# Towards flexible exchange rate regimes: Does a flexible exchange rate regime promote less credit dollarization?

### ERASMUS UNIVERSITY ROTTERDAM

### **Erasmus School of Economics**

**Master Thesis** 

MSc. Economics & Business - International Economics

July, 2020

#### Abstract

In this thesis I study the effect of exchange rate regimes and financial openness on the loan market dollarization. Using yearly data for 66 countries I show that the exchange rate regime by itself is not a significant determinant for the loan market dollarization, whereas financial openness is. Nevertheless, I also show with an interaction term that financial openness is also limited by the de facto exchange rate regime. For instance, the econometric results suggest that when the de facto regime becomes less flexible due to the central bank intervention and as the financial openness is increased, as a result this scenario is associated with a higher loan market dollarization. Whereas, countries under de facto floating regimes and high levels of financial openness, since the central bank doesn't intervene, is associated with lower levels on the loan market dollarization. Furthermore, the study shows that high income countries and middle-low income countries differ on the variables that may influence the loan market dollarization, however the currency substitution effect is statistically significant regardless the income level.

Student: Iván Zumbado Vargas Student ID: 526772 Supervisor: Dr. Agnieszka Markiewicz Second reader: Kevin Spiritus

The views stated in this thesis are those of the author and not necessarily those of Erasmus School of Economics or Erasmus University Rotterdam.

# Content

Introduction and Literature Review	3
Description of the data	7
Empirical Methodology	10
Descriptive Statistics	12
Econometric Results	16
Robustness tests	22
Conclusion	23
Appendix	24
Bibliography	28
	Introduction and Literature Review Description of the data Empirical Methodology Descriptive Statistics Econometric Results Robustness tests Conclusion Appendix Bibliography

# 1. Introduction and Literature Review

We can refer to dollarization as a situation where a foreign currency is used as a unit of account, store of value and a medium of exchange, in this scenario the foreign and local currencies coexist (Giovannini & Turtelboom, 1992). Agenor and Montiel (2015) in their book "Development Macroeconomics" provide an extent analysis about dollarization, exchange rate regimes and its determinants. They argue that countries with a history of economic instability and high inflation are associated with a higher level of dollarization. In fact, dollarization appears to be correlated with a deeper domestic financial system in inflationary economies, this means that the economic agents seek in the foreign currency a way to buffer against high inflation levels and capital losses on assets denominated in domestic currency.

Even though, dollarization could be an option under high inflation, high depreciation levels and lack of trust in the government. Dollarization could also complicate the conduct of monetary policy and exchange rates, and hence has negative consequences on the stability of the financial system. Agenor and Montiel (2015) highlight several consequences due to the dollarization of the financial system. First, dollarization implies a loss of the seigniorage revenue, because the demand for domestic currency is lower. Second, dollarization distorts the choice of assets that should be included in the monetary aggregates as monetary conditions indicators. Third, since the deposits in foreign currency are indexed to the exchange rates, when the banks extent loans in domestic currency mismatch weaken the bank's balance sheet due to the loss of the loan principal measured in foreign currency terms. Fourth, as shown by De Nicolo et al (2005) dollarization appears to increase solvency and liquidity risks and as a consequence the financial system becomes more fragile, therefore high dollarization levels seem to have a negative impact on the financial stability.

In the recent years there have been an increasing literature and empirical work about liability dollarization of the domestic banking system. De Nicolo et al (2005) explores the benefits and risks that determinate deposit dollarization. When controlling for the relevant regulations they find macroeconomic policy and the quality of the institutions are key determinants of the cross-country dollarization. They also find that only those economies with high inflation the dollarization has stimulated a deeper domestic financial system, because the private sector can use dollarization to reduce the negative effects of inflation. Furthermore, using proxies for the distance to default of the financial system the authors conclude that this risk is higher in those economies with high levels of dollarization.

Similarly, Honig (2009) test the importance of the government quality on dollarization, concluding that the effects of the exchange rate regimes are small or insignificant, whereas

countries with lower government quality tend to have higher dollarization levels, nevertheless when controlling for high past inflation levels this effect is significantly reduced, suggesting that it might be through high inflation in the past that the perception of the government quality could affect the dollarization. In other words, if that government has failed to control inflation in the past this may create and incentive to use the foreign currency as a shield, also dollarization might be the result from the belief that the government will not follow policies that promote long-run currency stability.

Other empirical studies have been focus on currency mismatches, Arteta (2005) studies the effect of the exchange rate regime and bank's currency mismatches in financial intermediation, he doesn't find solid evidence that more flexible regimes lead to lower currency mismatches, in fact he finds that are worse under floating regimes, suggesting that floating regimes are strongly associated with higher deposit dollarization rather than an increase in credit dollarization. Hence, he concludes that floating exchange rate regimes seem to result in larger mismatches than under fixed regimes. Honig (2009) doesn't find evidence that exchange rate regimes have an effect on banking mismatches, this can be explained by the banking regulations in emerging markets that prevent banks from having currency mismatches.

The impact of dollarization on the financial stability, especially on emerging markets, stills a recurrent discussion topic in macroeconomics and financial literature. It is argued that countries under more flexible regimes are less prone to lend in foreign currency because floating regimes encourage banks and firms to hedge, and the cost of hedging against exchange risk is higher under the flexible regimes, whereas in countries with fixed regimes the economic agents do not feel the need of hedging because of the authority's commitment to defend the peg. For instance, Eichengreen and Hausmann (1999) examine the evidence around the relationship between exchange rate policies and financial fragility in emerging markets, two of the main hypothesis they propose are "The moral hazard hypothesis" and "The original sin hypothesis". The first one is related to the implicit guarantees that incentive the investors to take an excessive risk, which essentially increases the financial fragility, due this the borrowers increase their unhedged shortterm and long-term foreign currency liabilities becoming what they call a "time bomb waiting to explode". The second hypothesis, is when private and public sector cannot use domestic currency to borrow abroad, so if the borrowers take long term loans in foreign currency this implies another source of financial fragility, assuming those firms or households with credit in foreign currency have most of their income or assets in domestic currency a devaluation can possibly lead them to face bankruptcy.

Mendoza and Terrones (2008) explore an association between credit booms and exchange rates regimes, they show that about <sup>3</sup>/<sub>4</sub> of the credit booms occur in countries with manage or fixed exchange regimes, and this holds for industrial countries and emerging countries. Similarly, Magud et al. (2011) corroborate the idea that exchange rate regime is statically significant in

credit booms, where less flexible regimes are associated with higher credit to private sector. In addition, they suggest that a large share of capital inflows could be intermediated through the banks towards credit lines to the private sector, this in line with Montiel and Reinhard (2001) idea that peg regimes might encourage banks to use external funding to expand credit. Thus, the intuition tells us that under this scenario most of the credit is lend in foreign currency to the borrowers, which increases the financial instability. For example, Cavallo and Cottani (1997) conclude that in Argentina the currency board, where the peg was a nominal anchor, was an important determinant for the financial system dollarization.

