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SCHOOL OF ECONOMICS AND MANAGEMENT

"Overburdened and Underrated: Understanding the Effects of Financial Repression"

A study of the effect of Financial Repression on the exchange rate and the current account

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Abstract

Financial Repression is increasingly recognized as a viable approach to address high and unsustainable debt levels. Despite its history dating back to the early-mid 1900s, the economic implications of Financial Repression have yet to be fully explored. This paper investigates the effects of Financial Repression, specifically the relationship between two key economic indicators: the exchange rate and the current account. We consider three measures of Financial Repression: Interest Rate Controls, Real Interest Rate, and Taylor Rule Deviation. We use various regression methods in a panel data set, including 90 countries from 1973 to 2017. We find that Financial Repression has a negative effect on the exchange rate, while we find no robust evidence of a relationship between Financial Repression and the current account. Given the discovered impact of Financial Repression on the exchange rate, we discuss the potential outcomes it may entail.

Keywords: Financial Repression, the current account, the exchange rate, debt, Taylor Rule Deviation, Interest Rate Controls, Real Interest Rate.

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1. Introduction

In the wake of the Covid-19 pandemic, the world experienced the largest surge in public debt since World War II. This increase was particularly prominent in advanced economies, where public debt reached 124 percent of GDP in 2020 (Gaspar et al., 2021). Reinhart et al. (2010) explain that while some level of debt can be desirable, a sharp rise in debt levels poses an imminent problem that must be addressed. High debt levels have been shown to hinder long-term economic growth, limit government fiscal flexibility, and, in the worst-case scenario, could lead to default. Traditional approaches to reducing debt, such as fiscal consolidation, promoting economic growth, and privatizing government assets, have had limited success, according to Reinhart et al. (2015). As a result, governments often turn to unconventional approaches such as refinancing, restructuring, and Financial Repression. Financial Repression, in particular, gained significant prominence as a means to address high debt levels following World War II. After a reduction in government debt in the middle of the 1900s, governments deregulated the financial market, and financial repression policies became less salient. When government debt is on the rise once again, Financial Repression is expected to become more prominent in the foreseeable future.

Even though Financial Repression has been a common approach to address debt, there is limited understanding of its impacts on other aspects of the economy. Some studies have examined how Financial Repression influences economic growth (Roubini & Sala-i-Martin, 1992; Xu & Gui, 2013; Huang & Wang, 2011), nevertheless, the relationship with other macroeconomic variables has not been thoroughly explored. Policymakers must understand the consequences of their policies, and as Financial Repression is expected to increase in the near future, it is pressing to investigate the implications of Financial Repression. Therefore, this research paper aims to investigate how Financial Repression affects other significant macroeconomic variables. Specifically, we examine how Financial Repression affects the exchange rate and the current account. We evaluate the relationship by running four separate regressions in a panel data set including 90 countries from 1973 to 2017, using three measures for Financial Repression. The three measures of Financial Repression are Interest Rate Controls, Real Interest Rate, and Taylor Rule Deviation.

Our results indicate a negative relationship between the exchange rate and Financial Repression, meaning that an increase in Financial Repression leads to currency appreciation. One way to interpret the found relationship is that the government uses its increased control over the financial market to appreciate the domestic currency, making foreign debt easier to pay. On the other hand, we find no clear relationship between Financial Repression and the current account. Therefore, more research is needed on this subject as the relationship remains hazy.

The rest of the paper is structured as follows. The next section provides a theoretical background, explaining and defining Financial Repression. In section 3, we report what previous research has found within the subject and highlight potential knowledge gaps in the literature. Section 4 presents the dataset, compares the different measures of Financial Repression, and describes the econometric tests we conduct for the data. We report our empirical analysis in section 5, where we describe and present the findings of our regressions. In section 6, we discuss our findings in a broader perspective. We end the paper with some concluding remarks in section 7.

2. Theoretical Background

In this section, we will elaborate on what we define as Financial Repression. For the continuation of this paper, it is important to understand that we define Financial Repression as regulating policies with a specific intent and not regulating policies in general. We will also explore the relationship between Financial Repression and other measures to reduce debt, as this will help us understand why governments might be inclined to employ Financial Repression when they face high levels of debt.

2.1 What is Financial Repression?

Financial Repression, as defined by Reinhart and Sbrancia (2015), is financial market policies implemented by the government to ease the burden of high and unsustainable debt levels. While Financial Repression can express itself through various mixed measures, the underlying dynamic of these policies is generally to suppress interest rates on government bonds and simultaneously channel capital toward them. By doing this, the government can issue new bonds at a low cost, which is their way of borrowing capital.

To highlight the underlying dynamic, Jafarov et al. (2019) explain that Financial Repression can express itself through binding ceilings or caps on interest rates that push interest rates below the market equilibrium clearing rate. A lower interest rate will inevitably raise demand for lending, but at the same time, as banks need to remain profitable, they have to lower the deposit rate to keep the spread constant. This is often referred to as credit rationing, which may cause savers and investors to move capital abroad. In order to prevent capital from flowing out of the country, Reinhart et al. (2011) emphasize that the government may impose capital controls, which in itself is another expression of Financial Repression as it captivates the domestic audience within the domestic financial market.

Abiad et al. (2010) give more examples of financial repression policies, such as government intervention in the financial market, like establishing and operating a state-owned bank. Controlling the financial market makes it easy to steer investments and credits to its favor more directly. Another measure is to raise the reserve requirement, hence inhibiting bank

lending. For a complete list and description of different Financial Repression measures, see Box 1.

Box 1. Examples of financial repression policies and what they aim to accomplish (Abiad et al., 2010; Reinhart & Sbrancia, 2015).

Policy	**Description**
Credit controls	The government regulates the availability, cost, and use of credit in the economy. For example, banks can be required to reserve a minimum amount of assets in government bonds. Hence, securing an artificially high demand for government bonds.
Excessively high reserve rate requirements	The governments impose excessively high reserve requirements upon commercial banks and other financial institutes. Excessively, meaning higher than necessary for financial stability purposes. This is a way of undirected and prudent credit controls.
Interest rate controls	The government set a binding ceiling on interest rates, enabling them to issue new bonds at a lower cost.
Entry barriers	The government sets entry barriers for the domestic and foreign financial institutions to act in a particular region. An example of this is the issuing of banking licenses, thus captivating the domestic capital audience.
State ownership in the banking sector	Government ownership of banks. A more direct form of influence can be executed as they can direct credit to their needs.
Financial account restriction	The government limits individuals and businesses from investing in foreign assets. For example, the government can limit the convertibility of currency. This is an especially effective measure when the government has decided to refinance its debt.

Given Box 1, it is evident that Financial Repression falls under the category of financial market regulation. However, it is not just any type of financial regulation policy. Instead, it refers specifically to financial market regulation policies intended to alleviate the burden of

government debt. This specificity makes Financial Repression difficult to measure, as it is challenging to distinguish between policies based on their intended purpose, which may not always be explicitly stated or accurately reflected.

2.2 Reasons for Implementing Financial Repression

The foremost reason to implement Financial Repression is to ease the burden of high debt levels, as stated in the definition. Nevertheless, the question remains why we should consider Financial Repression as a preferable option to more common methods of dealing with debt. We will consider fiscal consolidation, refinance, and growth.

Financial Repression has a crucial advantage over fiscal consolidation in that it is more politically expedient, as governments are often reluctant to raise taxes or reduce spending. Instead, Reinhart et al. (2011) explain that Financial Repression imposes a stealth tax on savers. Stealth tax means policies that generate additional government revenue without explicitly raising the existing tax rate, hence meeting less resistance from the general public, as it is less noticeable. However, whether or not Financial Repression is more effective than fiscal consolidation may be up for debate and falls outside the scope of this paper as it is not essential for our analysis.

