Preliminary impressions about the relationship between the level of public debt and the countries' ability to attract new foreign credits

Augusto Netto, Gabriella Garcia and Maria Clara Drzeviechi

Table of Contents

**Insper Data**

# Objective

This study aims to investigate how a country’s level of public debt can be an obstacle to attract new foreign credit. If the country incurs high levels of debt, it is more likely that it will not be able to repay its creditor. Thus, in situations that a country’s level of public debt is too large, the creditors may choose to stop financing the country (Krugman, 1988), because of fearing a default. Using econometric methods, the objective is to verify if a country's debt level has a negative impact on foreign participation in a country's sovereign debt.

# Motivation

In the past 50 years, emerging and developing economies experienced four big indebtedness waves, three of which ended up in financial crises. In the 1980s, the association of low real interest rates and growing debt market led certain economies to raise considerably their levels of indebtedness; the result was the well-known Latin America’s debt crisis. A decade later, the world would watch the Asian financial crisis, due to the liberalization of financial markets and capital flows, allowing these countries to acquire loans in foreign currencies. Finally, in 2007-09, both emerging and advanced economies faced major recessions as a result of the global financial crisis.

It is important to notice that although happening in different decades and locations, these three episodes share a common denominator: they all started in periods with low real interest rates and an escalating indebtedness. This scenario made the risk premium rise and subsequently there was a sudden stop of capital flows.

In 2010, the fourth global wave of debt started, and it was the largest and fastest one. In accordance with the aforementioned ones, interest rates were low since the Global Financial Crisis and investors were seeking assets with greater profitability. It is also reasonable to consider that this wave has not yet met its end. By 2018, according to the IMF, global debt has reached 226% of GDP, representing an amount of 188 trillions of dollars. Emerging and developing economies saw indebtedness grow 54 p.p. in 8 years, reaching 170% of GDP. Low income countries reached 67% of GDP in 2018 – that figure was 48% in 2010. A different situation is seen on advanced economies, once they have maintained the 265% ratio of debt to GDP on the same level since 2010.

Global debt waves have shown the need for emerging and developing markets to develop their sovereign bond markets to facilitate public debt financing and management, primarily through the issuance of domestic bonds in local currencies. This growth was reflected in the increase in domestic participation in government bonds, and in the increase in foreign interest in the debt of these governments, which has become increasingly relevant in the local bond market.

The raise in foreign participation in the sovereign debt market is also related to many susceptible advantages, such as a decrease in government borrowing costs, due to the higher demand for these bonds, presented in several studies (Andritzky, 2012; Arslanalp and Poghosyan, 2014; Jaramillo and Zhang, 2013; Warnock and Warnock, 2009) and the diversification of the investor base, reflecting different characteristics of investors in terms of risk tolerance and trading reasons, which may increase the liquidity of government debt bonds in the secondary market (World Bank and IMF , 2001).

However, foreign investors tend to be relatively more sensitive to risk, particularly foreign private investors, and can be an unstable source of demand in times of stress, because they have a broader pool of assets in which they can invest. As a result, they may be less inclined to maintain their participation during these episodes (Broner et al., 2013).

The constant rise in indebtedness, observed in the current wave of global debt and intensified by the current crisis of COVID-19, may culminate in a sudden increase in risk premiums, if investors consider debt to GDP levels to be unsustainable (Blanchard 2019; Henderson 2019; Rogoff 2019a, b). If this happens, both capital inflows and outflows decrease during economic crises, with this effect being stronger in global crises (Broner et al., 2013).

In this context, this study intends to analyze the impact of the variable debt-to-GDP ratio on the participation of foreign creditors in government bonds. Therefore, a worldwide analysis will be conducted using the database provided by Arslanalp and Takahiro Tsuda, previously affiliated with the Monetary and Capital Markets Department of the International Monetary Fund. If this relationship proves to be significant, several negative effects on local economies, as mentioned in the text, may intensify in the current world crisis scenario.

# Literature Review

Discussions on how indebtedness can affect the macroeconomic variables of a country are widely addressed in the literature. This review will focus on three topics: debt and growth; debt overhang and debt tolerance.

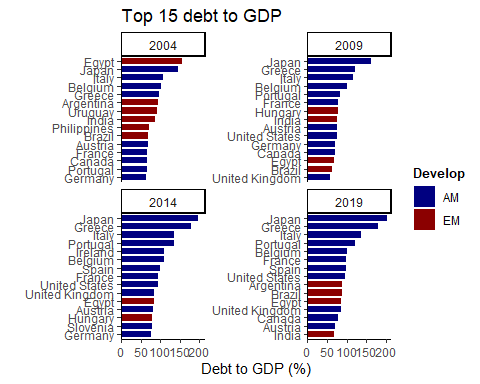
The relationship between debt and growth was first found to be non-linear by Reinhart, Rogoff, and Savastano (2003). Later, Reinhart and Rogoff (2010) analyze countries distinguishing developed and emerging markets and they found out that, for both groups, a 90% debt to GDP ratio can be detrimental for growth. On the other hand, Kumar and Woo (2010) produced evidence that the negative impact of debt on growth is higher for developing countries when compared with developed countries. Thinking about debt tolerance, Reinhart, Rogoff and Savastano (2003) introduce the concept of debt intolerance and analyze how emerging markets find it difficult to face high levels of debt, while advanced countries face this issue more easily. Later, Catão and Kapur (2006) discussed the macroeconomic determinants of a country’s volatility and how it impacts the spread rate it has to pay.

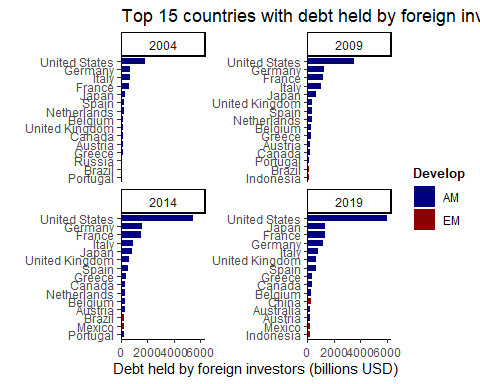
The concept of debt overhang refers to a debt burden so large that the country can not take any additional debt to finance itself. Krugman (1988) discussed the tradeoff for creditors when facing a debt overhang: financing or forgiving. Deshpande (1995) discusses how a situation of debt overhang can discourage investment. Reinhart, Reinhart, and Rogoff (2012) punctuated the main episodes in history about debt overhang.

# Dataset Description

The dataset used in this study is composed by the database provided by Arslanalp and Takahiro Tsuda (2012 and 2014), which compiles comparable estimates of investor holdings of sovereign debt. In addition, data provided bt the World Economic Outlook from IMF and the WOrld Bank are used. The dataset is composed of 45 countries and covers sixteen years, from 2004 to 2019, quartely frequncy.

## Ranking

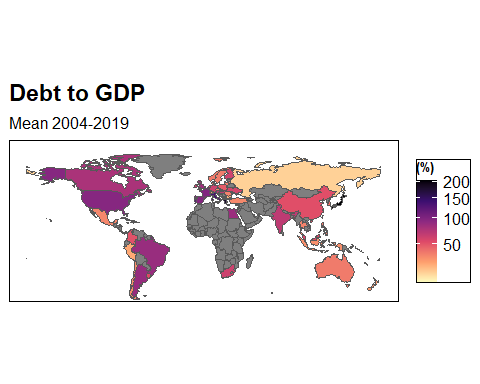




# Stylized Facts

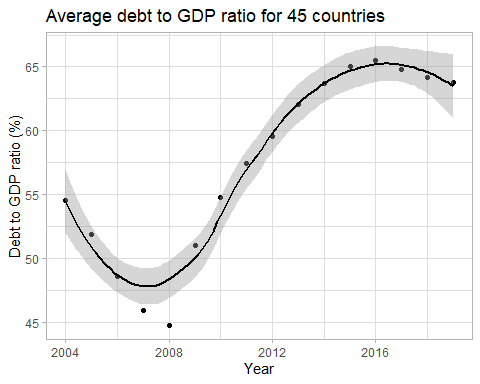
Firstly, some stylized facts will be explained in relation to our dataset.

## Countries have different indebtedness levels



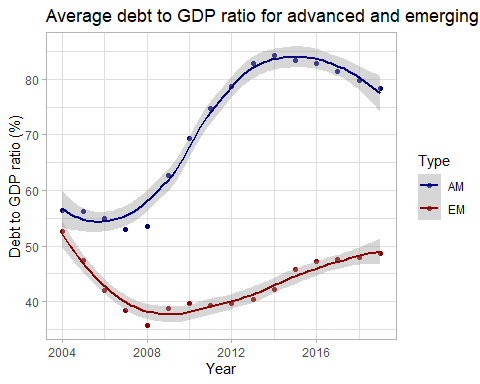
As the map shown above makes clear, countries around the world have contrasting levels of debt to GDP. Nations in grey are not part of our sample.