A study from Corrales and Imam (2019) explores the determinants of the credit and deposits dollarization and explores the differences between households and firms over the past decade. Even though, they only explain a significant fraction of the dollarization there is still more to be explained that cannot be done only by the traditional macroeconomic approach. Regarding the loan dollarization, their results for households suggest that M2 to GDP ratio and de facto floating regimes decreases the loan dollarization and encourages borrowing in local currency, which means that more access to a deep and diverse banking system could be discouraging loans in foreign currency, whereas for firms these two factors do not seem to be statistically significant. On the other hand, firms' credit dollarization is explained by the financial openness, GDP per capita, exports to GDP and polity score. Additionally, the authors suggest that because banking regulations and credit limits are different for households and firms, this may create differences to explain the loan dollarization.

Similarly, Neanidis and Savva (2009) explore the short-run determinants of financial dollarization in transition economies. They find that the main drivers of credit dollarization are the desire of the banks to match domestic loans and deposits, international financial integration and institutional quality. Furthermore, they also find that exchange rate and monetary base factors are significant drivers for the short-run loan dollarization. In particular, international financial integration and the net foreign assets position have an negative effect on the loan market dollarization, which represents the diversification of the bank's assets, in other words the increase in the net foreign assets position is associated with a lower supply of foreign-currency denominated loans.

How to approach the exchange rate regimes, dollarization and its determinants still an empirical and open debate, nevertheless it has an undeniable importance for the financial system stability. And that is what motivates this thesis, which addresses the following question. What is the impact of the exchange rate regime on the foreign currency loan market? In order to answer this question, I will base the analysis on the papers by Corrales and Imam (2019), Arteta (2005), Honig (2009) and De Nicoló (2005). Nevertheless, my empirical analysis uses loan market dollarization, instead of bank's currency mismatches or deposits. The idea behind is that even though the lenders might match their currency positions and thus "eliminate" their exchange rate risk

because of regulatory mandate, the borrower sector, especially the private sector, is less encourage to hedge their positions and thus the exchange rate risk persist on the borrower side.

Furthermore, this thesis contributes with the dollarization topic because I examine more in detail the role of financial openness on the loan market dollarization. I take the analysis a bit further to explore if there is a different significant role of financial openness under the presence of different exchange rate regimes. This variable is usually included in studies regarding dollarization such as: Corrales and Imam (2019) and Neanidis and Savva (2009). However, a significant difference between this thesis and the reviewed literature about exchange rate regimes and financial dollarization, is that I allow for the possibility that financial openness might be limited by the country's exchange rate regime.

My results show that the exchange rate regime itself is not a determinant factor for the foreigncurrency denominated loans. However, the actions the authorities take in order to regulate the foreign exchange market, in other words the de facto regime, is an important channel that determines the net effect of the financial openness. That means, as the de facto regime becomes less flexible due to the central bank intervention and as the financial openness is increased, as a result this scenario is associated with a higher loan market dollarization. These results are in line with Eichengreen and Hausmann (1999) and Arteta (2005), in particular with the "moral hazard hypothesis".

In addition, the econometric results also reveal that high income countries and middle-low income countries differ on the drivers that might influence the loan market dollarization. Only for the middle-low income countries financial openness seems to be limited by the exchange rate regime. These results may reflect the idea that high income countries due to their social and financial knowledge and sophistication may be more reluctant to borrow in foreign exchange (Corrales and Imam, 2019).

Moreover, the currency substituion effect seems to be a driver regardless the income level, nevertheless the channel is different. In high income countries depreciation seems to be the channel, whereas in middle-low income works through inflation.

The rest of the thesis is organized as follows. Section 2 presents the description of the data. Section 3 presents the empirical methodology. Section 4 gives a brief description of the data and a correlation analysis between loan market dollarization and macroeconomic variables. Section 5 presents the econometric results. Section 6 presents and explains the robustness tests. And section 7 concludes.

# 2. Description of the data

### **Dollarization data**

The main source for dollarization comes from the International Monetary Fund, specifically I use the data published under the Financial Soundness Indicators (FSI) reported by the financial authorities and central banks, the information consists in annual observations from 2001 until 2017. This database has pros and cons. On one hand, the foreign-currency-denominated loans to total loans indicator measures the relative size of this type of loans in the market, this variable is particularly important for those countries where domestic lending is permitted in foreign currency because of the increase credit and exchange rate risk associated with local borrowers when they are exposed due to large devaluations or a lack of foreign currency earnings. On the other hand, this indicator covers all resident deposit-takers and it is based on total balance sheet positions for loans, which means it includes all the economic sectors in the country and nonresidents, in other words we cannot separate private sector nor non-financial firms.

Furthermore, in order to provide robust results and work with "homogenous" data as possible we exclude those countries with zero values or full dollarization because this could be driven by legal requirements that are out of the scope of this research, for example Ecuador has the US Dollar as their legal currency and for our purposes doesn't make sense include it into our model.

It is important to mention that the Monetary and Financial Statistics (MFS) from the IMF also provide some information about the loans dollarization, even though the MFS is available for more than 100 countries, there are very specific indicators (or ratios) such as foreign-currency-denominated loans that are only accessible though the raw data or what the IMF call the standardized report forms (SRFs), ideally this is the best source of data for each country because it lets identify each sector (resident or non-resident) individually. Nevertheless, foreign currency denominated loans to households and non-financial firms from the Other Depository Corporations is only useful for a very limited number of countries.

Since, there is a tradeoff between the datasets that could be used as the main source for the foreign-currency denominated loans. I have decided to use the Financial Soundness Indicators (FSI) that covers 107 countries, and its time spam varies across countries, for example from 2006 the data is available for more than 45 of them. In addition, due to the coverage of this dataset it provides a better view of the loan market in each country and enriches the purpose of this research because improves the cross sectional analysis, for more information about the data source, please check the appendix 1.

That been said, the dollarization is defined as the foreign-currency-denominated loans to total loans, which measures the domestic market behavior. It is constructed in the following way:

Credit dollarization<sub>t</sub> = 
$$\frac{L_FC_t}{L_FC_t + L_DC_t}$$

Where:

L\_FC= Loans in Foreign Currency

L\_FC = Total Loans in Foreign Currency

L\_DC= Total Loans in Domestic Currency

### Exchange rate regime

The information about the exchange rate regime, for robustness purposes, is approached using two definitions. On one hand, the de jure exchange rate regime is based on the Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) published by the IMF, this report records information for 189 countries and it is available since 1999. Similarly, to other empirical works that uses these IMF classifications, they are grouped in three main regimes<sup>1</sup>: Fixed, intermediated and floating. It is important to highlight that after 2008 the report and classifications were updated; however, its definitions facilitate the identification across regimes, after 2008 the AREAER includes two new de facto classifications, Stabilized arrangement and Other managed arrangement, but the report provides the de jure regime description for each country.

Many studies similar to Levy-Yeyati and Sturzenegger (2005), suggest that the countries might differ between the de facto exchange rate regime and the officially announcements. For that reason, I will use the de facto classification proposed by Reinhart and Rogoff (2002). Even though the authors identify more than 15 de facto regimes, for our purposes we follow the same strategy used by other empirical work as Arteta (2005) and Markiewicz (2006), where these regimes are grouped in three categories<sup>2</sup>: fixed, intermediate and floating regimes.