One of the most appealing approaches to addressing debt is fostering economic growth. However, when faced with immediate debt challenges like high-interest rate payments, relying solely on growth may not be a feasible solution. Additionally, Reinhart et al. (2010) discovered a significant negative correlation between elevated debt levels and economic growth, indicating that fostering growth under high debt levels may be difficult when considering long-term perspectives. On the other hand, Financial Repression offers a dual approach: it can effectively tackle high debt burdens in the short term and, when coupled with high inflation, it can reduce interest rates by creating a negative real interest rate, thereby diminishing the overall amount of government debt that remains outstanding (Reinhart et al., 2011; Chari et al., 2020).

In some cases, Financial Repression should not be viewed as a standalone solution for dealing with debt. Instead, it should be seen as a supplementary tool. For instance, if a government chooses to refinance its debt by issuing bonds with lower interest rates or longer maturities, it may only be effective if financial market regulations are implemented. Without such regulations, people may find better investment options and invest their money elsewhere. Additionally, Gitau and Kosimbei (2015) also state that with control over the financial market, the government does not have to go through the legislative process but can go directly to a quicker and less costly repressed financial market.

To summarize the theoretical background, we define Financial Repression as market regulation policies with the specific purpose of alleviating the burden of high and unsustainable levels of government debt. We have also discussed why Financial Repression may be more favorable than other alternatives: It is politically expedient, cost-effective and eases the burdens of high debt levels in both the short and the long run. Moving on, we will explore previous research regarding the relationship between Financial Repression, the exchange rate, and the current account.

3. Previous Research

In this section, we will discuss the results of earlier research that explored the impact of Financial Repression on exchange rates and current accounts. Examining these findings will help us hypothesize about the expected relationship. Moreover, this information will guide us in constructing our model to explain this relationship and highlight the existing knowledge gaps we aim to address. We will see that the easing of financial regulations has led to domestic currency appreciation while the current account has a positive relationship with Financial Repression. Finally, we will examine the possible issue of the exchange rate and the current account mutually impacting each other. We aim to separate the specific effect of Financial Repression on each variable. If these variables are interdependent, it could disrupt the marginal effect of Financial Repression. To address this, we will consult previous research to determine whether we need to account for this interdependence in our analysis.

3.1 The Exchange Rate

To the best of our knowledge, no previous panel data research has been done regarding how Financial Repression affects the exchange rate. However, scholars have found anecdotal evidence of a positive relationship between financial regulations and the exchange rate. McKinnon and Schnabl (2014) explain that China's economy has benefited from a low valuation of its currency, as this has increased demand for Chinese exports. However, the benefit of having a low-value currency has been endangered by high volumes of capital inflow. To avoid currency appreciation, China implemented financial regulations through capital control. Kletzer and Kohli (2001) also stress that the abolishment of financial regulation leads to governments no longer being able to peg the nominal exchange rate like they previously could, which can lead to rapid currency appreciation. Empirics support the thesis that the easing of financial regulation has a negative effect on the exchange rate and appreciates the domestic currency. McKinnon and Schnabl (2014) found that the easing of financial regulation in Japan appreciated the Japanese Yen. Similarly, Lardy (2008) discovered that financial deregulation in China appreciated their currency.

It is important to note that the previous research focused on financial regulations that aimed to maintain a low domestic currency value rather than alleviating the burden of debt. Therefore, these findings offer some insights into how financial regulations may affect exchange rates. Because of this, our research is a valuable addition to the literature as the first paper to extensively explore the relationship between the exchange rate and Financial Repression in a panel data set.

To include appropriate control variables for the exchange rate, we dwell deeper into what determinants previous researchers have found for the exchange rate. Kletzer and Kohli (2000) claim that the study of exchange rate determinants has given mixed results; one reason could be that researchers have yet to separate financially liberated countries from countries under Financial Repression. With this in mind, the authors investigated the determinants of the exchange rate in India from 1991 to 1999, as India had significant financial repression policies during this time. They find four robust determinants of the exchange rate when Financial Repression is present. The determinants and their relationship with the exchange rate are presented in Table 1.

Table 1. Determinants for the exchange rate, according to Kletzer and Kohli (2000), and their relationship with the exchange rate.

Variable	Relationship
Money supply	Positive
Difference between domestic income and foreign income	Negative
Difference between domestic interest rate and foreign interest rate	Negative
Difference between domestic inflation and foreign inflation	Negative

Note that the difference between domestic and foreign inflation did not have the anticipated positive effect but showed a negative relationship with the exchange rate. Krugman et al. (2022) also claim that interest rates and inflation are important determinants of the exchange rate, even in countries where Financial Repression is absent. They also argue that output and expectation for future output are essential determinants for the exchange rate as output influences a country's interest rate. From the presented research results, we will include the money supply, real interest rate on government bonds, inflation, economic growth, and the total output of the economy as controlling variables in our regressions.

3.2 The Current Account

Not a lot of research has been done regarding the relationship between Financial Repression and the current account. However, Johansson and Wang (2012) have found a positive relationship between Financial Repression and the current account while studying external imbalances. They hypothesized that Financial Repression has a negative impact on the country's financial development, leading to fewer investment opportunities and capital outflow, which has a positive effect on the current account. To test their hypothesis, Johansson and Wang (2012) ran a regression on 66 countries between 1981 to 2005. The control variables they used are listed in Table 2.

Table 2. Control variables used by Johansson and Wang (2012) and their relationship with the current account.

Variables	Relationship
Net foreign asset position	Positive
Government budget balance	Positive
Relative income	Negative
Square term of the relative income	Positive
The two demographic factors young dependency ratio and old dependency ratio	Negative
Openness	Positive

When conducting their research, Johansson and Wang (2012) found that Financial Repression is statistically significant and positively affects the current account in a pooled Ordinary Least Squares (OLS) model, a fixed effect model, and a random effect model. They also do robustness checks using the real interest rate as an alternative measure of Financial Repression. Once again, they find that increased Financial Repression, taking the form of a lower real interest rate, positively affects the current account.

The existing research on the relationship between Financial Repression and the current account is limited, which is why we believe there is a need to conduct further research on this topic. Furthermore, our research aims to go beyond what has been done before, as we will address the econometric problems associated with using panel data that previous research by Johansson and Wang (2012) has not tackled. By doing so, we aim to provide more robust results that will contribute to a better understanding of the subject. Therefore, our research will make an important contribution to the literature on this topic.

The control variables that Johansson and Wang (2012) use in their regression are in line with what previous research has found regarding determinants for the current account (Chinn & Prasad, 2003; Gruber & Kamin, 2007; Fratzscher et al., 2010). Therefore, we will use the same control variables as Johansson and Wang (2012) in our model for the current account. However, we find it necessary to include one more control variable, which we will elaborate on in the following subsection.

3.3 Interdependence Between the Exchange Rate and the Current Account

There is a chance that exchange rates and current accounts impact each other, which adds complexity to the regression analysis investigating how Financial Repression influences them. In order to understand this potential interaction between variables, we will review existing literature to determine the direction of causality.

Numerous scholars have presented theoretical arguments explaining how current accounts could influence exchange rates. However, there is limited empirical evidence supporting this causal relationship. Researchers have observed that exchange rate fluctuations coincide with current account changes. However, they have identified other macroeconomic factors as the primary drivers behind these shifts (Dornbusch & Fischer, 1980; Lee & Chinn, 2006; Cheung et al., 2010).