## The level of indebtedness in the world has varied considerably in recent years

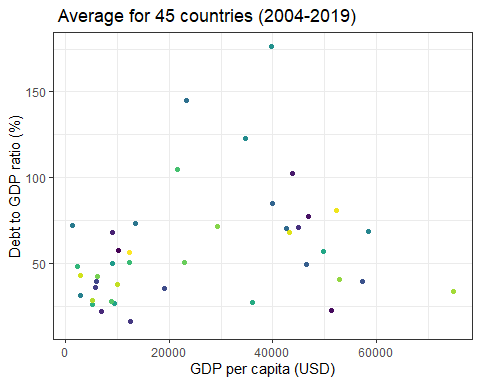


It is possible to observe that the average indebtedness in the countries fell a lot in 2008, rise until 2018 and has been showing a slight drop.

## Advanced markets are more indebted than emerging markets

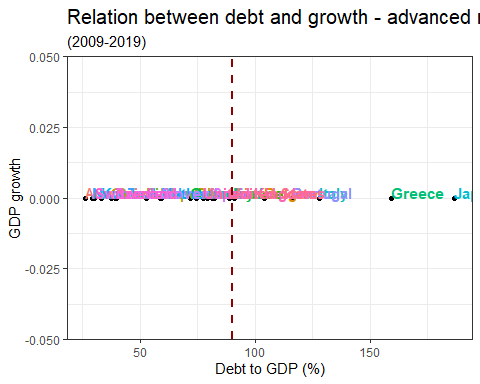


## The relationship between debt and GDP is not clear

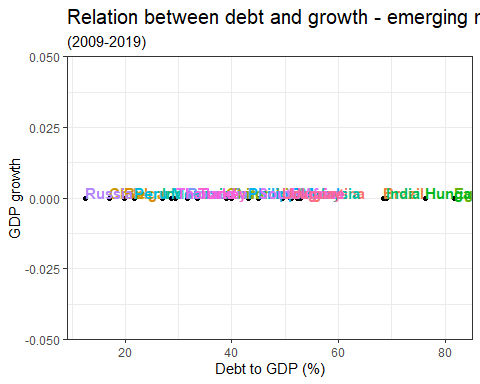


Even though advanced markets have a higher debt level than emerging markets, the relationship between GDP per capita and debt to GDP ratio is not clear.

## It is not possible to observe that countries with more than 90% debt to GDP grow less

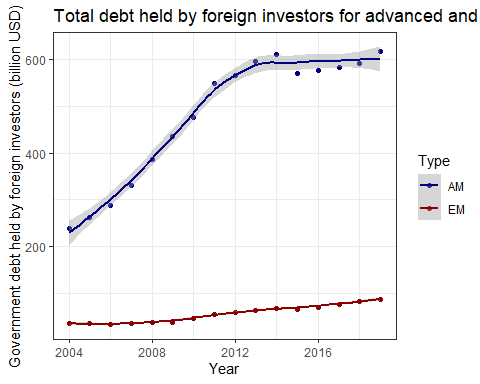


Contrasting with Reinhart and Rogoff (2010), this dataset does not show a clear pattern of decreasing GDP growth beyond the 90% debt to GDP level for advanced economies (marked in red).



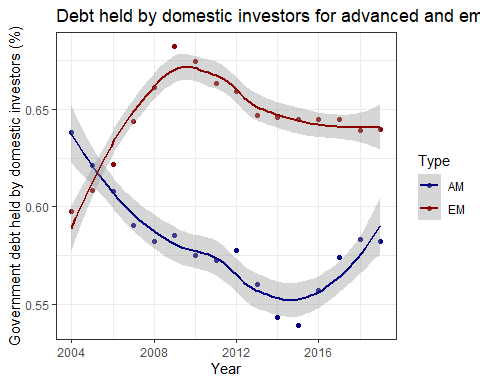
Concerning emerging economies, Reinhart et. al (2003) finds that real growth might be constrained even with low levels of indebtedness - such as 15 or 20%. Once again, the selection of countries and time space here goes in a different direction.

## Foreign investors have a preference for allocating their resources in advanced markets



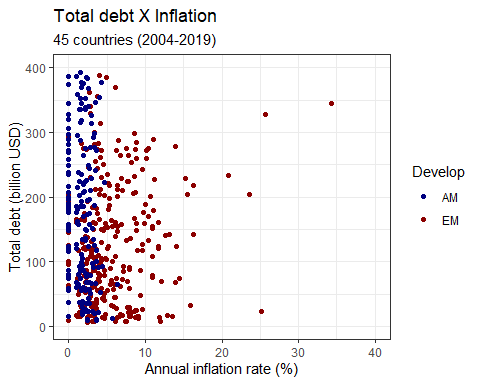
It is possible to observe that foreign investors have allocated much more resources in bonds from advanced markets. In addition, we can see that since 2012, the participation of foreign investors in government bonds has accelerated.

## The participation of domestic investors in the composition of debt it is not invariant over time



In addition to the domestic participation in debt varying for both emerging and advanced countries, it is possible to infer that those variations are inverse.

## There is no clear relationship between debt and inflation



# Econometrics

## REG 1 (foreign menos BC)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) +   
## log(debt\_to\_GDP\_) + fx\_ + GDP\_per\_cap\_cte + inflation\_mean +   
## nominal\_rate + vix\_EUA + vix\_EUR + taxes + develop + account\_balance +   
## lending\_borrow + unemployment, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1462935 -0.0308440 0.0013596 0.0319784 0.1292437   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## debt\_to\_GDP\_ 3.4729e-05 5.4372e-04 0.0639 0.9491162   
## log(debt\_to\_GDP\_) 4.1636e-02 2.1237e-02 1.9606 0.0509142 .   
## fx\_ -7.4913e-02 4.2426e-02 -1.7657 0.0785250 .   
## GDP\_per\_cap\_cte 1.6474e-06 1.2908e-06 1.2763 0.2029094   
## inflation\_mean -1.1094e-04 2.0609e-03 -0.0538 0.9571091   
## nominal\_rate 1.2395e-03 1.2841e-03 0.9653 0.3352365   
## vix\_EUA -3.3978e-03 1.3051e-03 -2.6034 0.0097183 \*\*   
## vix\_EUR 1.5876e-03 1.3184e-03 1.2042 0.2295189   
## taxes 3.8466e-03 1.1242e-03 3.4218 0.0007142 \*\*\*  
## account\_balance -1.1980e-06 1.0552e-06 -1.1354 0.2571778   
## lending\_borrow -4.9637e-06 1.5878e-06 -3.1260 0.0019567 \*\*   
## unemployment -3.8006e-06 2.4113e-06 -1.5762 0.1161100   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.8418  
## Residual Sum of Squares: 0.64719  
## R-Squared: 0.23118  
## Adj. R-Squared: 0.13303  
## F-statistic: 7.06617 on 12 and 282 DF, p-value: 3.065e-11

## REG 1.1

reg1.1 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean, data = panel\_dataset )  
  
summary(reg1.1)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA +   
## vix\_EUR + taxes + develop + account\_balance + lending\_borrow +   
## unemployment + inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1205405 -0.0266137 0.0017047 0.0267820 0.1051343   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 6.6159e-02 7.0684e-03 9.3598 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -1.1448e-03 3.5575e-04 -3.2179 0.0014422 \*\*   
## fx\_ -1.8300e-02 3.7553e-02 -0.4873 0.6264062   
## GDP\_per\_cap\_cte 3.6651e-06 1.1565e-06 3.1692 0.0016966 \*\*   
## nominal\_rate 7.7145e-04 1.1282e-03 0.6838 0.4946748   
## vix\_EUA -2.0954e-04 1.1998e-03 -0.1747 0.8614785   
## vix\_EUR -3.4267e-04 1.1767e-03 -0.2912 0.7711002   
## taxes 3.3462e-03 9.9007e-04 3.3798 0.0008277 \*\*\*  
## account\_balance -1.1598e-06 9.1691e-07 -1.2649 0.2069625   
## lending\_borrow -5.3550e-07 1.4675e-06 -0.3649 0.7154611   
## unemployment 3.1301e-06 2.2533e-06 1.3891 0.1659046   
## inflation\_mean -2.0485e-03 1.8242e-03 -1.1230 0.2624106   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.8418  
## Residual Sum of Squares: 0.50052  
## R-Squared: 0.40541  
## Adj. R-Squared: 0.32951  
## F-statistic: 16.0232 on 12 and 282 DF, p-value: < 2.22e-16

## REG 1.2

reg1.2 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean, data = panel\_dataset )  
  
summary(reg1.2)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA +   
## vix\_EUR + taxes + develop + account\_balance + lending\_borrow +   
## unemployment + inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1205405 -0.0266137 0.0017047 0.0267820 0.1051343   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 6.6159e-02 7.0684e-03 9.3598 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -1.1448e-03 3.5575e-04 -3.2179 0.0014422 \*\*   
## fx\_ -1.8300e-02 3.7553e-02 -0.4873 0.6264062   
## GDP\_per\_cap\_cte 3.6651e-06 1.1565e-06 3.1692 0.0016966 \*\*   
## nominal\_rate 7.7145e-04 1.1282e-03 0.6838 0.4946748   
## vix\_EUA -2.0954e-04 1.1998e-03 -0.1747 0.8614785   
## vix\_EUR -3.4267e-04 1.1767e-03 -0.2912 0.7711002   
## taxes 3.3462e-03 9.9007e-04 3.3798 0.0008277 \*\*\*  
## account\_balance -1.1598e-06 9.1691e-07 -1.2649 0.2069625   
## lending\_borrow -5.3550e-07 1.4675e-06 -0.3649 0.7154611   
## unemployment 3.1301e-06 2.2533e-06 1.3891 0.1659046   
## inflation\_mean -2.0485e-03 1.8242e-03 -1.1230 0.2624106   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.8418  
## Residual Sum of Squares: 0.50052  
## R-Squared: 0.40541  
## Adj. R-Squared: 0.32951  
## F-statistic: 16.0232 on 12 and 282 DF, p-value: < 2.22e-16

