable results (Montgomery, Peck, & Vining, 2021).

Our study is based on historical data from 1990 to 2023, for Ecuador and El Salvador. A total of 211 observations were collected for the 10 variables analysed over a 33-year period. In appendix 18 and 19, we have identified all the historical data for the 2 dependent variables and the 8 independent variables respectively. Appendix 20 contains a table showing the names assigned to the variables.

To conduct this study, we decided to use annual data, all from official databases (each dataset used is described in '*data justification*'): the Federal Reserve Economic Data (FRED), the Economic Commission for Latin America and the Caribbean (ECLAC), Trading Economics, the International Monetary Fund (IMF), the World Bank (WB), and the Central Bank of El Salvador (BCR). The data period spans from 1990 to 2023, focusing on Ecuador and El Salvador. Each variable's relevance to the study is explained in the next section. However, it is important to note that some data were unavailable, such as the unemployment rate for 1990 and 1991, which were approximated using the mean (details are provided in the following section). Additionally, the dataset on the deposit rate for Ecuador required supplementation with IMF publications.

Below, you can find a table which underscores the description and justification of all the databases used.

Variable	Type	Source	Description	Justification
Inflation, Consumer Prices (Annual %)	Dependent Variable	FRED: Federal Reserve Economic Data of Saint Louis	« Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services. » (FRED, n.d.-a)	Inflation, as a dependent variable, is a justified choice due to the fact that, theoretically, dollarisation appears to have an immediate impact on it. The authors (see chapter 2) agree on a reduction in inflation following the adoption of dollarisation. Given Argentina's experience with persistent inflation, and in recent years, "uncontrollable" hyperinflation, it becomes particularly relevant to quantitatively examine the effect of dollarisation on this variable. (see chapter 3)
GDP Growth Rate (Annual %)	Dependent Variable	FRED: Federal Reserve Economic Data of Saint Louis	Annual percentage growth rate of GDP at market prices based on constant local currency. The aggregates are based on constant 2015 prices, expressed in U.S. dollars. (FRED, n.d.-b)	GDP is selected as a dependent variable because it represents the overall economic activity and performance, making it a widely recognised and standard measure for assessing economic growth and development. By analysing GDP fluctuations, this study evaluates the impact of dollarisation on a country's economic well-being (World Bank Group Open Data, n.d.-c). Additionally, GDP is a crucial indicator as it provides insights into the size and performance of an economy. The growth rate of real GDP is often regarded as a key measure of economic health, with increases in real GDP generally interpreted as a positive sign of economic progress (IMF, n.d.-a).
Unemployment , Total (% of Total Labor Force)	Independent Variable	World Bank	Unemployment refers to the share of the labor force that is without work but available for and seeking employment. (World Bank Group Open Data, n.d.-a). Calculated for 1991 for Ecuador and El Salvador through a mean.*	Many studies suggests that unemployment has a negative impact on the economic growth. A decrease of the unemployment rate should have a positive impact on the GDP (Kukaj, 2018). Inflation and unemployment have historically maintained an inverse relationship. Low levels of unemployment seems to be related to a higher inflation, while high unemployment to a lower inflation. (Investopedia, n.d-a)
Broad Money (% of GDP)	Independent Variable	World Bank	Broad money is a measure of the amount of money circulating in an economy. In this case, it represents M2 which is the total money supply, including all the cash people have on hand, plus all the money deposited in checking accounts, savings accounts, and other short-term saving vehicles such as certificates of deposit (CDs) (Investopedia, n.d.-c). Broad money is derived by dividing current-year broad money by current-year GDP and multiplying by 100. (World Bank Group Open Data, n.d.-b)	An increase in the money supply should impact inflation by stimulating overall demand, which can lead to rising prices. As the money supply continues to grow, inflation expectations increase. Conversely, a reduction in the money supply should slow inflation. (Econlib, n.d.) The impact of money supply on GDP seems to be indirect, changes in the money supply should impact key variables like employment and price stability, which are critical for GDP performance. (Haqq & Hussein, 2017)
Total Reserves Minus Gold (current US\$)	Independent Variable	World Bank, Central Bank of El Salvador (BCR)	Total reserves includes reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities. (World Bank Group Open Data, n.d.-c) Last two data points for El Salvador are from the Central Bank of El Salvador's database.	The quantity theory of money suggests that accumulating reserves can create inflationary pressures if monetary expansion is not fully controlled and surpasses the growth in money demand. Thus, an increase in reserves could possibly increase inflation (Steiner, 2017). Reserves are essential for stabilizing the economy in the face of external shocks. They strengthen investor confidence, thereby promoting exports, which are direct drivers of economic growth. Consequently, there is a positive relationship between reserves and GDP growth (Benli, Ekinci & Orhan, 2022).
Current Account Balance (% of GDP)	Independent Variable	International Monetary Fund (IMF)	« The current account is the record of all transactions in the balance of payments covering exports and imports of goods and services, payments of income, and current transfers. » (IMF, n.d.-b)	An increase in the current account deficit can happen due to more imports, which might bring in inflation. However, more imports can also help meet domestic demand, which reduces pressure on prices. (Redalyc, n.d.-c) An increase in the current account deficit can directly lower GDP by increasing imports. While a growing deficit can also show weak exports or too much reliance on foreign goods, which might impact production and lower the country's economic output. (Benli, Ekinci & Orhan, 2022)
Net Lending/ Borrowing (Overall Balance)	Independent Variable	IMF, IMF Publications	Defined as the difference between revenue and total expenditure. (IMF,n.d.-c) For El Salvador, sourced from IMF; for Ecuador, data from 1995-2023 with IMF data and 1990-1994 with IMF publications.	Deficits from external borrowing can weaken the currency, making imports more expensive and raising inflation. Surpluses, on the other hand, strengthen the currency, reducing import costs and easing inflation (Mehrara, Behzadi Soufiani & Rezaei, 2016). Government spending affects GDP in different ways. Investing in infrastructure or education can boost growth by improving productivity and encouraging private investment. But too much or inefficient spending can slow growth by reducing private sector activity (Diamond, 1990).
Public Debt Stock (% of GDP)	Independent Variable	Economic Commission for Latin America and the Caribbean (ECLAC)	Public debt represents the total amount owed by various levels of government, incurred to cover budget deficits that arise when program spending exceeds revenue. This debt can be sourced domestically or internationally and is typically issued in the form of bonds, treasury bills, or other government securities. (ECLAC, n.d.-a)	When public debt rises, it can lead to inflation because governments may print more money to pay off debts, increasing prices. Higher debt can also boost spending, raising demand and putting pressure on prices (Barquero Romero & Loaiza Marín, 2017). In the short run, higher public debt can stimulate GDP by increasing demand through government spending. However, in the long run, excessive debt may reduce GDP growth by crowding out private investment, raising interest rates, and decrease economy's stability (Jacobo & Jalile, 2023).
Deposit Interest Rate (%)	Independent Variable	Trading Economics (Ecuador), CEPALSTAT (El Salvador)	« The Deposit Interest Rate is the average rate paid by commercial banks to individuals or corporations on deposits. » (ECLAC, n.d.-b) ECLAC for El Salvador Tradings economics for Ecuador	Many studies agreed on the fact that Interest rate and inflation have a strong relationship. When a central bank lower its interest rate, the expected effect is to stimulate the economy, as then the banks rate lower, driving people to consume. More demand, more inflation. At the same time, the deposit rate diminish, to still initiate people to consume. Which then seems to have this relationship: A decrease in the deposit rate should higher the inflation, and a increase should decrease the inflation. (Matheson, 2019) When interest rates rise, borrowing costs increase, discouraging investment and consumer spending, which can slow GDP growth. Conversely, lower interest rates reduce borrowing costs, encouraging investment and spending, thereby boosting economic growth (Budhathoki, Bhattarai & Upadhyaya, 2024).

Real Effective Exchange Rate (REER)	Independent Variable	World Bank	The Real Effective Exchange Rate (REER) index assesses the value of a currency relative to a weighted basket of other currencies, adjusted for inflation differences. It reflects the currency's strength in comparison to the average of its major trading partners' currencies. (World Bank Group Open Data, n.d.-d) The exchange rate could have been chosen due to its strong relationship with the chose to dollarize. However, as we tried to analyze the impact of the dollarization on the inflation, we needed data that were still measurable before and after the dollarization. The exchange rate, after dollarization, is no longer relevant. An increase in REER lowers the cost of imports, helping to reduce inflation, while making domestic goods more expensive, which can decrease demand for local products and ease inflationary pressures. Conversely, a lower REER raises import costs, increasing inflation by making imported goods more expensive. (Islam & Al Faisal, 2024) A higher REER reduces the competitiveness of exports, as they become more expensive in international markets. This can decrease export demand and decrease GDP growth. Additionally, cheaper imports may discourage domestic production, further impacting GDP negatively. Conversely, a lower REER enhances export competitiveness, encouraging foreign demand for domestic goods and boosting GDP (IMF, n.d.).
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Description and justification of the databases used in the quantitative study

*1990 Ecuador: $34.332+4.291+4.367 \approx 4.330\%$
 1990 El Salvador: $37.53+7.88+9.94 = 325.35 \approx 8.45\%$

5.3. Description of the statistical test bases

5.3.1. Multiple linear regression

A linear regression typically aims to respond to the questions : “Are there any relations between dependent and independent variables ?” and “What is the power of this relation ?”. The goal of a regression analysis is to establish a relation between two or more variables. As there is more than one independent variable in the model, it is called a multivariate analysis, which also applies to our model (Uyanık & Güler, 2013).

A multiple regression will therefore analyse and estimate the link between a dependent variable and two ore more independent variables (or predictor variables) (Rodríguez del Águila, & Benítez-Parejo, 2011). Multivariate regression analysis is formulated as in the following (the variables are linearly related to each other):

$$(1) \quad y = \beta_0 + \beta_1 x_1 + \dots + \beta_n x_n + \varepsilon$$

Where

y = dependent variable

β_0 = intercept (represent the value of the dependent variable as the independent ones are equal to 0)

x_i = independent variable

β_i = Parameter (measure the impact of the increase of one unit of the independent variable on the dependent one)

ε = error (everything that is not explained by the independent variables)

(Uyanık & Güler, 2013)

In this case, the dataset comprises panel data, which integrates both cross-sectional and time-series dimensions. It includes multiple entities, each observed repeatedly over different time periods. Consequently, the dataset consists of n entities, with each entity having T observations measured across t time periods (Park & Hun Myoung, 2009).

Thus, the previous model becomes a panel data regression model:

$$(2) \quad y_{it} = a + b \cdot x_{it} + c \cdot z_{it} + \varepsilon$$

With $i = 1, \dots, N; t = 1, \dots, T$

where y_{it} is the observation on the i^{th} region for the t^{th} time period, x_{it} denotes the $k \times 1$ vector of observations on the regressors and ε is the regression error (Baltagi, Song, & Koh, 2003).

By using panel data, we encounter a specific feature related to the modelling of errors.

$$(3) \quad \varepsilon_{it} = \mu_i + v_t + w_{it}$$

where μ_i denotes the unobservable individual-specific effect (which depends only on the individual, hence just i), v_t is dependent on the period t , and w_{it} represents the remainder disturbance (Baltagi, 2001).

Multiple models can be estimated through the different hypotheses that will be chosen for the error term. In our model, we will use fixed effects, and thus assume that μ_i and v_t have constant effects, and not random. Actually, our dataset is considered too small to perform a random analysis (Souakri, 2008).

To validate a linear regression model, we have to respect the various assumptions that comes with a multiple linear model. First, the relationship between independent and dependent variables must be linear. Then, the residuals must follow a normal distribution and, on top of that, they have to show an absence of multicollinearity and no auto-correlation. If any of these assumptions are violated, it can lead to incorrect conclusions and misinterpretation of the results. Verifying these assumptions will ensure accurate interpretations and uphold the integrity of the model (Schreiber-Gregory, 2018).

Those tests will therefore be presented in the following sections and described in the order that they have been performed in our analysis.

5.3.2. Stationarity

A time series is strictly stationary when the distribution function of the random variable is the same at every point. Therefore, when the statistical characteristics of the time series are constant over time, it is said that the time series is stationary (Fuller, 2009).

In other words, a time series is stationary if its mean and variance remain constant over time, and its auto-correlation depends only on the time lag. The first condition means that the expected value of the series should not change and must be finite. If this condition is not met, the data may come from different processes instead of one consistent process. Treating such data as if it comes from a single process can lead to unreliable or misleading results (Baumohl & Lyocsa, 2009).

To test the hypothesis of stationary in our panel data, we used the Levin-lin-Chu (LLC) model. The hypotheses are the following:

$$H_0 : \rho_i = 0$$

$$H_1 : \rho_i < 0$$

Under the null hypothesis, this test assumes that the times series are non stationary (no constant statistical properties over time). The alternative hypothesis states that the time series is stationary, which means that the mean, variance and auto-correlation are constant over time.

The choice of this test resides in the fact that the LLC test impose homogeneity: if the hypothesis is true, they are true for all the time series in the panel (Chapsa, Tabakis, & Athanasenas, 2018).

5.3.3. Normal distribution

One of the most widely used assumption for the multiple linear regression is that the residuals are normally distributed. Significant deviations from normality in the residuals of the regression can greatly impact the reliability of standard inference methods. Therefore, diagnostic tests for normality have crucial role in ensuring the validity of regression models (El-Salam, 2013).

In order to test it in our model, we used the Jarque-Bera test. This model is based on skewness which measure the dispersion from values characteristic of the normal distribution.

The following is based on comparing how far the Skewness (asymmetry) and Kurtosis (Symmetrical deviations) measures diverge from values characteristic of the normal distribution. The distribution is considered as a normal one if the skewness is closed to 0 and if the kurtosis is closed to 3 (Domański, 2010).

Here is the Jarque-Bera (JB) equation:

$$(4) \quad JB = n \left(\frac{S^2}{6} + \frac{(K - 3)^2}{24} \right)$$

The JB has in fact the distribution χ_2^2 (chi-squared distribution with two degrees of freedom), hence we accept the null hypothesis $H_0 : S = 0$ and $K = 3$ with the error ε if and only if $JB < \chi_2^2(\varepsilon)$ (Ciuiu, 2008).

To assess this in our model on RStudio, we used the *jarque.bera.test()* function.

5.3.4. Granger Causality

Testing Granger causality in panel data is crucial for identifying the direction of causal relationships between variables over time. Indeed, the granger causality is based on how well the past values of a times series could predict the future values of another time series. Indeed, Granger introduced a concept of causality based on predictability, where a time series, y_t is said to be causal for another series x_t including past values of y improves the prediction of x . Specifically, if the variance of the prediction error for x_t decreases when the history of y is included, y is considered Granger-causal for x (Shojaie & Fox, 2022). For our model, we used the function *pgrangertest()*, where the null hypothesis states that the variable is not granger causal.

5.3.5. Multicollinearity test

Multicollinearity occurs when two or more predictor variables in a multiple regression model are strongly correlated. In such situations, these variables tend to influence one another, which can affect the stability of the model. When multicollinearity is present, the standard errors of the coefficients increase, leading to an amplification of the variance of those coefficients. To assess multicollinearity in a model, the *VIF()* (Variance Inflation Factor) function is commonly used. The VIF provides a reliable and consistent method for detecting multicollinearity by measuring the degree to which a predictor's coefficient variance is inflated due to its correlation with other predictors (Daoud, 2017).

The interpretation of VIF values is summarised as follow:

VIF Value	Interpretation
$VIF \leq 1$	Not correlated
$1 < VIF \leq 5$	Moderately correlated
$VIF > 5$	Highly correlated

Table 3: VIF values and their interpretations

5.3.6. Heteroscedasticity

One of the main assumptions of the linear regression model is that the variance of the error term must be equal, which means it has to remain constant over time (Homoscedasticity). A violation of this assumption leads to a problem of heteroscedasticity. Testing this assumption is highly important as heteroscedasticity undermines the reliability of the results. Specifically, it leads to an increase in the variability of the regression coefficient estimates, which the model fails to account for properly, making the analysis less trustworthy.

In our model, we test the heteroscedasticity of our data through the Breusch-Pagan test, *bptest()* in R-studio. The null hypothesis H_0 states that the data exhibit homoscedasticity, meaning the residuals have equal variance, while the alternative hypothesis H_1 indicates the presence of heteroscedasticity, meaning the residuals have unequal variance (Ilori & Tanimowo, 2022).

5.3.7. Autocorrelation

A common problem in cross-sectional and time series data is autocorrelation, which occurs when observations from one period are associated with the ones from earlier periods. It frequently occurs in situations when observations are reliant on historical values.

The **Breusch-Godfrey test** is a common method for detecting higher-order autocorrelation. This test evaluates whether residuals are correlated with their own past values. The null hypothesis H_0 of the Breusch-Godfrey test assumes that the disturbances u_t are not autocorrelated. In RStudio, we used the *bgtest()*.

Autocorrelation should frequently be seen as an indication of inadequate dynamic specification or model misspecification. Ordinary least squares (OLS) estimators are susceptible to errors and inflated t-statistics due to autocorrelation. Differencing the data to eliminate trends is one approach to address this issue (Kumar, 2023; Lopes, 2021).

5.3.8. Cross-sectional dependence

According to recent literature, panel data sets are expected to show significant cross-sectional dependence. This could be because of shared shocks or unobserved components that end up in the error term. In dynamic panel models, the impact of cross-sectional dependence on estimators is very significant. The estimation's efficiency may be lowered if this reliance is present but ignored. In order to test the cross-dependence, we used the Pesaran's CD test (thanks to the RStudio function *pcdtest()*) which states under the null hypothesis that there is no cross-sectional dependence that exists in the data (De Hoyos & Sarafidis, 2006).

5.4. Data preparation

Before proceeding further, it is essential to outline the preliminary steps taken to prepare the data for the model. The entire code can be found in appendix 17.

First, we imported the dataset into RStudio. During this process, the data were cleaned to ensure consistency across several dimensions. Specifically, the time range was standardized, and the columns for Year and Country were renamed uniformly to create our panel. A Panel is often known as longitudinal data, which are time-series and cross-sectional. (Park & Hun Myoung, 2009). In our case, the panel is grouping all variable observations from 1990 to 2023. This step ensured that each cross-sectional unit (in this case, Ecuador and El Salvador) contained $T = 34$ observations over the specified period. Moreover, a column « Dollarization » was added to the panel to represent through a dummy variable if the country, at a certain moment t , is dollarize (1) or not (0). As to be noted here that Ecuador dollarized in 2000 and El Salvador in 2001. In the appendix 18-19, you can find the ‘panel’ with every observations for the 2 country during 1990-2023.

Once the cleaning was completed, the dataset was structured as a panel data frame, ready for further analysis. The following step after that was to normalize and stabilize the variance through a transformation log. (Feng & Hannig & Marron, 2016). As it was previously explained, the assumption of several concept is primordial in order to Assess the validity of our model. By applying a log transformation, we can address issues related to heteroscedasticity and improve the normality of residuals, thereby ensuring that the key assumptions of linear regression are better met (Benoit, 2011).

In R, we used the *log()* function to transformed all of our data, in the exception of the GDP as it is a variation rate form a period to an other (%change) and of course the indicator variable of dollarization remain unchanged.

After this step, we then tested our data for the stationarity. In order to do that, we used the Levin-Lin-Chu test, through the function *puretest()*. As we observed the results, some of them have a p-value superior to 0.05, which reject the null hypothesis of stationarity. (all the results of the Levin-Lin-Chu test is in appendix 22. We then transformed the data of our model through a first difference in order to make them stationary. More presicely, the differencing operation involves taking the difference of two consecutive values of the time series (Kamalov, 2021) :

$$\Delta x_t = x_t - x_{t-1}$$

After differencing the data, as shown in appendix 22, all datasets yielded p-values below the 0.05 threshold, allowing us to conclude that the data are stationary. For the remainder of our analysis, we used the panel dataset labeled ‘dpanel,’ which was obtained after applying logarithmic transformation and first-order differencing.

Next, we assessed multicollinearity among the variables using the test described in Section 6. By applying the *vif()* function, we obtained the results presented in appendix 23. The variance

inflation factor (VIF) values for all variables were close to one, indicating that there is no significant multicollinearity among the variables.

Following this, we examined Granger causality between the variables. For the Inflation Rate, none of the independent variables were found to be Granger causal. However, for GDP, we identified Budget Balance and Reserves as Granger-causal variables. This suggests that the past values of these two variables may help explain the current value of GDP.

Despite the lack of Granger causality for Inflation Rate, we decided to proceed with the selected variables. This decision is supported by their theoretical and empirical relevance in explaining inflation dynamics, as detailed in the section *Justification of the Data*. Including these variables ensures a more comprehensive analysis.

Chapter 6: Results and interpretation

6.1. Descriptive analysis of databases

Before getting further, it is important to analyse the dataset used for our multiple linear regression models in order to gain a better understanding of the characteristics of our variables. To this end, we will first perform some descriptive analysis that will allow us to visualise the overall trend of our time series and obtain their respective mean and variance. The mean can be defined as the expected value of the distribution, while the variance measures the dispersion of the values relative to this mean (Seltman, 2013).

This step helps identify the main trends, inter-period variations, and differences between the two countries under study: Ecuador and El Salvador.

The following table shows the variance and the standard deviation, before and after the dollarisation in both country for both of the dependent variable.

Country	Dollarisation	mean_inflation	sd_inflation	mean_gdp	sd_gdp
Ecuador	Before dollarisation	39.918400	14.489931	2.483400	2.761812
Ecuador	After dollarisation	7.630875	18.359587	3.529000	3.898486
El Salvador	Before dollarisation	8.930000	6.637006	3.498727	2.048484
El Salvador	After dollarisation	2.522391	2.378073	2.126304	3.227530

Table 4: Summary table of data before and after Dollarisation: Mean and Standard Deviation (1990–2023)

The first notable observation from table 4 is the high average inflation rate in Ecuador prior to dollarisation (1990–2001), which reached nearly 40% with significant dispersion, as evidenced by a standard deviation of 14.48. Following dollarisation, the average inflation rate

dropped dramatically to 7.6%, although the accompanying standard deviation indicates greater volatility in the post-2000 period.

In contrast, El Salvador experienced a much lower pre-dollarisation inflation rate of approximately 9%. After dollarisation, inflation decreased fourfold, accompanied by a notable reduction in volatility (from 6.6% to 2.4%). This suggests that inflation in El Salvador stabilised at a relatively low rate during the post-dollarisation period.

Regarding the GDP growth, Ecuador saw a modest improvement with a 1% increase compared to the pre-dollarisation era. However, this growth came with a higher volatility, indicating that the economy remained susceptible to fluctuations. Conversely, El Salvador experienced a decline in GDP growth of 1%, coupled with increased volatility, signaling less stable economic performance.

As mentioned earlier, the GDP represents the annual growth rate and is used throughout the econometric analysis. However, for a clearer visual representation, the GDP trend graph is based on current GDP data from the Saint Louis database and is only used for illustrative purposes.

The two graphs below provide an insight of the trajectories of our dependent variables over the period 1990–2023, with a focus on the year of dollarisation. As discussed above, a significant drop in inflation in Ecuador can be clearly observed at the time of the adoption of the dollarisation regime.