On the other hand, more empirical evidence supports that the causality goes in the other direction, that changes in exchange rates affect current accounts. McKinnon and Schnabl (2014) found that Japan's current account increased after a currency appreciation. Lardy (2008) finds a similar relationship in China, where a currency appreciation led to an increase in the current account. Diaz-Alejandro (1985) further supports that the causality goes in this direction, as depreciations in Latin American currencies led to decreases in their current accounts.

To summarize previous research: Scholars have found a positive relationship between financial regulations and the exchange rate. Nevertheless, since our focus is on Financial Repression, this only hints at how policies aimed at reducing government debt can affect the exchange rate. As for the current account, previous research suggests a positive relationship with Financial Repression. Despite this, more reliable and robust results are needed to solidify this relationship. Lastly, we need to include the exchange rate as a controlling variable for the current account, as previous research suggests that the exchange rate affects the current account but not vice versa.

4. Data

In this section, we will discuss different measures of Financial Repression and present the dataset we will use for our regressions. Furthermore, we will shed light on the challenges of handling unbalanced panel data by conducting numerous econometric tests. We will present, explain and address these challenges to get reliable results.

4.1 How to Measure Financial Repression

Measuring the degree of Financial Repression is no easy task, according to Abiad et al. (2009), mainly because Financial Repression, as we explained in the theoretical background, can express itself through a variety of policies and practices, such as banking sector profits, real interest rates, and outspoken capital controls. Therefore, a measure of Financial Repression cannot rely upon one single indicator but needs a combination of measurements and analysis to understand the phenomena comprehensively. Recognizing the limits, we will use three indicators of Financial Repression, each measuring different aspects of Financial Repression; Interest Rate Controls, Real Interest Rate, and Taylor Rule Deviation, which we will explain in detail in the following subsections.

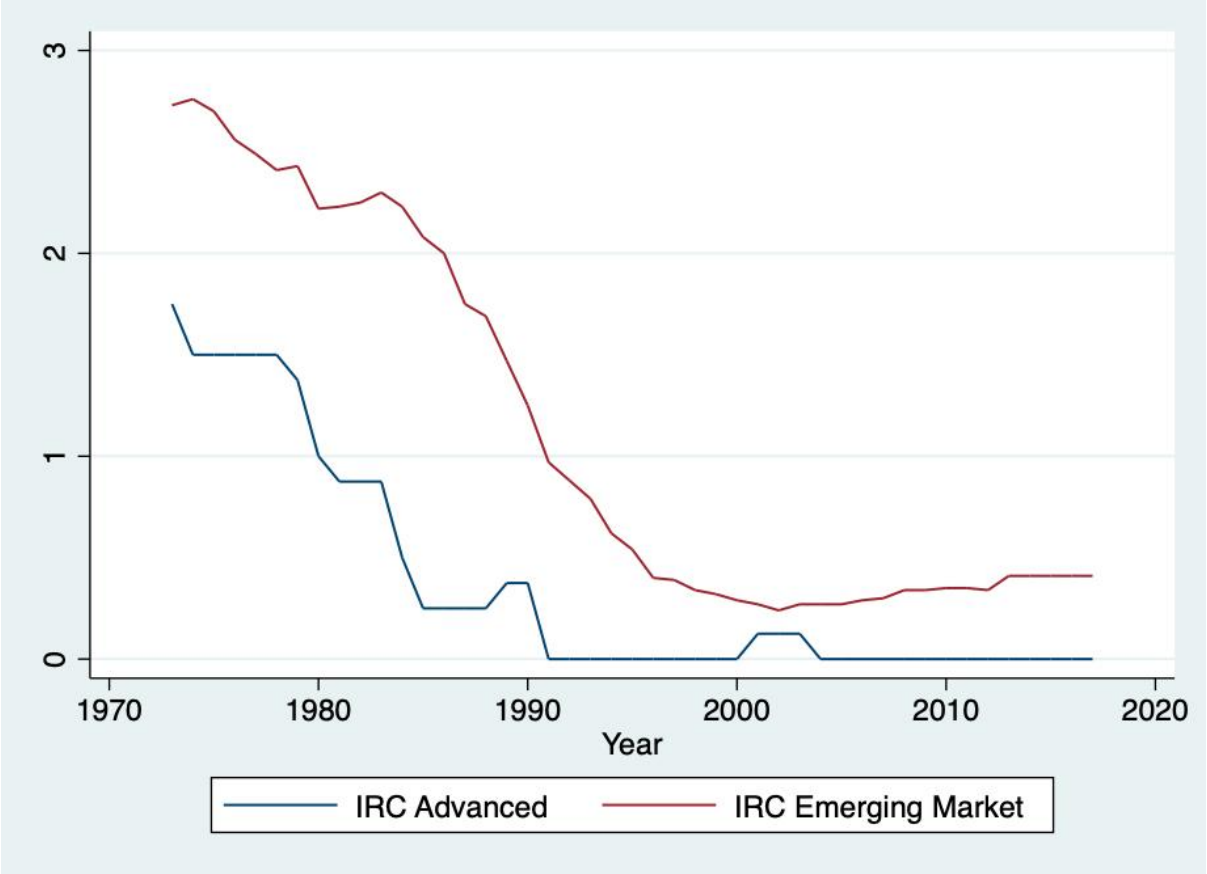
4.1.1 Interest Rate Control

The foremost used indicator of Financial Repression is Interest Rate Controls (IRC). IRC is an index variable ranging from zero to three, where three represent the highest degree of Financial Repression. This indicator is derived from a dataset compiled by Abiad et al. (2009) and measures seven different dimensions of Financial Repression; interest rate controls; credit controls; state ownership in the banking sector; barriers to entering financial markets; supervision in the banking sector; capital account restriction; and repression of security markets. Each dimension has been graded individually and then added to a final grade representing IRC. This indicator captures the “input side” of Financial Repression, meaning outspoken legislative and administrative controls imposed by the government. Jafarov et al. (2019) later updated and extended this database with the help of IMF documents, financial

institutions, and resident representatives. Thus, IRC is one way of measuring Financial Repression.

In our regressions, we will use the dataset for IRC provided by Jafarov et al. (2019), which includes unbalanced panel data for 90 countries over 45 years spanning from 1973 to 2017, giving 3,719 observations. In Figure 1, we can see a clear time trend where IRC diminishes over time. Also, since 1973, emerging market economies have had a higher level of IRC than advanced economies. For the complete list of countries included in our study, please refer to Appendix 1.

Figure 1: Average Interest Rate Controls for advanced economies (blue) and emerging market economies (red) 1973 - 2017. They both show a clear time trend where Interest Rate Controls decrease over time.