Intermediate: Pegged exchange rate within horizontal bands, Crawling peg and Crawling band.

<sup>&</sup>lt;sup>1</sup> 2001-2007

Fixed: Currency board arrangement and Conventional pegged arrangement.

Floating: Managed floating with no pre-determined path for the exchange rate and Independently floating. 2008-2017

Fixed: Currency board and Conventional peg.

Intermediate: Crawling peg, Crawl-like arrangement and Pegged exchange rate within horizontal bands. Floating: Floating and Free Floating.

<sup>&</sup>lt;sup>2</sup> Fixed: Pre announced peg or currency board arrangement, De Facto Peg and Pre announced horizontal band that is narrower than or equal to +/-2%.

Intermediate: Pre announced crawling peg; de facto moving band narrower than or equal to +/-1%, Pre announced crawling band that is narrower than or equal to +/-2% or de facto horizontal band that is narrower than or equal to +/-2%, De facto crawling peg, De facto crawling band that is narrower than or equal to +/-2%, Pre announced

crawling band that is wider than or equal to +/-2%, De facto crawling band that is narrower than or equal to +/-5%

Regarding the data coverage, the IMF de jure<sup>3</sup> classification is available until 2017, whilst the de facto dataset is available until 2016, in fact it is the same dataset used by Ilzetzki, Reinhart, and Rogoff (2018).

### Financial Openness

Even though, one of the main purpose of the thesis is to evaluate whether or not the exchange rate regime has an impact on the foreign currency loan market. The globalization and the integration on the international financial markets and cross-border financial transactions are increasing today. For that reason, I would like to extent the analysis and include a variable that let us evaluate whether or not the countries' financial openness has an influence on the loan market dollarization. Furthermore, an interaction term between financial openness and exchange rate regime is included in the econometric model in order to account the possibility that the financial openness' net effect could be limited by the exchange rate regime.

The financial openness indicator is based on Chinn and Ito (2008). This indicator is commonly known as the Chinn-Ito Index or KAOPEN index and it is widely used as an indicator of the country's degree of capital account openness and it is based on the Annual Report on Exchange Arrangements and Exchange Restrictions of the IMF. Currently, the indicator is available from 1970 until 2017 for 182 countries.

### **Control Variables**

Based on the vast literature on exchange rate regimes and dollarization and taking into account the importance to keep the model parsimonious as much as possible, the following variables are included as control variables.

Depreciation against the US dollar and inflation, both of these variables are included to take into account what it is called in the literature as "the currency substitution effect" -for example, the negative relationship between domestic currency demand and the country's inflation- both variables are measure as the annual percentage rate. Exports as percentage of GDP represents the access to foreign currency in the country, it is also important to take into account that countries with different levels of exporting firms will face different levels of risk, since most exporting firms receive their revenues in foreign currency the risk of bankruptcy due to high depreciations of the domestic currency is lower for exporting firms. Reserves as percentage of broad money, the idea of this variable is to measure the potential demand for foreign assets from domestic sources, furthermore this variable captures any precautionary motives behind the central bank, in addition high levels of reserves contribute with the financial stability, especially in emerging markets with an open capital account. Government quality, as shown by Honig

and Moving band that is narrower than or equal to +/-2% (i.e., allows for both appreciation and depreciation over time).

Floating: De facto moving band +/-5%/ Managed floating, freely floating and Freely falling.

<sup>&</sup>lt;sup>3</sup> IMF AREAR: <u>https://www.elibrary-areaer.imf.org/Pages/Home.aspx</u>

(2009) the dollarization could be interpreted as the lack of trust in the domestic currency as consequence of the lack of faith on the government and the policies they implement and follow to promote financial stability, the empirical results support this idea for high income countries where and increase in the government quality reduces the dollarization. Finally, to control for the country's size and development I include population and GDP per capita.

# 3. Empirical Methodology

The econometric estimation is based on a strongly balanced panel for 66 countries. Even though the loan's information is available for more countries, since we are excluding those under zero or total dollarization and due to the information availability for financial openness and the control variables, the effective number of countries included is lower than the total dataset. Furthermore, the information for the de jure regimes is available until 2017 and de facto regimes until 2016, as a result the analysis under de jure and de facto regimes will cover from 2003 to 2016, in order to have comparable estimations.

The baseline model is given by:

$$Dollarization_{it} = \alpha_0 + \alpha_1 Regime_{it} + \varphi Financial \ Openness_{it} + \theta' Controls_{it} + \varepsilon_{it}$$

Dollarization stands for the ratio of loans in foreign currency,  $\alpha_0$  is a constant term,  $\alpha_1$  measures the impact on dollarization of the variable Regime which takes the value of 0 when it is floating, 1 intermediate and 2 fixed, hence this variables give us the additional effect on dollarization as the regime becomes less flexible. The  $\varphi$  is the effect of the financial openness on dollarization, it is measured by the KAOPEN index. Furthermore,  $\theta'$  is the vector of coefficients associated to the control variables that will be included in order to estimate the effect of the exchange rate regimes over the credit dollarization.

There is not a consensus regarding the econometric modelling and exchange rate regimes studies. However, the most recent and relevant work related to this topic by Basso et al. (2011), and Corrales and Imam (2019), suggest two important factors to take into consideration. First, there is a posibility of endogeneity between the right hand side variable and the left hand side variables (De Nicoló, Honohan, & Ize, 2005), in order to minimize this potential problem I use the regressors lagged by one period. Second, the regular standard errors assume the error term of each country is not correlated between years, nevertheless this assumption is not very realistic, so in order address this, all the estimations include robust standard errors adjusted for heterocedasticity and serial correlation (Neanidis & Savva, 2009).

This research classifies the regimes in the official announced de jure regime and the actually regimes the countries follow according to Reinhart and Rogoff (2004) de facto classification system, the idea behind is to compare any discrepacies and significance between the regimes

and the other elements that might influcence on the loan market dollarization. Therefore, the models specification under de jure and de facto classifications are basically the same, this faciliates the comparison between models under different regimes definitions. (see Table 4 and 5)

The variables are tested for stationarity using the Fisher's test because it is the most suitable when one is working with an unbalanced or strongly balanced panel data. In fact, Choi (2001) suggests that the inverse normal Z statistic provides better trade-off between size and power and he recommends to use it, for that reason this is the parameter under I evaluate if the variable has unit root or not. The results suggest that only Financial Openness, Exports to GDP, Government Quality, GDP per capita and Population, follow a unit root process. For that reason GDP per capita is incorporated as the growth rate and the other variables are incorporated into the model as first differences.

In addition, since the poolability of the data is rejected this means there is a highly heterogeneity among the countries, for that reason I use fixed effects models including fixed time effects. This is in order to account for those unobservable characteristics of the countries that do not change in time and those time specific effects that might have an influence over the countries.

In order to ensure the robustness of the results and allow the possibility that the financial openness' effect could be limited by the regime, I include an interaction term between the Regime variable and financial openness, the idea behind is to differentiate the financial openness effect on the loan market dollarization as the regime becomes less flexible.