Regarding El Salvador, inflation was higher before dollarisation but had already begun to decline since the early 1990s. Therefore, it is difficult to attribute the entire reduction in inflation solely to dollarisation, as the disinflationary trend was already underway prior to the adoption of the dollar.

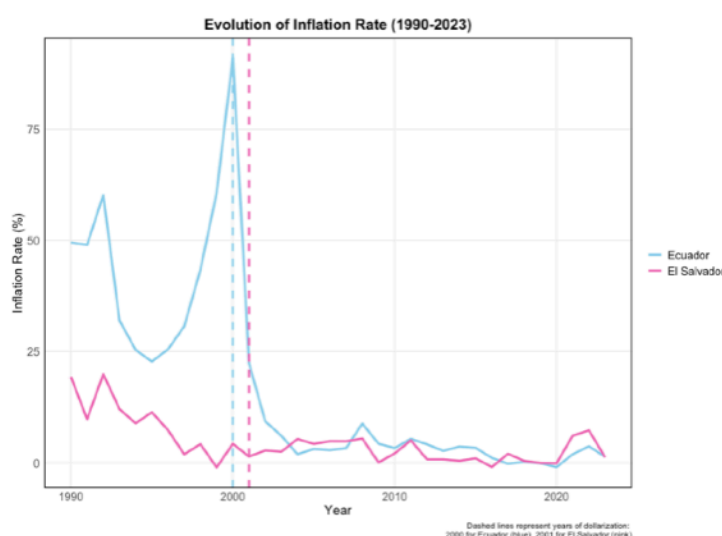


Figure 1: Evolution of inflation rate (1990-2023)

This graph below shows the GDP for Ecuador and El Salvador, expressed in current dollars. It can be seen that the Ecuador's GDP shows an evident rising trajectory with a noticeable acceleration after the year 2000. This is consistent with the table's data showing a higher growth rate after dollarisation. Conversely, El Salvador has a more moderate GDP development that is consistent with the less dynamic growth percentages shown in the table.

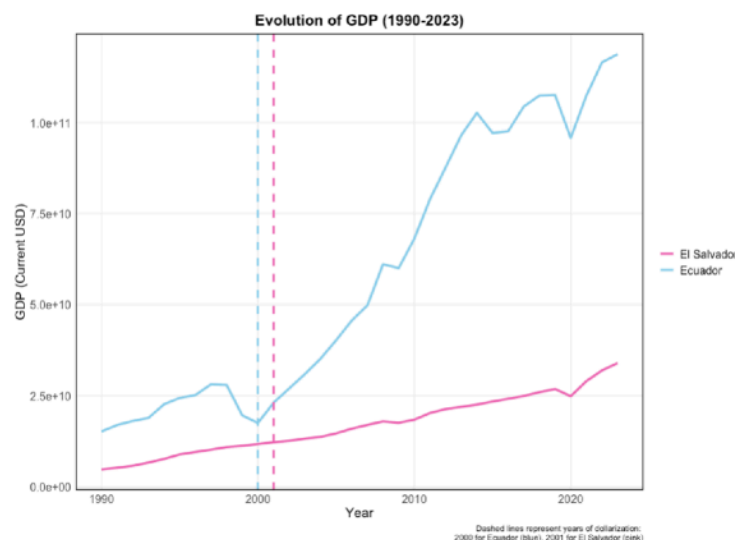


Figure 2: Evolution of GDP (1990-2023)

Appendix 26 provides tables detailing the mean and standard deviation of each independent variable before and after dollarisation. The plots representing the evolution of each of these variables are in appendix 25. The main observations are the following: The Ecuador shows higher reserves, a declining debt, and a strong increase in M2 (money supply) following dollarisation. El Salvador, on the other hand, shows a higher unemployment rate at the beginning but a decline after 2001, while its public debt and budget deficit tend to rise. Finally, the two countries' declining interest rates on deposits reflect the dollar's appreciation and monetary stabilisation.

6.2. Multiple Linear Regression models and statistical tests results

6.2.1. Panel data regression analysis

Panel data regression has three approach estimation models, depending on the hypotheses on parameters and error terms: the pooled model, the fixed-effects model, and the random effects model. Whereas the pooled model assumes that each unit or individual and time has the same intercept value, the fixed effects model makes individual or time specific as intercept with dummy variables. Unlike the latter, the random effects model treats these effects as random variables. To assess which of those 3 was the best suited for our analysis, we used first the Chow test. This test is used to specify both models, whether choosing the pooled or the fixed-effect model. After that, we had to estimate the random effect model through the Hausman test, which assesses the random effect and fixed-effect model (Jannah & Al, 2021).

The p-value of the Chow test rejected the null hypothesis for both equation, which temporarily set the fixed effect model as the preferred one. We then used the Hausman test, which has the same result for both equation: the fixed effects model is therefore preferred over the random effects model.

Variable	Pool Test (F-stat)	Pool Test Conclusion	Hausman Test (Chi-sq)	Hausman Test Conclusion
Inflation	F = 2.0648, p = 0.03275	Fixed effects preferred	Chi-sq = 40.418, p = 2.677e-06	Fixed effects preferred
GDP	F = 147.34, p < 2.2e-16	Fixed effects preferred	Chi-sq = 40.418, p = 2.677e-06	Fixed effects preferred

Table 5: Results of tests for model selection

After determining that the fixed effects model is the most appropriate, an additional analysis was conducted to identify which specific effects should be included: time, individual, or both. This was achieved using the *plm()* function, which allowed for testing all three possibilities. An effect was deemed significant and suitable for inclusion if the associated p-value was below the significance threshold (as outlined in the R documentation).

The results of this analysis indicated that for inflation, both time and individual effects were significant and should be included. In contrast, for GDP, only the time effect was significant.

Variable	Individual Effect	Temporal Effect	Combined Effect (Individual + Temporal)	Selected Effect
Inflation	Yes (p = 0.038239)	Yes (p = 0.01856)	Yes (p = 0.021831, R ² = 0.52401)	Combined Effect
GDP	No (p = 0.26142)	Yes (p = 0.0025685)	No (p = 0.28026)	Time Effect

Table 6: Results of tests for individual and temporal effects

6.2.2. Multiple Linear Regressions

The Seemingly Unrelated Regression (SUR) improves joint estimation efficiency by using the correlation between disturbances across many equations. This approach is especially interesting to panel data since it makes it easier to estimate numerous equations at once while taking cross-equation correlations into account, increasing the estimates' accuracy (You & Zhou, 2014).

Equation y_i of the SUR model is defined as:

$$(5) \quad y_i = X_i\beta_i + \varepsilon_i, \quad i = 1, \dots, N$$

With $\varepsilon = [\varepsilon_1, \varepsilon_2, \dots, \varepsilon_N]$

Where y_i is the i^{th} equation's dependent variable, X_i is the matrix of the regressors for the i^{th} equation (which has T observations).

The disturbance process is assumed to have an expectation of zero and a covariance matrix Ω . (Wooldridge, 2013).

As mentioned in '*data preparation*', the model's potential utility is not diminished even though only two variables were discovered to be Granger causal for GDP and none for inflation. Granger causality tests identify predictive relationships but do not capture all the dynamics and interactions within the system.

Adding both effects for Inflation, and time effects for GDP, we obtained the following model:

$$(6) \quad \begin{aligned} Inflation_rate_{it} = & \beta_0 + \beta_1 Dollarisation_{it} + \beta_2 M2_{it} + \\ & \beta_3 Reserves_{it} + \beta_4 REER_{it} + \\ & \beta_5 Deposit_interest_rate_{it} + \\ & \beta_6 Unemployment_rate_{it} + \sum_{t=1}^T \gamma_t Year_t + \sum_{j=1}^T \delta_j Country_j + \epsilon_{it} \end{aligned}$$

$$(7) \quad \begin{aligned} GDP_{it} = & \beta_0 + \beta_1 Dollarisation_{it} + \beta_2 M2_{it} + \beta_3 Reserves_{it} + \\ & \beta_4 REER_{it} + \beta_5 Deposit_interest_rate_{it} + \\ & \beta_6 Unemployment_rate_{it} + \sum_{t=1}^T \gamma_t Year_t + \epsilon_{it} \end{aligned}$$

To analyse these models, we will use the **systemfit()** function in RStudio, which allows us to generate the output shown in figures 3 and 4.

```

SUR estimates for 'inflation' (equation 1)
Model Formula: Inflation_rate ~ Dollarization + M2 + Reserves + Public_debt_GDP +
  Budget_Balance_GDP + Current_Account_Balance + REER + Deposit_interest_rate +
  Unemployment_Rate + factor(Year) + factor(Country)

              Estimate Std. Error t value Pr(>|t|)
(Intercept)    -0.56997391  0.35477822 -1.60656 0.12179338
Dollarization   -1.28124615  1.02587913 -1.24893 0.22425504
M2              -1.11480046  1.16958107 -0.95316 0.35041860
Reserves        -0.15772530  0.26299698 -0.59972 0.55455383
Public_debt_GDP -0.88505494  0.84043828 -1.05309 0.30323923
Budget_Balance_GDP -0.73786986  0.31896435 -2.31333 0.02999363 *
Current_Account_Balance -0.00208986  0.19465993 -0.01074 0.99152670
REER            3.22759807  1.75287065  1.84132 0.07850943 .
Deposit_interest_rate -0.60315917  0.43036890 -1.40149 0.17441710
Unemployment_Rate 0.28173843  0.84948189  0.33166 0.74314986
factor(Year)1992 1.00992386  0.51361906  1.96629 0.06144748 .
factor(Year)1993 0.94808855  0.78742491  1.20404 0.24082079
factor(Year)1994 0.72632823  0.53966622  1.34588 0.19145749
factor(Year)1995 0.55149910  0.48585588  1.13511 0.26802114
factor(Year)1996 0.51780433  0.51239531  1.01056 0.32274260
factor(Year)1997 0.20462255  0.51055824  0.40078 0.69227944
factor(Year)1998 0.83746130  0.50401456  1.66158 0.11016836
factor(Year)1999 -1.18447565  0.56141292 -2.10981 0.04596236 *
factor(Year)2000 2.45991260  0.60135998  4.09058 0.00044913 ***
factor(Year)2001 1.29346526  1.20444649  1.07391 0.29400182
factor(Year)2002 1.69077111  1.13404650  1.49092 0.14957121
factor(Year)2003 1.74315639  1.14443118  1.52316 0.14134990
factor(Year)2004 1.71331772  1.09156929  1.56959 0.13016669
factor(Year)2005 1.71750467  1.15833606  1.48273 0.15171869
factor(Year)2006 1.97014037  1.15907215  1.69976 0.10266311
factor(Year)2007 2.02237286  1.11315888  1.81679 0.08230505 .
factor(Year)2008 1.93997951  1.17070210  1.65711 0.11107746
factor(Year)2009 0.72544886  1.21155456  0.59878 0.55517487
factor(Year)2010 2.19885492  1.12845287  1.94856 0.06365040 .
factor(Year)2011 2.16945879  1.16672457  1.85944 0.07580410 .
factor(Year)2012 1.43728729  1.19228803  1.20549 0.24027172
factor(Year)2013 1.50339976  1.24250547  1.20997 0.23857817
factor(Year)2014 2.09259047  1.15695294  1.80871 0.08358916 .
factor(Year)2015 2.16139489  1.13138613  1.91040 0.06862830 .
factor(Year)2016 0.72703734  1.20398592  0.60386 0.55184761
factor(Year)2017 2.66355814  1.13006733  2.35699 0.02731060 *
factor(Year)2018 1.87586574  1.12191335  1.67202 0.10807081
factor(Year)2019 1.81393836  1.12691131  1.60965 0.12111415
factor(Year)2020 1.27323998  1.18165194  1.07751 0.29242526
factor(Year)2021 3.58508953  1.13859047  3.14871 0.00449628 **
factor(Year)2022 2.26801261  1.15840520  1.95788 0.06248432 .
factor(Year)2023 0.92943027  1.21163413  0.76709 0.45083207
factor(Country)El Salvador 0.00472900  0.11529358  0.04102 0.96763631
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.468972 on 23 degrees of freedom
Number of observations: 66 Degrees of Freedom: 23
SSR: 5.058492 MSE: 0.219934 Root MSE: 0.468972

```

Figure 3: Outputs for the Inflation_rate model

SUR estimates for 'gdp' (equation 2)
Model Formula: GDP ~ Dollarization + M2 + Reserves + Public_debt_GDP + Budget_Balance_GDP + Current_Account_Balance + REER + Deposit_interest_rate + Unemployment_Rate + factor(Year)

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	0.3846683	1.8138316	0.21207	0.8338393
Dollarization	9.7300398	5.2723345	1.84549	0.0773398 .
M2	-3.8028890	6.0027124	-0.63353	0.5323802
Reserves	2.6855641	1.3545309	1.98265	0.0589654 .
Public_debt_GDP	-3.2017805	4.3114187	-0.74263	0.4649141
Budget_Balance_GDP	1.6310228	1.6428357	0.99281	0.3307077
Current_Account_Balance	-0.0739056	1.0024190	-0.07373	0.9418385
REER	-9.3825116	8.9694982	-1.04605	0.3059611
Deposit_interest_rate	-0.2402989	2.1853116	-0.10996	0.9133547
Unemployment_Rate	3.9760613	4.2983265	0.92503	0.3641610
factor(Year)1992	1.5461628	2.6452081	0.58451	0.5643289
factor(Year)1993	-3.5217396	4.0158501	-0.87696	0.3892025
factor(Year)1994	-0.1941092	2.7801263	-0.06982	0.9449152
factor(Year)1995	-2.0148244	2.5034078	-0.80483	0.4288177
factor(Year)1996	-2.7280550	2.6378069	-1.03421	0.3113458
factor(Year)1997	0.6347513	2.6249697	0.24181	0.8109795
factor(Year)1998	-0.8758182	2.5968577	-0.33726	0.7388521
factor(Year)1999	-3.9957035	2.8907043	-1.38226	0.1796219
factor(Year)2000	-1.1193354	3.0761876	-0.36387	0.7191403
factor(Year)2001	-9.5397941	6.1665435	-1.54702	0.1349435
factor(Year)2002	-9.6165654	5.8014172	-1.65762	0.1104093
factor(Year)2003	-12.4217067	5.8698980	-2.11617	0.0448942 *
factor(Year)2004	-8.5299238	5.6077246	-1.52110	0.1413011
factor(Year)2005	-9.8545554	5.9606968	-1.65326	0.1113020
factor(Year)2006	-9.7387700	5.9663839	-1.63227	0.1156752
factor(Year)2007	-13.0098381	5.7257867	-2.27215	0.0323238 *
factor(Year)2008	-8.5922686	6.0152410	-1.42842	0.1660577
factor(Year)2009	-15.1525323	6.2132433	-2.43875	0.0225101 *
factor(Year)2010	-4.7505059	5.7997326	-0.81909	0.4207944
factor(Year)2011	-6.7265166	6.0035506	-1.12042	0.2736206
factor(Year)2012	-11.0035548	6.1295569	-1.79516	0.0852324 .
factor(Year)2013	-9.6287926	6.3933441	-1.50607	0.1451000
factor(Year)2014	-12.1754507	5.9320683	-2.05248	0.0511820 .
factor(Year)2015	-11.3197756	5.8114894	-1.94783	0.0632246 .
factor(Year)2016	-10.3515072	6.1772500	-1.67575	0.1067692
factor(Year)2017	-7.2120337	5.8060388	-1.24216	0.2261787
factor(Year)2018	-12.4563545	5.7677582	-2.15965	0.0410086 *
factor(Year)2019	-10.2816849	5.7839198	-1.77763	0.0881398 .
factor(Year)2020	-19.2795330	6.0314543	-3.19650	0.0038734 **
factor(Year)2021	8.4253357	5.8614732	1.43741	0.1635127
factor(Year)2022	-15.3102835	5.9661421	-2.56619	0.0169483 *
factor(Year)2023	-9.6565967	6.2334795	-1.54915	0.1344327

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.415374 on 24 degrees of freedom
Number of observations: 66 Degrees of Freedom: 24
SSR: 140.016703 MSE: 5.834029 Root MSE: 2.415374
Multiple R-Squared: 0.908564 Adjusted R-Squared: 0.75236

Figure 4: Outputs for the GDP model

It is essential to understand the interpretation of these outputs: the column **Pr(>|t|)** represents the p-values of the hypothesis tests and provides information on the significance of the coefficients. The null hypothesis states that the variable has no significant effect on the dependent variable. If the p-value is less than the threshold of 0.05, the null hypothesis is rejected, indicating that the explanatory variable is statistically significant and relevant to the model. Moreover, the output includes the Adjusted R-Squared (R^2), a crucial metric that reflects the percentage of variance in the dependent variable explained by the independent variables, while accounting for the inclusion of unnecessary predictors. Unlike R-Squared, which generally increases as more variables are added to the model, Adjusted R-Squared penalises the addition of irrelevant variables, providing a more accurate assessment of the model's explanatory power (Cornillon et al., 2023).

The outputs highlight multiple pieces of information that need to be addressed. However, what we are truly interested in here is the dollarisation coefficient. It is important to note that dollarisation is measured by a binary indicator variable (0 or 1), indicating whether a country has dollarised (in 2000 for Ecuador and in 2001 for El Salvador). The coefficient β_1 of the dollarisation variable captures the average difference between the post-dollarisation and pre-dollarisation periods for each country.

The coefficient of the dollarisation variable is -1.2812, which could suggest that the inflation rate could decrease on average by 1.2812 units after adopting a dollarisation regime. However, if we look at the p-value of the coefficient, we can see that this result is not statistically significant (p-value = 0.2243). There is therefore no robust evidence that dollarisation has a direct effect on reducing inflation, contrary to what was observed in the descriptive analysis. On the other hand, the Budget balance variable displays a significant coefficient of -0.7379 (p-value = 0.03), indicating that better public finances could contribute significantly to inflation control.

Looking at the time fixed effects, we observe significant variations for certain years, such as 1999 and 2000. The year 2000, corresponding to the year of dollarisation for Ecuador and the year just before that of El Salvador, is associated with a very significant increase in inflation with a coefficient of 2.4599 and a p-value well below the rejection threshold (< 0.001). In contrast, 1999 showed a significant decrease in inflation (-1.18 with a p-value = 0.046). By making a parallel with the descriptive analysis, inflation in Ecuador historically peaked in the year 2000 before declining in subsequent years. As for El Salvador, a noticeable decrease in inflation can be observed in 1999.

With regard to the Adjusted R-Squared, it appears that only 46.9% of the variation in inflation is explained by our model. This suggests that the model has moderate explanatory power, indicating that a significant proportion (53.1%) of inflation variability remains unexplained.

By looking at the GDP model, we can see that the dollarisation's coefficient is 9.73 and its p-value is 0.0773, indicating a marginal significance. This trend indicates that the GDP may increase by an average of 9.73 units following the adoption of the dollar in comparison to the pre-dollarisation period. Although this result is not significant at the conventional 5% threshold, it is close to the 10% threshold, which suggests that dollarisation may have a favorable impact on economic growth.

The analysis of fixed-temporal effects on the GDP shows significant negative coefficients for a number of years after dollarisation, including 2003, 2007, 2009, 2018, 2020, and 2022. These findings imply that over these years, the GDP of the countries under study experienced substantial decreases, perhaps due to the influence of outside events. Regarding the Adjusted R^2 , it appeared that our model accounted for 75% of the GDP fluctuation. This suggests that the model has a quite good amount of explanatory power, showing that only a moderate fraction (25%) of the GDP variability remains unexplained.

6.2.3. Statistical tests results

As previously mentioned, to ensure the reliability and validity of our model's results, we conducted several tests to evaluate key assumptions. Specifically, we tested for heteroscedasticity using the *bptest()*, for normality with the *jarque.bera.test()*, for autocorrelation using the *bgtest()*, and for cross-sectional dependence with the *pcdtest()*.

Test	p-value	Conclusion
Breusch-Pagan (Homoscedasticity) - Inflation	0.6721	No heteroscedasticity
Breusch-Pagan (Homoscedasticity) - GDP	0.1412	No heteroscedasticity
Jarque-Bera (Normality) - Inflation	0.7097	Residuals are normal
Jarque-Bera (Normality) - GDP	0.8158	Residuals are normal
Breusch-Godfrey (Autocorrelation) - Inflation	0.1983	No autocorrelation
Breusch-Godfrey (Autocorrelation) - GDP	0.2787	No autocorrelation
Pesaran CD (Cross-sectional dependence) - Inflation	0.3248	No cross-sectional dependence
Pesaran CD (Cross-sectional dependence) - GDP	0.8055	No cross-sectional dependence

Table 7: Results of model validity tests

The results of these tests confirm that the key assumptions underlying the regression models for both inflation and GDP are satisfied. Specifically, they demonstrate that the residuals are homoscedastic, normally distributed, free from autocorrelation, and exhibit no cross-sectional dependence. By those results, it can be said that our model is reliable.

Chapter 7: Discussion

7.1. Evaluating results against the hypothesis

For the recall, our hypothesis were the 2 following ones:

Hypothesis 1: Full dollarisation reduces the inflation rate

Hypothesis 2: Full dollarisation promotes economic growth

The findings of our quantitative analysis did not support the hypothesis 1 that full dollarisation significantly lowers Argentine inflation. The dollarisation indicator's coefficient was negative (-1.2812), however it wasn't statistically significant (p-value = 0.2243). This suggests that there isn't any solid evidence that dollarisation would have a direct impact on lowering inflation in the Argentina setting. Regardless of dollarisation, the variable Budget_Balance_GDP has a significant coefficient (= -0.7379, p-value = 0.03), indicating that strong public finances play a key role in controlling inflation, regardless of dollarisation.

Regarding the impact on GDP, the dollarisation coefficient was positive (9.73) with a p-value of 0.0773, this result suggests a favourable trend in which dollarisation may contribute to economic growth, even though it is not statistically significant at the conventional level of 5%. Dollarisation could potentially boost economic growth in Argentina. This trend is in line with the results observed in the Ecuador case studies, where dollarisation has contributed to a significant economic recovery and sustained GDP growth.

The results of our analysis suggest that the adoption of full dollarisation could have a positive effect on Argentina's economic growth, even if the impact on reducing inflation is not statistically significant. This positive trend could reflect increased investor confidence and price stabilisation, similar to the initial effects observed in Ecuador after its dollarisation.

However, when analyzing Argentina's economy in Chapter 3, we observe a complex system characterized by a strong dependence on capital flows, flawed competitiveness (continuous devaluation), and fragile fiscal management. The Convertibility Plan of 1991 is a case in point, showing that rigid monetary policy coupled with high public debt can lead to monetary crises, despite a currency stabilized at a 1:1 ratio. Indeed, during global economic crises such as in 2001, Argentina was unable to adjust its monetary policy autonomously, resulting in even more complicated economic imbalances. This experience demonstrates that dollarisation, without rigorous fiscal management and structural reforms, may not be sufficient to prevent economic crises and could even exacerbate them.