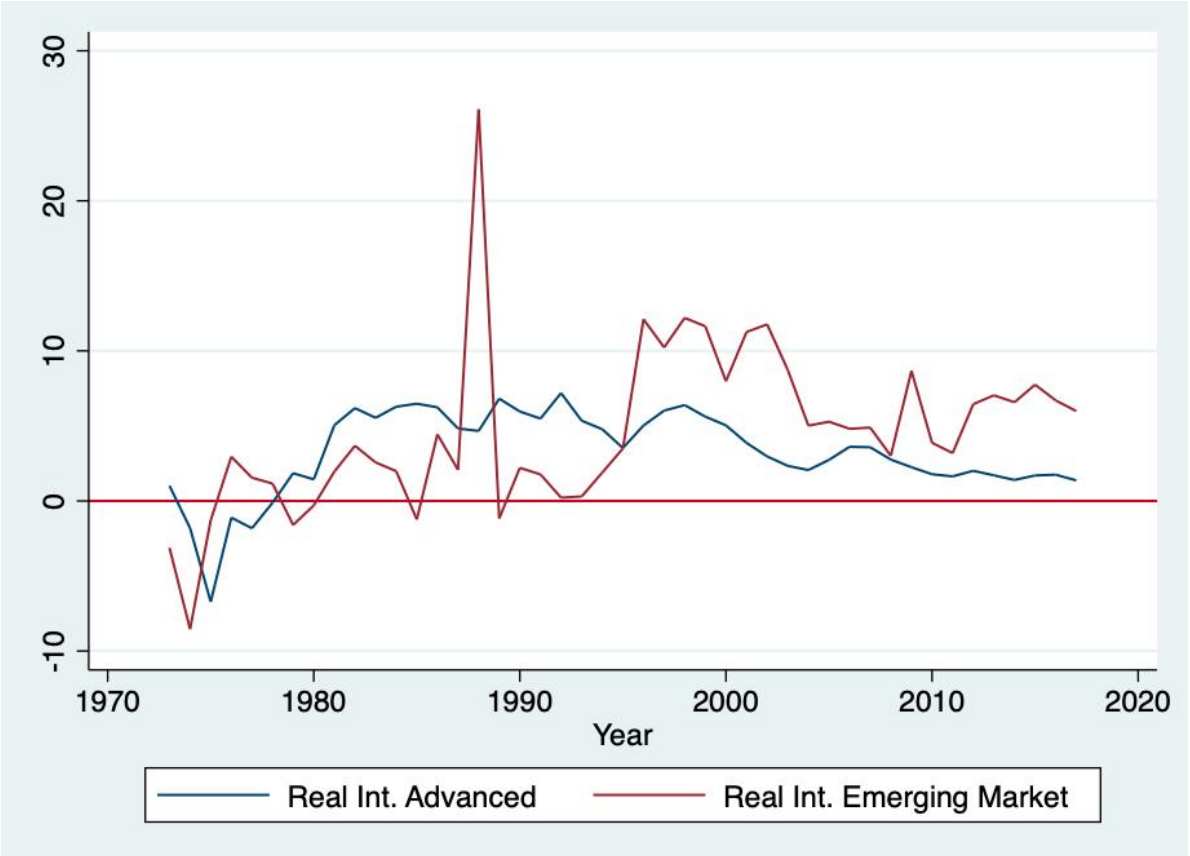
4.1.2 Real Interest Rate

As Financial Repression aims to suppress real interest rates, researchers like Reinhart et al. (2011) and Roubini and Sala-i-Martin (1992) have used the real interest rate as a proxy for measuring the presence of Financial Repression in the economy. However, as the real interest

rate captures the "output" side of Financial Repression, it is important to note that a low real interest rate does not necessarily indicate the presence of Financial Repression, as there can be other factors in play. Nonetheless, many scholars have included the real interest rate as an alternative measure of Financial Repression for robustness checks (Agarwala, 1983; Gelb, 1988; Johansson & Wang, 2012). The real interest rate provides an alternative approach for measuring Financial Repression to IRC.

We will use data from the World Bank's WDI database over Real Interest Rate, which includes 1,798 observations. Note that we have fewer observations for Real Interest Rate than IRC and that the data is skewed to advanced economies (only 183 of the observations are from emerging market economies). Because WDI does not provide observations for all countries and years and the skewness in data, we have greater explanatory power for advanced economies and are more prudent in our conclusions for emerging market economies. For the complete list of countries included in our study, please refer to Appendix 1.

Figure 2. Average Real Interest Rate for advanced economies (blue) and emerging market economies (red) 1973-2017. The graph shows that Real Interest Rate does not have a clear time trend as opposed to Interest Rate Controls.



Looking at Figure 2, Real Interest Rate have no clear time trend as opposed to IRC in Figure 1, which had a time trend. While Real Interest Rate fluctuates, it tends to return to the mean value of 3,2 percent for advanced economies and 4,6 percent for emerging market economies. The spike for emerging market economies in the late 80s is due to Nicaragua, which in 1988 had a real interest rate of 680 percent.

4.1.3 Taylor Rule Deviation

Additionally, we would like to introduce another measure of Financial Repression to the literature, namely what we would like to call Taylor Rule Deviation (TRD). TRD measures the difference between the interest rate suggested by the Taylor rule subtracted by the interest rate issued by the central bank. If the difference is positive, central banks hold the interest rate lower than the Taylor rule suggested, indicating that some form of Financial Repression is present. Similarly to the real interest rate, TRD measures the "output side" of Financial Repression.

It could be stressed that central banks do not necessarily aim to follow the Taylor rule, which would make TRD lose its ability to capture Financial Repression. However, scholars agree that the Taylor rule is, without a doubt, a valuable rationale for monetary policy and that there is no better model, so far discovered, for evaluating monetary policy (Kozicki, 1999; Woodford, 2001; Orphanides, 2003). Thus, TRD is a third way of measuring Financial Repression.

To calculate TRD, we have first calculated the interest rate for every country that is suggested by the Taylor rule using the following formula:

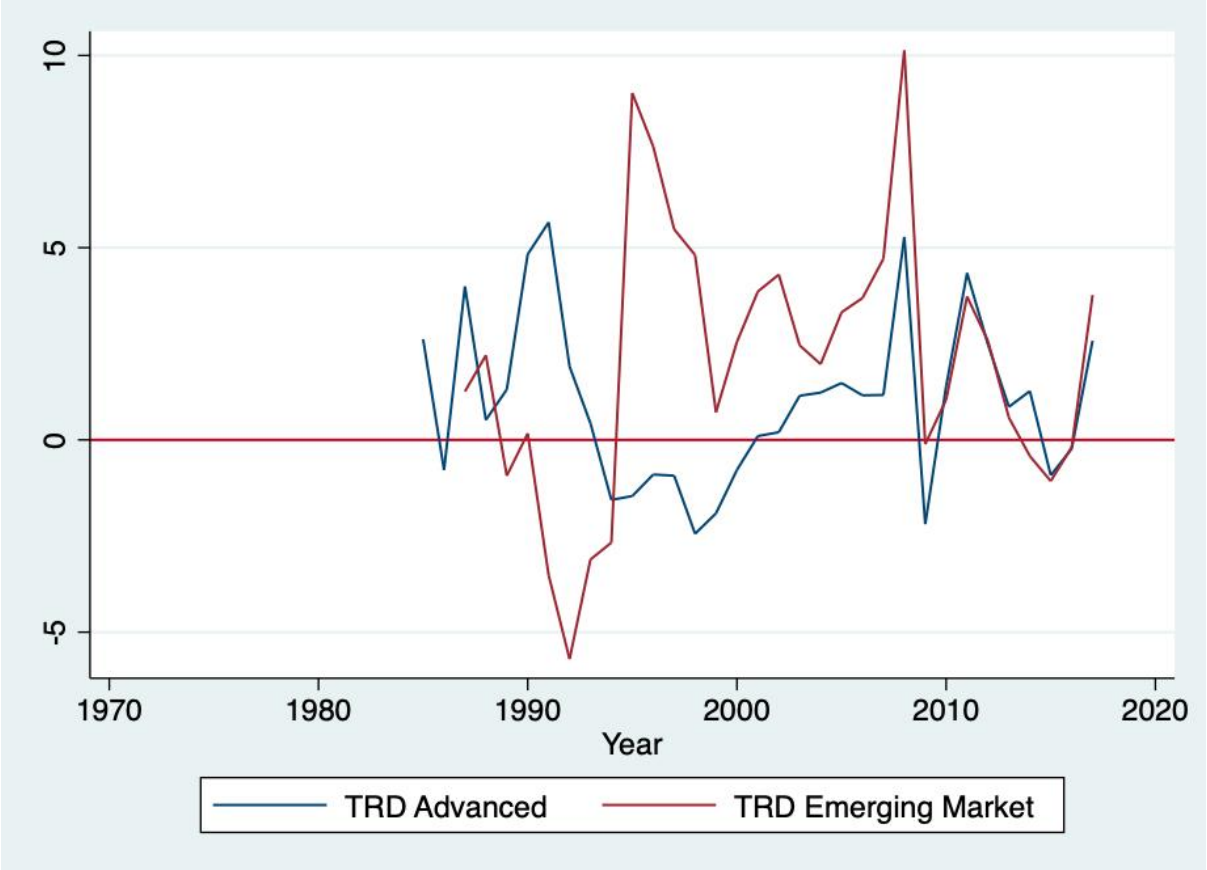
$$I = 2 + \pi^{*} + 1.5(\pi - \pi^{*}) + 0.5\,y$$