Furthermore, as another robustness tests the analysis is extended to income regions in order to capture the possibility of differentiated effects between the level of income (Table 6 and Table 8 in the appendix). In this case, since the effective number of low income countries included in the models due to data availability is very reduced, only five, the analysis is basically divided in high income countries (15) and middle-low income countries (50). Lastly it is important to recall that all the models have the independent variables lagged one period, in order to minimized the possible endogeneity and also the models use robust standard errors to adjusted for heterocedasticity and serial correlation.

Before presenting the results of the econometric estimations, I will go through a brief descriptive and correlation analysis of the data. Thereafter, I will proceed to compute the models in Stata to assess the cross country regime behavior on the loan market dollarization.

# 4. Descriptive Statistics

A first look to the data tells us that the intermediate exchange regimes tend to have a higher level of dollarization and based on the exchange rate interpretation (de jure or de facto) the dollarization average changes. In fact, the table 1 help us to visualize and shows the statement by Levy-Yeyati and Sturzenegger (2005), in which the countries do not always follow their de jure exchange rate commitment, this could happen for several reasons, for example the central bank could intervene in the exchange market in order to stabilize exchange rate volatility using sterilization interventions.

An important difference between the de jure and de facto regimes is clearly those under the category of intermediate regimes. Indeed, Ilzetzki, Reinhart and Rogoff (2018) highlight the fact that there is a sort of tendency of the countries towards intermediate regimes, in other words the world remains heavily skewed towards less flexible regimes rather than managed floating and freely floating. As a consquence, even though the countries might claim they follow a de jure floating regime, in practice most of them do not allow free movements of the exchange rate.

	Fixed_dejure	Intermediate_dejure	Float_dejure
Average	25.78%	38.44%	30.43%
Standard dev	26.59%	27.21%	20.34%
Obs	168	81	765

Table 1. Average loan market dollarization l	by Regime
2004-2016	

	Fixed_defacto	Intermediate_defacto	Float_defacto
Average	32.46%	33.86%	22.39%
Standard dev	27.31%	22.98%	15.24%
Obs	133	547	246

Source: Financial Soundness Indicators-IMF, author's calculations.

Furthermore, table 2 shows the situation by income level, in more recent years floating regimes have become more common, especially for developing countries, particularly middle income, nevertheless; the intermediate regimes still very popular and useful among these countries.

Thus, in practice freely floating is more the exception than the norm, and it is actually an important difference between developing and industrial economies, and may reflect the lower financial development reached by the former group. An important reason that could be behind this, is to pursue price stability as the main goal of monetary policy, which has led to different approaches, for instance many developing countries follow an inflation targeting policy, however; the "pass-through" effect from the exchange rate to prices lead the central banks to limit free movements in the exchange market. (Ágenor & Montiel, 2015)

		Fixed_defacto	Intermediate_defacto	Float_defacto
	Average	21.79%	32.82%	21.48%
High Income	Standard dev	25.58%	22.05%	13.83%
	Obs	62	118	154
Middle Income	Average	41.77%	33.99%	22.87%
	Standard dev	25.45%	24.14%	16.07%
	Obs	71	374	89
	Average	n.a.	35.22%	54.52%
Low Income	Standard dev	n.a.	15.91%	29.00%
	Obs	n.a.	55	3

# Table 2. Loans dollarization under de facto regime and Income Level2004-2016

Source: Financial Soundness Indicators-IMF, author's calculation.

Moreover, the loan market has roughly one third of their loans denominated in foreign currency. The high income countries have the lowest dollarized loan market, about 25%. Whereas, the middle and low income countries tend to have around 30% of their total loans denominated in foreign currency. The intermediate de facto regime could be a factor that might be contributing to this differentiation between develop and developing countries. However, Honig (2009) argue that government reputation and good governance lead to better institutions and as a consequence people rely on their domestic currency because the government will enact policies that promote long-run stability, which reduces dollarization. Following the government effectiveness index by the World Bank- Worldwide Governance Indicators- this particular indicator measures the capacity of the government to effectively formulate and implement sound policies<sup>4</sup>, the world's median is 0.56, the average for high income countries is 0.81, while middle and low income countries their average is 0.44 and 0.26, respectively. Other studies highlight the importance of the inflation levels on the dollarization process in a country, Nicoló et al. (2005) argue that the credibility of the macroeconomic policy –measure as the inflation rate- and quality of the institutions are key determinants for the cross-country variations in dollarization. Indeed, the high income countries have had lower inflation rates than the middle and low income countries, on average high income countries registered inflation levels about 5 percentage points lower from 2003 to 2016.

<sup>&</sup>lt;sup>4</sup> On a scale from 0 (less effective) to 1 (more effective).

	High Income	Middle_Income	Low_Income
Average	25.19%	32.86%	35.90%
Standard dev	20.03%	23.50%	16.75%
Obs	363	588	63

# Table 3. Loans dollarization by Income level2004-2016

Source: Financial Soundness Indicators-IMF, author's calculations

Through a correlation analysis, between the loans dollarization and key macroeconomic variables I can have a first and better understanding about the relationship behind these variables. A similar analysis for household's and firm's dollarization by Corrales and Imam (2019) suggest very similar results. Nevertheless, I extend the analysis for high, middle and low income countries.

Based on the correlation analysis, figure 1, the loan market dollarization is highly correlated with inflation, especially for the middle income countries, in the case of lower income countries this relationship is weaker. The other important macroeconomic variable related to the currency substitution hypothesis, depreciation, has a positive correlation with loans dollarization as shown by Neanidis and Savva (2009) depreciation of the domestic currency have a significant impact on short-run loans dollarization inducing banks to raise foreign currency loans, as a consequence of the increase in deposit dollarization, so in other words they suggest the banks increase loans in foreign currency as a currency matching behavior that shifts the exchange rate risk to the borrowers. International reserves have two important effects over the loans dollarization that we can also indentify by the income level. On one hand, a stronger level of reserves may send a positive signal to the market about the authorities' commitment to the policies for financial and price stability, thus providing confidence to the domestic currency, which is the case for the high income countries. On the other hand, an increase of volatility in the international reserves under the concept of Barajas and Morales (2003) <sup>5</sup> represents a higher intervention of the authorities reducing the free movement of the exchange rate, which leads to a higher financial dollarization because the country will be under a de facto peg essencially (Montiel and Reinhard, 2001). Extending Honig's (2009) argument the correlation analysis shows the middle income and high income countries have a positive correlation between government quality and dollarization, which makes sense, especially for the middle income countries that usually have a weaker governance. The econometric section explores these results deeper.

<sup>&</sup>lt;sup>5</sup> They compare the variabilities of international reserves relative to broad money and the exchange rate as a proxy to define the exchange rate regime.



### Figure 1. Correlation: Loan dollarization and macroeconomic variables. Average 2001-2017

Source: International Monetary Fund and World Bank, author's calculation.

## 5. Econometric Results

The regression results shed light on several important elements regarding the loan market dollarization. First, an increase in the financial openness is correlated with a lower loan market dollarization, the reason behind is because when the countries increase their capital account openness the exchange rate volatility is increased (Calderón & Kubota, 2018), which decreases the incentive to get a loan in foreign currency due to the risks and the cost of hedging against exchange risk (Eichengreen & Hausmann, 1999). However, as I explain next, its net effect on the loan market dolarization may be limited by the de facto exchange rate regime.