In summary, given the mixed results, particularly regarding inflation, which contradicts the literature, it is not possible to confirm the hypothesis formulated in the section 'research question and hypothesis' which was as follows: *The adoption of full dollarisation could significantly reduce inflation and promote GDP growth in Argentina, thereby contributing to greater economic stability.* Indeed, drawing a direct parallel between Argentina and the cases of Ecuador and El Salvador is particularly challenging due to significant differences in economic structures, political institutions, and historical contexts in each country.

7.2. Study limitations

After analysing this study, it is important to highlight the limitations of the model developed.

A. Sample size

Complete dollarisation is a relatively uncommon phenomenon, with only a few countries, such as Ecuador and El Salvador, having recently adopted this policy. The primary objective of this study was to explore the potential implications of dollarisation in Argentina in the coming years, necessitating the selection of countries that offer meaningful comparability. For instance, Panama, which has been dollarised since 1900 (Ponsot, 2019), was excluded due to the considerable temporal distance, making its context less relevant to current economic conditions. Similarly, countries from other continents, such as those in Asia, were also deemed unsuitable for comparison due to their distinct institutional, political, and economic contexts, which differ significantly from Argentina's (Jetin, 2009). This focus on geographically and economically similar countries ensures greater relevance, although it limits the variety of cases examined and, consequently, the scope of the findings (Baltagi, 2005).

B. Simplistic measure of dollarisation

A binary variable (0 or 1) is used in this study to represent dollarisation, indicating whether a country is dollarised during a given period. Although this approach simplifies the model and makes analysis easier, it has significant limitations that may compromise the accuracy and relevance of the results.

In fact, by indicating whether dollarisation is present or not, the indicator variable allows the model to be simplified without capturing the multiple levels of dollar integration into the economy. For instance, the speed of adoption, the economic policies that accompany dollarisation (such as fiscal reforms or reserve stabilisation), and the preexisting economic conditions can all have varying effects on economic indicators. These differences in implementation are not captured by the binary variable, which may have an impact on how dollarisation affects inflation and the GDP. Furthermore, the binary variable ignores possible interactions between dollarisation and other variables, such as fiscal or monetary reforms, which could mask significant combined effects. It also ignores the temporal component, focusing only on whether dollarisation is there or not and failing to distinguish between short-term and long-term effects. (Ponsot, 2019 ; Baltagi, 2005)

C. Omission of relevant variables and unmeasured impacts

Even while the model includes a number of relevant independent variables, it does not include other factors that could affect inflation and the GDP. For instance, the exchange rate, which is essential in a dollarisation scenario, has not been included. The latter was significant during the pre-dollarisation era, despite the fact that it was not present during the full dollarisation (Lo Vuolo, 2007).

Furthermore, non-observable variables that change over time, such as political instability or external factors, are not taken into consideration despite the use of fixed individual and temporal effects. These exclusions have the potential to introduce bias into coefficient estimations, including the dollarisation assumption. A political crisis, for instance, might have a significant influence on inflation and the GDP, reinforcing the effects of dollarisation. The accuracy and reliability of the results obtained are thus jeopardised since the model's ability to isolate the actual dollarisation effect is limited by the absence of these effects.

D. Making a parallel with Argentina

Drawing a direct comparison between the cases of Argentina, Ecuador, and El Salvador is particularly challenging due to notable differences in each country's political institutions, economic structures, and historical backgrounds. Argentina has several distinctive characteristics, such as a history marked by economic crisis cycles, a different industrial structure, and a different political system, all of which may have an impact on how the dollarisation of its economy plays out. Therefore, lessons learned from other countries' experiences cannot be directly applied without being adjusted to the unique institutional and economic characteristics of Argentina.

7.3. Suggestions for future improvements

Despite the results observed in certain case studies, the econometric model did not demonstrate a significant reduction in inflation following the adoption of full dollarisation. To improve the robustness of the analysis, several approaches can be considered.

Adding More Independent Variables

As previously mentioned, incorporating additional independent variables into the model, such as net inflows, industrial production, or the exchange rate, could provide more comprehensive insights. The exchange rate, in particular, has shown a strong correlation with inflation throughout this study. An improvement could involve using a Market Pressure Index (EMP) to integrate this variable into the quantitative analysis. The EMP reflects the combined pressures exerted on the exchange rate resulting from market interventions and market forces. Its components quantify exchange rate pressures stemming from dollarisation policies, offering valuable insights into their economic implications (Jeisman, 2005).

Inclusion of Interaction Effects in Econometric Models

Another potential improvement involves incorporating interaction effects into the econometric models used to analyse the impact of dollarisation. An interaction occurs when the effect of an independent variable (x_1) on the dependent variable (y) depends on the values of another independent variable (x_2). Formally, this means the effect of x_1 on y is not constant but varies based on x_2 (Bickel, 2008). Incorporating interaction terms would enable the model to capture more complex relationships among economic variables. For example, the impact of dollarisation on inflation might depend on the level of foreign exchange reserves or fiscal

management. Including interaction terms in the econometric analysis could uncover how these factors interact to influence economic stability, providing a more nuanced understanding of dollarisation's impacts.

Incorporating Other Dollarised Countries

Expanding the analysis to include other countries that have adopted dollarisation, despite cultural heterogeneity, could also enhance the study. Including culturally diverse countries would test the robustness of conclusions drawn from the case studies of Ecuador and Argentina and provide a better understanding of how cultural factors influence the outcomes of dollarisation.

Event Study Analysis

The use of an event study could prove particularly relevant for future quantitative research. An event study focuses on identifying abnormal variations in specific financial and economic indicators (such as inflation, GDP growth, or investment rates) around a defined period marked by the adoption of dollarisation.

In the context of the implications of dollarisation for countries like Ecuador and El Salvador, this approach could reveal how these economies reacted in the short and medium term to structural changes in their monetary policy. By isolating the direct impact of dollarisation from other confounding factors during the event window, an event study would offer a more precise quantification of the immediate and cumulative effects of dollarisation (Saens & Sandoval, 2005).

V.

Conclusion

In light of the recent economic reforms envisioned in Argentina under President Javier Milei, this study examined the effects of full dollarization on economic stability, focusing specifically on the cases of Ecuador and El Salvador. With a long history of macroeconomic instability, chronic inflation, and recurring crises, Argentina has considered dollarization as a potential remedy to stabilize its economy. However, Milei's reforms over the past year, which have diverged from a full dollarization, highlight the complexity and challenges inherent in this policy.

The results of the quantitative analysis revealed that dollarization did not lead to a significant reduction in inflation, contrary to theoretical expectations. However, a marginal positive trend was observed regarding GDP growth, suggesting that dollarization could foster some economic growth, although this relationship is not statistically robust at the conventional 5% threshold. These findings indicate that dollarization may offer limited economic benefits without rigorous fiscal management and complementary structural reforms.

The central question of this study, namely, *to what extent full dollarization can stabilize key economic indicators in Argentina*, has thus been partially answered. While a reduction in inflation was not confirmed by the econometric analysis, the potential impact on economic growth remains plausible but requires further evidence.

This research is not without its limitations. The small sample size, comprising only two countries that adopted full dollarization, limits the generalizability of the results. Additionally, the use of a binary variable to represent dollarization fails to capture the nuances and various stages of dollar integration within national economies. The absence of certain relevant variables, such as the prior-dollarization exchange rate and other macroeconomic factors, could also bias the results obtained.

Furthermore, drawing a direct parallel between Argentina and the cases of Ecuador and El Salvador is particularly challenging due to significant differences in economic structures, political institutions, and historical contexts in each country. Argentina has unique characteristics, such as a history marked by cycles of economic crises, a different industrial structure, and distinct political governance, which can influence how dollarization would affect its economy. Therefore, lessons drawn from other countries' experiences cannot be directly applied without considering Argentina's specific institutional and economic features.

Moreover, the recent shift in Argentina's economic policies under President Milei, underscores the complexities and challenges of implementing this policy. This shift highlights that dollarization alone is insufficient to ensure economic stability; rather, it requires a balanced combination of monetary, fiscal, and structural policies to address underlying economic vulnerabilities.

For future research, it would be pertinent to expand the panel of countries studied to include nations with varied economic and cultural contexts, while integrating additional variables that could influence the outcomes, such as foreign currency reserves, fiscal policies, and exchange rates. Additionally, adopting complementary methods, such as event studies, could help better isolate the direct effects of dollarization and understand its dynamics.

In conclusion, drawing a parallel to Argentina is therefore challenging; only assumptions can be made, but no certainties can be drawn. The study thus highlights the complexity of the full dollarization process, which does not guarantee economic stability after implementation. Sustainable economic stability therefore relies more on a balanced combination of monetary, fiscal, and structural policies.

VI. Bibliography

- Ahmad, R. (2002). *An Economic Review of Argentina's Economy Since 2002 and an Overview of its Current State of Economy*. 16(2). Online https://serialsjournals.com/abstract/85617_ch-7-rizwan_ahmad.pdf, retrieved 7 January 2025.
- Ahmad, R. (2019). *An Economic Review of Argentina's Economy Since 2002 and an Overview of its Current State of Economy*. 16(2). Online www.serialsjournal.com, retrieved 7 January 2025.
- Aimola, A. U., & Odhiambo, N. M. (2020). Public Debt and Inflation: A Review of International Literature. *Folia Oeconomica Stetinensia*, 20(1), 9–24. Online <https://doi.org/10.2478/fofi-2020-0001>.
- Alawin, M., & Oqaily, M. (2017). Current Account Balance, Inflation, Industry and Sustainable Development in Jordan. *Revista Galega de Economía*, 26(3), Article 3. Online <https://doi.org/10.15304/rge.26.3.4459>.
- Baliño, T. J. T. (2003). Chapter 30 Dollarisation: A Primer. In *Current Developments in Monetary and Financial Law, Volume 2* (Vol. 2). International Monetary Fund. Online <https://www.elibrary.imf.org/display/book/9781589061767/ch030.xml>, retrieved 7 January 2025.
- Banco Central de Reserva (BCR). (n.d.). *Banco Central de Reserva*. Official website of the Central Reserve Bank of El Salvador. Online <https://www.bcr.gob.sv/>, retrieved 7 January 2025.
- Baltagi, B. H. (2001). *Econometric Analysis of Panel Data*. Online <https://library.wbi.ac.id/repository/27.pdf>, retrieved 7 January 2025.
- Baltagi, B. H., Song, S. H., & Koh, W. (2023). Testing panel data regression models with spatial error correlation. *Econometric Theory*, 117. Online [https://doi.org/10.1016/S0304-4076\(03\)00120-9](https://doi.org/10.1016/S0304-4076(03)00120-9).
- Barquero Romero, J. P., & Loaiza Marín, K. (2017). *Inflation and Public Debt. Monetaria, January-June, 2017*. Banco Central de Costa Rica. Online <https://www.cemla.org/PDF/monetaria/PUB-MON-V-01-02.pdf>, retrieved 7 January 2025.
- Benoit, K. (2011). *Linear Regression Models with Logarithmic Transformations*. Online <https://kenbenoit.net/assets/courses/ME104/logmodels2.pdf>, retrieved 7 January 2025.
- Benli, M., Ekinci, A., & Orhan, B. (2022). The Long-Run Effect of International Reserves on Economic Growth in Developing Economies. *Eskişehir Osmangazi Üniversitesi İİBF Dergisi*, 17(3), 822–836. Online <https://doi.org/10.17153/oguiibf.1145526>.
- Berg, A., & Borensztein, E. (2001). *Full Dollarisation: The Pros and Cons*. In *Full Dollarisation*. International Monetary Fund. Online <https://www.elibrary.imf.org/display/book/9781557759979/9781557759979.xml>, retrieved 25 December 2024.

- Berg, A., Borensztein, E., & Mauro, P. (2003). *Quel régime monétaire pour l'Amérique latine?* 40(3). Online <https://www.imf.org/external/pubs/ft/fandd/fre/2003/09/pdf/berg.pdf>, retrieved 7 January 2025.
- Bitar, J. (2022). *Monetary and Macprudential Policies in a Dollarised Economy: The Case of Lebanon*. Université de Bordeaux. Online <https://theses.hal.science/tel-03882379v1/document>, retrieved 7 January 2025.
- Bogetic, Z. (2000). *Official Dollarisation: Current Experiences and Issues*. (SSRN Scholarly Paper 1809824). Online <https://papers.ssrn.com/abstract=1809824>, retrieved 7 January 2025.
- Bourguinat, H., & Dohni, L. (2002). *La dollarisation comme solution en dernier ressort*. *Revue française d'économie*, 17(1), 57–96. Online <https://doi.org/10.3406/rfeco.2002.1455>.
- Boyer, R., & César, J. N. (2007). *La crise argentine 1976-2001: Lectures institutionnalistes et régulationnistes*. Online <https://shs.hal.science/halshs-00587696>, retrieved 7 January 2025.
- Calcagno, A. (2019). *La crise argentine actuelle. Une perspective historique*. *Mondes en développement*, 188(4), 85–106. Online <https://doi.org/10.3917/med.188.0085>.
- Calvo, G. A. (2001). Capital Markets and the Exchange Rate, with Special Reference to the Dollarisation Debate in Latin America. *Journal of Money, Credit and Banking*, 33(2), 312–334. Online <https://doi.org/10.2307/2673902>.
- Canuto, O., & Carranza, S. (2022, April 28). *Dollarisation of Argentina: Revival of a Zombie Idea*. Policy Center. Online <https://www.policycenter.ma/publications/dollarisation-argentina-revival-zombie-idea>, retrieved 7 January 2025.
- Carluccio, J., & Cezar, R. (2021). *La crise de la dette argentine et ses racines*. *Revue d'économie financière*, 141(1), 209–224. Online <https://doi.org/10.3917/ecofi.141.0209>.
- Cartas, J. M., & Harutyunyan, A. (2017). 6. *Money, Liquidity, Credit, and Debt*. In *Monetary and Financial Statistics Manual and Compilation Guide*. USA: International Monetary Fund. Online <https://doi.org/10.5089/9781513579191.069.ch006>.
- Castillo, P., Montoro, C., & Tuesta, V. (2013). An Estimated Stochastic General Equilibrium Model with Partial Dollarisation: A Bayesian Approach. *Open Economies Review*, 24(2), 217–265. Online <https://doi.org/10.1007/s11079-012-9239-3>.
- Corrales, J. (1997). *Do Economic Crises Contribute to Economic Reform? Argentina and Venezuela in the 1990s*. *Political Science Quarterly*, 112(4), 617–644. Online <https://academic.oup.com/psq/article-abstract/112/4/617/7043679?redirectedFrom=fulltext>, retrieved 7 January 2025.
- Corso, E. (2021). *Dolarización financiera en Argentina: Un análisis histórico de una restricción vigente*. *Ensayos Económicos*, 77, Article 77. Online https://bcra.ojs.theke.io/ensayos_economicos_bcra/article/view/123, retrieved 7 January 2025.

- Damill, M., & Frenkel, R. (2013). *La economía argentina bajo los Kirchner: Una historia de dos lustros*. ITF Documentos técnicos, 2013. Online http://www.itf.org.ar/pdf/documentos/91_2013.pdf, retrieved 7 January 2025.
- Daoud, J. I. (2017). *Multicollinearity and Regression Analysis*. *Journal of Physics: Conference Series*, 949(1), 012009. Online <https://doi.org/10.1088/1742-6596/949/1/012009>.
- De Hoyos, R. E., & Sarafidis, V. (2006, November). *Testing for Cross-Sectional Dependence in Panel-Data Models*. Online <https://journals.sagepub.com/doi/10.1177/1536867X0600600403>, retrieved 7 January 2025.
- Diamond, J. (1990). Government expenditure and growth: How does the level and composition of such expenditure affect aggregate economic growth? *Finance & Development*, 27(4), 34–36. Online <https://doi.org/10.5089/9781451951783.022.A011>.
- Economic Commission for Latin America and the Caribbean (ECLAC). (n.d.). *ECLAC Statistical Databases*. Online <https://www.cepal.org/en/databases>, retrieved 7 January 2025
- Edwards, S., & Magendzo, I. I. (2001). *Dollarisation, Inflation and Growth*. (Working Paper 8671). National Bureau of Economic Research. Online <https://doi.org/10.3386/w8671>.
- Edwards, S., & Magendzo, I. I. (2003). *Strict Dollarisation and Economic Performance: An Empirical Investigation*. (Working Paper 9820). National Bureau of Economic Research. Online <https://doi.org/10.3386/w9820>.
- El-Salam, M. E.-F. A. (2013). A modification of the Jarque-Bera test for normality. *International Journal of Contemporary Mathematical Sciences*, 8, 843–853. Online <https://doi.org/10.12988/ijcms.2013.39106>.
- Feng, Q., Hannig, J., & Marron, J. S. (2016). *A Note on Automatic Data Transformation*. (arXiv:1601.01986). arXiv. Online <https://doi.org/10.48550/arXiv.1601.01986>.
- Finkel, M. (2017). *Navigating the Leftist Spectrum in Argentina: An Economic Classification of the Kirchner Era*. *Inquiries Journal*, 9(1). Online <http://www.inquiriesjournal.com/articles/1517/navigating-the-leftist-spectrum-in-argentina-an-economic-classification-of-the-kirchner-era>, retrieved 25 December 2024.
- Frankel, J., & Rose, A. (2002). *Estimate of the Effect of Common Currencies on Trade and Income*. *The Quarterly Journal of Economics*, 117(2), 437–466. Online <https://doi.org/10.1162/003355302753650292>.
- Federal Reserve Bank of St. Louis. (n.d.). *FRED: Federal Reserve Economic Data*. Online <https://fred.stlouisfed.org>, retrieved 7 January 2025
- Gaggero, A., & Nemiña, P. (2022). Origen y consolidación de la dolarización del mercado inmobiliario en Argentina. *Ensayos de Economía*, 32(60), Article 60. Online <https://doi.org/10.15446/ede.v32n60.92443>.

- Gerard, M. (2003). *Régulation et crise monétaires en régime de currency board: Le cas de l'Argentine 1991-2002*. Online https://theorie-regulation.org/wp-content/uploads/2012/12/rr_gerard.pdf, retrieved 25 December 2024.
- Gianella, C., & Pupperto, L. (2016). Le financement de l'économie argentine: La période post-crise et les perspectives. *Revue d'économie financière*, 124(4), 135–151. Online <https://doi.org/10.3917/ecofi.124.0135>.
- Goldfajn, I., & Olivares, G. (2000). *Full Dollarisation: The Case of Panama*. (SSRN Scholarly Paper 228898). Online <https://papers.ssrn.com/abstract=228898>, retrieved 25 December 2024.
- Graña-Colella, S., & Vernengo, M. (2024). Currency substitution in Argentina, 2003-2019: An evaluation of alternative explanations. *PSL Quarterly Review*, 77(310), Article 310. Online <https://doi.org/10.13133/2037-3643/18652>.
- Haqq, A., & Hussein, M. (2017). The impact of money supply on economic growth: Evidence from emerging economies and industrialized countries. *International Journal of Business Ethics and Governance (IJBEG)*, 5(2), 1–12. Online <https://doi.org/10.51325/ijbeg.v5i2.86>.
- Hellmund, P. F., Arnaud, A., Abreu, B., & Colmenarez, H. E. (2023). *El Mercosur como proceso multidimensional: Relaciones internacionales, economía, cuestión agraria y educación*. (1st ed.). Amplla Editora. Online <https://doi.org/10.51859/amplla.emp423.1123-0>.
- Hufty, M. (1993). *50 années de réformes économiques en Argentine*. In G. Étienne & J. Revel-Mouroz (Eds.), *Économies d'Asie et d'Amérique latine: Changements de cap* (IHEAL, pp. 100–124). Éditions de l'IHEAL. Online <https://doi.org/10.4000/books.iheal.3046>.
- International Monetary Fund (IMF). (2013, January 25). *ARGENTINA ECONOMIC DEVELOPMENTS*. Online <https://www.imf.org/external/pubs/ft/scr/2016/cr1667.pdf>, retrieved 7 January 2025.
- International Monetary Fund (IMF). (n.d.). *IMF Data*. Online <https://www.imf.org/en/Data>, retrieved 7 January 2025.
- International Monetary Fund. (1995). Ecuador: Recent Economic Developments. *IMF Staff Country Reports*, 1995(096), A001. Online <https://doi.org/10.5089/9781451811759.002.A001>.
- Investopedia. (n.d.). *M2 Definition and Meaning in the Money Supply*. Investopedia. Online <https://www.investopedia.com/terms/m/m2.asp>, retrieved 7 January 2025.
- Islam, D., & Al Faisal, M. A. (2024). Determinants of Uruguay's Real Effective Exchange Rate: A Mundell-Fleming Model Approach. Online <https://doi.org/10.48550/arXiv.2403.16452>.
- Jacobo, A. D., & Jalile, I. R. (2023). The relationship between public debt and economic growth in Latin America: A retrospective appraisal. *Paradigma Económico*, 15(2), 125–141. Online <https://doi.org/10.46652/rgn.v9i41.1271>.

- Jannah, W., Sulvianti, I. D., Indahwati, Silvianti, P., & Kurnia, A. (2021). Analysis of Credit Bank Distribution with Seemingly Unrelated Regression Method on Panel Data. *Journal of Physics: Conference Series*, 1863(1), 012057. Online <https://doi.org/10.1088/1742-6596/1863/1/012057>.
- Jetin, B. (2009). L'intégration monétaire asiatique: Dollarisation, monnaie commune ou simple coopération monétaire? *Revue Tiers Monde*, 199(3), 591–610. Online <https://doi.org/10.3917/rtm.199.0591>.
- Kamalov, F. (2021). *A note on time series differencing*. *Gulf Journal of Mathematics*, 10(2), Article 2. Online <https://doi.org/10.56947/gjom.v10i2.609>.
- Koráb, P., Fidrmuc, J., & Dibooglu, S. (2023). *Growth and inflation tradeoffs of dollarisation: Meta-analysis evidence*. Online <https://www.sciencedirect.com/science/article/abs/pii/S026156062300116X?via%3Dihub>, retrieved 7 January 2025.
- Kukaj, D. (2018). Impact of Unemployment on Economic Growth: Evidence from Western Balkans. *European Journal of Marketing and Economics*, 1(1), 9–17. Online <https://doi.org/10.26417/ejme.v1i1.p10-18>.
- Kumar, N. K. (2023). *Autocorrelation and Heteroscedasticity in Regression Analysis*. *Journal of Business and Social Sciences*, 5(1), Article 1. Online <https://doi.org/10.3126/jbss.v5i1.72442>.
- Lederman, D., Menendez Jaramillo, A. M., Perry, G., & Stiglitz, J. (2000). *Mexico: Five years after the crisis*. *World Bank*. Online <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/920211468777294386/Mexico-five-years-after-the-crisis>, retrieved 7 January 2025.
- Lo Vuolo, R. M. (2007). *Argentina: Les leçons de la sortie de crise*. *Revue Tiers Monde*, 189(1), 13–34. Online <https://doi.org/10.3917/rtm.189.0013>.
- Lopes, A. S. (2021). *Serial correlation in time series regression models—An introduction*. Online <https://repositorio.ulisboa.pt/handle/10400.5/19963>, retrieved 7 January 2025.
- Llach, L. (2013). La bonne fortune du populisme: L'économie argentine sous les Kirchner (2003-2013). *Politique étrangère*, 4, 103–117. Online <https://doi.org/10.3917/pe.134.0103>.
- Matheson, T. D. (2019). *Chapter 15 Interest Rates and Inflation*. In *Brazil*. USA: International Monetary Fund. Online <https://doi.org/10.5089/9781484339749.071.ch015>.
- Minda, A. (2005). La dollarisation intégrale: Une option monétaire de dernier ressort pour l'Amérique latine ? *Mondes en développement*, 130(2), 15–39. Online <https://doi.org/10.3917/med.130.0015>.
- Montgomery, D. C., Peck, E. A., & Vining, G. G. (2021). *Introduction to Linear Regression Analysis, 6th Edition*. Online <https://www.wiley.com/en-jp/Introduction+to+Linear+Regression+Analysis%2C+6th+Edition-p-9781119578727>, retrieved 7 January 2025.