We have collected the output gap, y, from OECD:s database for Economic Outlook (2018), the current inflation level, π, has been collected from the dataset provided by Jafarov et al. (2019), the inflation target level, π^{*}, for every country has been obtained from each central bank's statutes where only Turkey has an inflation target set to 5 percent as all the others have a target of 2 percent. We use the same assumptions as Hoffman and Bogdanova (2012) and set the equilibrium interest rate to 2 percent, the weight for the inflation gap to 1.5, and the

weight for the output gap to 0.5. The assumption of constant parameters across all periods and countries is unrealistic. We nonetheless find it necessary to rely on them for the continuation of this paper. TRD is calculated by subtracting the average central bank interest rate for every year and country from the Taylor rule interest rate for the same year and country. A positive TRD value indicates that the central bank has set an interest rate lower than the Taylor rule suggests, which implies the presence of Financial Repression.

However, it is important to note that our analysis is limited by data availability. We only had output gap observations for 33 countries, mostly advanced economies, and the number of observations per country ranged from 9 to 33, giving us a total number of 684 observations. This limits our ability to draw broad conclusions about the relationship between TRD and exchange rates and current accounts. Nonetheless, we maintain that our empirical analysis is robust enough to provide reliable conclusions and can inspire further research in this area. For the complete list of countries included in our study, please refer to Appendix 1.

Figure 3. Average Taylor Rule Deviation for advanced economies (blue) and emerging markets (red) 1985-2017. The mean reversion of Taylor Rule Deviation is less apparent than Real Interest Rate but does not have a clear time trend as Interest Rate Controls.



Looking at Figure 3, we see that TRD, similar to Real Interest Rate, has no clear time trend as opposed to IRC in Figure 1. Over time, central banks in both advanced and emerging market economies have withheld a lower interest rate than the Taylor rule suggests, indicating Financial Repression. On average, TRD was 1 percent for advanced economies and 2 percent for emerging market economies.

Table 3. Correlation between IRC, Real Interest Rate, and TRD. Note that the correlations are as expected, except for the correlation between Real Interest Rate and TRD.

Variable	IRC	TRD	Real Interest Rate
IRC	1	0,11	-0,15
TRD		1	0,03
Real Interest Rate			1

Table 3 shows the correlation between IRC, TRD, and Real Interest Rate. The low correlation between the measures indicates that they work poorly as instruments for each other and instead capture different aspects of Financial Repression. Therefore it is interesting to regress them separately to understand this phenomenon comprehensively. Note that even though TRD and Real Interest Rate are both measures of the output side of Financial Repression, it is clear that they do not capture the same thing.

As a rise in both IRC and TRD expresses a rise in Financial Repression, IRC and TRD are expected to have a positive correlation. Additionally, it is logical that IRC and Real Interest Rate cohere negatively as Real Interest Rate, in contrast to IRC, has a negative relationship with Financial Repression. However, we are surprised that TRD and Real Interest Rate have a positive correlation as they are supposed to affect Financial Repression in opposite directions. Remember that a lower central bank interest, all other things equal, lead to higher TRD but a lower Real Interest Rate. This surprising relationship could be explained by the low correlation that may limit to zero, meaning no correlation.

4.2 Econometric Tests

To obtain reliable results when running regressions with unbalanced data, it is crucial to consider the potential problems of unit root, heteroskedasticity, and autocorrelation (Davidson & McKinnon, 2004). When conducting our tests, we used an OLS model with random effects with the logarithm of the exchange rate and the current account as the

dependent variable. Additionally, we have included the control variables we found relevant from the previous research. This section will briefly explain the tests, their results, and how we handle the problems.

Firstly, we checked whether the dependent variables, the exchange rate and the current account, in our regressions, are stationary. We computed a Dickey-Fuller-based test for unit root; the Fisher-type unit root test designed by Choi (2001). In the test, the null hypothesis is that the data contains unit roots. We can reject the null hypothesis on the one percent significance level, indicating that our data is stationary and does not suffer from unit roots. This result implies that we can be more accurate in our statistical analysis. For the test results, please refer to Appendix 3.

Secondly, we conducted the Breusch-Pagan Lagrange Multiplier test for heteroskedasticity. From the test, we discovered that the error terms depend on time and, therefore, are not normally distributed. This implies that the test statistics may not be reliable. For this reason, we have used robust standard errors in our regressions, which handle the problem by giving less weight to extreme observations. We can trust our regression results again when we include robust standard errors. For the test results, please refer to Appendix 3.

Thirdly, we performed a test for autocorrelation. We did this by creating an auxiliary regression on our saved OLS residuals onto lagged OLS residuals, including the explanatory variables. We found that lagged OLS residuals significantly affect our OLS residuals, suggesting we have a problem with autocorrelation. This can be solved by including a sufficient amount of lags of the dependent variable as an explanatory variable, as this controls for the effect of autocorrelation. For the test results, please refer to Appendix 3.

Finding the appropriate amount of lags is a challenging task. Previous research has not dealt with this problem at all. We, on the other hand, would like to adequately address the problem by comparing the fit of our models with different amounts of lags. To measure the goodness of fit, we will look at the R-squared result as well as the Akaike's (AIC) and the Bayesian (BIC) information criterion. Ideally, we would like high R-squared and low AIC and BIC results. The result of our model comparison is reported in Table 4.

Table 4. OLS with random effects for the exchange rate. The result suggests that one lag is sufficient to address the autocorrelation problem.

Model	R-squared	AIC	BIC
0 lags	0.0367	15244.46	15287.4
1 lag	0.9293	10179.19	10228.25
2 lags	0.9292	10147.08	10202.24
3 lags	0.9290	10116.34	10177.6
4 lags	0.9286	10086.23	10153.6

Table 5. OLS with random effects for the current account. The result suggests that one lag is sufficient to address the autocorrelation problem.

Model	R-squared	AIC	BIC
0 lags	0.1875	18543.97	18592.32
1 lag	0.7266	16210.91	16265.31
2 lags	0.7254	16192.38	16252.81
3 lags	0.7265	16185.83	16252.3
4 lags	0.7263	16178.11	16250.62

As we can see in Table 4 and Table 5, the R-squared ratio takes a big step in both the exchange rate and current account model when we include one lag. However, including more lags does not significantly increase the fit. Additionally, AIC and BIC are reduced to a significantly lower value in the model with one lag compared to the model with no lag. Turning to models with more than one lag, there is no significant increase in fit. Our testing thus indicates that we should include one lagged value as an explanatory variable.