Second, the role of the de jure and de facto exchange rate regime by itself seems to be less relevant for the loan market dollarization. However, the de facto regime becomes significant for the loan market dollarization when it interacts with the financial openness indicator, this can be seen on the statistically significant coefficient for the interaction term. The reason behind it is explained when the countries increase their capital account openness the exchange rate volatility is increased as shown by Calderón and Kubota (2018); as a consequence, the central banks take actions in order to reduce the increasing volatility. For that reason, the interaction term, Table 4, has a positive sign, which means that as the de facto regime becomes less flexible due to the central bank intervention and as the financial openness is increased, as a result this scenario is associated with a higher loan market dollarization. The econometric results suggest that assuming 50 index points increase on the financial openness the net effect under a fixed regime is about 0.35 percentage points (p.p) increase on the loan market dollarization, while under an intermediate and floating regime implies a decrease around 3 p.p and 6.7 p.p, respectively. This results are in line with Eichengreen and Hausmann (1999), in particular with the "moral hazard hypothesis", where actions of the central bank to limit the volatility of the exchange rate is an implicit guarantee that incentive the investors to take an excessive risk, which essentially increases the financial fragility, due this the borrowers increase their unhedged short-term and long-term foreign currency liabilities. Also, it is in line with Arteta (2005) where he shows that floating regimes are associated with a lower credit dollarization.

This result is very interesting because the role of financial openness is limited by the exchange rate regime, therefore its net effect on the loan market dollarization depends on the flexibility of the de facto exchange rate regime the central bank puts in practice. So, basically high financially open countries are likely to have a lower loan market dollarization as the exchange rate regime is released.

As mentioned by Markiewicz (2006) the financial deepening and innovation reduces the effectiveness of capital controls, and eventually the imposible trinity becomes in a dilemma between monetary policy and exchange rate stability trade-off. Therefore, a country under de facto fixed exchange rate and full financial openness will not have full independence of their monetary policy. Even though, one of the principal benefits of "fixing" is the Financial Fisher

Effect, where this type of regimes might bring a relief for borrowers exposed to foreign liabilities because reduces the possibility of currency mistmaches. On the other hand, the implicit guarentee granted by the central bank leads to risk missperceptions, encouraging excesive borrowing in foreign currency, which at the end becomes unsustainable. (Stanley, 2017)

In addition, this result is in line and supports the monetary policy decision taken by Peru back in the 90's. During that time many central banks were facing high levels of dollarization and decide to deal with that using hard-pegs as their exchange rate systems. Nevertheless, Peru decided to have a floating exchange rate regime and independent monetary policy<sup>6</sup>, this lead to an important reduction of the dollarization while the demand for domestic currency grew. (Schaechter, Ugolini, & Stone, 2004)

Furthermore, for all the fixed and random effect specifications under de facto and de jure regimes, Table 4 and 5, there are other results that I want to highlight. First, on the literature the currency substitution view says that inflation and depreciation are correlated with high levels of dollarization because this reflects macroeconomic instability, then the economic agents increase the use of foreign currency to protect themselves. An evidence of the currency substitution effect is the statistically significant coefficient for inflation, which implies that higher levels of loan market dollarization are associated with high levels of inflation.

Second, the increase of exports to GDP ratio reflects the access to foreign currency in the country, since most exporting firms receive their revenues in foreign currency is better for them to borrow in foreign currency. The statistically significant coefficient of this variable reflects that an increase on the number of exporting firms is correlated with an increase in the foreign currency loans. Corrales and Imam (2019) argue that exporting firms have a natural hedge in foreign currency borrowing and therefore may be more inclined to borrow in this currency. Furthermore, limits or other restrictions in the banking sector are used by some countries with low degrees of dollarization in particular related to foreign currency loans to non-exporters (Cayazzo et al., 2006). Also, it is important to highlight that this might not be the case for households, because typically they earn in local currency and therefore may be less willing to take the risk of borrowing in foreign currency.

Third, higher levels of international reserves to monetary base reflects the less intervention of the central bank on the exchange rates market, which is a signal that the authorities are following a more flexible regime. Hence the negative coefficient associated to international reserves is statistically significant in most of the specifications. In addition, high levels of international reserves may provide to the economic agents more confidence in the domestic currency and in the financial system, because the monetary authority can use those reserves to provide liquidity in foreign currency to the commercial banks. (Gonçalves, 2007)

<sup>&</sup>lt;sup>6</sup> Since 2002 Peru has follow an inflation targeting policy.

Fourth, the institutional quality doesn't have a statistically significant effect, Table 4 and 5, this result is similarly to Corrales and Imam (2019), where they show that households foreign currency borrowing doesn't seem to be influenced by this variable. This could be seen, as the loan market dollarization is more a concern of macroprudential policies, rather than quality of the institutions.

The table 6 displays the results for loan market dollarization by middle-low income and high income countries. Corrales and Imam (2019) find evidence that income per capita, measure as GDP per capita, plays an important role on the loan market dollarization for firms, whereas it does not have an important role for households. In my case due to the lack of data I can't do this separation between firms and households, as a result in my econometric estimation GDP per capita growth does not seem to be have a significant role, nevertheless I agree that this variable might have a significant role for firms.

The econometric results also reveal the different effect of financial openness and exchange rate regime on high income versus middle-low income countries. It is worth notice that high income countries and middle-low income countries differ on the variables that may influence the loan market dollarization. First, for the high income countries the effect of the financial openness is not statistically significant, not even through the interaction variable. Whereas, in the middle-low income countries financial openness seems to have a statistically significant effect on the same direction I mentioned above, which means that in these countries as the exchange rate regime becomes less flexible and the financial openness increases, this is associated with a higher level of loan market dollarization. Behind this result there are two important ideas that I would like to highlight. First, it seems that high income countries due to their social and financial knowledge and sophistication may be more reluctant to borrow in foreign exchange (Corrales and Imam, 2019). Second, high levels of financial openness under floating regimes are correlated with lower levels of loan market dollarization. (Schaechter, Ugolini and Stone, 2004; and Stanley, 2017)

Second, the currency substituion effect seems to be a driver regardless the income level, nevertheless the channel is different. In high income countries depreciation seems to be the channel, whereas in middle-low income inflation is statistically significant. This make sense if we take into account that middle-low income countries have experienced during their history higher levels of inflation and periods of higher macroeconomic instability. (Frieden & Lake, 2002)

Third, the results suggest that in middle-low income countries the reserves ratio and government quality do not have a relevant role to provide trust in the domestic currency, whilst in high income countries these two variables are statistically significant, in other words it seems the "trust" in the domestic currency could be increased through financial and political institutions in the high income countries. Similarly, Honig (2009) suggests that improving the institutions quality and policies can lead to a reduction of the loan market dollarization.