- O'Connell, A. (2005). *The Recent Crisis – and Recovery – of the Argentine Economy: Some Elements and Background*. Online <https://peri.umass.edu/images/publication/chapter12.pdf>, retrieved 25 December 2024.
- Park, Hun Myoung. (2009). *Linear Regression Models for Panel Data Using SAS, Stata, LIMDEP, and SPSS*. Working Paper | The University Information Technology Services (UITs) Center for Statistical and Mathematical Computing, Indiana University. Online <http://www.indiana.edu/~statmath/stat/all/panel>, retrieved 7 January 2025.
- Perelman, M. (2024, February 1). *Living with Inflation in Argentina*. Current History. University of California Press. Online <https://online.ucpress.edu/currenthistory/article-abstract/123/850/50/199814/Living-with-Inflation-in-Argentina?redirectedFrom=fulltext>, retrieved 7 January 2025.
- Pesce, M. A., & Feldman, G. (2023). *Monetary policy challenges over two decades: A view from Argentina*. Online https://www.bis.org/publ/bppdf/bispap143_c.pdf, retrieved 7 January 2025.
- Ponsot, J.-F. (2002). *La dollarisation des économies émergentes*. (27 p., Table, ref. bib.: 39 ref.). Laboratoire d'analyse et de techniques économiques (LATEC). Online <https://hal.science/hal-01526893>, retrieved 7 January 2025.
- Ponsot, J.-F. (2024). *Les pays du Sud entre dollarisation et dédollarisation*. *L'Économie politique*, 102(2), 30–42. Online <https://shs.cairn.info/revue-l-economie-politique-2024-2-page-30?lang=fr>, retrieved 7 January 2025.
- Pou, P. (2000). *Finance and Development*. *Finance and Development* | F&D. Online <https://www.imf.org/external/pubs/ft/fandd/2000/03/pou.htm>, retrieved 7 January 2025.
- Quispe-Agnoli, M., & Whisler, E. (2006). *Official Dollarisation and the Banking System*. *ProQuest*, 91(3). Online <https://www.proquest.com/docview/200340686?sourcetype=Scholarly%20Journals>, retrieved 7 January 2025.
- Razia, A., & Omarya, M. (2022). The Impact of the Broad Money Supply (M2) on Economic Growth per Capita in Palestine. *International Journal of Business Ethics and Governance*, 5(2), Article 2. Online <https://doi.org/10.51325/ijbeg.v5i2.86>.
- Rodríguez del Águila, M. M., & Benítez-Parejo, N. (2011). *Simple linear and multivariate regression models*. *Allergologia et Immunopathologia*, 39(3), 159–173. Online <https://doi.org/10.1016/j.aller.2011.02.001>.
- Rouvière, L., Hengartner, N., & Matzner-Løber, E. (2023). *Régression avec R*. Online <https://doi.org/10.1051/978-2-7598-3146-3>.
- Salama, P. (1989). *La Dollarisation. Essai sur la monnaie, l'industrialisation et l'endettement des pays sous-développés*. Online <http://excerpts.numilog.com/books/9782707118202.pdf>, retrieved 7 January 2025.
- Salama, P. (2011). *Croissance et inflation en Argentine sous les mandatures Kirchner*. Documentos de Trabajo, Escuela de Economía, Article 9914. Online <https://ideas.repec.org/p/col/000178/009914.html>, retrieved 7 January 2025.

- Salama, P. (2019). *Argentina: Avancer sans reculer... Recherches Internationales*, 115(1), 119–143. Online <https://doi.org/10.3406/rint.2019.1701>.
- Sánchez, M. S. (March 2017). *The blue dollar as a 'public issue' in post-convertibility Argentina (2011-2015)*. Online <https://www.scielo.org.mx/pdf/rms/v79n1/0188-2503-rms-79-01-00007.pdf>, retrieved 7 January 2025.
- Sánchez, M. S. (2024). Facing inflation in times of digital finance: Monetary plurality and financial repertoires in the Argentinian crisis. *Economic Sociology. Perspectives and Conversations*, 25(3), 37–43. Online <https://www.econstor.eu/handle/10419/300736>, retrieved 7 January 2025.
- Sembler, J. I., Gassos, S. M., Barbosa, F., Loayza, M. J., Jalkh, I. F., Garay, I., Sartori, J. P., & Pires, J. C. L. (2024). *Revisión independiente del Programa de País Argentina 2021-2023*. IDB Publications. Online <https://doi.org/10.18235/0013002>.
- Sgard, J. (2002). Argentina: Une nouvelle aventure monétaire en Amérique latine. *Critique internationale*, 15(2), 33–44. Online <https://doi.org/10.3917/crri.015.0033>.
- Shojaie, A., & Fox, E. B. (2022). *Granger Causality: A Review and Recent Advances. Annual Reviews*. Online <https://doi.org/10.1146/annurev-statistics-040120-010930>.
- Sigal, S., & Kessler, G. (1997). Comportements et représentations face à la dislocation des régulations sociales: L'hyperinflation en Argentine. *Cultures et Conflits*, 24/25, 37–77. Online <https://www.jstor.org/stable/23699187>, retrieved 7 January 2025.
- Sims, C. A. (2001). Fiscal Consequences for Mexico of Adopting the Dollar. *Journal of Money, Credit and Banking*, 33(2), 597–616. Online <https://doi.org/10.2307/2673918>.
- Souakri, R. (2008). *La régression sur données de panel*. Online https://www.academia.edu/36311265/La_r%C3%A9gression_sur_donn%C3%A9es_de_panel, retrieved 7 January 2025.
- Steiner, A. (2017). Does the accumulation of international reserves spur inflation? A reappraisal. *The North American Journal of Economics and Finance*, 41, 112–132. Online <https://doi.org/10.1016/j.najef.2017.03.007>.
- Trading Economics. (n.d.). *TRADING ECONOMICS | 20 million INDICATORS FROM 196 COUNTRIES*. Online <https://tradingeconomics.com/>, retrieved 7 January 2025.
- Trenta, A. (2010). Éclairages sur la crise argentine de 2001: Des réformes structurelles de l'économie à l'intensification de la protestation sociale. *ILCEA. Revue de l'Institut des langues et cultures d'Europe, Amérique, Afrique, Asie et Australie*, 13, Article 13. Online <https://doi.org/10.4000/ilcea.905>.
- Uyanık, G. K., & Güler, N. (2013). *A Study on Multiple Linear Regression Analysis. Procedia - Social and Behavioral Sciences*, 106, 234–240. Online <https://doi.org/10.1016/j.sbspro.2013.12.027>.

- Vidal-Durupt, A. (1986). *Vie Administrative à l'Étranger: L'EVOLUTION DU PLAN AUSTRAL EN ARGENTINE*. *La Revue Administrative*, 39(233), 494–496. Online <https://www.jstor.org/stable/40780050>, retrieved 7 January 2025.
- Wayne, A. (1995, December). *Introduction to Statistical Time Series, 2nd Edition*. Wiley. Online <https://www.wiley.com/en-us/Introduction+to+Statistical+Time+Series%2C+2nd+Edition-p-9780471552390>, retrieved 7 January 2025.
- White, L. H. (2003). *Currency Competition and Consumer-Driven Unification*. *Cato Journal*, 23(1), 139–145. Online <https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=ae6fb450e05a725883749b4036aacd4b05b6e7c5>, retrieved 7 January 2025.
- Wooldridge, J. M. (2013). *Introductory Econometrics: A Modern Approach* (5th ed.). Online https://www.academia.edu/47723645/Introductory_Econometrics_A_Modern_Approach, retrieved 7 January 2025.
- World Bank. (n.d.). *World Bank Open Data*. Online <https://data.worldbank.org>, retrieved 7 January 2025.
- Wylde, C. (2011). State, Society and Markets in Argentina: The Political Economy of 'Neodesarrollismo' under Néstor Kirchner, 2003-2007. *Bulletin of Latin American Research*, 30(4), 436–452. Online <https://www.jstor.org/stable/41238254>, retrieved 7 January 2025.
- You, J., & Zhou, X. (2014). Asymptotic Theory in Fixed Effects Panel Data Seemingly Unrelated Partially Linear Regression Models. *Econometric Theory*, 30(2), 407–435. Online <https://www.jstor.org/stable/24534591>, retrieved 7 January 2025.
- Zendejas, J. F. (2024). When it rains, it pours: Mexico's bank nationalisation and the debt crisis of 1982. *Revista de Historia Económica - Journal of Iberian and Latin American Economic History*, 42(1), 33–58. Online <https://doi.org/10.1017/S0212610923000174>.

VII.

Appendices

Time Period 1 : 2002-2006

Appendix 1: Table of Macroeconomic Indicators

Year	GDP Growth Rate (%)	GDP (current US\$)	Exports of Goods and Services (US\$ Million)	Imports of Goods and Services (US\$ Million)	Official Exchange Rate (ARS/USD)	Current Account Balance (US\$ Million)	Foreign Direct Investment (US\$ Million)	Real Interest Rate (%)	**Inflation Rate (IPC %)	Total reserves minus gold (current US\$)
2002	-10.89	97,724,004,252	27,736,610,298	13,065,823,829	3.063256667	8,766,610,000	2,148,910,000	16.18	25.869	1,05E+10
2003	8.84	127,587,000,000	33,084,505,278	18,772,898,619	2.900629167	8,139,930,000	1,652,010,000	7.83	13.443	1.42e+10
2004	9.03	164,658,000,000	39,266,996,606	27,736,672,324	2.923300819	3,211,790,000	4,124,710,000	-9.79	4.416	1.89e+10
2005	8.85	198,737,000,000	46,198,180,131	34,392,237,787	2.9036575	5,273,750,000	5,265,250,000	-3.77	9.642	2.72e+10
2006	8.05	232,557,000,000	53,550,250,227	40,480,743,016	3.054313333	6,498,802,520	5,537,347,786	-4.50	10.898	3.09e+10

World Bank, International Monetary Fund (IMF), Central Bank of the Argentine Republic (BCRA)

Appendix 2: Debt Indicators Table

Année	External Debt Stocks (US\$ Million)	Government Primary Balance (% of GDP)	Gross Public Debt (% of GDP)
2002	148,320,000,000	0.234949	147.2025
2003	163,443,000,000	3.226374	125.1616
2004	168,000,000,000	5.219481	117.8778
2005	130,788,000,000	5.151818	80.2818
2006	118,921,000,000	3.286042	70.79269

World Bank, International Monetary Fund (IMF), Central Bank of the Argentine Republic (BCRA)

Appendix 3: Social indicators table

Année	Unemployment Rate (%)	Poverty Rate (%)
2002	19.59	12.4
2003	15.36	5.4
2004	13.52	3.9
2005	11.51	2.7
2006	10.08	2.2

World Bank

Appendix 4: Table of private investment in local currency and in USD (expressed in ARS)

Date	Loans to Private Sector (ARS) millions	Loans to Private Sector (USD) millions	Deposits - Private Sector (ARS) millions	Deposits - Private Sector (USD) millions
2002	41,175.27	6,749.06	63,350.74	2,214.29
2003	34,974.95	5,483.08	71,857.75	5,181.73
2004	41,422.13	5,549.24	75,789.75	7,424.59
2005	54,162.52	7,898.14	89,539.89	10,733.46
2006	72,778.22	12,487.86	107,103.18	15,178.41

Central Bank of the Argentine Republic (BCRA)

Time Period 2 : 2007-20012

Appendix 5: Table of Macroeconomic Indicators

Year	GDP Gro wth Rate (%)	GDP (current US\$)	Exports of Goods and Services (US\$ Million)	Imports of Goods and Services (US\$ Million)	Official Exchang e Rate (ARS/ USD)	Current Account Balance (US\$ Million)	Foreign Direct Investment (US\$ Million)	Real Intere st Rate (%)	**Inflat ion Rate (IPC %) **	Total reserve s minus gold (curren t US\$)
2007	9.01	287,531,000,000	65,162,321,195	52,567,536,062	3.095648849	6,048,537,893	6,473,157,762	-3.38	8.83	4,47E+10
2008	4.06	361,558,000,000	79,762,958,392	66,316,154,417	3.14416456	5,421,206,329	9,725,553,130	-3.01	8.585	4.49e+10
2009	-5.92	332,976,000,000	65,133,480,388	48,268,743,530	3.710106831	7,254,115,684	4,017,158,925	0.24	6.27	4.61e+10
2010	10.13	423,627,000,000	80,208,867,996	67,937,933,972	3.896295154	-1,622,995,871	11,332,718,626	-8.57	10.461	4.97e+10
2011	6.00	530,158,000,000	97,809,980,731	88,838,309,449	4.110139576	-5,340,181,192	10,839,930,945	-7.77	9.775	4.32e+10
2012	-1.03	545,982,000,000	88,655,850,854	81,013,690,407	4.53693436	-2,138,040,360	15,323,933,917	-6.75	10.043	3.99e+10

World Bank, Social reports from BCRA, IMF

Appendix 6: Debt Indicators Table

Year	External Debt Stocks (US\$ Million)	Government Primary Balance (% of GDP)	Gross Public Debt (% of GDP)
2007	120,818,000,000	2.549627	62.13271
2008	129,752,000,000	1.864627	53.81385
2009	133,695,000,000	-0.48791	55.39708
2010	126,642,000,000	-0.53845	43.45432
2011	142,885,000,000	-1.58737	38.93485
2012	139,878,000,000	-1.69582	40.43605

World Bank, National Statistical Institutes, Social reports from BCRA

Appendix 7: Social indicators table

Year	Unemployment Rate (%)	Poverty Rate (%)
2007	8.47	1.8
2008	7.837	1.6
2009	8.645	1.6
2010	7.714	0.7
2011	7.217	0.7
2012	7.1	0.6

World Bank

Appendix 8: Table of private investment in local currency and in USD (expressed in ARS)

Year	Loans to Private Sector (ARS)	Loans to Private Sector (USD)	Deposits - Private Sector (ARS)	Deposits - Private Sector (USD)
2007	100,117.36	17,373.96	131,326.72	21,329.54
2008	120,097.79	21,469.01	137,466.51	27,671.89
2009	133,118.34	21,827.15	159,361.78	38,844.23
2010	179,454.54	31,419.61	210,093.30	46,650.32
2011	262,471.08	42,782.20	273,404.72	52,430.58
2012	372,206.26	29,094.69	386,298.74	39,249.38

Central Bank of the Argentine Republic (BCRA)

Time Period 3 : 2013-2023

Appendix 9: Table of Macroeconomic Indicators

Year	GDP Growth Rate (%)	GDP (current US\$)	Exports of Goods and Services (US\$ Million)	Imports of Goods and Services (US\$ Million)	Official Exchange Rate (ARS/USD)	Current Account Balance (US\$ Million)	Foreign Direct Investment (US\$ Million)	Real Interest Rate (%)	**Inflation Rate (IPC %) **	Total reserves minus gold (current US\$)
2013	2.41	552,025,000,000	80,259,482,469	65,845,643,691	5.459352665	-13,124,373,786	9,821,661,858	-5.485839182	10.62	1.81E+10
2014	-2.51	526,320,000,000	75,818,867,911	73,691,675,720	8.075275993	-9,179,026,267	5,065,335,542	-11.60069877	23.90	2.9e+10
2015	2.73	594,749,000,000	63,671,789,069	70,064,879,912	9.233185525	-17,621,985,168	11,758,994,011	-1.314708785	29.00	2.34E+10
2016	-2.08	557,532,000,000	69,842,604,407	75,639,254,068	14.75817509	-15,104,786,525	3,260,164,342	-7.006039843	26.50	3.63e+10
2017	2.82	643,628,000,000	72,860,557,903	89,910,495,567	16.56270693	-31,151,351,751	11,516,861,462	0.455892832	25.675	5.3e+10
2018	-2.62	524,820,000,000	75,766,598,613	85,681,309,473	28.09499167	-27,083,606,451	11,716,769,819	4.564409099	34.277	6.4e+10
2019	-2.00	447,755,000,000	80,259,482,469	65,845,643,691	48.14789167	-3,492,479,581	6,648,187,838	12.10396965	53.548	4.22e+10
2020	-9.90	385,741,000,000	64,053,810,078	52,454,091,268	70.53916667	2,688,362,006	4,884,127,676	-7.635174216	42.015	3.56e+10
2021	10.72	487,903,000,000	87,805,815,481	72,860,619,871	94.99074167	6,624,785,192	6,658,049,679	-11.88381637	48.409	3.64e+10
2022	4.96	631,133,000,000	102,872,000,000	96,884,984,786	130.61655	-40,550,465,170	15,200,600,518	-10.07372869	72.4	4.12E+10
2023	-1.55	640,591,000,000	82,760,724,362	90,018,415,644	296.2580417	-20,955,532,698	23,866,141,440	-16.22721611	133.5	1.9E+10

World Bank, Social reports from BCRA

Appendix 10: Debt Indicators Table

Year	External Debt Stocks (US\$ Million)	Government Primary Balance (% of GDP)	Gross Public Debt (% of GDP)
2013	150,225	-2.63968	43.49607
2014	153,794	-3.50003	44.69685
2015	177,185	-4.41783	52.56264
2016	181,639	-4.7622	53.06018
2017	225,925	-4.22838	57.02784
2018	277,827	-2.23799	85.24631
2019	280,685	-6.17856	88.83502
2020	255,558	-2.51912	102.7897
2021	246,307	-1.80463	80.82043
2022	247,681	-4.3%	84.6847
2023	288	-3.6%	88.000

World Bank, National Statistical Institutes, Social reports from BCRA

Appendix 11: Social indicators table

Year	Unemployment Rate (%)	Poverty Rate (%)
2013	7.268	0.7
2014	7.58	0.6
2015	8.083	1.0
2016	8.347	1.1
2017	9.221	1.2
2018	9.843	0.9
2019	11.461	0.6
2020	8.736	n.a.
2021	6.805	n.a.
2022	6.178	n.a.
2023	6.178	n.a.

World Bank

Appendix 12: Table of private investment in local currency and in USD (expressed in ARS)

Year	Loans to Private Sector (ARS)	Loans to Private Sector (USD)	Deposits - Private Sector (ARS)	Deposits - Private Sector (USD)
2013	499,633.37	27,025.15	499,410.49	45,145.14
2014	601,331.10	31,671.24	653,817.41	64,084.53
2015	816,406.80	41,890.28	920,444.87	138,726.94
2016	970,368.87	154,225.82	1,158,531.16	356,608.07
2017	1,409,183.64	292,028.64	1,464,089.60	495,919.77
2018	1,719,083.47	604,732.96	2,089,795.39	1,095,187.51
2019	2,175,555.26	648,643.37	2,823,946.18	1,165,979.64
2020	3,284,090.20	477,671.75	5,169,580.21	1,343,315.81
2021	4,916,943.29	440,500.61	8,244,582.41	1,620,882.78
2022	8,398,099.64	688,091.84	16,437,387.31	2,896,527.31
2023	20,487,509.45	3,260,638.39	39,844,078.01	12,783,397.50

Central Bank of the Argentine Republic (BCRA)

Other indicators and tables

Appendix 13: Money supply, private deposits and currency substitution

Year	M2	Deposits_Private_Sector_USD	Currency_Substitution
2002	87294434000.0	2214290000.0	0.02536576386989347
2003	113164000000.0	5181730000.0	0.04578956205153582
2004	137412000000.0	7424590000.0	0.05403159840479725
2005	166975000000.0	10733460000.0	0.0642818385985926
2006	200808000000.0	15178410000.0	0.07558667981355324
2007	249937000000.0	21329540000.0	0.08533966559573013
2008	270094000000.0	27671890000.0	0.10245281272445889
2009	316010000000.0	38844230000.0	0.12292088857947533
2010	422752000000.0	46650320000.0	0.11034914086745894
2011	531401000000.0	52430580000.0	0.09866481244860284
2012	716870000000.0	39249380000.0	0.05475104272741222
2013	910614000000.0	45145140000.0	0.049576593375458756
2014	1182400000000.0	64084530000.0	0.05419868910690122
2015	1648860000000.0	138726940000.0	0.08413506301323338
2016	2334520000000.0	356608070000.0	0.152754343505303
2017	3037660000000.0	495919770000.0	0.1632571683466879
2018	4484010000000.0	1095187510000.0	0.24424287858412447
2019	5644660000000.0	1165979640000.0	0.20656330762171682
2020	9388820000000.0	1343315810000.0	0.14307610647557414
2021	14203600000000.0	1620882780000.0	0.11411774338899998
2022	26658100000000.0	2896527310000.0	0.10865467944077034
2023	68924200000000.0	12783397500000.0	0.1854703790540913

Central Bank of the Argentine Republic (BCRA) and World Bank

Appendix 14: Dollar Blue evolution by month

Year	Annual Variation	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2011	15.28%	\$4.13	\$4.15	\$4.15	\$4.30	\$4.29	\$4.27	\$4.34	\$4.43	\$4.43	\$4.48	\$4.62	\$4.73
2012	43.34%	\$4.78	\$4.71	\$4.92	\$5.07	\$5.90	\$5.93	\$6.29	\$6.35	\$6.28	\$6.32	\$6.42	\$6.78
2013	46.76%	\$7.89	\$7.82	\$8.38	\$9.37	\$8.75	\$8.00	\$8.48	\$9.20	\$9.43	\$9.87	\$9.53	\$9.95
2014	37.69%	\$11.15	\$11.20	\$10.70	\$10.45	\$11.30	\$12.05	\$12.60	\$13.95	\$15.60	\$14.18	\$13.00	\$13.70
2015	3.43%	\$13.50	\$12.93	\$12.52	\$12.60	\$12.55	\$13.30	\$14.79	\$15.32	\$15.84	\$15.60	\$14.59	\$14.17
2016	16.23%	\$13.87	\$15.21	\$14.86	\$14.26	\$14.11	\$14.65	\$15.07	\$15.01	\$15.31	\$15.16	\$15.75	\$16.47
2017	14.63%	\$16.24	\$15.88	\$15.58	\$15.59	\$15.99	\$16.44	\$17.65	\$17.83	\$17.51	\$17.70	\$17.56	\$18.88
2018	103.92%	\$19.55	\$19.95	\$20.36	\$20.60	\$25.17	\$28.40	\$27.45	\$36.00	\$39.30	\$34.50	\$36.00	\$38.50
2019	90.91%	\$35.50	\$38.80	\$42.65	\$45.00	\$44.50	\$42.30	\$43.70	\$60.00	\$58.25	\$66.00	\$66.25	\$73.50
2020	117.69%	\$74.00	\$74.50	\$78.50	\$108.00	\$115.00	\$116.00	\$131.00	\$131.00	\$140.00	\$163.00	\$149.00	\$160.00
2021	27.50%	\$148.00	\$141.00	\$136.00	\$145.00	\$152.00	\$163.00	\$175.50	\$176.50	\$182.00	\$193.50	\$197.50	\$204.00
2022	67.65%	\$209.00	\$207.00	\$196.00	\$196.50	\$201.00	\$234.00	\$286.00	\$285.00	\$284.00	\$286.00	\$310.00	\$342.00
2023	185.09%	\$379.00	\$373.00	\$388.00	\$462.00	\$485.00	\$489.00	\$545.00	\$725.00	\$790.00	\$870.00	\$855.00	\$975.00