To include one lagged value to account for autocorrelation is also reasonable from an economic standpoint. Scholars have studied exchange rate volatility, where they found that periods of high volatility are often followed by periods with high volatility, suggesting that more lags are necessary (West & Cho, 1995; Vilasuso, 2002; Diebold & Nerlove, 1989). However, they look at more frequently updated data, from day to day, while we look at changes from year to year. This suggests that one lag should be enough. As for current accounts, scholars agree that it is persistent in its mean-reversion. This means that the current

account is slow to come back to its mean after a shock that led to either a surplus or a deficit (Sarisoy-Guerin, 2003; Bergin & Sheffrin, 2000; Sadiku et al., 2015; Gnimassoun & Mignon, 2015). From this, we expect the lagged values of the current account to have a significant impact on the current value. Nevertheless, as our comparison of model fit suggests, one lag is sufficient to account for the autocorrelation.

Lastly, we computed tests for multicollinearity between our measures for financial repression and our control variables. If we have multicollinearity, meaning strong coherence between explanatory variables, it is harder to distinguish the effects of each variable, making our results less robust.

We investigated the correlation between our measures of Financial Repression and the control variables. Our threshold for multicollinearity is when the absolute value of the correlation is greater than 0.7. We found no multicollinearity for the current account as a dependent variable. However, for the logarithm of the exchange rate, we find that growth and inflation are multicollinear with Real Interest Rate and TRD, respectively. To determine if the multicollinearity constitutes any problem in our regression, we ran an alternative regression excluding inflation and growth. When excluding these variables, the results do not significantly differ, indicating that our regression robustness is unaffected by the multicollinearity. For the test results and alternative regressions, please refer to Appendix 3.

To summarize the section of data, we have concluded that each measure, IRC, Real Interest Rate, and TRD, captures different aspects of Financial Repression. This gives support that we should consider all three variables for our regressions. Additionally, from the results of the econometric tests, we will use robust standard errors and one lagged dependent variable as an explanatory variable in our regressions. Preceding, we will, in the next section, report the findings of our regressions.

5. Empirical Analysis

In this section, we will introduce our models and conduct an empirical analysis to examine the relationship between Financial Repression and the exchange rate and the current account. To support our findings more broadly, we will use four different regression methods; pooled OLS, OLS with random effects, OLS with fixed effects, and maximum likelihood estimator. Firstly, we will focus on how the exchange rate is influenced by our three measures of Financial Repression: IRC, Real Interest Rate, and TRD. Moving on, we will shift our attention to the current account and investigate how it is affected by the three measures of Financial Repression. We want to remind the reader of the significant difference in the observations available for each measure, which impacts the reliability of the regression results for each measure. We will provide a corresponding paragraph that thoroughly discusses and interprets the results.

5.1 The Exchange Rate

Our model for how Financial Repression affects the exchange rate of the country is as follows:

$$logEX_{it} = \beta_0 + \beta_1 FR_{it} + \beta_2 X_{it} + ADV_i + \varepsilon_{it}$$

Where $logEX$ is the dependent variable and is the logarithm of the annual average nominal exchange rate in national currency units per U.S. dollar. The explanatory variable FR represents the different measures of Financial Repression, such as IRC, Real Interest Rate, and TRD. To obtain meaningful results and marginal effects, we need to control for other determinants of the exchange rate. Thus, we use a vector X that includes control variables suggested by our theoretical background and previous research. These variables include the stock of broad money in national currency, the real interest rate on government bonds, the annual inflation rate expressed as a percentage change in the consumer price index, real GDP at constant 2011 national prices, the annual real GDP growth, and one lagged value of $logEX$. We also include a dummy variable that takes a value of 1 if the country is an advanced

economy. For a detailed explanation and source of the variables included in the model, please refer to Appendix 2.

In the section for previous research, we discovered that financial repression policies in China and Japan led to currency depreciation, which positively affected their exchange rates. However, this may not be true for other countries. Financial repression policies are typically used to lower the cost of high debt levels rather than benefit exports, which was the case for China and Japan. In order to achieve this goal, it makes more sense to use financial repression policies to appreciate the currency, which has a negative effect on the exchange rate. Financial Repression lowers domestic interest rates, reducing the cost of domestic debt while the foreign debt remains unchanged. Implementing policies to increase demand for the currency, such as forcing banks to hold more currency reserves, will result in currency appreciation, making it cheaper to pay off foreign debt. As a result, we hypothesize that, unlike previous research findings, Financial Repression will have a negative effect on the exchange rate and lead to currency appreciation. In our model, this means we expect a negative value for β_1.

Table 6. The logarithm of the exchange rate affected by Interest Rate Controls. Interest Rate Controls have a statistically significant negative effect on the exchange rate, and most control variables have the expected effect.

$VARIABLES$	(1)	(2)	(3)	(4)
$logEX$	Pooled OLS	RE OLS	FE OLS	MLE
IRC	-0.088***	-0.089***	-0.236***	-0.193***
	(0.026)	(0.026)	(0.054)	(0.052)
$logEX_{t-1}$	0.966***	0.966***	0.841***	0.877***
	(0.005)	(0.007)	(0.035)	(0.039)
$money$	4.23e-11	4.23e-11	-4.98e-10***	-3.35e-10***
	(4.60e-11)	(6.79e-11)	(6.66e-11)	(7.95e-11)
$rbondintr$	-0.008***	-0.008**	0.006	0.002
	(0.003)	(0.003)	(0.011)	(0.008)
$inflation$	0.001***	0.001***	0.001***	0.001***
	(0.001)	(7.24e-05)	(7.49e-05)	(7.22e-05)
$rgdpna$	-2.48e-10	-2.48e-10	2.25e-08	1.34e-08
	(4.66e-09)	(1.15e-08)	(4.13e-08)	(1.96e-08)
$growth$	-0.019***	-0.019**	-0.015	-0.016*
	(0.007)	(0.007)	(0.009)	(0.009)
ADV	-0.070**	-0.070	-	-0.176
	(0.036)	(0.086)		(0.201)
$constant$	-0.057	-0.057	-0.237***	-0.159
	(0.064)	(0.063)	(0.084)	(0.116)
$Observations$	3,401	3,401	3,401	3,401
$R-squared$	0.93	0.93	0.93	-

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

We start our empirical analysis of how Financial Repression affects the exchange rate by inserting the IRC variable as the measure for Financial Repression. In Table 6, we found that IRC is significant at the one percent level in all four regressions and has a negative effect on

the exchange rate. The coefficients in the regressions indicate that when keeping all other variables constant, a one-unit increase in IRC (i.e., increased Financial Repression) leads to an 8.9% to 23.6% decrease in the exchange rate. This result contradicts previous research but is in line with our hypothesis.

Furthermore, we observed that most of the determinants of the exchange rate have a significant impact on the exchange rate, and their coefficients align with what we expected. For instance, a higher domestic interest rate is expected to appreciate the domestic currency, which the regression reports. Contrary, higher domestic inflation was expected to depreciate the domestic currency, and the regression results support this expectation. Additionally, we found that growth has a negative effect on the exchange rate, which aligns with the expectation that higher productivity should appreciate the domestic currency. Finally, the dummy variable for advanced economies suggests that the national currency to US dollar ratio is lower for advanced economies than for emerging market economies, which we expected to find.

Table 7. The logarithm of the exchange rate affected by Real Interest Rate. Real Interest Rate has no statistically significant effect, while most control variables have the expected effect.