Dependent Variable: Foreign-currency denominated loans/total loans						
	FE	FE	RE	RE		
De Facto Regime	0.463	0 512	0 715	0 756		
	(1 507)	(1 471)	(1 418)	(1 389)		
AFinancial Openess	-6 257**	-13 <u>4</u> ***	-6 351**	-13 196***		
Annancial_openess	(2.75)	(4 936)	(2.698)	(4 778)		
Depreciation	-0.017	-0.018	-0.015	-0.016		
	(0.031)	(0.031)	(0.031)	(0.031)		
Inflation	0 131**	0 128**	0 14***	0 137**		
	(0.054)	(0.054)	(0.054)	(0.054)		
Reserves BM	-0.089**	-0.091**	-0.082**	-0.084**		
	(0.044)	(0.044)	(0.042)	(0.042)		
ΔExports GDP	0.22*	0.223*	0.214*	0.217*		
	(0.124)	(0.124)	(0.123)	(0.123)		
ΔGoverment Quality	0.457	0.383	0.555	0.481		
	(8.334)	(8.308)	(8,4)	(8.373)		
GDP pc growth	6.643	5.692	7.193	6.274		
	(16.5818)	(16.6409)	(16.612)	(16.6739)		
ΔPopulation	-3.132	-3.134	-2.465***	-2.469***		
	(1.929)	(1.921)	(0.923)	(0.926)		
De Facto Regime*AFinancial Openess		7 05*		6 759**		
		(3.564)		(3.405)		
	<b>10 715**</b> *	40.000***	20 012***	40 OF 4***		
_cons	40.745	40.886	39.912	40.054		
	(2.973)	(2.967)	(4.388)	(4.403)		
R-Squared	0.1317	0.1343	0.1312	0.1338		
Countries	66	66	66	66		
Observations	610	610	610	610		
Robust standard arror in paranthasis						

### Table 4. Loans dollarization. De Facto Regime

Robust standard error in parenthesis

\*\*\* p<0.01, \*\*p<0.05, \*p<0.1

Dependent Variable: Foreign-currency denominated loans/total loans						
	FE	FE	FE	FE		
De lure Regime	1 508	1 472	1 068	1 0/12		
De_Jule_Kegime	(1 211)	(1 21)	(1 166)	(1 163)		
AFinancial Openess	-5 906**	-7 109**	-6.087**	-7 263**		
Armanetal_openess	(2.828)	(2.92)	(2 786)	(2.856)		
Depreciation	-0.016	-0.016	-0.014	-0.014		
	(0.031)	(0.031)	(0.031)	(0.031)		
Inflation	0 132**	0 133**	0 137**	0 137**		
	(0.055)	(0.054)	(0.055)	(0.055)		
Reserves BM	-0.079*	-0.081*	-0.075*	-0.076*		
	(0.045)	(0.045)	(0.042)	(0.042)		
ΔExports GDP	0.217*	0.219*	0.211*	0.213*		
· _	(0.124)	(0.124)	(0.123)	(0.123)		
ΔGoverment Quality	0.473	0.413	0.503	0.442		
_ ,	(8.116)	(8.076)	(8.179)	(8.137)		
GDP_pc_growth	6.417	6.125	7.093	6.799		
	(16.5139)	(16.474)	(16.5911)	(16.5535)		
ΔPopulation	-3.034*	-3.065*	-2.364***	-2.379***		
	(1.818)	(1.808)	(0.881)	(0.887)		
De Jure Regime*AFinancial Openess		4,702		4.615		
		(3.111)		(2.988)		
		()		()		
cons	39.96***	40.084***	39.642***	39.749***		
-	(3.085)	(3.105)	(4.748)	(4.769)		
	· /	· · ·	. ,	· ·		
R-Squared	0.1352	0.1365	0.1346	0.1359		
Countries	66	66	66	66		
Observations	611	611	611	611		
Pobust standard error in parenthesis						

### Table 5.Loans dollarization. De Jure Regime

Robust standard error in parenthesis

\*\*\* p<0.01, \*\*p<0.05, \*p<0.1

Dependent Variable: Foreign-currency denominated loans/total loans					
	Middle-Lo	Middle-Low Income		ncome	
	FE	FE	FE	FE	
De_Facto_Regime	1.133	1.193	-0.675	-0.827	
	(2.363)	(2.316)	(1.411)	(1.409)	
ΔFinancial_Openess	-7.14***	-13.362***	-1.347	-41.228	
	(2.643)	(4.937)	(8.397)	(27.019)	
Depreciation	-0.045	-0.047	0.067*	0.065**	
	(0.042)	(0.042)	(0.032)	(0.03)	
Inflation	0.15**	0.146**	0.163	0.101	
	(0.057)	(0.057)	(0.12)	(0.133)	
Reserves_BM	-0.042	-0.045	-0.24***	-0.222**	
	(0.054)	(0.054)	(0.078)	(0.075)	
ΔExports_GDP	0.332	0.335	0.003	0.017	
	(0.201)	(0.201)	(0.051)	(0.05)	
ΔGoverment_Quality	9.972	9.848	-20.804***	-21.307***	
	(7.317)	(7.29)	(3.37)	(3.655)	
GDP_pc_growth	6.494	5.543	-6.796	-5.824	
	(18.5395)	(18.5788)	(21.1275)	(21.0731)	
ΔPopulation	-3.606*	-3.611*	-3.207	-3.440	
	(1.881)	(1.873)	(9.852)	(10.244)	
De_Facto_Regime*∆Financial_Openess		6.087*		47.824	
		(3.653)		(33.887)	
_cons	37.448***	37.604***	52.218***	53.278***	
	(3.323)	(3.329)	(6.479)	(6.26)	
R-Squared	0.1295	0.1318	0.4319	0.4448	
Countries	51	51	15	15	
Observations	471	471	139	139	
Robust standard error in parenthesis					

### Table 6. Loan dollarization by income and de facto regime

\*\*\* p<0.01, \*\*p<0.05, \*p<0.1

# 6. Robustness tests

In order to assess the robustness of the findings, several models and specifications are estimated. These estimations are described on the paragraphs below.

First, I include fixed and random effects models, including fixed time effects in both specifications.

Second, the model is tested under de jure and de facto regimes, in order to take into account that the authorities do not always follow the regime they claim to use officially. Furthermore, an interaction term is included in order to test the possibility that the financial openness might be limited by the exchange rate regime.

Third, in order to account for different effects of the variables due to the level of income of the countries, the analysis also splits the countries in middle-low and high income countries under de facto regimes (Table 6) and de jure regimes (Table 7 in the appendix).

Fourth, in order to account for the possibility that the economic region might have a role in the results. The model is also separated by region (Table 9 and 10 in the appendix), the results suggest that the European and Asian region are associated with the behavior described in the previous section, that means that these regions are more likely to increase the loan market dollarization when the financial openness increases under a less flexible regime. Furthermore, the reserves ratio is also statistically significant in these two regions, meaning that reserves might have a role increasing the trust in the domestic currency.

In addition, the independent variables are lagged one period in all the regressions, in order to minimize endogeneity problems and reduce the possibility that endogeneity has not driven the results. Moreover, all the regressions, fixed and random effects use robust standard errors.

The results in the robustness tests do not change the results drastically nor the econometric interpretation presented in the previous section.