## REG 1.3

reg1.3 <- plm(for\_ex\_BC ~ debt\_to\_GDP\_ + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean, data = panel\_dataset )  
  
summary(reg1.3)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ debt\_to\_GDP\_ + fx\_ + GDP\_per\_cap\_cte +   
## nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop +   
## account\_balance + lending\_borrow + unemployment + inflation\_mean,   
## data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.13959699 -0.02922251 -0.00044393 0.03456053 0.13006769   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## debt\_to\_GDP\_ 8.9721e-04 3.2114e-04 2.7939 0.0055639 \*\*   
## fx\_ -6.7892e-02 4.2487e-02 -1.5980 0.1111650   
## GDP\_per\_cap\_cte 1.5756e-06 1.2968e-06 1.2150 0.2253709   
## nominal\_rate 1.1040e-03 1.2887e-03 0.8567 0.3923479   
## vix\_EUA -3.5230e-03 1.3101e-03 -2.6891 0.0075891 \*\*   
## vix\_EUR 1.5454e-03 1.3248e-03 1.1665 0.2444011   
## taxes 3.8503e-03 1.1298e-03 3.4079 0.0007496 \*\*\*  
## account\_balance -8.7295e-07 1.0473e-06 -0.8335 0.4052378   
## lending\_borrow -5.6502e-06 1.5565e-06 -3.6300 0.0003362 \*\*\*  
## unemployment -4.2660e-06 2.4116e-06 -1.7689 0.0779815 .   
## inflation\_mean -1.0769e-04 2.0712e-03 -0.0520 0.9585717   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.8418  
## Residual Sum of Squares: 0.65602  
## R-Squared: 0.2207  
## Adj. R-Squared: 0.12432  
## F-statistic: 7.2859 on 11 and 283 DF, p-value: 5.8955e-11

## REG 1.4

reg1.4 <- plm(for\_ex\_BC ~ debt\_to\_GDP\_ + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean, data = panel\_dataset )  
  
summary(reg1.4)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ debt\_to\_GDP\_ + fx\_ + GDP\_per\_cap\_cte +   
## nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop +   
## account\_balance + lending\_borrow + unemployment + inflation\_mean,   
## data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.13959699 -0.02922251 -0.00044393 0.03456053 0.13006769   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## debt\_to\_GDP\_ 8.9721e-04 3.2114e-04 2.7939 0.0055639 \*\*   
## fx\_ -6.7892e-02 4.2487e-02 -1.5980 0.1111650   
## GDP\_per\_cap\_cte 1.5756e-06 1.2968e-06 1.2150 0.2253709   
## nominal\_rate 1.1040e-03 1.2887e-03 0.8567 0.3923479   
## vix\_EUA -3.5230e-03 1.3101e-03 -2.6891 0.0075891 \*\*   
## vix\_EUR 1.5454e-03 1.3248e-03 1.1665 0.2444011   
## taxes 3.8503e-03 1.1298e-03 3.4079 0.0007496 \*\*\*  
## account\_balance -8.7295e-07 1.0473e-06 -0.8335 0.4052378   
## lending\_borrow -5.6502e-06 1.5565e-06 -3.6300 0.0003362 \*\*\*  
## unemployment -4.2660e-06 2.4116e-06 -1.7689 0.0779815 .   
## inflation\_mean -1.0769e-04 2.0712e-03 -0.0520 0.9585717   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.8418  
## Residual Sum of Squares: 0.65602  
## R-Squared: 0.2207  
## Adj. R-Squared: 0.12432  
## F-statistic: 7.2859 on 11 and 283 DF, p-value: 5.8955e-11

## REG 1.5

reg1.5 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean, data = panel\_dataset )  
  
summary(reg1.5)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ +   
## GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR +   
## taxes + develop + account\_balance + lending\_borrow + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1203042 -0.0269057 0.0018461 0.0265785 0.1047314   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 6.6645e-02 6.9883e-03 9.5367 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -1.1297e-03 3.5392e-04 -3.1918 0.0015729 \*\*   
## GDP\_per\_cap\_cte 3.5987e-06 1.1469e-06 3.1379 0.0018814 \*\*   
## nominal\_rate 7.8718e-04 1.1262e-03 0.6989 0.4851583   
## vix\_EUA -2.2690e-04 1.1976e-03 -0.1895 0.8498697   
## vix\_EUR -3.6414e-04 1.1743e-03 -0.3101 0.7567149   
## taxes 3.2943e-03 9.8300e-04 3.3513 0.0009137 \*\*\*  
## account\_balance -1.1235e-06 9.1264e-07 -1.2310 0.2193487   
## lending\_borrow -5.0915e-07 1.4646e-06 -0.3476 0.7283641   
## unemployment 3.1547e-06 2.2497e-06 1.4022 0.1619415   
## inflation\_mean -1.9583e-03 1.8123e-03 -1.0805 0.2808304   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.8418  
## Residual Sum of Squares: 0.50094  
## R-Squared: 0.40491  
## Adj. R-Squared: 0.33131  
## F-statistic: 17.5054 on 11 and 283 DF, p-value: < 2.22e-16

## REG 1.6

reg1.6 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ + fx\_ + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean, data = panel\_dataset )  
  
summary(reg1.6)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ +   
## fx\_ + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes +   
## develop + account\_balance + lending\_borrow + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1269907 -0.0270644 0.0038991 0.0263459 0.1030628   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 6.1835e-02 7.0454e-03 8.7766 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -1.0296e-03 3.5950e-04 -2.8641 0.004496 \*\*   
## fx\_ -4.2819e-03 3.7883e-02 -0.1130 0.910087   
## nominal\_rate 4.9009e-04 1.1425e-03 0.4289 0.668290   
## vix\_EUA -9.0953e-04 1.1980e-03 -0.7592 0.448346   
## vix\_EUR -1.8621e-04 1.1943e-03 -0.1559 0.876212   
## taxes 2.9624e-03 9.9821e-04 2.9677 0.003257 \*\*   
## account\_balance -1.5337e-06 9.2370e-07 -1.6604 0.097932 .   
## lending\_borrow 8.2171e-07 1.4259e-06 0.5763 0.564893   
## unemployment 3.1284e-06 2.2891e-06 1.3667 0.172808   
## inflation\_mean -1.7151e-03 1.8500e-03 -0.9271 0.354670   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.8418  
## Residual Sum of Squares: 0.51835  
## R-Squared: 0.38423  
## Adj. R-Squared: 0.30808  
## F-statistic: 16.0537 on 11 and 283 DF, p-value: < 2.22e-16

## REG 1.7

reg1.7 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ + fx\_ + GDP\_per\_cap\_cte + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean, data = panel\_dataset )  
  
summary(reg1.7)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ +   
## fx\_ + GDP\_per\_cap\_cte + continent + vix\_EUA + vix\_EUR + taxes +   
## develop + account\_balance + lending\_borrow + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 41, T = 7-16, N = 588  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1873919 -0.0382907 0.0010503 0.0364233 0.2252027   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 7.4179e-02 7.8077e-03 9.5007 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -2.6011e-03 3.2402e-04 -8.0276 6.326e-15 \*\*\*  
## fx\_ 8.9594e-02 3.6032e-02 2.4865 0.01320 \*   
## GDP\_per\_cap\_cte 2.1089e-06 1.0699e-06 1.9712 0.04921 \*   
## vix\_EUA -8.0181e-04 1.2631e-03 -0.6348 0.52584   
## vix\_EUR -2.5829e-04 1.2256e-03 -0.2107 0.83317   
## taxes -9.6997e-04 1.1096e-03 -0.8742 0.38242   
## account\_balance -7.9719e-07 9.2258e-07 -0.8641 0.38793   
## lending\_borrow -5.1073e-06 1.2114e-06 -4.2160 2.919e-05 \*\*\*  
## unemployment -6.8815e-06 1.6409e-06 -4.1938 3.209e-05 \*\*\*  
## inflation\_mean 7.0189e-04 1.0269e-03 0.6835 0.49457   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 3.2407  
## Residual Sum of Squares: 2.0475  
## R-Squared: 0.36819  
## Adj. R-Squared: 0.30807  
## F-statistic: 28.3961 on 11 and 536 DF, p-value: < 2.22e-16