$VARIABLES$	(1)	(2)	(3)	(4)
$logEX$	Pooled OLS	RE OLS	FE OLS	MLE
$Real\ Interest\ Rate$	0.002	0.002	0.001	0.002
	(0.002)	(0.002)	(0.002)	(0.002)
$logEX_{t-1}$	0.978***	0.978***	0.814***	0.975***
	(0.005)	(0.008)	(0.061)	(0.009)
$money$	9.96e-11	9.96e-11*	-8.09e-12	1.02e-10*
	(6.22e-11)	(5.76e-11)	(1.19e-11)	(5.93e-11)
$rbondintr$	-0.004	-0.004	0.003	-0.004
	(0.003)	(0.004)	(0.009)	(0.004)
$inflation$	0.001***	0.001***	0.001**	0.001***
	(0.001)	(7.15e-05)	(0.001)	(6.93e-05)
$rgdpna$	-2.91e-09	-2.91e-09	4.19e-08***	-1.80e-09
	(2.66e-09)	(3.57e-09)	(1.30e-08)	(3.76e-09)
$growth$	-0.015**	-0.015*	-0.006	-0.015*
	(0.007)	(0.007)	(0.010)	(0.008)
ADV	-0.143**	-0.143**	-	-0.149**
	(0.057)	(0.066)		(0.071)
$constant$	0.168***	0.168***	0.466***	0.174***
	(0.048)	(0.045)	(0.124)	(0.047)
$Observations$	1,592	1,592	1,592	1,592
$R-squared$	0.98	0.98	0.98	-

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In Table 7, we use Real Interest Rate as a measure of Financial Repression and found that it, contrary to IRC, did not significantly impact the exchange rate. This result is surprising as we expected that Real Interest Rate would affect the exchange rate. However, it is important to note that IRC and Real Interest Rate measure different aspects of Financial Repression.

Despite this unexpected finding, most determinants in our analysis are still significant and have the expected impact on the exchange rate.

Even though Real Interest Rate and the real interest rate on government bonds showed no sign of multicollinearity, as reported in Appendix 3, the variables are still closely connected. Therefore we ran an alternative regression that excluded the real interest rate on government bonds. Nonetheless, the results remain the same and Real Interest Rate is still not statistically significant. The result of the alternative regression is reported in Appendix 4.

Table 8. The logarithm of the exchange rate affected by TRD. Taylor Rule Deviation has a statistically significant negative effect, and most control variables have the expected effect.

$VARIABLES$	(1)	(2)	(3)	(4)
$logEX$	Pooled OLS	RE OLS	FE OLS	MLE
TRD	-0.006***	-0.006***	-0.007***	-0.006***
	(0.001)	(0.001)	(0.001)	(0.001)
$logEX_{t-1}$	1.001***	1.001***	0.859***	1.001***
	(0.002)	(0.001)	(0.017)	(0.001)
$money$	1.10e-11	1.10e-11*	-3.28e-13	1.10e-11*
	(2.74e-11)	(6.60e-12)	(3.67e-12)	(6.56e-12)
$rbondintr$	-0.004***	-0.004***	-0.004***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
$inflation$	0.014***	0.014***	0.016***	0.014***
	(0.002)	(0.002)	(0.003)	(0.002)
$rgdpna$	9.22e-10	9.22e-10***	-1.16e-09	9.22e-10***
	(6.44e-10)	(2.97e-10)	(2.42e-09)	(2.94e-10)
$growth$	-0.005***	-0.005***	-0.002	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)
ADV	-0.003	-0.003	-	-0.003
	(0.009)	(0.003)		(0.003)
$constant$	-0.0151***	-0.0151***	0.138***	-0.015***
	(0.005)	(0.004)	(0.020)	(0.004)
$Observations$	585	585	585	585
$R-squared$	0.99	0.99	0.99	-

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Moving on to the impact of TRD on the exchange rate, we present the results in Table 8. Our study shows that TRD has a significant negative effect on the exchange rate, with a confidence level of one percent. More specifically, an increase in TRD by one unit, which indicates more Financial Repression, leads to a 0.6% to 0.7% reduction in the exchange rate.

This finding contradicts previous research but further supports the correlation between Financial Repression and a higher valuation of the domestic currency. Additionally, we confirm that the other factors we examined have the expected effect on the exchange rate.

5.2 The Current Account

We will use Johansson and Wang's (2012) model as a foundation for our regression analysis of the current account. Our model will use the same control variables that Johansson and Wang (2012) used. Additionally, we will include the exchange rate as a control variable. The regression model is as follows:

$$CA_{it} = \delta_0 + \delta_1 FR_{it} + \delta_2 X_{it} + ADV_i + \varepsilon_{it}$$

CA is the dependent variable, expressed as the current account balance as a percentage of GDP. FR is the measure of Financial Repression, and X is the vector of control variables. The control variables for the current account include the percentage of exports and imports as a share of GDP, the real annual GDP per capita growth, the fiscal balance, the net foreign asset of the country, the logarithm of the country's exchange rate, the relative income of the country, the age dependency ratio of the country, and one lagged value of CA. We also include a dummy variable, ADV, to indicate whether the country is an advanced economy. Please refer to Appendix 2 for the explanation and source of the variables used in the model.

We hypothesize that Financial Repression will increase the current account, meaning that the coefficient for the Financial Repression variable, δ_1, in our regression model would be significantly positive. This hypothesis is supported by previous research and our reasoning that Financial Repression enables governments to finance cheaper debts. If Financial Repression were to decrease, interest rates would rise, and the cost of debt would increase, potentially leading to a decrease in the current account.

Table 9. The current account affected by Interest Rate Controls. Interest Rate Controls have no statistically significant effect, while most control variables have the expected effect.

$VARIABLES$	(1)	(2)	(3)	(4)
CA	Pooled OLS	RE OLS	FE OLS	MLE
IRC	-0.011	-0.011	-0.127*	-0.070
	(0.066)	(0.069)	(0.074)	(0.066)
CA_{t-1}	0.784***	0.784***	0.695***	0.743***
	(0.023)	(0.025)	(0.028)	(0.032)
$openess$	0.003*	0.003	0.007	0.004
	(0.002)	(0.002)	(0.005)	(0.003)
pcg	-0.110***	-0.110***	-0.117***	-0.115***
	(0.028)	(0.041)	(0.044)	(0.042)
$deficit$	0.128***	0.128***	0.157***	0.144***
	(0.029)	(0.041)	(0.058)	(0.048)
nfa	3.13e-16	3.13e-16	-4.19e-16	-1.77e-17
	(4.85e-16)	(3.23e-16)	(3.20e-16)	(2.77e-16)
$logEX$	0.014	0.014	0.030	0.022
	(0.020)	(0.019)	(0.022)	(0.018)
$rpcy$	0.496**	0.496*	-0.281	0.528*
	(0.222)	(0.272)	(0.869)	(0.300)
adt	-0.017***	-0.017***	-0.025**	-0.020***
	(0.005)	(0.006)	(0.010)	(0.007)
ADV	0.098	0.098	-	0.192
	(0.174)	(0.264)		(0.311)
$constant$	0.750	0.750	0.791	0.650
	(0.468)	(0.599)	(0.882)	(0.607)
$Observations$	3,113	3,113	3,113	3,113
$R-squared$	0.73	0.73	0.73	-

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In Table 9, we show the outcomes of the regressions that examine how Financial Repression measured as IRC affects the current account. However, we found that IRC is only significant at the 10 percent level in the OLS with a fixed effect. This implies that there is no significant influence on the current account when altering the degree of Financial Repression while controlling for other determinants of the current account. This finding differs from previous research that found that Financial Repression has a statistically significant and positive impact on the current account. Nonetheless, we were unable to establish such a connection in our regression.

Looking at the control variables of our regression, we found that fiscal balance positively affected the current account as we anticipated. Also, we find that countries with a higher percentage of working-age population tend to have lower current accounts, just as Johansson and Wang (2012) found.