# 7. Conclusion

The financial dollarization and the exchange rate regimes have been studied from different perspectives and concepts, and its importance has increased due to the consequences on the financial system stability. Some of these studies have explore bank mismatches (Arteta, 2005), deposit dollarization (De Nicoló, Honohan, and Ize, 2005) and determinants of financial dollarization (Neanidis and Savva, 2009; Basso, Calvo-Gonzalez and Jurgilas, 2011). This thesis addresses the loan market dollarization and exchange rate regimes, emphasizing the role of financial openness.

Due to the technological advances and globalization the countries face difficulties to restrict capital flows. As a consequence, the trilemma has become a dilemma between independent monetary policy and exchange rate regimes, the results presented in this thesis may help to shed light on the loan market dollarization and its connection with exchange rate regimes and financial openness, and hence help to improve and strengthen the financial stability.

The main contribution of this thesis is that it shows that higher financial openness under more flexible exchange rate regimes are correlated with lower levels of loan market dollarization, in particular for middle-low income countries. The importance of this result is because the literature usually does not deepen on this relationship between financial openness and exchange rate regimes. In fact, most of the literature argues that exchange rate regimes are weekly correlated with financial dollarization, and indeed I also validate this result. Nevertheless, as I have shown the role of financial openness is limited by the exchange rate regime. For instance, high levels of financial openness under floating exchange rate regimes are correlated with lower levels of loan market dollarization, in comparison with high levels of financial openness under less flexible regimes.

Additionally, the econometric results suggest that the loan market dollarization in high income and middle-low income countries is influenced by different variables. There is no evidence that financial openness and exchange rate regimes play a role in high income countries, whereas the reserves ratio and government quality are both significant for this level of income. Which may reflect, first, the idea that high income countries due to their social and financial knowledge and sophistication may be more reluctant to borrow in foreign exchange. And second, the demand for domestic currency could be increased through the trust in financial and political institutions in high income countries.

Finally, these results contribute to the existing literature and empirical evidence about loan market dollarization and its causes and consequences. Even though, I recognize there is still more to be explored about this topic, hopefully this thesis may contribute with future research and policy assessment regarding financial dollarization.

# 8. Appendix

Variable	Source
De jure exchange rate regimes	International Monetary Fund
De facto exchange rate regimes	Ilzetzki, Reinhart, and Rogoff (2018) Obtained from: https://www.ilzetzki.com/irr- data
Financial_Openness	Chinn and Ito (2008) Obtained from: http://web.pdx.edu/~ito/Chinn- Ito_website.htm
Foreign-currency denominated loans	International Monetary Fund
Total Loans	International Monetary Fund
Depreciation	World Bank
Inflation	World Bank
Reserves_BM	World Bank
Exports_GDP	World Bank
Goverment_Quality	World Bank
GDP_per capita	World Bank
Population	World Bank

Table 7. Data Source

Dependent Variable: Foreign-currency denominated loans/total loans					
	Middle-Lo	Middle-Low Income		ncome	
	FE	FE	FE	FE	
De_Jure_Regime	1.079	1.057	0.745	0.237	
	(1.879)	(1.882)	(2.043)	(1.945)	
ΔFinancial_Openess	-7.013**	-8.394***	-0.769	-3.148	
	(2.652)	(2.572)	(8.981)	(7.925)	
Depreciation	-0.046	-0.046	0.065*	0.065*	
	(0.041)	(0.041)	(0.032)	(0.032)	
Inflation	0.137**	0.137**	0.180	0.202	
	(0.055)	(0.055)	(0.136)	(0.125)	
Reserves_BM	-0.038	-0.039	-0.229**	-0.237**	
	(0.054)	(0.055)	(0.1)	(0.1)	
ΔExports_GDP	0.332	0.333	-0.005	-0.010	
	(0.201)	(0.201)	(0.057)	(0.056)	
ΔGoverment_Quality	9.773	9.622	-20.859***	-20.958***	
	(7.107)	(7.122)	(3.295)	(3.424)	
GDP_pc_growth	7.021	6.809	-6.827	-4.554	
	(18.3867)	(18.3335)	(20.4244)	(18.9594)	
ΔPopulation	-3.361**	-3.407**	-3.379	-3.483	
	(1.654)	(1.634)	(9.569)	(9.681)	
De_Jure_Regime*∆Financial_Openess		5.041*		163.243***	
		(2.857)		(32.37)	
_cons	37.858***	38.002***	50.431***	51.519***	
	(3.426)	(3.441)	(7.836)	(8.546)	
R-Squared	0.1295	0.1312	0.4335	0.4543	
Countries	51	51	15	15	
Observations	472	472	139	139	
Robust standard error in parenthesis					

### Table 8.Loan dollarization by income and de jure regime

\*\*\* p<0.01, \*\*p<0.05, \*p<0.1

Dependent Variable: Foreign-currency denominated loans/total loans						
	Eur	Europe Asia			Latin America	
	FE	FE	FE	FE	FE	FE
De Facto Regime	1.606	1,218	2,129	2.061	1.391	1.376
2-2-10-2002	(2.381)	(2.104)	(3.243)	(3.253)	(3.203)	(3.214)
ΔFinancial Openess	-7.971*	-25.484***	1.149	-20.068**	-4.284	-3.879
_ ·	(3.937)	(6.577)	(5.663)	(8.622)	(2.576)	(3.257)
Depreciation	0.030	0.029	-0.038	-0.043	0.004	0.004
	(0.026)	(0.026)	(0.061)	(0.061)	(0.032)	(0.032)
Inflation	0.102	0.089	0.090	0.070	0.084	0.084
	(0.124)	(0.125)	(0.341)	(0.34)	(0.051)	(0.052)
Reserves_BM	-0.100	-0.103	-0.156	-0.156	0.099	0.099
	(0.07)	(0.065)	(0.092)	(0.093)	(0.113)	(0.114)
ΔExports_GDP	0.050	0.046	0.128	0.137	0.164	0.163
	(0.138)	(0.135)	(0.102)	(0.105)	(0.131)	(0.132)
∆Goverment_Quality	0.426	-2.397	27.453***	27.366***	2.245	2.191
	(9.457)	(8.863)	(7.833)	(7.81)	(13.133)	(13.139)
GDP_pc_growth	-18.500	-20.563	-32.021	-32.148	18.005	18.157
	(16.9063)	(15.0639)	(22.9876)	(23.191)	(18.2276)	(18.1488)
ΔPopulation	-4.865**	-4.782**	-0.151	-0.327	-8.152	-8.159
	(2.193)	(2.191)	(1.827)	(1.83)	(5.493)	(5.512)
De_Facto Regime*∆Financial Openess		15.084***		19.974***		-0.455
		(4.785)		(6.091)		(1.592)
cons	59.749***	60.321***	46.863***	47.285***	25.847***	25.834***
_	(6.364)	(6.134)	(7.37)	(7.365)	(4.509)	(4.549)
R-Squared	0.3408	0.3564	0.2296	0.2344	0.1303	0.1303
Countries	15	15	19	19	16	16
Observations	154	154	155	155	156	156