## REG 1.8

reg1.8 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean, data = panel\_dataset )  
  
summary(reg1.8)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + vix\_EUA + vix\_EUR +   
## taxes + develop + account\_balance + lending\_borrow + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1205405 -0.0266137 0.0017047 0.0267820 0.1051343   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 6.6159e-02 7.0684e-03 9.3598 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -1.1448e-03 3.5575e-04 -3.2179 0.0014422 \*\*   
## fx\_ -1.8300e-02 3.7553e-02 -0.4873 0.6264062   
## GDP\_per\_cap\_cte 3.6651e-06 1.1565e-06 3.1692 0.0016966 \*\*   
## nominal\_rate 7.7145e-04 1.1282e-03 0.6838 0.4946748   
## vix\_EUA -2.0954e-04 1.1998e-03 -0.1747 0.8614785   
## vix\_EUR -3.4267e-04 1.1767e-03 -0.2912 0.7711002   
## taxes 3.3462e-03 9.9007e-04 3.3798 0.0008277 \*\*\*  
## account\_balance -1.1598e-06 9.1691e-07 -1.2649 0.2069625   
## lending\_borrow -5.3550e-07 1.4675e-06 -0.3649 0.7154611   
## unemployment 3.1301e-06 2.2533e-06 1.3891 0.1659046   
## inflation\_mean -2.0485e-03 1.8242e-03 -1.1230 0.2624106   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.8418  
## Residual Sum of Squares: 0.50052  
## R-Squared: 0.40541  
## Adj. R-Squared: 0.32951  
## F-statistic: 16.0232 on 12 and 282 DF, p-value: < 2.22e-16

## REG 1.9

reg1.9 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean, data = panel\_dataset )  
  
summary(reg1.9)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA +   
## taxes + develop + account\_balance + lending\_borrow + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1203699 -0.0265807 0.0012446 0.0271036 0.1052693   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 6.5806e-02 6.9525e-03 9.4651 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -1.1388e-03 3.5460e-04 -3.2117 0.0014720 \*\*   
## fx\_ -1.8710e-02 3.7466e-02 -0.4994 0.6178947   
## GDP\_per\_cap\_cte 3.6510e-06 1.1536e-06 3.1649 0.0017204 \*\*   
## nominal\_rate 7.9942e-04 1.1223e-03 0.7123 0.4768605   
## vix\_EUA -5.3127e-04 4.6718e-04 -1.1372 0.2564302   
## taxes 3.3637e-03 9.8665e-04 3.4093 0.0007461 \*\*\*  
## account\_balance -1.1516e-06 9.1499e-07 -1.2586 0.2092295   
## lending\_borrow -4.8397e-07 1.4545e-06 -0.3327 0.7395738   
## unemployment 3.1267e-06 2.2497e-06 1.3898 0.1656671   
## inflation\_mean -1.9984e-03 1.8131e-03 -1.1022 0.2713140   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.8418  
## Residual Sum of Squares: 0.50067  
## R-Squared: 0.40523  
## Adj. R-Squared: 0.33168  
## F-statistic: 17.5288 on 11 and 283 DF, p-value: < 2.22e-16

## REG 1.10

reg1.10 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean, data = panel\_dataset )  
  
summary(reg1.10)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUR +   
## taxes + develop + account\_balance + lending\_borrow + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1203785 -0.0265729 0.0016909 0.0263529 0.1052203   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 6.6523e-02 6.7421e-03 9.8668 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -1.1485e-03 3.5449e-04 -3.2400 0.0013379 \*\*   
## fx\_ -1.8495e-02 3.7472e-02 -0.4936 0.6219900   
## GDP\_per\_cap\_cte 3.7023e-06 1.1348e-06 3.2626 0.0012391 \*\*   
## nominal\_rate 7.6849e-04 1.1262e-03 0.6824 0.4955430   
## vix\_EUR -5.3191e-04 4.5815e-04 -1.1610 0.2466259   
## taxes 3.3369e-03 9.8693e-04 3.3811 0.0008236 \*\*\*  
## account\_balance -1.1656e-06 9.1473e-07 -1.2742 0.2036302   
## lending\_borrow -5.4546e-07 1.4639e-06 -0.3726 0.7097226   
## unemployment 3.1312e-06 2.2495e-06 1.3920 0.1650232   
## inflation\_mean -2.1052e-03 1.7920e-03 -1.1748 0.2410590   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.8418  
## Residual Sum of Squares: 0.50058  
## R-Squared: 0.40535  
## Adj. R-Squared: 0.3318  
## F-statistic: 17.5371 on 11 and 283 DF, p-value: < 2.22e-16

## REG 1.11

reg1.11 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean, data = panel\_dataset )  
  
summary(reg1.11)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA +   
## vix\_EUR + develop + account\_balance + lending\_borrow + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 348  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1215185 -0.0298425 0.0041748 0.0292424 0.1043434   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 7.6639e-02 6.4986e-03 11.7932 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -1.5595e-03 3.2726e-04 -4.7653 2.896e-06 \*\*\*  
## fx\_ -1.2500e-02 3.5642e-02 -0.3507 0.726055   
## GDP\_per\_cap\_cte 3.3747e-06 1.1789e-06 2.8626 0.004486 \*\*   
## nominal\_rate 8.4551e-04 1.0384e-03 0.8143 0.416109   
## vix\_EUA 2.5967e-04 1.1251e-03 0.2308 0.817626   
## vix\_EUR -4.7441e-04 1.0880e-03 -0.4360 0.663109   
## account\_balance -2.0338e-06 8.8068e-07 -2.3094 0.021575 \*   
## lending\_borrow 1.1108e-06 1.4214e-06 0.7815 0.435098   
## unemployment 4.0242e-06 2.1295e-06 1.8898 0.059717 .   
## inflation\_mean -3.5882e-03 1.4403e-03 -2.4913 0.013248 \*   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 1.064  
## Residual Sum of Squares: 0.60691  
## R-Squared: 0.42957  
## Adj. R-Squared: 0.36558  
## F-statistic: 21.3595 on 11 and 312 DF, p-value: < 2.22e-16

## REG 1.12

reg1.12 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + account\_balance + lending\_borrow + unemployment + inflation\_mean, data = panel\_dataset )  
  
summary(reg1.12)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA +   
## vix\_EUR + taxes + account\_balance + lending\_borrow + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1205405 -0.0266137 0.0017047 0.0267820 0.1051343   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 6.6159e-02 7.0684e-03 9.3598 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -1.1448e-03 3.5575e-04 -3.2179 0.0014422 \*\*   
## fx\_ -1.8300e-02 3.7553e-02 -0.4873 0.6264062   
## GDP\_per\_cap\_cte 3.6651e-06 1.1565e-06 3.1692 0.0016966 \*\*   
## nominal\_rate 7.7145e-04 1.1282e-03 0.6838 0.4946748   
## vix\_EUA -2.0954e-04 1.1998e-03 -0.1747 0.8614785   
## vix\_EUR -3.4267e-04 1.1767e-03 -0.2912 0.7711002   
## taxes 3.3462e-03 9.9007e-04 3.3798 0.0008277 \*\*\*  
## account\_balance -1.1598e-06 9.1691e-07 -1.2649 0.2069625   
## lending\_borrow -5.3550e-07 1.4675e-06 -0.3649 0.7154611   
## unemployment 3.1301e-06 2.2533e-06 1.3891 0.1659046   
## inflation\_mean -2.0485e-03 1.8242e-03 -1.1230 0.2624106   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.8418  
## Residual Sum of Squares: 0.50052  
## R-Squared: 0.40541  
## Adj. R-Squared: 0.32951  
## F-statistic: 16.0232 on 12 and 282 DF, p-value: < 2.22e-16

## REG 1.13

reg1.13 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + lending\_borrow + unemployment + inflation\_mean, data = panel\_dataset )  
  
summary(reg1.13)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA +   
## vix\_EUR + taxes + develop + lending\_borrow + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 4-16, N = 322  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1188593 -0.0258865 0.0013944 0.0264182 0.1074172   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 6.5856e-02 7.0229e-03 9.3773 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -1.1267e-03 3.5371e-04 -3.1853 0.0016059 \*\*   
## fx\_ -1.4478e-02 3.7269e-02 -0.3885 0.6979471   
## GDP\_per\_cap\_cte 3.8509e-06 1.1387e-06 3.3820 0.0008199 \*\*\*  
## nominal\_rate 6.0257e-04 1.1158e-03 0.5400 0.5895885   
## vix\_EUA -2.4076e-04 1.1850e-03 -0.2032 0.8391494   
## vix\_EUR -3.1499e-04 1.1664e-03 -0.2701 0.7873110   
## taxes 3.5228e-03 9.7625e-04 3.6085 0.0003635 \*\*\*  
## lending\_borrow -7.8794e-07 1.4461e-06 -0.5449 0.5862725   
## unemployment 2.2165e-06 2.1232e-06 1.0439 0.2974011   
## inflation\_mean -1.2363e-03 1.6993e-03 -0.7276 0.4674802   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.84189  
## Residual Sum of Squares: 0.50349  
## R-Squared: 0.40195  
## Adj. R-Squared: 0.32876  
## F-statistic: 17.4747 on 11 and 286 DF, p-value: < 2.22e-16