Data from <https://estudiodelamo.com/cotizacion-historica-dolar-peso-argentina/>

Appendix 15: Dollar Blue evolution by year

Year	Annual Variation (%)	Average Rate
2011	15.28	4.36
2012	43.34	5.81
2013	46.76	8.89
2014	37.69	12.49
2015	3.43	13.98

2016	16.23	14.98
2017	14.63	16.9
2018	103.92	28.82
2019	90.91	51.37
2020	117.69	120.0
2021	27.5	167.83
2022	67.65	253.04
2023	185.09	611.33

Data from <https://estudiodelamo.com/cotizacion-historica-dolar-peso-argentina/>

Appendix 16: Dollar Blue evolution for each month of 2023

Year	Annual Variation	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2023	185.09%	\$379.00	\$373.00	\$388.00	\$462.00	\$485.00	\$489.00	\$545.00	\$725.00	\$790.00	\$870.00	\$855.00	\$975.00

RStudio

Appendix 17: Rstudio Code for the quantitative study

RStudio code used to obtain the results of the quantitative study.

```
#-----Packages installation-----

install.packages("ecm")
install.packages("astsa")
install.packages("trend")
install.packages("tsoutliers")
install.packages("tis")
install.packages("ggplot2")
install.packages("ggthemes")
install.packages("nnet")
install.packages("mgcv")
install.packages("quantreg")
install.packages("systemfit")
install.packages("foreign")
install.packages("car")
install.packages("Rcpp")
library(tidyverse)
library(ecm)
library(vars)
library(mFilter)
library(TSstudio)
library(tidyverse)
library(astsa)
library(car)
library(forecast)
library(tseries)
library(lmtest)
library(trend)
library(outliers)
```

```

library(EnvStats)
library(quantmod)
library(dynlm)
library(readr)
library(tsoutliers)
library(tis)
library(urca)
library(RColorBrewer)
library(corrplot)
library(ggplot2)
library(ggthemes)
library(gridExtra)
library(readr)
library(foreign)
library(systemfit)
library(dplyr)
library(readr)
library(lubridate)

#####DATA IMPORTATION#####

#-----El Salvador-----

#Inflation (CPI,annual%)

CPI_SA <- read_delim("Inflation IPC st louis sa.csv",
                    delim = ";", escape_double = FALSE, trim_ws = TRUE)

CPI_SA <- Inflation_IPC_st_louis_sa %>%

mutate(
  observation_date = dmy(observation_date),
  Year = year(observation_date)
) %>%

filter(Year >= 1990 & Year <= 2023) %>%

dplyr::select(-observation_date) %>%

```

```

rename(Inflation_rate = SLVPCPIEPCH) %>%
mutate(Country = "El Salvador")
CPI_SA <- CPI_SA %>%
mutate(
  Year = as.integer(Year)
)
#GDP (% change, annual)
GDP_SA<- read_delim("GDP stlou sa.csv",
  delim = ";", escape_double = FALSE, trim_ws = TRUE)
GDP_SA <- GDP_stlou_sa %>%
mutate(
  observation_date = dmy(observation_date),
  Year = year(observation_date)
) %>%
filter(Year >= 1990 & Year <= 2023) %>%
dplyr::select(-observation_date) %>%
rename(GDP = SLVNGDPRPCH) %>%
mutate(Country = "El Salvador")
GDP_SA <- GDP_SA %>%
mutate(
  Year = as.integer(Year)
)
#GDP plot
GDP_plot_SA <- read_delim("MKTGDPSVA646NWDB.csv",
  delim = ";", escape_double = FALSE, trim_ws = TRUE)
GDP_plot_SA <- GDP_plot_SA %>%
mutate(
  observation_date = dmy(observation_date),
  Year = year(observation_date)
) %>%
filter(Year >= 1990 & Year <= 2023) %>%

```

```
dplyr::select(-observation_date) %>%
rename(GDP = MKTGDPSVA646NWDB) %>%
mutate(Country = "El Salvador »)
```

```
GDP_plot_SA <- GDP_plot_SA %>%
  mutate(
    Year = as.integer(Year)
  )
```

#Unemployment rate (% of total labor force) (ilo estimated)

```
Unemployment_SA <- read_delim("Unemployment rate ilo sa (WB).csv",
  delim = ";", escape_double = FALSE, trim_ws = TRUE)
```

```
Unemployment_SA <- read_delim("Unemployment rate ilo sa (WB).csv",
  col_names = c("Variable", "Value"),
  na = c("n.a", ".."),
  show_col_types = FALSE)
```

```
Country_Un_SA <- Unemployment_SA %>%
  filter(Variable %in% c("Country Name", "Series Name")) %>%
  pivot_wider(names_from = Variable, values_from = Value)
```

```
years_Un_SA <- Unemployment_SA %>%
  filter(str_detect(Variable, "^\\d{4} \\[YR\\d{4}\\]\\]$")) %>%
  mutate(
    Year = str_extract(Variable, "^\\d{4}"),
    Year = as.integer(Year),
    Unemployment_Rate = as.numeric(Value)
  ) %>%
  dplyr::select(Year, Unemployment_Rate)
```

```
Unemployment_SA <- years_Un_SA %>%
```

```

mutate(
  Country = Country_Un_SA$`Country Name`,
  Indicator = Country_Un_SA$`Series Name`
) %>%

dplyr::select(Country, Year, Unemployment_Rate)

#Broad Money M2 (%GDP)

M2_SA <- read_delim("Broad money (% of GDP)_WB_sa.csv",
  delim = ";", escape_double = FALSE, trim_ws = TRUE)

M2_SA <- read_delim("Broad money (% of GDP)_WB_sa.csv",
  col_names = c("Variable", "Value"),
  na = c("n.a", ".."),
  show_col_types = FALSE)

Country_M2_SA <- M2_SA %>%

  filter(Variable %in% c("Country Name", "Series Name")) %>%

  pivot_wider(names_from = Variable, values_from = Value)

Years_M2_SA <- M2_SA %>%

  filter(str_detect(Variable, "^\\d{4} \\[YR\\d{4}\\]\\]$")) %>%

  mutate(
    Year = as.integer(str_extract(Variable, "^\\d{4}")),
    M2 = as.numeric(Value)
  ) %>%

  dplyr::select(Year, M2)

M2_SA <- Years_M2_SA %>%

  mutate(
    Country = Country_M2_SA$`Country Name`,
    Indicator = Country_M2_SA$`Series Name`
  ) %>%

  dplyr::select(Country, Year, M2)

```

#Reserves (minus gold) (Current US\$)

```
Reserves_SA <- read_delim("Reserves WB sa.csv",
  delim = ";", escape_double = FALSE, trim_ws = TRUE)
```

```
Reserves_SA <- read_delim("Reserves WB sa.csv",
  col_names = c("Variable", "Value"),
  na = c("n.a", ".."),
  show_col_types = FALSE)
```

```
Country_Reserves_SA <- Reserves_SA %>%
  filter(Variable %in% c("Country Name", "Series Name")) %>%
  pivot_wider(names_from = Variable, values_from = Value)
Years_Reserves_SA <- Reserves_SA %>%
  filter(str_detect(Variable, "^\\d{4} \\[/YR\\d{4}\\/$$")) %>%
  mutate(
    Year = as.integer(str_extract(Variable, "^\\d{4}")),
    Reserves = as.numeric(Value)
  ) %>%
  dplyr::select(Year, Reserves)
```

```
Reserves_SA <- Years_Reserves_SA %>%
  mutate(
    Country = Country_Reserves_SA$`Country Name`,
    Indicator = Country_Reserves_SA$`Series Name`
  ) %>%
  dplyr::select(Country, Year, Reserves)
```

#Current account balance (%GDP)

```
Current_Account_SA <- read_delim("Currentaccount_IMF_Sa.csv",
  delim = ";", escape_double = FALSE, locale = locale(decimal_mark = ","),
  trim_ws = TRUE)
```

```
colnames(Current_Account_SA)[1] <- "Country"
```

```
Current_Account_SA <- Current_Account_SA %>%
```

```

pivot_longer(
  cols = -Country,
  names_to = "Year",
  values_to = "Current Account Balance"
)
Current_Acccount_SA <- Current_Account_SA %>%
  filter(Year >= 1990 & Year <= 2023)
Current_Acccount_SA <- Current_Acccount_SA %>%
  mutate(
    Year = as.integer(Year)
  )
#Budget Balance : Net lending/borrowing (Overall Balance) (%GDP)
Budget_Balance_SA <- read_delim("NetLend:Bo_IMF_Sa.csv",
  delim = ";", escape_double = FALSE, locale = locale(decimal_mark = ","),
  trim_ws = TRUE)
colnames(Budget_Balance_SA)[1] <- "Country"
Budget_Balance_SA <- Budget_Balance_SA%>%
  pivot_longer(
    cols = -Country,
    names_to = "Year",
    values_to = "Budget Balance(%GDP)"
  )
Budget_Balance_SA <- Budget_Balance_SA %>%
  filter(Year >= 1990 & Year <= 2023)
View(Budget_Balance_SA)
sapply(Budget_Balance_SA, class)
Budget_Balance_SA <- Budget_Balance_SA %>%
  mutate(
    Year = as.integer(Year)
  )
#Public Debt (%GDP)

```

```

Public_Debt_SA <- read_delim("Debt_ECLAC_Sa.csv",
                             delim = ";", escape_double = FALSE, locale = locale(decimal_mark = ","),
                             trim_ws = TRUE)

Public_Debt_SA <- Public_Debt_SA %>%
  dplyr::select(Year, value, Country__ESTANDAR)

Public_Debt_SA <- Public_Debt_SA %>%
  rename(
    `Public debt (%GDP)` = value,
    Country = Country__ESTANDAR
  )

Public_Debt_SA <- Public_Debt_SA %>%
  mutate(
    Year = as.integer(Year)
  )

#Nominal deposit rate

Deposit_Rate_SA <- read_delim("DepRate_Eclac_Sa.csv",
                              delim = ";", escape_double = FALSE, locale = locale(decimal_mark = ","),
                              trim_ws = TRUE)

Deposit_Rate_SA <- Deposit_Rate_SA %>%
  dplyr::select(Year, `Final Value`) %>%
  rename(
    `Deposit interest rate` = `Final Value`
  )

Deposit_Rate_SA <- Deposit_Rate_SA %>%
  mutate(Country = "El Salvador") %>%
  dplyr::select(Year, `Deposit interest rate`, Country)

Deposit_Rate_SA <- Deposit_Rate_SA %>%
  mutate(
    Year = as.integer(Year)
  )

```

#REER = Reel effective exchange rate (index 2005 = 100)

```
REER_SA <- read_delim("REER_eclac_Sa.csv",
                      delim = ";", escape_double = FALSE, locale = locale(decimal_mark = ","),
                      trim_ws = TRUE)
```

```
REER_SA <- REER_SA %>%
```

```
  dplyr::select(Years, Country__ESTANDAR, value) %>%
```

```
  rename(
```

```
    Year = Years,
```

```
    Country = Country__ESTANDAR,
```

```
    REER = value
```

```
  )
```

```
REER_SA <- REER_SA %>%
```

```
  mutate(
```

```
    Year = as.integer(Year)
```

```
  )
```

```
## ----- Ecuador -----
```

#Inflation : Consumer prices Index (CPI,annual% change)

```
CPI_ECU <- read_delim("IPC_inflation_stlouis ecuador.csv",
```

```
                      delim = ";", escape_double = FALSE, trim_ws = TRUE)
```

```
CPI_ECU <- CPI_ECU %>%
```

```
  mutate(
```

```
    observation_date = dmy(observation_date),
```

```
    Year = year(observation_date)
```

```
  ) %>%
```

```
  filter(Year >= 1990 & Year <= 2023) %>%
```

```
  dplyr::select(Year, ECUPCPIEPCH) %>%
```

```
  rename(Inflation_rate = ECUPCPIEPCH) %>%
```

```
  mutate(Country = "Ecuador")
```

```
CPI_ECU <- CPI_ECU %>%
```

```
  mutate(
```

```
    Year = as.integer(Year) )
```

#GDP (% change, annual)

```
GDP_ECU <- read_delim("growth rate stlou ec.csv",
                      delim = ";", escape_double = FALSE, trim_ws = TRUE)

GDP_ECU <- GDP_ECU %>%

  mutate(

    observation_date = dmy(observation_date),
    Year = year(observation_date)

  ) %>%

  filter(Year >= 1990 & Year <= 2023) %>%

  dplyr::select(Year, ECUNGDP RPCH) %>%

  rename(GDP = ECUNGDP RPCH) %>%

  mutate(Country = "Ecuador")

GDP_ECU <- GDP_ECU %>%

  mutate(

    Year = as.integer(Year)

  )
```

#GDP plot

```
GDP_plot_ECU <- read_delim("MKTGDPECA646NWDB.csv",
                           delim = ";", escape_double = FALSE, trim_ws = TRUE)

GDP_plot_ECU <- GDP_plot_ECU %>%

  mutate(

    observation_date = dmy(observation_date),
    Year = year(observation_date)

  ) %>%

  filter(Year >= 1990 & Year <= 2023) %>%

  dplyr::select(-observation_date) %>%

  rename(GDP = MKTGDPECA646NWDB) %>%

  mutate(Country = "Ecuador")

GDP_plot_ECU <- GDP_plot_ECU %>%

  mutate(

    Year = as.integer(Year)
```

```

)

#Unemployment rate (% of labor force, ILO estimated)

Unemployment_ECU <- read_delim("Unemployment rate ilo ec(WB).csv",
                                col_names = c("Variable", "Value"),
                                na = c("n.a", ".."),
                                show_col_types = FALSE)

Country_Un_ECU <- Unemployment_ECU %>%
  filter(Variable %in% c("Country Name", "Series Name")) %>%
  pivot_wider(names_from = Variable, values_from = Value)

years_Un_ECU <- Unemployment_ECU %>%
  filter(str_detect(Variable, "\\d{4} \\[YR\\d{4}\\]\\]$")) %>%
  mutate(
    Year = str_extract(Variable, "\\d{4}"),
    Year = as.integer(Year),
    Unemployment_Rate = as.numeric(Value)
  ) %>%
  dplyr::select(Year, Unemployment_Rate)

Unemployment_ECU <- years_Un_ECU %>%
  mutate(
    Country = Country_Un_ECU$`Country Name`,
    Indicator = Country_Un_ECU$`Series Name`
  ) %>%
  dplyr::select(Country, Year, Unemployment_Rate)

#Broad Money, M2, %GDP

M2_ECU <- read_delim("Broad_money_WB_ec.csv",
                     col_names = c("Variable", "Value"),
                     na = c("n.a", ".."),
                     show_col_types = FALSE)

Country_M2_ECU <- M2_ECU %>%

```

```

filter(Variable %in% c("Country Name", "Series Name")) %>%
pivot_wider(names_from = Variable, values_from = Value)
Years_M2_ECU <- M2_ECU %>%
filter(str_detect(Variable, "\\d{4} \\[/YR\\d{4}\\/$")) %>%
mutate(
  Year = as.integer(str_extract(Variable, "\\d{4}")),
  M2 = as.numeric(Value)
) %>%
dplyr::select(Year, M2)
M2_ECU <- Years_M2_ECU %>%
mutate(
  Country = Country_M2_ECU$`Country Name`,
  Indicator = Country_M2_ECU$`Series Name`
) %>%
dplyr::select(Country, Year, M2)
View(M2_ECU)

```

#Reserves minus gold (current US\$)

```

Reserves_ECU <- read_delim("Reserves (minus gold, $mil)_WB_ec.csv",
  col_names = c("Variable", "Value"),
  na = c("n.a", ".."),
  show_col_types = FALSE)
Country_Reserves_ECU <- Reserves_ECU %>%
filter(Variable %in% c("Country Name", "Series Name")) %>%
pivot_wider(names_from = Variable, values_from = Value)
Years_Reserves_ECU <- Reserves_ECU %>%
filter(str_detect(Variable, "\\d{4} \\[/YR\\d{4}\\/$")) %>%
mutate(
  Year = as.integer(str_extract(Variable, "\\d{4}")),
  Reserves = as.numeric(Value)
) %>%

```

```

dplyr::select(Year, Reserves)

Reserves_ECU <- Years_Reserves_ECU %>%

mutate(

  Country = Country_Reserves_ECU$`Country Name`,
  Indicator = Country_Reserves_ECU$`Series Name`
) %>%

dplyr::select(Country, Year, Reserves)

#Current account balance (%GDP)

Current_Account_ECU <- read_delim("Currentaccount_IMF_Ec.csv",
                                delim = ";", escape_double = FALSE, locale = locale(decimal_mark = ","),
                                trim_ws = TRUE)

colnames(Current_Account_ECU)[1] <- "Country"

Current_Account_ECU <- Current_Account_ECU %>%

pivot_longer(

  cols = -Country,
  names_to = "Year",
  values_to = "Current Account Balance"
)

Current_Account_ECU <- Current_Account_ECU %>%

filter(Year >= 1990 & Year <= 2023)

Current_Account_ECU <- Current_Account_ECU %>%

mutate(

  Year = as.integer(Year)
)

#Budget Balance: net lending/borrowing (overall balance) (%GDP)-

Budget_Balance_ECU <- read_delim("NetLend:Bo_imf_ec.csv",
                                delim = ";", escape_double = FALSE, locale = locale(decimal_mark = ","),
                                trim_ws = TRUE)

colnames(Budget_Balance_ECU)[1] <- "Country"

```

```

Budget_Balance_ECU <- Budget_Balance_ECU%>%
  pivot_longer(
    cols = -Country,
    names_to = "Year",
    values_to = "Budget Balance(%GDP)"
  )
Budget_Balance_ECU <- Budget_Balance_ECU %>%
  filter(Year >= 1990 & Year <= 2023)
Budget_Balance_ECU <- Budget_Balance_ECU %>%
  mutate(
    Year = as.integer(Year)
  )
#Public debt (%GDP)
Public_Debt_ECU <- read_delim("Debt_ECLAC_Ec.csv",
  delim = ";", escape_double = FALSE, locale = locale(decimal_mark = ","),
  trim_ws = TRUE)
Public_Debt_ECU <- Public_Debt_ECU%>%
  dplyr::select(Year, value, Country__ESTANDAR)

Public_Debt_ECU <- Public_Debt_ECU %>%
  rename(
    `Public debt (%GDP)` = value,
    Country = Country__ESTANDAR
  )
Public_Debt_ECU <- Public_Debt_ECU %>%
  mutate(
    Year = as.integer(Year)
  )
#Nominal deposit rate
Deposit_Rate_ECU <- read_delim("Dep_intrrate_ec.csv",

```

```

      delim = ";", escape_double = FALSE, trim_ws = TRUE)

Deposit_Rate_ECU <- Deposit_Rate_ECU %>%
  dplyr::select(Country, DateTime, Value) %>%
  rename(
    `Deposit interest rate` = Value
  )

Deposit_Rate_ECU <- Deposit_Rate_ECU %>%
  mutate(
    Year = as.integer(str_sub(DateTime, 1, 4)),
    `Deposit interest rate` = as.numeric(`Deposit interest rate`)
  ) %>%
  dplyr::select(Year, `Deposit interest rate`, Country)

Deposit_Rate_ECU <- Deposit_Rate_ECU %>%
  filter(Year >= 1990 & Year <= 2023)

#REER: reel effective exchange rate (index: 2005 = 100)

REER_ECU <- read_delim("REER_eclac_Ec.csv",
  delim = ";", escape_double = FALSE, locale = locale(decimal_mark = ","),
  trim_ws = TRUE)

REER_ECU <- REER_ECU %>%
  dplyr::select(Years, Country__ESTANDAR, value) %>%
  rename(
    Year = Years,
    Country = Country__ESTANDAR,
    REER = value
  )

REER_ECU <- REER_ECU %>%
  mutate(
    Year = as.integer(Year)
  )

```

----- *Panel creation* -----

#Assemble all the indicators for El Salvador

```
panel_SA <- CPI_SA %>%
  left_join(GDP_SA, by = c("Year", "Country")) %>%
  left_join(Unemployment_SA, by = c("Year", "Country")) %>%
  left_join(M2_SA, by = c("Year", "Country")) %>%
  left_join(Reserves_SA, by = c("Year", "Country")) %>%
  left_join(Current_Acccount_SA, by = c("Year", "Country")) %>%
  left_join(Budget_Balance_SA, by = c("Year", "Country")) %>%
  left_join(Public_Debt_SA, by = c("Year", "Country")) %>%
  left_join(Deposit_Rate_SA, by = c("Year", "Country")) %>%
  left_join(REER_SA, by = c("Year", "Country"))
```

#Assemble all the indicators for Ecuador

```
panel_ECU <- CPI_ECU %>%
  left_join(GDP_ECU, by = c("Year", "Country")) %>%
  left_join(Unemployment_ECU, by = c("Year", "Country")) %>%
  left_join(M2_ECU, by = c("Year", "Country")) %>%
  left_join(Reserves_ECU, by = c("Year", "Country")) %>%
  left_join(Current_Acccount_ECU, by = c("Year", "Country")) %>%
  left_join(Budget_Balance_ECU, by = c("Year", "Country")) %>%
  left_join(Public_Debt_ECU, by = c("Year", "Country")) %>%
  left_join(Deposit_Rate_ECU, by = c("Year", "Country")) %>%
  left_join(REER_ECU, by = c("Year", "Country"))
```

#Combining data from the two countries

```
panel <- bind_rows(panel_SA, panel_ECU)
panel <- panel %>%
  dplyr::select(Year, Country, everything())
```

#Add Variable dollarization

```
panel <- panel %>%
  mutate(
```

```

Dollarization = case_when(
  (Country == "Ecuador" & Year >= 2000) ~ 1,
  (Country == "El Salvador" & Year >= 2001) ~ 1,
  TRUE ~ 0
)
)
View(panel)
#-----Descriptive analysis-----
library(moments)
#GDP plot SA
GDP_plot_SA <- read_delim("MKTGDPSVA646NWDB.csv",
  delim = ";", escape_double = FALSE, trim_ws = TRUE)
GDP_plot_SA <- GDP_plot_SA %>%
  mutate(
    observation_date = dmy(observation_date),
    Year = year(observation_date)
  ) %>%
  filter(Year >= 1990 & Year <= 2023) %>%
  dplyr::select(-observation_date) %>%
  rename(GDP = MKTGDPSVA646NWDB) %>%
  mutate(Country = "El Salvador")
GDP_plot_SA <- GDP_plot_SA %>%
  mutate(
    Year = as.integer(Year)
  )
#GDP plot Ecuador
GDP_plot_ECU <- read_delim("MKTGDPECA646NWDB.csv",
  delim = ";", escape_double = FALSE, trim_ws = TRUE)
GDP_plot_ECU <- GDP_plot_ECU %>%
  mutate(
    observation_date = dmy(observation_date),