### Table 9.Loan dollarization by region and de facto regime

Robust standard error in parenthesis

\*\*\* p<0.01, \*\*p<0.05, \*p<0.1

Dependent Variable: Foreign-currency denominated loans/total loans						
	Europe		Asia		Latin America	
	FE	FE	FE	FE	FE	FE
De_Jure_Regime	-2.453	-2.457	3.962*	3.908*	0.103	0.760
	(2.285)	(2.278)	(1.903)	(1.964)	(2.346)	(2.42)
ΔFinancial_Openess	-8.212*	-12.308***	2.110	2.017	-4.184	-2.125
	(4.006)	(2.654)	(5.231)	(5.111)	(2.933)	(4.208)
Depreciation	0.028	0.026	-0.045	-0.046	0.007	0.007
	(0.024)	(0.024)	(0.053)	(0.053)	(0.032)	(0.033)
Inflation	0.070	0.072	0.007	0.011	0.072	0.074
	(0.119)	(0.123)	(0.307)	(0.296)	(0.049)	(0.049)
Reserves_BM	-0.086	-0.098	-0.125	-0.123	0.102	0.105
	(0.076)	(0.074)	(0.096)	(0.1)	(0.109)	(0.112)
ΔExports_GDP	0.020	0.010	0.140	0.139	0.155	0.152
	(0.139)	(0.135)	(0.107)	(0.108)	(0.125)	(0.127)
$\Delta$ Goverment_Quality	-1.437	-4.133	23.967***	23.874***	2.453	1.522
	(9.132)	(8.626)	(7.923)	(7.915)	(13.329)	(12.685)
GDP_pc_growth	-18.629	-17.417	-25.650	-25.615	16.822	17.665
	(17.3465)	(16.4271)	(23.6018)	(23.7507)	(17.4871)	(17.2832)
ΔPopulation	-4.499**	-4.576**	0.240	0.205	-8.018	-8.055
	(1.757)	(1.747)	(1.881)	(1.971)	(5.382)	(5.441)
De_Jure_Regime*∆Financial_Openess		8.636**		16.182		-5.033
		(3.006)		(90.494)		(8.194)
_cons	62.189***	62.426***	44.108***	44.062***	26.583***	26.108***
	(4.841)	(4.864)	(7.783)	(7.945)	(4.989)	(5.266)
R-Squared	0.3456	0.3576	0.2693	0.2694	0.1257	0.1275
Countries	15	15	19	19	16	16
Observations	155	155	155	155	156	156

### Table 10.Loan dollarization by region and de jure regime

Robust standard error in parenthesis

\*\*\* p<0.01, \*\*p<0.05, \*p<0.1

### 9. Bibliography

- Ágenor, P.-R., & Montiel, P. (2015). Development Macroeconomics. Princeton university press.
- Arteta, C. (2005). Exchange Rate Regimes and Financial Dollarization: Does Flexibility Reduce Currency Mismatches in Bank Intermediation? *Topics in Macroeconomics 5(1)*.
- Barajas, A., & Morales, A. (2003). *Dollarization of Liabilities: Beyond the Usual Suspects*. IMF Working Papers 03/11, International Monetary Fund.
- Basso, H., Calvo-Gonzalez, O., & Jurgilas, M. (2011). *Financial dollarization: The role of foreign-owned banks and interest rates.* Journal of banking & finance, 35(4).
- Calderón, C., & Kubota, M. (2018). Does higher openness cause more real exchange rate volatility? Journal of International Economics, 176-204.
- Cavallo, D. F., & Cottani, J. A. (1997). Argentina's Convertibility Plan and the IMF. *The American Economic Review*, 17-22.
- Cayazzo, J., Pascual, A. G., Heysen, S., & Gutierrez, M. E. (2006). *Toward An Effective Supervision of Partially Dollarized Banking Systems*. International Monetary Fund.
- Chinn, M. D., & Ito, H. (2008). A new measure of financial openness. Journal of comparative policy analysis, 10(3).
- Choi, I. (2001). Unit root tests for panel da. Journal of International Money and Finance, 249–27.
- Corrales, J. S., & Imam, P. A. (2019). *Financial dollarization of households and firms: does it differ?* Internationla Monetary Fund.
- De Bock, R., & Demyanets, A. (2012). *Bank Asset Quality in Emerging Markets: Determinants and Spillovers.* IMF Working Paper 12/71, Washington.
- De Nicoló, G., Honohan, P., & Ize, A. (2005). Dollarization of the Banking System: Causes and Consequences. *Journal of Banking and Finance, 29*, 1697-1727.
- Eichengreen, B., & Hausmann, R. (1999). Exchange Rates and Financial Fragility. NBER Working Paper.
- Frieden, J. A., & Lake, D. A. (2002). *International political economy: perspectives on global power and wealth.* . Routledge.
- Giovannini, A., & Turtelboom, B. (1992). Currency Substitution. National Bureau of Economic Research.
- Gonçalves, F. M. (2007). *The Optimal Level of Foreign Reserves in Financially Dollarized Economies: The Case of Uruguay.* International Monetary Fund.
- Honig, A. (2009). Dollarization, exchange rate regimes and government quality. *Journal of international Money and Finance, 28(2),* 198-214.

- Ilzetzki, E., Reinhart, C., & Rogoff, K. (2018). *Replication Data for: 'Exchange Arrangements Entering the Twenty-First Century: Which Anchor Will Hold*? Harvard Dataverse.
- Ize, A., & Parrado, E. (2002). *Dollarization, monetary policy, and the pass-through*. International Monetary Fund (No 2-188).
- Levy-Yeyati, E., & Rey, H. (2006). Financial Dollarization: Evaluating the Consequences. *Economic Policy*, 21(45), 62-118.
- Levy-Yeyati, E., & Sturzenegger, F. (2005). Classifying exchange rate regimes: Deeds vs. words. *European* economic review, 49 (6), 1603-1635.
- Magud, N., Reinhart, C., & Rogoff, K. (2011). Capital Controls: Myth and Reality-A Portfolio Balance Approach. *NBER Working Paper 16805*.
- Markiewicz, A. (2006). Choice of exchange rate regime in transition economies: An empirical analysis. *Journal of Comparative Economics*, 484-498.
- Mendoza, E., & Terrones, M. (2008). An anatomy of credit booms: evidence from macro aggregates and micro data. *NBER Working Paper 14049*.
- Montiel, P., & Reinhart, C. (2001). The Dynamics of Capital Movements to Emerging Economies During the 1990s. *Short-term Capital Flows and Economic Crises*, 3-28.
- Neanidis, K., & Savva, C. (2009). *Financial dollarization: Short-run determinants in transition economies*. Journal of Banking & Finance, 33(10).
- Reinhart, C. M., & Rogoff, K. S. (2004). The modern history of exchange rate arrangements: a reinterpretation. *The Quarterly Journal of economics*, 1-48.
- Schaechter, A., Ugolini, P., & Stone, M. (2004). 2 *Monetary Policy in a Highly Dollarized Economy: The Case of Peru*. International Monetary Fund.
- Stanley, L. (2017). Emerging Market Economies and Financial Globalization: Argentina, Brazil, China, India and South Korea. Anthem Press.