## REG 1.14

reg1.14 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + unemployment + inflation\_mean, data = panel\_dataset )  
  
summary(reg1.14)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA +   
## vix\_EUR + taxes + develop + account\_balance + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.12054829 -0.02635163 0.00085787 0.02592543 0.10577794   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 6.7119e-02 6.5500e-03 10.2472 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -1.1692e-03 3.4883e-04 -3.3519 0.0009118 \*\*\*  
## fx\_ -1.7796e-02 3.7470e-02 -0.4749 0.6352027   
## GDP\_per\_cap\_cte 3.5420e-06 1.1044e-06 3.2070 0.0014950 \*\*   
## nominal\_rate 7.4620e-04 1.1244e-03 0.6637 0.5074462   
## vix\_EUA -2.2655e-04 1.1970e-03 -0.1893 0.8500231   
## vix\_EUR -2.9090e-04 1.1663e-03 -0.2494 0.8032213   
## taxes 3.2442e-03 9.4829e-04 3.4211 0.0007157 \*\*\*  
## account\_balance -1.2045e-06 9.0729e-07 -1.3276 0.1853940   
## unemployment 3.4212e-06 2.1042e-06 1.6259 0.1050796   
## inflation\_mean -2.0358e-03 1.8211e-03 -1.1179 0.2645464   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.8418  
## Residual Sum of Squares: 0.50076  
## R-Squared: 0.40513  
## Adj. R-Squared: 0.33156  
## F-statistic: 17.5214 on 11 and 283 DF, p-value: < 2.22e-16

## REG 1.15

reg1.15 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + inflation\_mean, data = panel\_dataset )  
  
summary(reg1.15)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA +   
## vix\_EUR + taxes + develop + account\_balance + lending\_borrow +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 26, T = 1-16, N = 331  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1213159 -0.0252034 0.0020516 0.0289024 0.1032334   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 5.9896e-02 6.4106e-03 9.3433 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -7.8121e-04 3.0758e-04 -2.5399 0.011604 \*   
## fx\_ -1.8748e-02 3.7172e-02 -0.5044 0.614383   
## GDP\_per\_cap\_cte 3.5722e-06 1.1330e-06 3.1531 0.001783 \*\*   
## nominal\_rate 8.0008e-04 1.0786e-03 0.7418 0.458799   
## vix\_EUA 2.2065e-05 1.1739e-03 0.0188 0.985016   
## vix\_EUR -6.2249e-04 1.1492e-03 -0.5417 0.588450   
## taxes 3.0278e-03 9.3863e-04 3.2257 0.001398 \*\*   
## account\_balance -8.5087e-07 8.5457e-07 -0.9957 0.320230   
## lending\_borrow -1.3139e-06 1.3489e-06 -0.9741 0.330820   
## inflation\_mean -1.8467e-03 1.7142e-03 -1.0773 0.282229   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.8422  
## Residual Sum of Squares: 0.51248  
## R-Squared: 0.3915  
## Adj. R-Squared: 0.31699  
## F-statistic: 17.1956 on 11 and 294 DF, p-value: < 2.22e-16

## REG 1.16

reg1.16 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment, data = panel\_dataset )  
  
summary(reg1.16)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA +   
## vix\_EUR + taxes + develop + account\_balance + lending\_borrow +   
## unemployment, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 322  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.12474321 -0.02690473 0.00091861 0.02716412 0.10772872   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 6.6219e-02 7.1236e-03 9.2957 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -1.1267e-03 3.6017e-04 -3.1283 0.001940 \*\*   
## fx\_ -2.8041e-03 3.7901e-02 -0.0740 0.941074   
## GDP\_per\_cap\_cte 3.6727e-06 1.1640e-06 3.1553 0.001774 \*\*   
## nominal\_rate -1.0180e-03 7.0838e-04 -1.4371 0.151772   
## vix\_EUA 2.7012e-04 1.1852e-03 0.2279 0.819874   
## vix\_EUR -8.9850e-04 1.1772e-03 -0.7632 0.445949   
## taxes 3.1817e-03 1.0061e-03 3.1624 0.001733 \*\*   
## account\_balance -9.8974e-07 8.7112e-07 -1.1362 0.256839   
## lending\_borrow 2.5134e-07 1.4786e-06 0.1700 0.865137   
## unemployment 4.0076e-06 2.2684e-06 1.7667 0.078347 .   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.85337  
## Residual Sum of Squares: 0.52674  
## R-Squared: 0.38275  
## Adj. R-Squared: 0.30721  
## F-statistic: 16.1223 on 11 and 286 DF, p-value: < 2.22e-16

## REG 1.17

reg1.17 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + taxes + develop + unemployment + inflation\_mean, data = panel\_dataset )  
  
summary(reg1.17)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ +   
## GDP\_per\_cap\_cte + nominal\_rate + continent + taxes + develop +   
## unemployment + inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 4-16, N = 322  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1139367 -0.0272181 0.0010608 0.0262678 0.1103255   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 6.9794e-02 5.8831e-03 11.8635 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -1.1307e-03 3.4314e-04 -3.2952 0.0011057 \*\*   
## GDP\_per\_cap\_cte 4.1831e-06 9.6872e-07 4.3181 2.163e-05 \*\*\*  
## nominal\_rate 8.4857e-04 1.0803e-03 0.7855 0.4327978   
## taxes 3.4080e-03 9.2619e-04 3.6796 0.0002784 \*\*\*  
## unemployment 2.4314e-06 1.9875e-06 1.2234 0.2221902   
## inflation\_mean -1.5841e-03 1.6244e-03 -0.9752 0.3302869   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.84189  
## Residual Sum of Squares: 0.50672  
## R-Squared: 0.39812  
## Adj. R-Squared: 0.33378  
## F-statistic: 27.4034 on 7 and 290 DF, p-value: < 2.22e-16

## REG 1.18

reg1.18 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + taxes + develop + unemployment, data = panel\_dataset )  
  
summary(reg1.18)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ +   
## GDP\_per\_cap\_cte + nominal\_rate + continent + taxes + develop +   
## unemployment, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 4-16, N = 325  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1215823 -0.0272148 0.0013458 0.0261344 0.1121121   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 6.7629e-02 5.9230e-03 11.4181 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -1.0761e-03 3.4755e-04 -3.0964 0.0021477 \*\*   
## GDP\_per\_cap\_cte 4.4433e-06 9.7792e-07 4.5436 8.082e-06 \*\*\*  
## nominal\_rate -6.9178e-04 6.5028e-04 -1.0638 0.2882890   
## taxes 3.4563e-03 9.4291e-04 3.6656 0.0002928 \*\*\*  
## unemployment 2.9647e-06 2.0179e-06 1.4692 0.1428394   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.85346  
## Residual Sum of Squares: 0.5331  
## R-Squared: 0.37537  
## Adj. R-Squared: 0.31163  
## F-statistic: 29.4465 on 6 and 294 DF, p-value: < 2.22e-16

## REG 1.19

reg1.19 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ + GDP\_per\_cap\_cte + continent + taxes + develop + unemployment, data = panel\_dataset )  
  
summary(reg1.19)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ +   
## GDP\_per\_cap\_cte + continent + taxes + develop + unemployment,   
## data = panel\_dataset)  
##   
## Unbalanced Panel: n = 41, T = 11-16, N = 599  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1918038 -0.0380787 0.0024899 0.0374039 0.2496091   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 7.8857e-02 7.1162e-03 11.0813 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -2.9870e-03 3.0984e-04 -9.6403 < 2.2e-16 \*\*\*  
## GDP\_per\_cap\_cte 1.4096e-06 9.5916e-07 1.4696 0.142242   
## taxes -2.0727e-03 1.0660e-03 -1.9445 0.052347 .   
## unemployment -4.8476e-06 1.5712e-06 -3.0853 0.002135 \*\*   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 3.3022  
## Residual Sum of Squares: 2.2444  
## R-Squared: 0.32033  
## Adj. R-Squared: 0.26503  
## F-statistic: 52.1271 on 5 and 553 DF, p-value: < 2.22e-16

## REG 1.20

reg1.20 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_\*develop + GDP\_per\_cap\_cte + nominal\_rate + continent + taxes + develop + unemployment, data = panel\_dataset )  
  
summary(reg1.20)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ \*   
## develop + GDP\_per\_cap\_cte + nominal\_rate + continent + taxes +   
## develop + unemployment, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 4-16, N = 325  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1213447 -0.0255425 0.0015373 0.0267424 0.1153855   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 6.6476e-02 5.9397e-03 11.1918 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -1.3887e-03 3.9013e-04 -3.5595 0.0004333 \*\*\*  
## GDP\_per\_cap\_cte 4.4427e-06 9.7456e-07 4.5587 7.57e-06 \*\*\*  
## nominal\_rate -7.4291e-04 6.4872e-04 -1.1452 0.2530620   
## taxes 3.1297e-03 9.5822e-04 3.2662 0.0012195 \*\*   
## unemployment 1.9055e-06 2.1010e-06 0.9070 0.3651615   
## debt\_to\_GDP\_:developEM 8.9463e-04 5.1400e-04 1.7405 0.0828169 .   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.85346  
## Residual Sum of Squares: 0.52764  
## R-Squared: 0.38176  
## Adj. R-Squared: 0.31635  
## F-statistic: 25.8468 on 7 and 293 DF, p-value: < 2.22e-16