```

```

    Year = year(observation_date)
  ) %>%

  filter(Year >= 1990 & Year <= 2023) %>%

  dplyr::select(-observation_date) %>%

  rename(GDP = MKTGDPECA646NWDB) %>%

  mutate(Country = "Ecuador")

GDP_plot_ECU <- GDP_plot_ECU %>%

  mutate(

    Year = as.integer(Year)

  )

GDP_plot <- bind_rows(GDP_plot_SA, GDP_plot_ECU)

GDP_plot <- GDP_plot %>%

  mutate(

    Country = factor(Country, levels = c("El Salvador", "Ecuador"))

  )

#plot GDP

ggplot(GDP_plot, aes(x = Year, y = GDP, color = Country)) +

  geom_line(size = 1.2) +

  geom_vline(xintercept = 2000, color = "#87CEEB", linetype = "dashed", size = 1) +

  geom_vline(xintercept = 2001, color = "#FF69B4", linetype = "dashed", size = 1) +

  labs(

    title = "Evolution of GDP (1990-2023)",

    x = "Year",

    y = "GDP (Current USD)",

    color = "Country",

    caption = "Dashed lines represent years of dollarization: \n2000 for Ecuador (blue), 2001 for El
    Salvador (pink)"

  ) +

  scale_color_manual(values = colors) +

  theme_minimal() +

  theme(

    plot.title = element_text(hjust = 0.5, size = 16, face = "bold"),

```

```

axis.title = element_text(size = 14),
axis.text = element_text(size = 12),
legend.title = element_blank(),
legend.text = element_text(size = 12),
panel.grid.minor = element_blank(),
panel.border = element_rect(color = "black", fill = NA, size = 1)
)

#Panel analysis mean and variances

descriptive_summary <- panel %>%
  group_by(Country, Dollarization) %>%
  summarise(

    Inflation_mean = mean(Inflation_rate, na.rm = TRUE),
    Inflation_sd = sd(Inflation_rate, na.rm = TRUE),
    GDP_mean = mean(GDP, na.rm = TRUE),
    GDP_sd = sd(GDP, na.rm = TRUE),
    M2_mean = mean(M2, na.rm = TRUE),
    M2_sd = sd(M2, na.rm = TRUE),
    Reserves_mean = mean(Reserves, na.rm = TRUE),
    Reserves_sd = sd(Reserves, na.rm = TRUE),
    Budget_Balance_mean = mean(`Budget Balance(%GDP)`, na.rm = TRUE),
    Budget_Balance_sd = sd(`Budget Balance(%GDP)`, na.rm = TRUE),
    Public_Debt_mean = mean(`Public debt (%GDP)`, na.rm = TRUE),
    Public_Debt_sd = sd(`Public debt (%GDP)`, na.rm = TRUE),
    Deposit_rate_mean = mean(`Deposit interest rate`, na.rm = TRUE),
    Deposit_rate_sd = sd(`Deposit interest rate`, na.rm = TRUE),
    REER_mean = mean(REER, na.rm = TRUE),
    REER_sd = sd(REER, na.rm = TRUE)
  ) %>%

  arrange(Country, Dollarization)

print(descriptive_summary)

colors <- c("Ecuador" = "#87CEEB", "El Salvador" = "#FF69B4") # Sky Blue and Hot Pink

```

#Plot inflation

```

ggplot(panel, aes(x = Year, y = Inflation_rate, color = Country)) +
  geom_line(size = 1.2) +
  geom_vline(xintercept = 2000, color = "#87CEEB", linetype = "dashed", size = 1, show.legend =
TRUE) +
  geom_vline(xintercept = 2001, color = "#FF69B4", linetype = "dashed", size = 1, show.legend =
TRUE) +
  labs(
    title = "Evolution of Inflation Rate (1990-2023)",
    x = "Year",
    y = "Inflation Rate (%)",
    color = "Country",
    caption = "Dashed lines represent years of dollarization: \n2000 for Ecuador (blue), 2001 for El
Salvador (pink)"
  ) +
  scale_color_manual(values = colors) +
  theme_minimal() +
  theme(
    plot.title = element_text(hjust = 0.5, size = 16, face = "bold"),
    axis.title = element_text(size = 14),
    axis.text = element_text(size = 12),
    legend.title = element_blank(),
    legend.text = element_text(size = 12),
    panel.grid.minor = element_blank(),
    panel.border = element_rect(color = "black", fill = NA, size = 1)
  )

```

#Plot Unemployment rate

```

ggplot(panel, aes(x = Year, y = Unemployment_Rate, color = Country)) +
  geom_line(size = 1.2) +
  geom_vline(xintercept = 2000, color = "#87CEEB", linetype = "dashed", size = 1) +
  geom_vline(xintercept = 2001, color = "#FF69B4", linetype = "dashed", size = 1) +
  labs(

```

```

title = "Evolution of Unemployment Rate (1990-2023)",
x = "Year",
y = "Unemployment Rate (%)",
color = "Country",

caption = "Dashed lines represent years of dollarization: \n2000 for Ecuador (blue), 2001 for El
Salvador (pink)"

) +
scale_color_manual(values = colors) +
theme_minimal() +
theme(

plot.title = element_text(hjust = 0.5, size = 16, face = "bold"),
axis.title = element_text(size = 14),
axis.text = element_text(size = 12),
legend.title = element_blank(),
legend.text = element_text(size = 12),
panel.grid.minor = element_blank(),
panel.border = element_rect(color = "black", fill = NA, size = 1)

)

```

#PlotM2

```

ggplot(panel, aes(x = Year, y = M2, color = Country)) +
geom_line(size = 1.2) +
geom_vline(xintercept = 2000, color = "#87CEEB", linetype = "dashed", size = 1) +
geom_vline(xintercept = 2001, color = "#FF69B4", linetype = "dashed", size = 1) +
labs(

title = "Evolution of Broad Money (M2) as % of GDP (1990-2023)",
x = "Year",
y = "M2 (% of GDP)",
color = "Country",

caption = "Dashed lines represent years of dollarization: \n2000 for Ecuador (blue), 2001 for El
Salvador (pink)"

) +
scale_color_manual(values = colors) +

```

```

theme_minimal() +
theme(
  plot.title = element_text(hjust = 0.5, size = 16, face = "bold"),
  axis.title = element_text(size = 14),
  axis.text = element_text(size = 12),
  legend.title = element_blank(),
  legend.text = element_text(size = 12),
  panel.grid.minor = element_blank(),
  panel.border = element_rect(color = "black", fill = NA, size = 1)
)

```

#reserves plot

```

ggplot(panel, aes(x = Year, y = Reserves, color = Country)) +
  geom_line(size = 1.2) +
  geom_vline(xintercept = 2000, color = "#87CEEB", linetype = "dashed", size = 1) +
  geom_vline(xintercept = 2001, color = "#FF69B4", linetype = "dashed", size = 1) +
  labs(
    title = "Evolution of Reserves (Current US$) (1990-2023)",
    x = "Year",
    y = "Reserves (Current USD)",
    color = "Country",
    caption = "Dashed lines represent years of dollarization: \n2000 for Ecuador (blue), 2001 for El
Salvador (pink)"
  ) +
  scale_color_manual(values = colors) +
  theme_minimal() +
  theme(
    plot.title = element_text(hjust = 0.5, size = 16, face = "bold"),
    axis.title = element_text(size = 14),
    axis.text = element_text(size = 12),
    legend.title = element_blank(),
    legend.text = element_text(size = 12),
    panel.grid.minor = element_blank(),

```

```

    panel.border = element_rect(color = "black", fill = NA, size = 1)
  )
#Plot REER
ggplot(panel, aes(x = Year, y = REER, color = Country)) +
  geom_line(size = 1.2) +
  geom_vline(xintercept = 2000, color = "#87CEEB", linetype = "dashed", size = 1) +
  geom_vline(xintercept = 2001, color = "#FF69B4", linetype = "dashed", size = 1) +
  labs(
    title = "Evolution of Real Effective Exchange Rate (Index 2005 = 100) (1990-2023)",
    x = "Year",
    y = "REER (Index)",
    color = "Country",
    caption = "Dashed lines represent years of dollarization: \n2000 for Ecuador (blue), 2001 for El
Salvador (pink)"
  ) +
  scale_color_manual(values = colors) +
  theme_minimal() +
  theme(
    plot.title = element_text(hjust = 0.5, size = 16, face = "bold"),
    axis.title = element_text(size = 14),
    axis.text = element_text(size = 12),
    legend.title = element_blank(),
    legend.text = element_text(size = 12),
    panel.grid.minor = element_blank(),
    panel.border = element_rect(color = "black", fill = NA, size = 1)
  )

```

#plot Current account

```

ggplot(panel, aes(x = Year, y = `Current Account Balance`, color = Country)) +
  geom_line(size = 1.2) +
  geom_vline(xintercept = 2000, color = "#87CEEB", linetype = "dashed", size = 1) +

```

```

geom_vline(xintercept = 2001, color = "#FF69B4", linetype = "dashed", size = 1) +
labs(
  title = "Evolution of Current Account Balance (%GDP) (1990-2023)",
  x = "Year",
  y = "Current Account Balance (%GDP)",
  color = "Country",
  caption = "Dashed lines: Dollarization years (2000: Ecuador, 2001: El Salvador)"
) +
scale_color_manual(values = c("#87CEEB", "#FF69B4")) +
theme_minimal() +
theme(
  plot.title = element_text(hjust = 0.5, size = 16, face = "bold"),
  axis.title = element_text(size = 14),
  axis.text = element_text(size = 12),
  legend.title = element_blank(),
  legend.text = element_text(size = 12),
  panel.grid.minor = element_blank(),
  panel.border = element_rect(color = "black", fill = NA, size = 1)
)

#Public debt plot

ggplot(panel, aes(x = Year, y = `Public debt (%GDP)`, color = Country)) +
  geom_line(size = 1.2) +
  geom_vline(xintercept = 2000, color = "#87CEEB", linetype = "dashed", size = 1) +
  geom_vline(xintercept = 2001, color = "#FF69B4", linetype = "dashed", size = 1) +
  labs(
    title = "Evolution of Public Debt (%GDP) (1990-2023)",
    x = "Year",
    y = "Public Debt (%GDP)",
    color = "Country",
    caption = "Dashed lines: Dollarization years (2000: Ecuador, 2001: El Salvador)"
  ) +

```

```

scale_color_manual(values = c("#87CEEB", "#FF69B4")) +
theme_minimal() +
theme(
  plot.title = element_text(hjust = 0.5, size = 16, face = "bold"),
  axis.title = element_text(size = 14),
  axis.text = element_text(size = 12),
  legend.title = element_blank(),
  legend.text = element_text(size = 12),
  panel.grid.minor = element_blank(),
  panel.border = element_rect(color = "black", fill = NA, size = 1)
)

```

#budget balance plot

```

ggplot(panel, aes(x = Year, y = `Budget Balance(%GDP)`, color = Country)) +
  geom_line(size = 1.2) +
  geom_vline(xintercept = 2000, color = "#87CEEB", linetype = "dashed", size = 1) +
  geom_vline(xintercept = 2001, color = "#FF69B4", linetype = "dashed", size = 1) +
  labs(
    title = "Evolution of Budget Balance (%GDP) (1990-2023)",
    x = "Year",
    y = "Budget Balance (%GDP)",
    color = "Country",
    caption = "Dashed lines: Dollarization years (2000: Ecuador, 2001: El Salvador)"
  ) +
  scale_color_manual(values = c("#87CEEB", "#FF69B4")) +
  theme_minimal() +
  theme(
    plot.title = element_text(hjust = 0.5, size = 16, face = "bold"),
    axis.title = element_text(size = 14),
    axis.text = element_text(size = 12),
    legend.title = element_blank(),
    legend.text = element_text(size = 12),

```

```

panel.grid.minor = element_blank(),
panel.border = element_rect(color = "black", fill = NA, size = 1)
)

#Deposit rate plot

ggplot(panel, aes(x = Year, y = `Deposit interest rate`, color = Country)) +
  geom_line(size = 1.2) +
  geom_vline(xintercept = 2000, color = "#87CEEB", linetype = "dashed", size = 1) +
  geom_vline(xintercept = 2001, color = "#FF69B4", linetype = "dashed", size = 1) +
  labs(
    title = "Evolution of Deposit Interest Rate (1990-2023)",
    x = "Year",
    y = "Deposit Interest Rate (%)",
    color = "Country",
    caption = "Dashed lines: Dollarization years (2000: Ecuador, 2001: El Salvador)"
  ) +
  scale_color_manual(values = c("#87CEEB", "#FF69B4")) +
  theme_minimal() +
  theme(
    plot.title = element_text(hjust = 0.5, size = 16, face = "bold"),
    axis.title = element_text(size = 14),
    axis.text = element_text(size = 12),
    legend.title = element_blank(),
    legend.text = element_text(size = 12),
    panel.grid.minor = element_blank(),
    panel.border = element_rect(color = "black", fill = NA, size = 1)
  )

```

#Put in a table

```

library(dplyr)
library(ggplot2)
library(knitr)
library(kableExtra)
install.packages('kableExtra')
desc_stats_gdp_inflation <- panel %>%
  group_by(Country) %>%
  summarise(
    mean_inflation = mean(Inflation_rate, na.rm = TRUE),
    sd_inflation   = sd(Inflation_rate, na.rm = TRUE),
    mean_gdp       = mean(GDP, na.rm = TRUE),
    sd_gdp         = sd(GDP, na.rm = TRUE)
  ) %>%
  ungroup()
desc_stats_gdp_inflation %>%
  kable("pipe",
    caption = "Descriptive analysis for inflation and GDP (1990-2023)") %>%
  kable_styling(full_width = FALSE)
desc_stats <- panel %>%
  group_by(Country) %>%
  summarise(
    mean_unemp      = mean(Unemployment_Rate, na.rm = TRUE),
    mean_m2         = mean(M2, na.rm = TRUE),
    mean_reserves   = mean(Reserves, na.rm = TRUE),
    mean_current_acc = mean(`Current Account Balance`, na.rm = TRUE),
    mean_budget_balance = mean(`Budget Balance(%GDP)`, na.rm = TRUE),
    mean_debt       = mean(`Public debt (%GDP)`, na.rm = TRUE),
    mean_deposit_rate = mean(`Deposit interest rate`, na.rm = TRUE),
    mean_reer       = mean(REER, na.rm = TRUE)
  ) %>%
  ungroup()

```

#table

```
desc_stats %>%
```

```
  kable("pipe", caption = "Mean of the independent variables (1990-2023)") %>%
```

```
  kable_styling(full_width = FALSE)
```

```
desc_stats_gdp_inflation <- panel %>%
```

```
  group_by(Country, Dollarization) %>%
```

```
  summarise(
```

```
    mean_inflation = mean(Inflation_rate, na.rm = TRUE),
```

```
    sd_inflation   = sd(Inflation_rate, na.rm = TRUE)
```

```
    mean_gdp      = mean(GDP, na.rm = TRUE),
```

```
    sd_gdp        = sd(GDP, na.rm = TRUE)
```

```
  ) %>%
```

```
  ungroup() %>%
```

```
  mutate(
```

```
    Dollarization = ifelse(Dollarization == 0, "Before dollarization", "After dollarization")
```

```
  )
```

```
desc_stats_gdp_inflation %>%
```

```
  kable("pipe",
```

```
    caption = "Inflation and GDP (mean & sd), before vs. after dollarization (1990-2023)") %>%
```

```
  kable_styling(full_width = FALSE)
```

```
desc_stats_indep <- panel %>%
```

```
  group_by(Country, Dollarization) %>%
```

```
  summarise(
```

```
    mean_unemp      = mean(Unemployment_Rate, na.rm = TRUE),
```

```
    mean_m2         = mean(M2, na.rm = TRUE),
```

```
    mean_reserves   = mean(Reserves, na.rm = TRUE),
```

```
    mean_current_acc = mean(`Current Account Balance`, na.rm = TRUE),
```

```
    mean_budget_balance = mean(`Budget Balance(%GDP)`, na.rm = TRUE),
```

```
    mean_debt       = mean(`Public debt (%GDP)`, na.rm = TRUE),
```

```
    mean_deposit_rate = mean(`Deposit interest rate`, na.rm = TRUE),
```

```

mean_reer      = mean(REER, na.rm = TRUE)
) %>%
ungroup() %>%
mutate(
  Dollarization = ifelse(Dollarization == 0, "Before dollarization", "After dollarization")
)
desc_stats_indep %>%
kable("pipe",
      caption = "Mean of independent variables, before vs. after dollarization (1990-2023)" ) %>%
kable_styling(full_width = FALSE)
#-----Log transformation-----
#inflation
k <- abs(min(panel$Inflation_rate, na.rm = TRUE)) + 1 #For the values which are negatives, ensure
> 0
panel$Inflation_rate <- log(panel$Inflation_rate + k)
hist(panel$Inflation_rate, main = "Histogram of Log-transformed Inflation Rate", xlab =
"Log(Inflation Rate)")

#Current account balance
k <- abs(min(panel$`Current Account Balance`, na.rm = TRUE)) + 1
panel$`Current Account Balance` <- log(panel$`Current Account Balance` + k)
hist(panel$`Current Account Balance`, main = "Histogram of Log-transformed Current account
balance", xlab = "Log(Current account balance)")
shapiro.test(panel$`Current Account Balance`)

#Budget balance
K <- abs(min(panel$`Budget Balance(%GDP)`, na.rm = TRUE)) + 1
epsilon <- 1e-5
panel$`Budget Balance(%GDP)` <- log(panel$`Budget Balance(%GDP)` + K + epsilon)
hist(panel$`Budget Balance(%GDP)`, main = "Histogram of Log-transformed Budget balance", xlab
= "Log(budget balance)")
shapiro.test(panel$`Budget Balance(%GDP)`)

#Public debt
panel$`Public debt (%GDP)` <- log(panel$`Public debt (%GDP)`)

```

```
hist(panel$`Public debt (%GDP)`, main = "Histogram of Log-transformed Public debt", xlab = "Log(public debt)")
```

```
shapiro.test(panel$`Public debt (%GDP)`)
```

#REER

```
panel$REER <- log(panel$REER)
```

```
hist(panel$REER, main = "Histogram of Log-transformed REER", xlab = "Log(REER)")
```

#Deposit rate

```
panel$`Deposit interest rate` <- log(panel$`Deposit interest rate`)
```

```
hist(panel$`Deposit interest rate`, main = "Histogram of Log-transformed Deposit rate", xlab = "Log(Deposit Rate)")
```

#Reserves

```
panel$Reserves <- log(panel$Reserves)
```

```
hist(panel$Reserves, main = "Histogram of Log-transformed Reserves", xlab = "Log(Reserves)")
```

#M2

```
panel$M2 <- log(panel$M2)
```

```
hist(panel$M2, main = "Histogram of Log-transformed M2", xlab = "Log(M2)")
```

#Unemployment rate

```
panel$Unemployment_Rate <- log(panel$Unemployment_Rate)
```

```
hist(panel$Unemployment_Rate, main = "Histogram of Log-transformed Unemployment rate", xlab = "Log(Unemployment rate)")
```

```
##### -----Difference (for stationarity)-----
```

```
library(plm)
```

```
panel <- pdata.frame(panel, index = c("Country", "Year"))
```

```
panel <- panel %>%
```

```
  rename(Public_debt_GDP = Public.debt...GDP.)
```

```
panel <- panel %>%
```

```
  rename(Budget_Balance_GDP = Budget.Balance..GDP.)
```

```
panel <- panel %>%
```

```
  rename(Current_Account_Balance = Current.Account.Balance)
```

```
panel <- panel %>%
```

```
rename(Deposit_interest_rate = Deposit.interest.rate)
view(panel)
```

#first diff

```
dpanel <- panel
for (col in setdiff(names(panel), c("Country", "Year", "Dollarization"))) {
  dpanel[[col]] <- ave(panel[[col]], panel$Country, FUN = function(x) c(NA, diff(x)))
}
```

```
dpanel <- dpanel[complete.cases(dpanel), ]
```

#second diff --> not needed

```
d2_panel <- panel
for (col in setdiff(names(panel), c("Country", "Year", "Dollarization"))) {
  d2_panel[[col]] <- ave(panel[[col]], panel$Country, FUN = function(x) c(NA, diff(diff(x))))
}
d2_panel <- d2_panel[complete.cases(d2_panel), ]
```

```
#-----Stationarity test-----
```

#Inflation

```
test_result <- purtest(panel$Inflation_rate, test = "levinlin", lags=5)
```

```
test_result#Stationary after 0 diff
```

#GDP Growth

```
test_result <- purtest(panel$GDP, test = "levinlin", lags=5)
```

```
test_result#Stationary after 0 diff
```

#M2

```
test_result <- purtest(panel$M2, test = "levinlin", lags=5)
```

```
test_result
```

```
test_result <- purtest(dpanel$M2, test = "levinlin", lags=5)
```

```
test_result#Stationary after 1 diff
```

#Reserves

```
test_result <- purtest(panel$Reserves, test = "levinlin", lags=5)
```

```
test_result
```

```

test_result <- purtest(dpanel$Reserves, test = "levinlin", lags=5)
test_result#Stationary after 1 diff

#Public debt

test_result <- purtest(panel$Public_debt_GDP, test = "levinlin", lags=5)
test_result
test_result <- purtest(dpanel$Public_debt_GDP, test = "levinlin", lags=5)
test_result#Stationary after 1 diff

#Budget balance

test_result <- purtest(panel$Budget_Balance_GDP, test = "levinlin", lags=5)
test_result
test_result <- purtest(dpanel$Budget_Balance_GDP, test = "levinlin", lags=5)
test_result#Stationary after 1 diff

#Current account

test_result <- purtest(panel$Current_Account_Balance, test = "levinlin", lags=5)
test_result
test_result <- purtest(dpanel$Current_Account_Balance, test = "levinlin", lags=5)
test_result#Stationary after 1 diff

#Deposit rate

test_result <- purtest(panel$Deposit_interest_rate, test = "levinlin", lags=5)
test_result#Stationary after 0 diff

#REER

test_result <- purtest(panel$REER, test = "levinlin", lags=5)
test_result
test_result <- purtest(dpanel$REER, test = "levinlin", lags=5)
test_result#Stationary after 1 diff

test_result <- purtest(panel$Unemployment_Rate, test = "levinlin", lags=5)
test_result
test_result <- purtest(dpanel$Unemployment_Rate, test = "levinlin", lags=5)
test_result#Stationary after 1 diff

#Use of the dpanel data as 1 diff is needed for almost all the indicators