## REG 1.20

reg1.20 <- plm(for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_\*develop + GDP\_per\_cap\_cte + nominal\_rate + continent + taxes + develop + unemployment, data = panel\_dataset )  
  
summary(reg1.20)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_ex\_BC ~ log(foreign\_debt\_) + debt\_to\_GDP\_ \*   
## develop + GDP\_per\_cap\_cte + nominal\_rate + continent + taxes +   
## develop + unemployment, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 4-16, N = 325  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1213447 -0.0255425 0.0015373 0.0267424 0.1153855   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(foreign\_debt\_) 6.6476e-02 5.9397e-03 11.1918 < 2.2e-16 \*\*\*  
## debt\_to\_GDP\_ -1.3887e-03 3.9013e-04 -3.5595 0.0004333 \*\*\*  
## GDP\_per\_cap\_cte 4.4427e-06 9.7456e-07 4.5587 7.57e-06 \*\*\*  
## nominal\_rate -7.4291e-04 6.4872e-04 -1.1452 0.2530620   
## taxes 3.1297e-03 9.5822e-04 3.2662 0.0012195 \*\*   
## unemployment 1.9055e-06 2.1010e-06 0.9070 0.3651615   
## debt\_to\_GDP\_:developEM 8.9463e-04 5.1400e-04 1.7405 0.0828169 .   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.85346  
## Residual Sum of Squares: 0.52764  
## R-Squared: 0.38176  
## Adj. R-Squared: 0.31635  
## F-statistic: 25.8468 on 7 and 293 DF, p-value: < 2.22e-16

# REG 2 (VARÃAVEL RESPOSTA "FOREIGN NONBANK")

reg2 <- plm(for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean , data=panel\_dataset )  
  
summary(reg2)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA +   
## vix\_EUR + taxes + develop + account\_balance + lending\_borrow +   
## unemployment + inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1367556 -0.0268449 0.0014195 0.0292518 0.1610699   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## debt\_to\_GDP\_ -2.0477e-04 5.6142e-04 -0.3647 0.715575   
## log(debt\_to\_GDP\_) 6.6501e-02 2.1928e-02 3.0327 0.002649 \*\*  
## fx\_ -8.3120e-02 4.3807e-02 -1.8974 0.058796 .   
## GDP\_per\_cap\_cte 1.4060e-06 1.3328e-06 1.0549 0.292369   
## nominal\_rate 1.1982e-03 1.3259e-03 0.9037 0.366932   
## vix\_EUA -4.4585e-03 1.3476e-03 -3.3085 0.001060 \*\*  
## vix\_EUR 2.7760e-03 1.3613e-03 2.0391 0.042368 \*   
## taxes 2.5761e-03 1.1608e-03 2.2193 0.027262 \*   
## account\_balance 4.9204e-07 1.0895e-06 0.4516 0.651892   
## lending\_borrow -3.3836e-06 1.6395e-06 -2.0638 0.039954 \*   
## unemployment -5.9982e-06 2.4898e-06 -2.4091 0.016632 \*   
## inflation\_mean -1.4738e-03 2.1280e-03 -0.6926 0.489126   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.92212  
## Residual Sum of Squares: 0.69002  
## R-Squared: 0.25171  
## Adj. R-Squared: 0.15618  
## F-statistic: 7.9048 on 12 and 282 DF, p-value: 1.0186e-12

# REG 2.1

reg2.1 <- plm(for\_nonbank\_prop ~ debt\_to\_GDP\_ + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean , data=panel\_dataset )  
  
summary(reg2.1)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_nonbank\_prop ~ debt\_to\_GDP\_ + fx\_ + GDP\_per\_cap\_cte +   
## nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop +   
## account\_balance + lending\_borrow + unemployment + inflation\_mean,   
## data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.13075288 -0.03414286 -0.00010457 0.03072089 0.16990737   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## debt\_to\_GDP\_ 1.1728e-03 3.3468e-04 3.5042 0.0005322 \*\*\*  
## fx\_ -7.1908e-02 4.4279e-02 -1.6240 0.1054933   
## GDP\_per\_cap\_cte 1.2913e-06 1.3515e-06 0.9555 0.3401536   
## nominal\_rate 9.8176e-04 1.3431e-03 0.7310 0.4653917   
## vix\_EUA -4.6585e-03 1.3653e-03 -3.4120 0.0007390 \*\*\*  
## vix\_EUR 2.7085e-03 1.3807e-03 1.9617 0.0507833 .   
## taxes 2.5818e-03 1.1774e-03 2.1928 0.0291393 \*   
## account\_balance 1.0112e-06 1.0914e-06 0.9265 0.3549762   
## lending\_borrow -4.4802e-06 1.6222e-06 -2.7618 0.0061238 \*\*   
## unemployment -6.7416e-06 2.5133e-06 -2.6823 0.0077412 \*\*   
## inflation\_mean -1.4687e-03 2.1586e-03 -0.6804 0.4968172   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.92212  
## Residual Sum of Squares: 0.71252  
## R-Squared: 0.2273  
## Adj. R-Squared: 0.13174  
## F-statistic: 7.56809 on 11 and 283 DF, p-value: 2.0099e-11

# REG 2.2

reg2.2 <- plm(for\_nonbank\_prop ~ log(debt\_to\_GDP\_) + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean , data=panel\_dataset )  
  
summary(reg2.2)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_nonbank\_prop ~ log(debt\_to\_GDP\_) + fx\_ + GDP\_per\_cap\_cte +   
## nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop +   
## account\_balance + lending\_borrow + unemployment + inflation\_mean,   
## data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.13644411 -0.02809586 0.00080556 0.02959845 0.16126188   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## log(debt\_to\_GDP\_) 6.0030e-02 1.2867e-02 4.6654 4.757e-06 \*\*\*  
## fx\_ -7.9952e-02 4.2872e-02 -1.8649 0.063228 .   
## GDP\_per\_cap\_cte 1.4008e-06 1.3307e-06 1.0527 0.293374   
## nominal\_rate 1.2131e-03 1.3233e-03 0.9167 0.360080   
## vix\_EUA -4.4320e-03 1.3436e-03 -3.2987 0.001096 \*\*   
## vix\_EUR 2.7514e-03 1.3576e-03 2.0267 0.043632 \*   
## taxes 2.5772e-03 1.1590e-03 2.2237 0.026958 \*   
## account\_balance 5.4557e-07 1.0779e-06 0.5061 0.613154   
## lending\_borrow -3.4718e-06 1.6191e-06 -2.1442 0.032869 \*   
## unemployment -6.2396e-06 2.3966e-06 -2.6035 0.009714 \*\*   
## inflation\_mean -1.4948e-03 2.1239e-03 -0.7038 0.482159   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.92212  
## Residual Sum of Squares: 0.69034  
## R-Squared: 0.25135  
## Adj. R-Squared: 0.15876  
## F-statistic: 8.63778 on 11 and 283 DF, p-value: 3.5515e-13

# REG 2.3

reg2.3 <- plm(for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean , data=panel\_dataset )  
  
summary(reg2.3)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) +   
## GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR +   
## taxes + develop + account\_balance + lending\_borrow + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.13860424 -0.02790435 0.00013008 0.02789717 0.16411504   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## debt\_to\_GDP\_ 6.4175e-06 5.5280e-04 0.0116 0.9907456   
## log(debt\_to\_GDP\_) 6.2990e-02 2.1950e-02 2.8697 0.0044186 \*\*   
## GDP\_per\_cap\_cte 1.0239e-06 1.3236e-06 0.7736 0.4398221   
## nominal\_rate 1.2704e-03 1.3315e-03 0.9541 0.3408269   
## vix\_EUA -4.6609e-03 1.3495e-03 -3.4538 0.0006374 \*\*\*  
## vix\_EUR 2.7374e-03 1.3674e-03 2.0019 0.0462511 \*   
## taxes 2.3546e-03 1.1602e-03 2.0295 0.0433395 \*   
## account\_balance 6.9624e-07 1.0891e-06 0.6393 0.5231756   
## lending\_borrow -3.4932e-06 1.6460e-06 -2.1222 0.0346914 \*   
## unemployment -6.1743e-06 2.4995e-06 -2.4703 0.0140914 \*   
## inflation\_mean -9.9277e-04 2.1225e-03 -0.4677 0.6403340   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.92212  
## Residual Sum of Squares: 0.69883  
## R-Squared: 0.24215  
## Adj. R-Squared: 0.14843  
## F-statistic: 8.2206 on 11 and 283 DF, p-value: 1.6994e-12

# REG 2.4

reg2.4<- plm(for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) + fx\_ + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean , data=panel\_dataset )  
  
summary(reg2.4)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) +   
## fx\_ + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes +   
## develop + account\_balance + lending\_borrow + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.138485 -0.029517 0.001451 0.028812 0.161122   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## debt\_to\_GDP\_ -1.9848e-04 5.6150e-04 -0.3535 0.7239942   
## log(debt\_to\_GDP\_) 6.5845e-02 2.1924e-02 3.0034 0.0029089 \*\*   
## fx\_ -7.6137e-02 4.3313e-02 -1.7578 0.0798549 .   
## nominal\_rate 1.0754e-03 1.3211e-03 0.8140 0.4163037   
## vix\_EUA -4.6530e-03 1.3352e-03 -3.4848 0.0005705 \*\*\*  
## vix\_EUR 2.7884e-03 1.3616e-03 2.0480 0.0414834 \*   
## taxes 2.4102e-03 1.1503e-03 2.0953 0.0370330 \*   
## account\_balance 3.4080e-07 1.0802e-06 0.3155 0.7526276   
## lending\_borrow -2.7210e-06 1.5147e-06 -1.7963 0.0735064 .   
## unemployment -5.8138e-06 2.4842e-06 -2.3403 0.0199610 \*   
## inflation\_mean -1.3916e-03 2.1270e-03 -0.6543 0.5134780   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.92212  
## Residual Sum of Squares: 0.69274  
## R-Squared: 0.24875  
## Adj. R-Squared: 0.15584  
## F-statistic: 8.51885 on 11 and 283 DF, p-value: 5.5429e-13

# REG 2.5

reg2.5 <- plm(for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) + fx\_ + GDP\_per\_cap\_cte + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean , data=panel\_dataset )  
  
summary(reg2.5)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) +   
## fx\_ + GDP\_per\_cap\_cte + continent + vix\_EUA + vix\_EUR + taxes +   
## develop + account\_balance + lending\_borrow + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 41, T = 7-16, N = 588  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.20093382 -0.03292729 0.00061666 0.03058829 0.23388958   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## debt\_to\_GDP\_ -1.8066e-04 4.3184e-04 -0.4184 0.675854   
## log(debt\_to\_GDP\_) 5.9280e-02 2.0768e-02 2.8544 0.004478 \*\*   
## fx\_ 8.1642e-02 3.6682e-02 2.2257 0.026452 \*   
## GDP\_per\_cap\_cte -1.8044e-07 1.0708e-06 -0.1685 0.866252   
## vix\_EUA -2.9134e-03 1.2658e-03 -2.3016 0.021743 \*   
## vix\_EUR 1.5851e-03 1.2445e-03 1.2737 0.203317   
## taxes -6.7683e-04 1.1359e-03 -0.5959 0.551518   
## account\_balance 1.9300e-06 9.4883e-07 2.0341 0.042437 \*   
## lending\_borrow -2.7430e-06 1.2358e-06 -2.2196 0.026867 \*   
## unemployment -8.0371e-06 1.5634e-06 -5.1409 3.839e-07 \*\*\*  
## inflation\_mean 4.2165e-04 1.0462e-03 0.4030 0.687075   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 2.4091  
## Residual Sum of Squares: 2.1396  
## R-Squared: 0.11187  
## Adj. R-Squared: 0.02737  
## F-statistic: 6.13802 on 11 and 536 DF, p-value: 1.5771e-09

# REG 2.6

reg2.6 <- plm(for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean , data=panel\_dataset )  
  
summary(reg2.6)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + vix\_EUA + vix\_EUR +   
## taxes + develop + account\_balance + lending\_borrow + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1367556 -0.0268449 0.0014195 0.0292518 0.1610699   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## debt\_to\_GDP\_ -2.0477e-04 5.6142e-04 -0.3647 0.715575   
## log(debt\_to\_GDP\_) 6.6501e-02 2.1928e-02 3.0327 0.002649 \*\*  
## fx\_ -8.3120e-02 4.3807e-02 -1.8974 0.058796 .   
## GDP\_per\_cap\_cte 1.4060e-06 1.3328e-06 1.0549 0.292369   
## nominal\_rate 1.1982e-03 1.3259e-03 0.9037 0.366932   
## vix\_EUA -4.4585e-03 1.3476e-03 -3.3085 0.001060 \*\*  
## vix\_EUR 2.7760e-03 1.3613e-03 2.0391 0.042368 \*   
## taxes 2.5761e-03 1.1608e-03 2.2193 0.027262 \*   
## account\_balance 4.9204e-07 1.0895e-06 0.4516 0.651892   
## lending\_borrow -3.3836e-06 1.6395e-06 -2.0638 0.039954 \*   
## unemployment -5.9982e-06 2.4898e-06 -2.4091 0.016632 \*   
## inflation\_mean -1.4738e-03 2.1280e-03 -0.6926 0.489126   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.92212  
## Residual Sum of Squares: 0.69002  
## R-Squared: 0.25171  
## Adj. R-Squared: 0.15618  
## F-statistic: 7.9048 on 12 and 282 DF, p-value: 1.0186e-12

# REG 2.7

reg2.7 <- plm(for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean , data=panel\_dataset )  
  
summary(reg2.7)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA +   
## taxes + develop + account\_balance + lending\_borrow + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1412627 -0.0287724 0.0014614 0.0291252 0.1475941   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## debt\_to\_GDP\_ -1.4813e-04 5.6385e-04 -0.2627 0.7929646   
## log(debt\_to\_GDP\_) 6.5771e-02 2.2047e-02 2.9832 0.0031014 \*\*   
## fx\_ -8.1787e-02 4.4046e-02 -1.8569 0.0643697 .   
## GDP\_per\_cap\_cte 1.4297e-06 1.3402e-06 1.0668 0.2869906   
## nominal\_rate 9.7727e-04 1.3289e-03 0.7354 0.4626938   
## vix\_EUA -1.9237e-03 5.2330e-04 -3.6761 0.0002832 \*\*\*  
## taxes 2.4526e-03 1.1656e-03 2.1041 0.0362518 \*   
## account\_balance 4.4206e-07 1.0953e-06 0.4036 0.6868121   
## lending\_borrow -4.0533e-06 1.6152e-06 -2.5094 0.0126523 \*   
## unemployment -6.3074e-06 2.4990e-06 -2.5240 0.0121514 \*   
## inflation\_mean -1.8052e-03 2.1336e-03 -0.8461 0.3982237   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.92212  
## Residual Sum of Squares: 0.70019  
## R-Squared: 0.24067  
## Adj. R-Squared: 0.14676  
## F-statistic: 8.15441 on 11 and 283 DF, p-value: 2.1808e-12

# REG 2.8

reg2.8 <- plm(for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean , data=panel\_dataset )  
  
summary(reg2.8)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUR +   
## taxes + develop + account\_balance + lending\_borrow + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1420597 -0.0280543 0.0012637 0.0307853 0.1398235   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## debt\_to\_GDP\_ -1.0475e-04 5.7037e-04 -0.1837 0.854415   
## log(debt\_to\_GDP\_) 7.0051e-02 2.2283e-02 3.1437 0.001846 \*\*  
## fx\_ -9.4594e-02 4.4430e-02 -2.1290 0.034115 \*   
## GDP\_per\_cap\_cte 2.0092e-06 1.3433e-06 1.4957 0.135847   
## nominal\_rate 1.1835e-03 1.3490e-03 0.8773 0.381080   
## vix\_EUR -1.3786e-03 5.3487e-04 -2.5775 0.010459 \*   
## taxes 2.4233e-03 1.1800e-03 2.0536 0.040938 \*   
## account\_balance 3.6605e-07 1.1078e-06 0.3304 0.741320   
## lending\_borrow -4.2114e-06 1.6486e-06 -2.5546 0.011156 \*   
## unemployment -6.8790e-06 2.5187e-06 -2.7312 0.006706 \*\*  
## inflation\_mean -2.5446e-03 2.1399e-03 -1.1891 0.235378   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.92212  
## Residual Sum of Squares: 0.7168  
## R-Squared: 0.22266  
## Adj. R-Squared: 0.12652  
## F-statistic: 7.36932 on 11 and 283 DF, p-value: 4.2872e-11

# REG 2.9

reg2.9 <- plm(for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + develop + account\_balance + lending\_borrow + unemployment + inflation\_mean , data=panel\_dataset )  
  
summary(reg2.9)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA +   
## vix\_EUR + develop + account\_balance + lending\_borrow + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 348  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.16937270 -0.03013775 0.00055487 0.03034055 0.13718966   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## debt\_to\_GDP\_ -4.6155e-04 5.6802e-04 -0.8126 0.4170867   
## log(debt\_to\_GDP\_) 7.1085e-02 2.2664e-02 3.1364 0.0018731 \*\*   
## fx\_ -1.4235e-01 4.2156e-02 -3.3767 0.0008264 \*\*\*  
## GDP\_per\_cap\_cte 4.3880e-07 1.3960e-06 0.3143 0.7534822   
## nominal\_rate -4.9996e-04 1.2594e-03 -0.3970 0.6916630   
## vix\_EUA -3.3445e-03 1.3340e-03 -2.5072 0.0126788 \*   
## vix\_EUR 1.6631e-03 1.3154e-03 1.2643 0.2070504   
## account\_balance -2.2151e-07 1.0814e-06 -0.2048 0.8378355   
## lending\_borrow -3.5795e-06 1.6512e-06 -2.1678 0.0309314 \*   
## unemployment -7.2773e-06 2.4393e-06 -2.9833 0.0030765 \*\*   
## inflation\_mean -4.6909e-04 1.7156e-03 -0.2734 0.7847113   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 1.1527  
## Residual Sum of Squares: 0.89502  
## R-Squared: 0.22355  
## Adj. R-Squared: 0.13645  
## F-statistic: 8.16626 on 11 and 312 DF, p-value: 1.4407e-12