```

————— Granger Causality —————

```
pgrangertest(Inflation_rate~Reserves, data = dpanel) #NO
pgrangertest(Inflation_rate~Unemployment_Rate, data = dpanel) #NO
pgrangertest(Inflation_rate~Public_debt_GDP, data = dpanel) #NO
pgrangertest(Inflation_rate~Current_Account_Balance, data = dpanel) #NO
pgrangertest(Inflation_rate~REER, data = dpanel) #NO
pgrangertest(Inflation_rate~Budget_Balance_GDP, data = dpanel) #NO
pgrangertest(Inflation_rate~M2, data = dpanel) #NO
pgrangertest(Inflation_rate~Deposit_interest_rate, data = dpanel) #NO
```

```
pgrangertest(GDP~Deposit_interest_rate, data = dpanel) #NO
pgrangertest(GDP~Public_debt_GDP, data = dpanel) #NO
pgrangertest(GDP~M2, data = dpanel) #NO
pgrangertest(GDP~Reserves, data = dpanel) #OUI
pgrangertest(GDP~Unemployment_Rate, data = dpanel) #NO
pgrangertest(GDP~REER, data = dpanel) #NO
pgrangertest(GDP~Current_Account_Balance, data = dpanel) #NO
pgrangertest(GDP~Budget_Balance_GDP, data = dpanel) #O-UI
```

————— Multicollinearity —————

```
Inflation_model <- lm(Inflation_rate ~ M2 + Reserves + Public_debt_GDP + Budget_Balance_GDP
  + Current_Account_Balance + REER + Deposit_interest_rate + Unemployment_Rate,
  data = dpanel)

GDP_model <- lm(GDP ~ M2 + Reserves + Public_debt_GDP + Budget_Balance_GDP +
  Current_Account_Balance + REER + Deposit_interest_rate + Unemployment_Rate,
  data = dpanel)

vif_inflation <- vif(Inflation_model)
vif_gdp <- vif(GDP_model)

print("VIF for Inflation Model:")
print(vif_inflation) #<5 ok

print("VIF for GDP Model:")
print(vif_gdp) #<5 ok
```

#————— Pooled VS fixed effects model: which one? —————

```
dpanel <- as.data.frame(dpanel)
```

#Pooled model

```
model_pooled_infl <- plm(
  Inflation_rate ~ M2 + Reserves + Public_debt_GDP + Budget_Balance_GDP +
    Current_Account_Balance + REER + Deposit_interest_rate + Unemployment_Rate,
  data = dpanel,
  model = "pooling"
)
```

#Fixed model

```
model_fe_infl <- plm(
  Inflation_rate ~ M2 + Reserves + Public_debt_GDP + Budget_Balance_GDP +
    Current_Account_Balance + REER + Deposit_interest_rate + Unemployment_Rate,
  data = dpanel,
  model = "within" # "within" => fixed effects
)
```

#Random model

```
model_re_infl <- plm(
  Inflation_rate ~ M2 + Reserves + Public_debt_GDP + Budget_Balance_GDP +
    Current_Account_Balance + REER + Deposit_interest_rate + Unemployment_Rate,
  data = dpanel,
  model = "random" # "random" => random effects
)
pooltest(model_pooled_infl, model_fe_infl) #0.03275 --> fixed effects is better
phtest(model_fe_infl, model_re_infl) #0.000002 --> fixed effects is better
```

#Pooled model

```
model_pooled_gdp <- plm(
  GDP ~ M2 + Reserves + Public_debt_GDP + Budget_Balance_GDP +
```

```

    Current_Account_Balance + REER + Deposit_interest_rate + Unemployment_Rate,
data = dpanel,
model = "pooling"
)

```

#Fixed model

```

model_fe_gdp <- plm(
  Inflation_rate ~ M2 + Reserves + Public_debt_GDP + Budget_Balance_GDP +
    Current_Account_Balance + REER + Deposit_interest_rate + Unemployment_Rate,
data = dpanel,
model = "within"
)

```

#Random model

```

model_re_gdp <- plm(
  Inflation_rate ~ M2 + Reserves + Public_debt_GDP + Budget_Balance_GDP +
    Current_Account_Balance + REER + Deposit_interest_rate + Unemployment_Rate,
data = dpanel,
model = "random"
)

```

```

pooltest(model_pooled_gdp, model_fe_gdp) #2.2e-16 --> fixed effects is better

```

```

phtest(model_fe_gdp, model_re_gdp) #----> fixed effects is better

```

```

library(plm)

```

#-----Which effects? Time, country or individual?-----

#Inflation

#Country effects

```

Country_effects_inflation <- plm(Inflation_rate ~ M2 + Reserves + Public_debt_GDP +
  Budget_Balance_GDP + Current_Account_Balance + REER + Deposit_interest_rate +
  Unemployment_Rate, data = dpanel, model = "within", effect = "individual") #0.038239

```

```

summary(Country_effects_inflation)

```

#time effect

```
Time_effects_inflation <- plm(Inflation_rate ~ M2 + Reserves + Public_debt_GDP +
Budget_Balance_GDP + Current_Account_Balance + REER + Deposit_interest_rate +
Unemployment_Rate, data = dpanel, model = "within", effect = "time")#0.01856
```

```
summary(Time_effects_inflation)
```

#both

```
Both_effects_inflation <- plm(Inflation_rate ~ M2 + GDP + Reserves + Public_debt_GDP +
Budget_Balance_GDP + Current_Account_Balance + REER + Deposit_interest_rate +
Unemployment_Rate, data = dpanel, model = "within", effect = "twoways")#0.02
```

```
summary(Both_effects_inflation)
```

#GDP

```
Country_effects_GDP <- plm(GDP ~ M2 + Reserves + Public_debt_GDP + Budget_Balance_GDP
+ Current_Account_Balance + REER + Deposit_interest_rate + Unemployment_Rate, data =
dpanel, model = "within", effect = "individual")#0.26143
```

```
summary(Country_effects_GDP)
```

```
Time_effects_GDP <- plm(GDP ~ M2 + Reserves + Public_debt_GDP + Budget_Balance_GDP +
Current_Account_Balance + REER + Deposit_interest_rate + Unemployment_Rate,
data = dpanel, model = "within", effect = "time")#0.0025
```

```
summary(Time_effects_GDP)
```

```
Both_effects_GDP <- plm(GDP ~ M2 + Reserves + Public_debt_GDP + Budget_Balance_GDP +
Current_Account_Balance + REER + Deposit_interest_rate + Unemployment_Rate,
data = dpanel, model = "within", effect = "twoways")#0.28
```

```
summary(Both_effects_GDP)
```

```
#-----SUR ESTIMATION-----
```

```
library(systemfit)
```

```
library(dplyr)
```

```
library(plm)
```

```
library(car)
```

```
library(lmtest)
```

```
library(sandwich)
```

```
library(ggplot2)
```

```

dpanel <- as.data.frame(dpanel)

eqinflation <- Inflation_rate ~ Dollarization + M2 + Reserves + Public_debt_GDP +
Budget_Balance_GDP + Current_Account_Balance + REER + Deposit_interest_rate +
Unemployment_Rate+ factor(Year) + factor(Country)

eqGDP <- GDP ~ Dollarization + M2 + Reserves + Public_debt_GDP + Budget_Balance_GDP +
Current_Account_Balance + REER + Deposit_interest_rate + Unemployment_Rate +
factor(Year)

eqinflation <- as.formula(eqinflation)
eqGDP <- as.formula(eqGDP)

system_fixed <- list(inflation = eqinflation, gdp = eqGDP)

fit_fixed <- systemfit(system_fixed, data = dpanel, method = "SUR")

summary(fit_fixed)

#-----Validity TEST on residuals-----

#Residuals extraction

resid_fixed <- resid(fit_fixed)
resid_fixed_df <- as.data.frame(resid_fixed)
colnames(resid_fixed_df) <- c("Residuals_Inflation", "Residuals_GDP")

dpanel_resid <- dpanel %>%
  mutate(Residuals_Inflation = resid_fixed_df$Residuals_Inflation,
         Residuals_GDP = resid_fixed_df$Residuals_GDP)

dpanel_resid <- dpanel_resid %>%
  mutate(Residuals2_Inflation = Residuals_Inflation^2,
         Residuals2_GDP = Residuals_GDP^2)

auxiliary_inflation <- lm(Residuals2_Inflation ~ Dollarization + M2 + Reserves +
Public_debt_GDP + Budget_Balance_GDP +
Current_Account_Balance + REER +
Deposit_interest_rate + Unemployment_Rate, data = dpanel_resid)

auxiliary_gdp <- lm(Residuals2_GDP ~ Dollarization + M2 + Reserves +
Public_debt_GDP + Budget_Balance_GDP +
Current_Account_Balance + REER +
Deposit_interest_rate + Unemployment_Rate, data = dpanel_resid)

```

#homoscedasticity test

```
bptest(auxiliary_inflation)#0.6721
```

```
bptest(auxiliary_gdp)#0.1412
```

#Normality test

```
jarque.bera.test(dpanel_resid$Residuals_Inflation)#0.7097
```

```
jarque.bera.test(dpanel_resid$Residuals_GDP)#0.8158
```

#Autocorrelation

```
dpanel_resid_lag <- dpanel_resid %>%
```

```
  arrange(Country, Year) %>%
```

```
  group_by(Country) %>%
```

```
  mutate(
```

```
    residuals_lag1_inflation = lag(Residuals_Inflation, 1),
```

```
    residuals_lag1_gdp = lag(Residuals_GDP, 1)
```

```
  ) %>%
```

```
  ungroup()
```

```
residuals_data_inflation <- dpanel_resid_lag %>%
```

```
  filter(!is.na(residuals_lag1_inflation))
```

```
residuals_data_gdp <- dpanel_resid_lag %>%
```

```
  filter(!is.na(residuals_lag1_gdp))
```

```
bg_model_inflation <- lm(Residuals_Inflation ~ residuals_lag1_inflation + Dollarization + M2 +  
Reserves +
```

```
  Public_debt_GDP + Budget_Balance_GDP +
```

```
  Current_Account_Balance + REER +
```

```
  Deposit_interest_rate + Unemployment_Rate + factor(Country) + factor(Year),
```

```
  data = residuals_data_inflation)
```

```
bgttest(bg_model_inflation, order = 1)#0.1983
```

```
bg_model_gdp <- lm(Residuals_GDP ~ residuals_lag1_gdp + Dollarization + M2 + Reserves +
```

```
  Public_debt_GDP + Budget_Balance_GDP +
```

```
  Current_Account_Balance + REER +
```

```
  Deposit_interest_rate + Unemployment_Rate + factor(Year),
```

```
  data = residuals_data_gdp)
```

```
bgtest(bg_model_gdp, order = 1)#0.2787
```

#Cross dependence

```
dpanel_resid <- pdata.frame(dpanel_resid, index = c("Country", "Year"))
```

```
inflation_residuals <- residuals_data_inflation$Residuals_Inflation
```

```
inflation_residuals <- data.frame(inflation_residuals, index = c("Country", "Year"))
```

```
plm_model_inflation <- plm(
```

```
  Inflation_rate ~ Dollarization + M2 + Reserves +
```

```
  Public_debt_GDP + Budget_Balance_GDP +
```

```
  Current_Account_Balance + REER +
```

```
  Deposit_interest_rate + Unemployment_Rate,
```

```
  data = residuals_data_inflation,
```

```
  model = "within",
```

```
  effect = "twoways"
```

```
)
```

```
plm_model_gdp <- plm(
```

```
  GDP ~ Dollarization + M2 + Reserves +
```

```
  Public_debt_GDP + Budget_Balance_GDP +
```

```
  Current_Account_Balance + REER +
```

```
  Deposit_interest_rate + Unemployment_Rate,
```

```
  data = residuals_data_gdp,
```

```
  model = "within",
```

```
  effect = "time"
```

```
)
```

```
pcdtest(plm_model_inflation, test = "cd") #0.3248
```

```
pcdtest(plm_model_gdp, test = "cd")#0.8055
```

Appendix 18: Panel data values: Ecuador

Coun try	Ye ar	Inflati on_ra te	GDP	Unem ploym ent_r ate	M2	Res erve s	Current _accou nt_bala nce	Budg et_ba lance	Public_d ebt	Deposit_ rate	REER
Ecu dor	1990	49.5	3.008	4.33	13.920982 233012	838 481 822. 708 455	-3.1	-0.4	49.5	43.55	129.1
	1991	49	5.113	4.332	13.236012 0208729	924 296 672. 817 52	-5.4	-1.9	46.5	41.54	124.4
	1992	60.2	3.614	4.291	12.979172 5558397	868 163 838. 739 395	-0.8	-2.9	55.3	46.81	123.1
	1993	32	2	4.367	18.199342 3267319	137 994 889 7.96 451	-5.1	-0.5	65.7	31.97	107.4
	1994	25.3 83	4.258	4.373	21.112828 5729422	184 423 846 4.21 111	-4.4	-0.2	57.3	33.65	101.7
	1995	22.7 74	2.253	4.372	20.951804 2357402	162 762 851 8.50 971	-4.5	-2.02 4094 736	48	43.31	101.9
	1996	25.5 27	1.732	4.387	22.814952 4757757	185 845 322 0.73 186	-0.2	-3.44 0007 202	48	41.49	102.9
	1997	30.7	4.328	4.389	22.292573 6509208	209 279 047 9.14 598	-1.8	-2.82 5145 646	42.2	28.09	99.4
	1998	43.4	3.267	4.35	18.763094 2246312	161 973 140 3.16 665	-8	-5.09 9174 516	46.9	39.39	99.1
	1999	60.7	-4.73 9	4.642	13.145662 5643925	164 236 925 4.49 257	4.9	-4.82 4863 706	72.1	10.51	136.5
	2000	91.0 05	1.092	4.8	21.644676 1777991	946 926 261. 644 739	6.3	-0.32 0323 581	63.7	8.8	155.4

Coun try	Ye ar	Inflat ion_ra te	GDP	Unem ploym ent_r ate	M2	Res erve s	Current _accou nt_bala nce	Budg et_ba lance	Public_d ebt	Deposit_ rate	REER
	2002	22.4	4.206	4.252	21.617713 6518247	839 767 943. 475 718	-2.4	0.032 7101 59	49.4	6.78	109.1
	2001	9.36	4.928	4.825	25.154997 8028211	714 626 724. 675 629	-4.5	0.738 1023 37	43.9	5.61	94.4
	2002	6.07	2.885	5.662	25.910062 5450344	812 578 785. 546 265	-1.2	1.045 3106 43	40.4	5.67	91.8
	2009	1.94	6.832	5.002	28.351475 1194255	106 960 934 2.03 766	-1.4	1.941 5764 14	36.4	4.16	95.9
	2002	3.13	5.399	3.779	29.618620 1100235	171 423 166 6.52 374	1.2	0.660 8869 53	32.4	3.59	100
	2009	2.86	4.341	3.55	29.497177 002651	148 948 716 3.35 999	3.8	2.921 2707 09	26.5	4.22	101
	2009	3.31	1.902	3.142	31.391521 5103295	281 638 159 8.57 904	3.8	2.658 3253 99	25.2	4.83	106.6
	2002	8.83	6.565	3.917	31.712020 6715018	373 815 305 4.27 756	2.9	0.568 0604 81	20.6	4.87	108.3
	2002	4.31	1.091	4.608	34.550278 7587342	287 318 473 1.63 49	0.5	-3.71 4036 78	14.9	4.78	100.6
	2018	3.32	4.029	4.088	35.473983 4890087	143 484 585 6.38 252	-2.3	-1.38 5372 972	17.8	3.9	99.4
	2019	5.40	8.481	3.458	35.694337 6986956	166 430 438 3.64 451	-0.5	-0.12 7193 668	17.3	4.83	102.1

Coun try	Ye ar	Inflat ion_ra te	GDP	Unem ploym ent_r ate	M2	Res erve s	Current _accou nt_bala nce	Budg et_ba lance	Public_d ebt	Deposit_ rate	REER
	2014	4.16	5.783	3.235	37.584961 3554665	107 995 614 3.68 357	-0.2	-2.83 4871 838	20.1	3.89	98.1
	2015	2.70	7.211	3.083	38.911990 511496	332 803 783 3.46 757	-1	-8.16 5210 768	22.9	3.89	98.81
	2016	3.66	4.226	3.48	42.048952 8162959	348 414 001 7.73 337	-0.7	-8.10 6317 036	27.5	4.03	97.6
	2017	3.38	0.12	3.616	42.287057 3611702	208 543 059 9.56 405	-2.3	-6.86 6372 605	30.9	4.38	100
	2018	1.12	-0.68 8	4.597	49.592673 8926826	378 114 247 0.05 677	1.1	-10.2 9248 501	35.7	4.77	102.4
	2019	-0.19 7	5.97	3.836	37.088418 0365937	167 819 470 6.64 821	-0.2	-5.77 2174 498	41.3	3.5	103.1
	2019	0.26 6	1.044	3.53	37.735078 5449528	189 610 167 5.19 71	-1.2	-2.80 2726 444	42.2	3.63	104.4
	2019	-0.06 5	0.165	3.812	41.031893 0290504	186 509 098 5.11 069	-0.1	-3.46 7604 87	48.2	4.44	104.7
	2020	-0.93 3	-9.24 5	6.127	50.638750 8737244	523 558 663 8.35 225	2.3	-7.37 5708 835	59	4.78	106.1
	2021	1.94 1	9.818	4.552	50.880964 8896779	608 255 972 6.18 178	2.9	-1.58 3743 498	57	4.16	108.2
	2022	3.73 7	6.186	3.761	51.632448 0007171	649 090 084 9.42 025	1.8	0.044 5975 99	59.7	4.16	111.9

Coun try	Ye ar	Inflat ion_ra te	GDP	Unem ploym ent_r ate	M2	Res erve s	Current _accou nt_bala nce	Budg et_ba lance	Public_d ebt	Deposit_ rate	REER
	2021	1.35	2.355	3.367	53.292884 2299874	269 891 257 7.71 816	1.9	-3.55 2974 114	60.5	5.86	108.9

Appendix 19: Panel data values: El Salvador

Cou ntry	Year	Inflatio n_rate	GDP	Unem pl oy me nt_r ate	M2	Reser ves	Curre nt_ac coun t_bal ance	Budge t_bala nce	Public _debt	Deposit_r ate	REER
El Salv ador	1990	19.333	4.83 1	8.4 5	28.7541 4019626 57	41481 4226. 57239 2	-3.1	-0.612 94659 4	50.3	9.288541 666	128. 1
	1991	9.828	1.49 8	7.5 3	31.3481 0672263 29	287200 42211 3750. 05156 3	-3.2	-2.304 63245 3	48.2	8.990833 333	140. 9
	1992	19.937	7.02 1	7.8 8	32.7221 3326349 46	42211 3750. 05156 3	-1.9	-4.288 81422 1	45.8	8.693125	137. 7
	1993	12.086	5.81 7	9.9 4	38.0070 5324482 49	53621 9229. 81857	-1.2	-1.416 47205 5	51.7	8.395416 667	124. 1
	1994	8.895	4.69 2	7.6 8	46.4338 0771166 02	64940 1406. 85515 2	-0.2	-0.943 04488 1	48.5	8.097708 333	117
	1995	11.385	4.73 3	7.6 5	44.7429 5883482 83	75833 9824. 71370 3	-2.9	-0.176 86716 5	43.3	7.8	112. 7
	1996	7.349	0.81 6	7.6 8	47.3889 6063973 86	93692 8307. 87194 1	-1.8	-2.702 39257 6	44	8.375	104. 2
	1997	1.928	3.13 6	7.9 8	49.1337 7180640 31	13079 10997 .2043 5	-1	-1.972 37057 2	42.1	7.675	100. 9
	1998	4.223	2.65 2	7.1	50.0436 6712770 26	16130 79244 .3133 4	-0.8	-2.939 92595 6	38.7	6.855	99.4
	1999	-1.027	2.16 4	7.3	52.7717 5267559 83	18198 02189 .9941 1	-2.1	-3.082 45430 1	29.3	6.609166 667	98.1

Cou ntry	Year	Inflatio n_rate	GDP	Une mpl oy me nt_r ate	M2	Reser ves	Curre nt_ac coun t_bal ance	Budge t_bala nce	Public _debt	Deposit_r ate	REER
	2000	4.293	1.12 6	6.9 6	51.3195 7952188 99	17725 63135 .1871 1	-3.7	-3.445 50201	31.6	6.500833 333	96.6
	2001	1.418	0.87 7	6.9 6	62.2792 9425628 79	15937 11384 .9564 4	-1.2	-4.945 07239 1	35.8	5.480833 333	97
	2002	2.796	1.57 7	6.2	59.1339 4645255 32	14728 16682 .7743	-3.2	-5.504 01920 4	41	3.411666 667	97.5
	2003	2.524	1.56 5	6.9	57.6626 9689055 78	17906 78166 .1849 6	-5.3	-4.230 17389 1	43.3	3.371666 667	98.2
	2004	5.369	0.88 9	6.8	57.6504 2438321 76	17524 09349 .5011 7	-4.7	-2.759 62747	44.3	3.3375	98.5
	2005	4.26	2.70 9	7.2 2	55.9072 2242323 25	17214 06455 .4783 7	-4.2	-3.472 57717	43.7	3.436666 667	100
	2006	4.876	4.34 2	6.5 7	56.7473 5334334 74	18227 89886 .9712 8	-4.8	-3.416 39539 1	43.7	4.386666 667	100. 3
	2007	4.859	1.86 1	6.4 1	62.6383 6867170 04	21085 23963 .9261	-7.2	-2.323 9353	41.3	4.7125	100. 9
	2008	5.479	2.12 8	5.8 8	58.5581 8679083 32	24416 47733 .6889 3	-8.5	-3.800 47469 1	41	4.209862 315	101. 7
	2009	0.08	-2.0 83	7.3 3	61.1531 1194668 44	28673 85586 .0669 9	-1.8	-6.645 64320 8	50	4.484166 667	99.6
	2010	2.13	2.10 2	4.8 93	58.4320 7951689 4	25682 08188 .8452 2	-2.9	-4.966 19834 3	49.4	2.967305 512	101. 1

Cou ntry	Year	Inflatio n_rate	GDP	Une mpl oy me nt_r ate	M2	Reser ves	Curre nt_ac coun t_bal ance	Budge t_bala nce	Public _debt	Deposit_r ate	REER
	2011	5.052	3.81 5	4.2 97	52.0433 1847875 5	21514 56411 .7690 4	-5.5	-4.469 85432 4	47.6	1.918525 801	102. 4
	2012	0.783	2.81 7	3.8 43	49.9970 8833955 62	28049 23319 .6854 9	-5.8	-3.807 92998 8	50.9	2.742527 099	103. 1
	2013	0.786	2.23 3	3.6 93	49.7941 1605505 17	24761 75225 .7377	-6.9	-4.457 19513 8	49.2	3.573791 502	105
	2014	0.477	1.71 1	4.1 54	48.6180 4997928 3	24302 70623 .4845 5	-5.4	-4.017 48823 9	49.6	3.897409 364	102. 5
	2015	1.014	2.39 5	3.9 98	50.1110 0964795 14	27398 35136 .1009 1	-3.2	-3.632 14132 1	49.7	4.355062 19	100
	2016	-0.931	2.54 4	4.4 18	50.0303 9168354 25	31877 88699 .8160 9	-2.3	-3.104 19975 3	49.6	4.535421 731	98.7
	2017	2.035	2.25	4.3 85	53.8410 7140479 73	35100 79660 .7997 1	-1.9	-2.528 18446 1	48.2	4.560891 924	100. 1
	2018	0.438	2.41 5	4.0 06	54.8223 5547013 26	35122 77016 .4739 3	-3.3	-2.705 13837 9	47.6	4.366341 329	101. 5
	2019	-0.009	2.43 3	4.1 7	59.0672 5985828 73	43786 51102 .5226 9	-0.4	-3.070 25783 5	48.8	4.299832 483	102. 8
	2020	-0.08	-7.8 93	5.0 08	69.3654 7167591 11	29994 43127 .1397	1.1	-8.179 46166 3	62.4	4.189478 206	103. 4
	2021	6.114	11.9 1	4.3 27	60.8647 4506089 91	33457 67659 .2240 9	-4.3	-5.531 01161 5	57.6	4.088878 111	107. 7