# REG 2.10

reg2.10 <- plm(for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + account\_balance + lending\_borrow + unemployment + inflation\_mean , data=panel\_dataset )  
  
summary(reg2.10)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA +   
## vix\_EUR + taxes + account\_balance + lending\_borrow + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1367556 -0.0268449 0.0014195 0.0292518 0.1610699   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## debt\_to\_GDP\_ -2.0477e-04 5.6142e-04 -0.3647 0.715575   
## log(debt\_to\_GDP\_) 6.6501e-02 2.1928e-02 3.0327 0.002649 \*\*  
## fx\_ -8.3120e-02 4.3807e-02 -1.8974 0.058796 .   
## GDP\_per\_cap\_cte 1.4060e-06 1.3328e-06 1.0549 0.292369   
## nominal\_rate 1.1982e-03 1.3259e-03 0.9037 0.366932   
## vix\_EUA -4.4585e-03 1.3476e-03 -3.3085 0.001060 \*\*  
## vix\_EUR 2.7760e-03 1.3613e-03 2.0391 0.042368 \*   
## taxes 2.5761e-03 1.1608e-03 2.2193 0.027262 \*   
## account\_balance 4.9204e-07 1.0895e-06 0.4516 0.651892   
## lending\_borrow -3.3836e-06 1.6395e-06 -2.0638 0.039954 \*   
## unemployment -5.9982e-06 2.4898e-06 -2.4091 0.016632 \*   
## inflation\_mean -1.4738e-03 2.1280e-03 -0.6926 0.489126   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.92212  
## Residual Sum of Squares: 0.69002  
## R-Squared: 0.25171  
## Adj. R-Squared: 0.15618  
## F-statistic: 7.9048 on 12 and 282 DF, p-value: 1.0186e-12

# REG 2.11

# REG 2.11

reg2.11 <- plm(for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + lending\_borrow + unemployment + inflation\_mean , data=panel\_dataset )  
  
summary(reg2.11)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA +   
## vix\_EUR + taxes + develop + lending\_borrow + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 4-16, N = 322  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1370843 -0.0264755 0.0016271 0.0290228 0.1617435   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## debt\_to\_GDP\_ -2.3508e-04 5.5253e-04 -0.4255 0.670815   
## log(debt\_to\_GDP\_) 6.8217e-02 2.1516e-02 3.1706 0.001687 \*\*  
## fx\_ -8.5653e-02 4.3302e-02 -1.9780 0.048884 \*   
## GDP\_per\_cap\_cte 1.3618e-06 1.3098e-06 1.0397 0.299380   
## nominal\_rate 1.2622e-03 1.3073e-03 0.9655 0.335086   
## vix\_EUA -4.3637e-03 1.3294e-03 -3.2826 0.001156 \*\*  
## vix\_EUR 2.7100e-03 1.3474e-03 2.0113 0.045234 \*   
## taxes 2.5092e-03 1.1426e-03 2.1962 0.028883 \*   
## lending\_borrow -3.2545e-06 1.6064e-06 -2.0260 0.043692 \*   
## unemployment -5.5884e-06 2.3258e-06 -2.4028 0.016907 \*   
## inflation\_mean -1.8221e-03 1.9826e-03 -0.9190 0.358847   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.92221  
## Residual Sum of Squares: 0.6911  
## R-Squared: 0.25061  
## Adj. R-Squared: 0.1589  
## F-statistic: 8.69469 on 11 and 286 DF, p-value: 2.7413e-13

# REG 2.12

# REG 2.12

reg2.12 <- plm(for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + unemployment + inflation\_mean , data=panel\_dataset )  
  
summary(reg2.12)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA +   
## vix\_EUR + taxes + develop + account\_balance + unemployment +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 319  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1410066 -0.0276608 0.0005317 0.0280242 0.1618191   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## debt\_to\_GDP\_ -3.7554e-04 5.5848e-04 -0.6724 0.5018535   
## log(debt\_to\_GDP\_) 7.6482e-02 2.1511e-02 3.5554 0.0004421 \*\*\*  
## fx\_ -8.6303e-02 4.4031e-02 -1.9600 0.0509718 .   
## GDP\_per\_cap\_cte 3.5215e-07 1.2382e-06 0.2844 0.7763106   
## nominal\_rate 1.0882e-03 1.3325e-03 0.8167 0.4148100   
## vix\_EUA -4.8829e-03 1.3395e-03 -3.6454 0.0003176 \*\*\*  
## vix\_EUR 3.3387e-03 1.3414e-03 2.4890 0.0133861 \*   
## taxes 1.9141e-03 1.1220e-03 1.7060 0.0891052 .   
## account\_balance 1.3113e-07 1.0816e-06 0.1212 0.9035824   
## unemployment -4.6043e-06 2.4102e-06 -1.9103 0.0570993 .   
## inflation\_mean -1.1896e-03 2.1357e-03 -0.5570 0.5779759   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.92212  
## Residual Sum of Squares: 0.70044  
## R-Squared: 0.2404  
## Adj. R-Squared: 0.14646  
## F-statistic: 8.14245 on 11 and 283 DF, p-value: 2.2814e-12

# REG 2.13

# REG 2.13

reg2.13 <- plm(for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + inflation\_mean , data=panel\_dataset )  
  
summary(reg2.13)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA +   
## vix\_EUR + taxes + develop + account\_balance + lending\_borrow +   
## inflation\_mean, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 26, T = 1-16, N = 331  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1412711 -0.0281980 0.0020132 0.0280594 0.1758973   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## debt\_to\_GDP\_ -5.4933e-04 5.3232e-04 -1.0320 0.302941   
## log(debt\_to\_GDP\_) 7.1650e-02 2.1563e-02 3.3228 0.001004 \*\*   
## fx\_ -8.7412e-02 4.3268e-02 -2.0202 0.044266 \*   
## GDP\_per\_cap\_cte 1.2094e-06 1.3016e-06 0.9291 0.353579   
## nominal\_rate 1.0580e-03 1.2672e-03 0.8349 0.404434   
## vix\_EUA -4.6823e-03 1.2979e-03 -3.6076 0.000363 \*\*\*  
## vix\_EUR 2.8934e-03 1.3180e-03 2.1953 0.028926 \*   
## taxes 2.6234e-03 1.0978e-03 2.3898 0.017489 \*   
## account\_balance -3.8756e-07 1.0085e-06 -0.3843 0.701032   
## lending\_borrow -2.3525e-06 1.5507e-06 -1.5171 0.130324   
## inflation\_mean -1.4599e-03 2.0030e-03 -0.7289 0.466668   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.92251  
## Residual Sum of Squares: 0.70554  
## R-Squared: 0.2352  
## Adj. R-Squared: 0.14155  
## F-statistic: 8.21947 on 11 and 294 DF, p-value: 1.47e-12

# REG 2.14

reg2.14 <- plm(for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) + fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA + vix\_EUR + taxes + develop + account\_balance + lending\_borrow + unemployment , data=panel\_dataset )  
  
summary(reg2.14)

## Oneway (individual) effect Within Model  
##   
## Call:  
## plm(formula = for\_nonbank\_prop ~ debt\_to\_GDP\_ + log(debt\_to\_GDP\_) +   
## fx\_ + GDP\_per\_cap\_cte + nominal\_rate + continent + vix\_EUA +   
## vix\_EUR + taxes + develop + account\_balance + lending\_borrow +   
## unemployment, data = panel\_dataset)  
##   
## Unbalanced Panel: n = 25, T = 1-16, N = 322  
##   
## Residuals:  
## Min. 1st Qu. Median 3rd Qu. Max.   
## -0.1411003 -0.0287729 0.0003664 0.0291551 0.1556187   
##   
## Coefficients:  
## Estimate Std. Error t-value Pr(>|t|)   
## debt\_to\_GDP\_ -1.6224e-04 5.6650e-04 -0.2864 0.774787   
## log(debt\_to\_GDP\_) 6.4988e-02 2.2175e-02 2.9307 0.003655 \*\*  
## fx\_ -7.0399e-02 4.3800e-02 -1.6073 0.109097   
## GDP\_per\_cap\_cte 1.3143e-06 1.3309e-06 0.9875 0.324223   
## nominal\_rate -3.1846e-04 8.1512e-04 -0.3907 0.696317   
## vix\_EUA -3.9901e-03 1.3271e-03 -3.0066 0.002876 \*\*  
## vix\_EUR 2.2306e-03 1.3545e-03 1.6468 0.100689   
## taxes 2.3807e-03 1.1717e-03 2.0319 0.043087 \*   
## account\_balance 5.3931e-07 1.0304e-06 0.5234 0.601084   
## lending\_borrow -2.6498e-06 1.6408e-06 -1.6149 0.107440   
## unemployment -5.0738e-06 2.4988e-06 -2.0305 0.043230 \*   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Total Sum of Squares: 0.93337  
## Residual Sum of Squares: 0.71598  
## R-Squared: 0.23291  
## Adj. R-Squared: 0.13904  
## F-statistic: 7.89454 on 11 and 286 DF, p-value: 5.6012e-12

# REG 3