Cou ntry	Year	Inflatio n_rate	GDP	Unem pl oy me nt_r ate	M2	Reser ves	Curre nt_ac coun t_bal ance	Budge t_bala nce	Public _debt	Deposit_r ate	REER
	2022	7.316	2.79 7	2.9 99	57.8292 3028839 36	244044	-6.8	-2.688 27456 5	54	4.544297 956	111
	2023	1.229	3.51 1	2.7 58	59.2149 0619782 91	264552	-1.4	-4.673 60720 6	53.9	3.914749 962	110. 4

Appendix 20: Names chosen for the variables in the RStudio Code

Variable	Variable name in code
Inflation	<i>Inflation_rate</i>
Growth domestic Product	<i>GDP</i>
Deposit rate	<i>Deposit_interest_rate</i>
Monney supply	<i>M2</i>
Reel effective exchange rate	<i>REER</i>
Unemployment rate	<i>Unemployment_rate</i>
Net lending/borrowing (Overall balance)	<i>Budget_Balance_GDP</i>
Public debt	<i>Public_debt_GDP</i>
Current account balance	<i>Current_Account_Balance</i>

Appendix 21: Names chosen for the panel databases

Initial name	first-order differentiation	Second-order differentiation
<i>Panel</i>	<i>dpanel</i>	<i>d2_panel</i>

Appendix 22: p-values for Stationary Tests

Variable	$H_0 = \text{Non-Stationarity}^*$ $H_1 = \text{Stationarity}$			Results	Decision
	No diff()	First diff()	Second diff		
	p-value	p-value	p-value		
Inflation_rate	0.02276			Stationary	Reject H_0
GDP	0.02916			Stationary	Reject H_0
M2	0.9087	8.263e-05		Stationary	Reject H_0
Reserves	0.8102	0.0005706		Stationary	Reject H_0
Public debt (%GDP)	0.6782	0.003608		Stationary	Reject H_0
Budget balance (%GDP)	0.09662	5.524e-06		Stationary	Reject H_0
Current Account Balance	0.7123	3.23e-06		Stationary	Reject H_0
Deposit Rate	0.009129	NA		Stationary	Reject H_0
REER	0.6784	2.538e-06		Stationary	Reject H_0
Unemployment Rate	0.06644	0.00216		Stationary	Reject H_0

*Rejection threshold: 0.05

Appendix 23: VIF test results for multicollinearity between independent variables

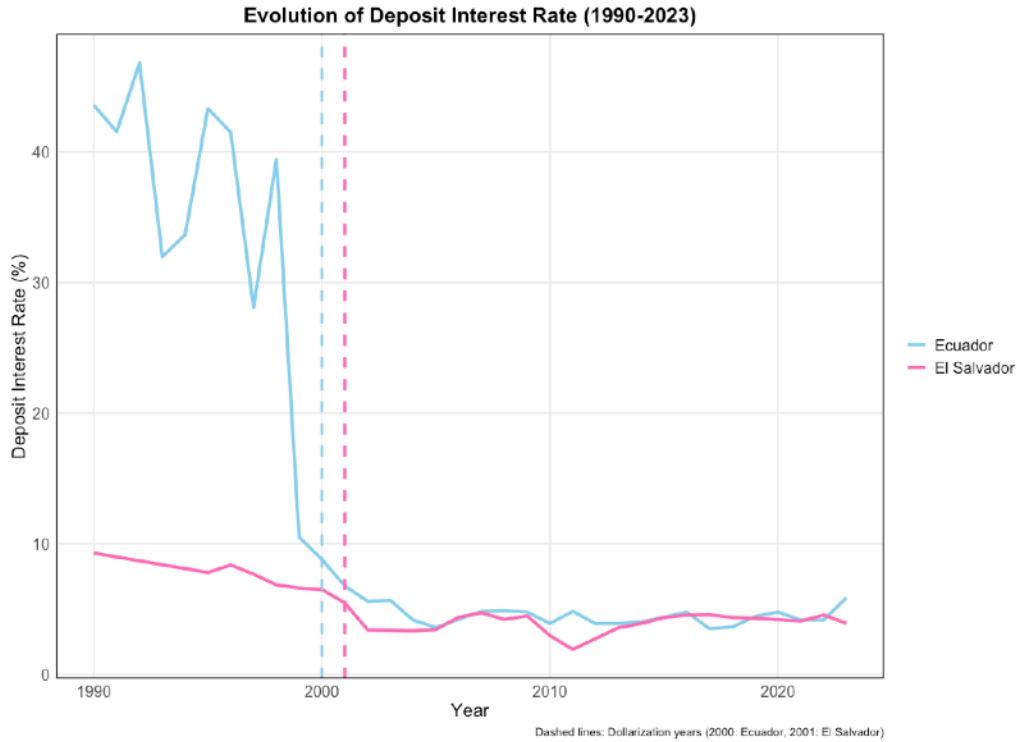
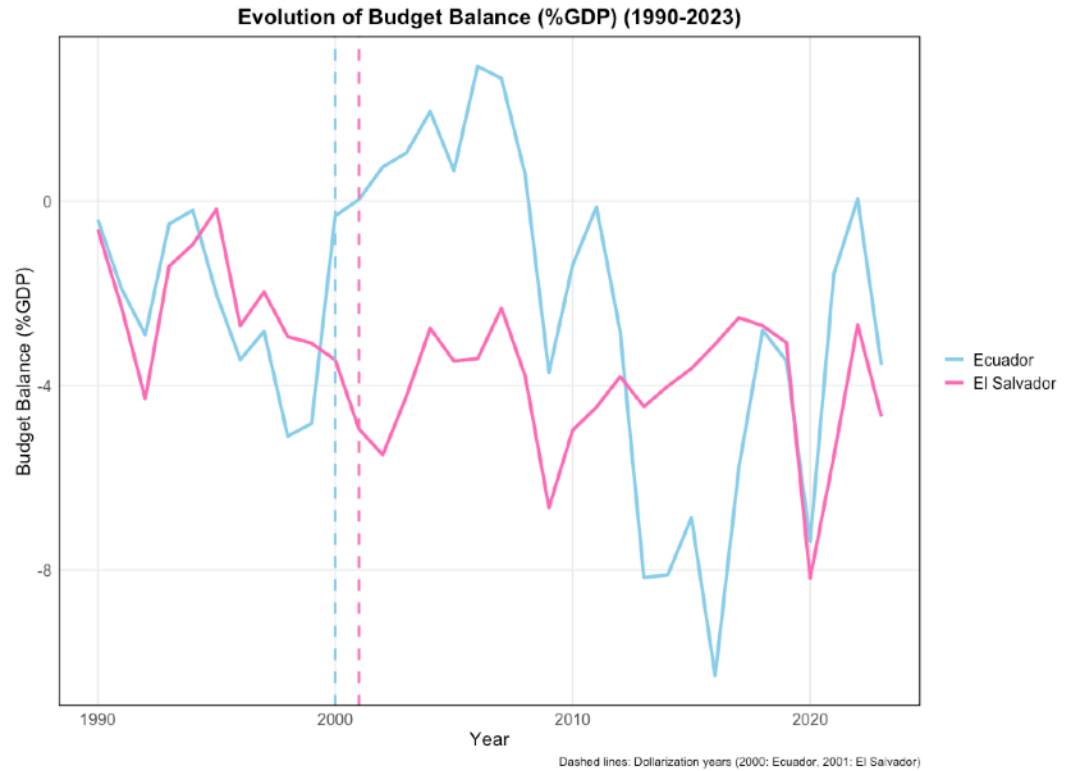
Variable	VIF value
M2	1.230801
Reserves	1.201727
Public Debt to GDP	1.329548
Budget Balance to GDP	1.487442
Current Account Balance	1.465963
REER	1.376673
Deposit Interest Rate	1.240899
Unemployment Rate	1.482379

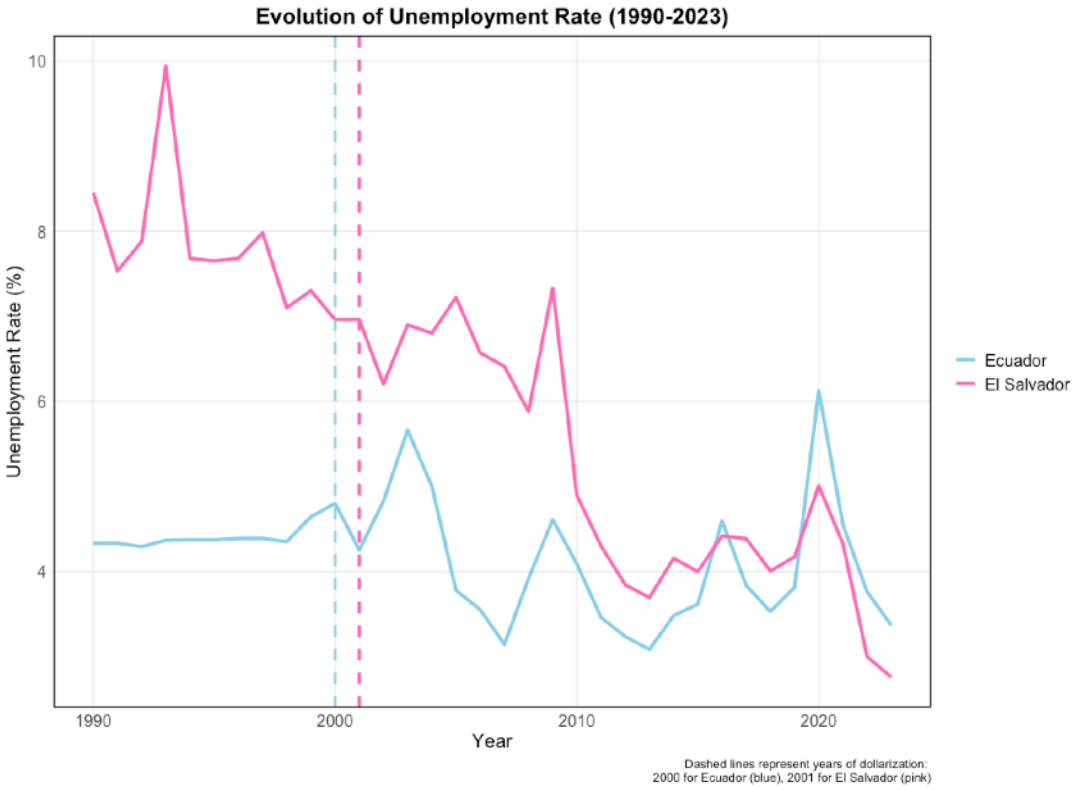
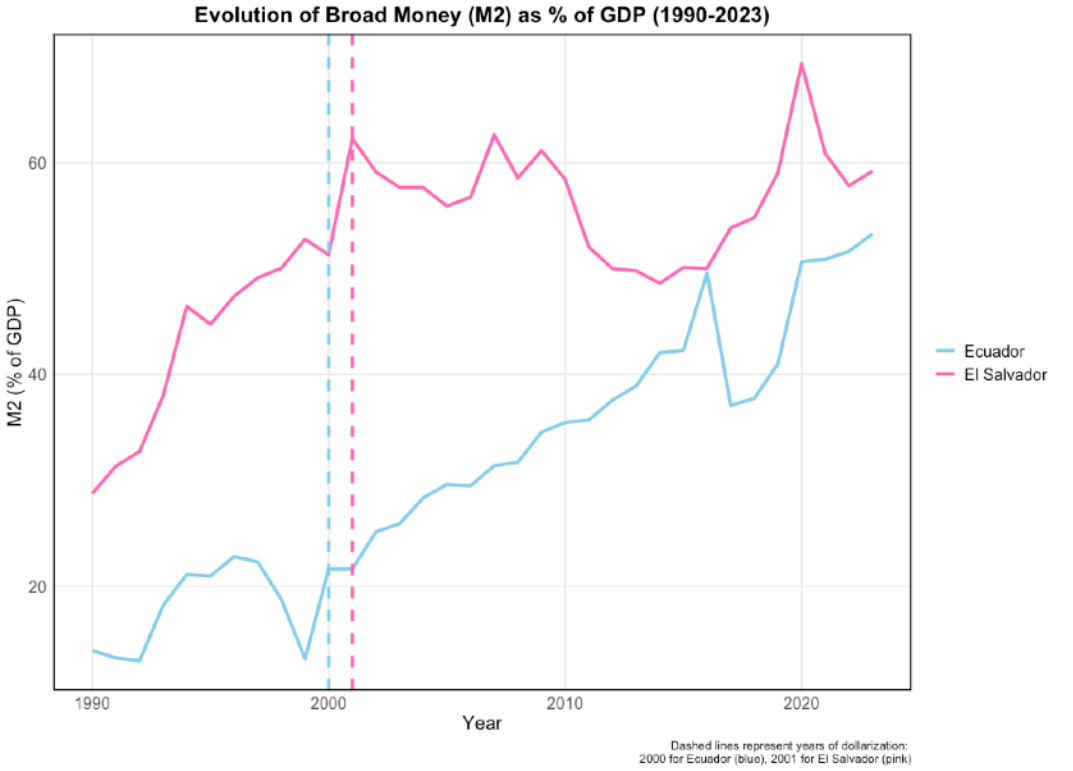
Appendix 24: Results of the Granger test for each independent variable, on each of the independent variables

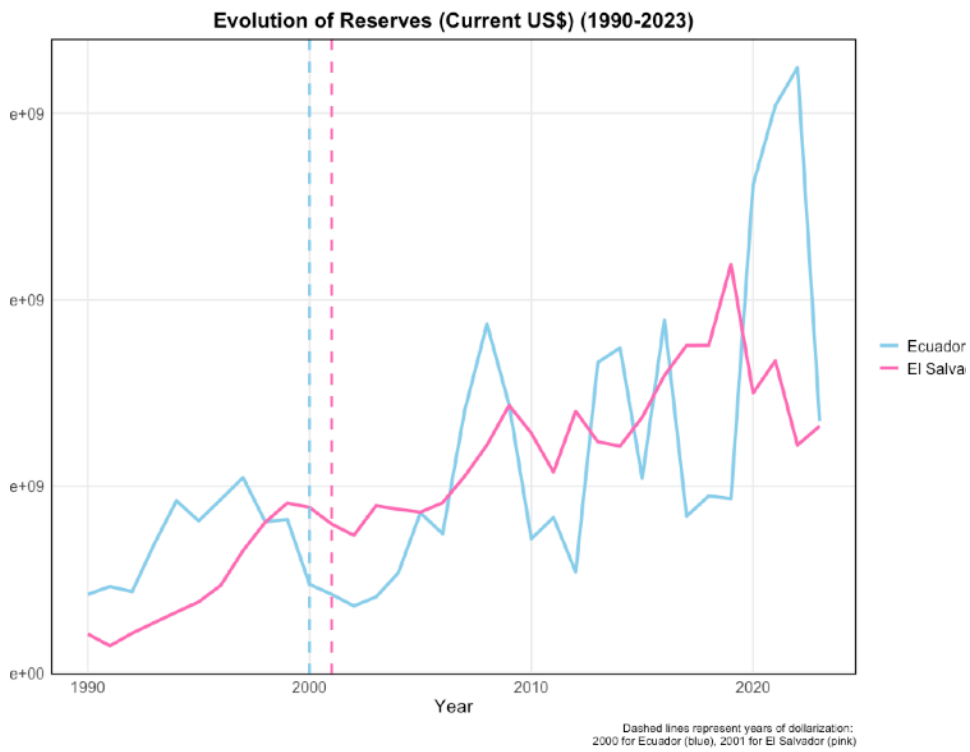
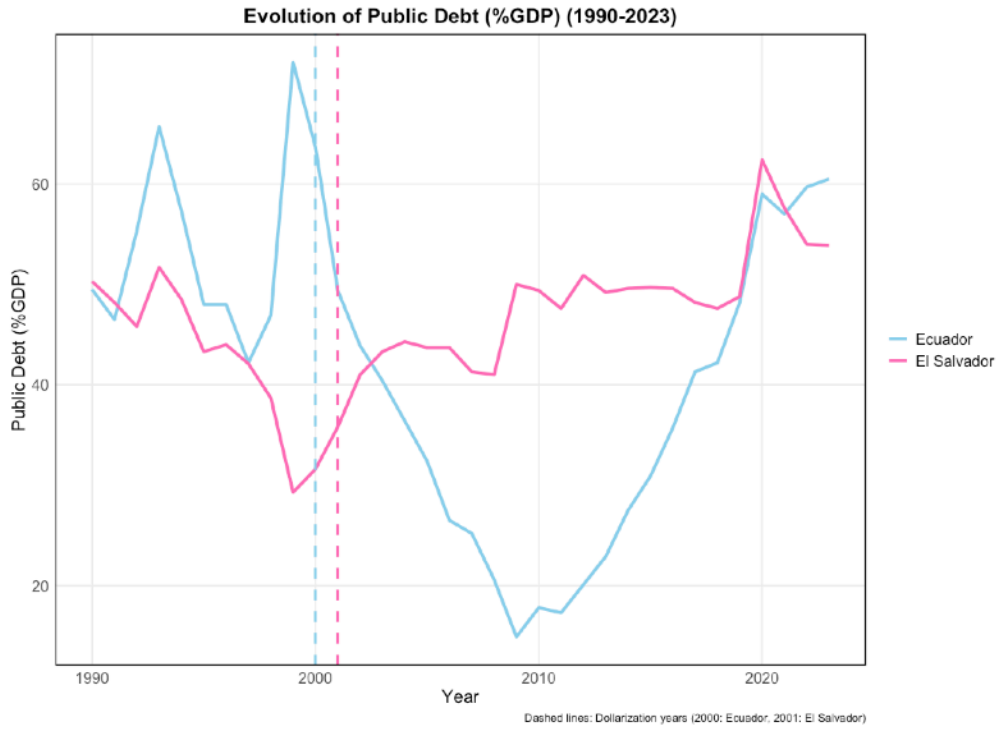
Variable	$H_0 = \text{Non-Granger Causal}^*$ $H_1 = \text{Granger Causal}$		
	Inflation_rate	GDP	Results
	<i>p</i> -value	<i>p</i> -value	
Reserves	0.06678	0.0042	Only for GDP
Unemployment_Rate	0.6399	0.239	NO
Public debt (% GDP)	0.982	0.2741	NO
Current Account Balance	0.3753	0.6695	NO
REER	0.4825	0.557	NO
Budget Balance (% GDP)	0.4167	0.0001	Only for GDP
M2	0.3658	0.2522	NO
Deposit interest rate	0.5147	0.7836	NO

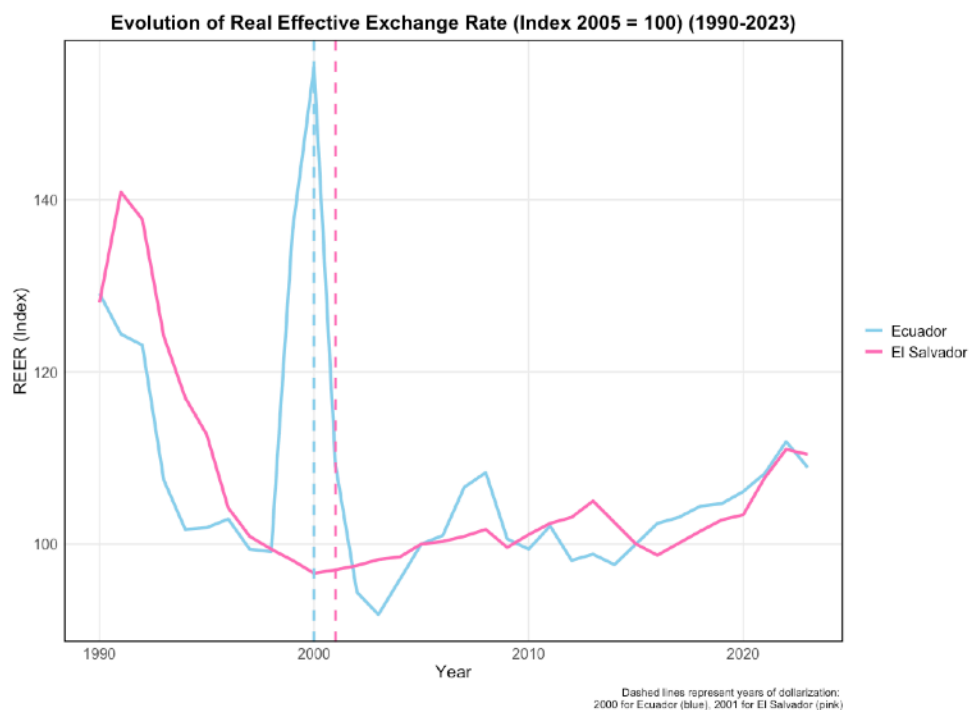
*Rejection threshold: 0.05

Appendix 25: Plots of all the indicators produced during the descriptive analysis









Appendix 26: Mean of the independent variable before vs after dollarisation (1990-2023)

Country	Dollarisation	mean_unemp	mean_m2	mean_reserves	mean_current_acc	mean_budget_balance	mean_debt	mean_deposit_rate	mean_reer
Ecuador	Before dollarisation	4.383300	17.74164	1469610257	-2.840000	-2.411329	53.15000	36.031000	112.5500
	After dollarisation	4.086625	36.80596	2492506322	0.437500	-2.323178	37.22917	4.730417	104.5337
El Salvador	Before dollarisation	7.831818	42.96963	956215665	-1.990909	-2.171402	43.04545	7.934602	114.5182
	After dollarisation	5.096478	56.77225	2554878495	-3.908696	-4.127342	47.93913	3.947219	101.8870

Abstract

The election of the libertarian candidate Javier Milei in Argentina in November 2023 marked a significant economic turning point, introducing ambitious reforms such as the closure of the Central Bank of Argentina and the dollarisation of the economy. For decades, Argentine citizens have lost trust in their national currency, exacerbating the phenomenon of dollarisation as a strategy to counter monetary instability (Messari, 2024).

Focusing on full dollarisation, this study explores its theoretical advantages and disadvantages, as well as its impact on economic stability, by examining the cases of Ecuador, highlighting a notable experience in recent years.

Adopting a quantitative approach using linear regression models applied to panel data, the research evaluates the effects of dollarisation on two key indicators: inflation and GDP growth. The aim is to determine to what extent dollarisation can genuinely stabilise these economic indicators through a before-and-after dollarisation analysis.

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