Table 10. The current account affected by Real Interest Rate. Real Interest Rate has no statistically significant effect, while most control variables have the expected effect.

$VARIABLES$	(1)	(2)	(3)	(4)
CA	POLS	RE OLS	FE OLS	MLE
$Real\ Interest\ Rate$	-0.016*	-0.016	-0.027	-0.018
	(0.008)	(0.011)	(0.017)	(0.012)
CA_{t-1}	0.821***	0.821***	0.717***	0.792***
	(0.026)	(0.022)	(0.024)	(0.024)
$openness$	0.002	0.002	0.002	0.002
	(0.002)	(0.002)	(0.006)	(0.003)
pcg	-0.110**	-0.110	-0.123*	-0.116
	(0.049)	(0.072)	(0.073)	(0.074)
$deficit$	0.124***	0.124**	0.155*	0.130**
	(0.037)	(0.053)	(0.083)	(0.059)
nfa	2.31e-17	2.31e-17	-5.75e-16	-1.36e-16
	(5.67e-16)	(3.45e-16)	(4.17e-16)	(3.06e-16)
$logEX$	0.015	0.015	0.243**	0.030
	(0.040)	(0.027)	(0.117)	(0.034)
$rpcy$	0.188	0.188	-0.555	0.393
	(0.383)	(0.478)	(1.460)	(0.460)
adt	-0.015**	-0.015**	-0.027*	-0.019***
	(0.006)	(0.006)	(0.014)	(0.007)
ADV	-0.079	-0.079	-	-0.144
	(0.265)	(0.361)		(0.357)
$constant$	1.048**	1.048*	1.302	1.219*
	(0.501)	(0.622)	(1.219)	(0.700)
$Observations$	1,716	1,716	1,716	1,716
$R-squared$	0.75	0.75	0.74	-

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As shown in Table 10, our findings differ from those of previous studies. We discovered that Real Interest Rate only has a statistically significant impact in the pooled OLS model. This suggests no relationship between the current account and the real interest rate. The control variables demonstrate similar relationships as in the preceding study.

Table 11. The current account affected by Taylor Rule Deviation. Taylor Rule Deviation has a statistically significant negative effect on the current account, and most control variables have the expected effect.

$VARIABLES$	(1)	(2)	(3)	(4)
CA	Pooled OLS	RE OLS	FE OLS	MLE
TRD	-0.043**	-0.043**	-0.044*	-0.043*
	(0.021)	(0.022)	(0.024)	(0.022)
CA_{t-1}	0.827***	0.827***	0.699***	0.825***
	(0.032)	(0.031)	(0.049)	(0.060)
$openess$	0.011***	0.011***	0.020**	0.011***
	(0.004)	(0.003)	(0.008)	(0.003)
pcg	-0.193***	-0.193***	-0.197**	-0.193***
	(0.051)	(0.067)	(0.076)	(0.067)
$deficit$	0.080**	0.080*	0.065	0.080*
	(0.033)	(0.041)	(0.059)	(0.042)
nfa	1.32e-5	1.32e-15	-7.67e-15	1.31e-15
	(1.95e-15)	(1.43e-15)	(5.75e-15)	(1.51e-15)
$logEX$	0.144***	0.144***	1.687**	0.146**
	(0.045)	(0.039)	(0.792)	(0.059)
$rpcy$	0.637	0.637**	0.614	0.643**
	(0.392)	(0.311)	(1.057)	(0.328)
adt	0.042**	0.042**	0.111**	0.042*
	(0.017)	(0.017)	(0.041)	(0.023)
ADV	0.189	0.189	-	0.195
	(0.171)	(0.238)		(0.346)
$constant$	-2.925**	-2.925**	-8.980**	-2.972*
	(1.260)	(1.169)	(3.629)	(1.581)
$Observations$	626	626	626	626
$R-squared$	0.88	0.88	0.63	-

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Looking at how TRD affects the current account in Table 11, we see that it has a significant impact, unlike Financial Repression measured by IRC or Real Interest Rate. The TRD variable is significant at different levels across all four regression models. In our analysis, a lower central bank interest rate than the Taylor rule suggests leads to a decrease in the current account balance by 4.3-4.4% for every percentage point increase in TRD. This result contradicts our hypothesis that a lower interest rate would help maintain a higher current account by reducing the cost of bearing debt. As mentioned before, fewer observations are available for TRD compared to the other measures. Therefore, a significant result for IRC or Real Interest Rate would provide stronger evidence for a negative relationship. Nevertheless, we still consider the result for TRD as a measure of Financial Repression robust since we deem 626 observations sufficient for conducting an empirical analysis.

Another way to look at the relationship between TRD and the current account that might explain the negative relationship is that the Financial Repression is causing the current account deficits. When Financial Repression is present, and the domestic interest rate is lower than the Taylor rule suggests, it allows the government to take on debt cheaper than it otherwise could have. In this light, we might explain that TRD has a negative effect on the current account as the country pounces on the opportunity to invest at a relatively cheap cost. When, on the other hand, Financial Repression eases and the interest rate rises, this makes the country more reluctant to invest and instead chooses to save at a higher interest rate. However, this explanation is contrary to the relationship that Johansson and Wang (2012) found, where an increase in Financial Repression decreased the number of investments and increased the current account. Therefore, we have contradicting indications of how Financial Repression affects the current account, and the relationship remains hazy.

When we look at the controlling variables, we find that the openness to trade significantly affects the current account this time. This means a positive relationship exists between the two variables, aligning with previous research. Furthermore, we find that age dependency has the expected effect as a larger working-age population leads to an increase in the current account. We also find that the logarithm of the exchange rate is now significant, meaning that a cheaper currency leads to an increase in the current account.

To summarize our empirical analysis, we first saw that Financial Repression had a significant negative relationship with the exchange rate, which implies that more Financial Repression

tends to appreciate the domestic currency. This was in line with our hypothesis but contradicted previous research. For the case of the current account, however, we only found a significant negative relationship with TRD which does not give broad support for the relationship. This contradicts our hypothesis and previous research and indicates that no clear relationship between Financial Repression and the current account was found. In the next section, we will discuss the implications of these results further.

6. Discussion

In this section, we want to elevate our analysis from specific to general. As Financial Repression is a relatively unexplored research territory, we want to discuss how our findings fit into established economic theories. Furthermore, we want to discuss how Financial Repression, through exchange rates and current accounts, affects other macroeconomic variables, which has important policy implications. Finally, we want to analyze the strengths and drawbacks of our chosen measures of Financial Repression. As we find no significant robust results for the relationship between Financial Repression and the current account, we will not elaborate on this relationship in our discussion.

6.1 Relating Results to Economic Theory and Implications for the Economy

According to the New Keynesian framework, a suppressed real interest rate under Financial Repression could be seen as an expansionary fiscal policy, equivalent to a tax on savings and subsidizing investments. All other things equal, this would lead to greater economic activity and aggregate demand. The increase in aggregate demand will lead to more inflation, forcing the central bank to increase the interest rate to dampen inflation. Nonetheless, the interest rate will remain low under Financial Repression, resulting in even higher inflation.

While higher inflation helps the government in reducing its debt payments, it can be harmful to the overall economy and, in addition, leads to currency depreciation. However, our findings do not support that higher inflation leads to currency depreciation, as we find that Financial Repression instead appreciates the currency. This could be because when the government controls the financial market, it negatively affects the exchange rate more than the positive impact of higher inflation.

Assuming that Financial Repression leads to domestic currency appreciation, this will affect households and businesses in the country. An appreciation in the currency will strengthen the purchasing power of households as goods and services become cheaper to import. The effect on businesses in the country will instead depend on how dependent they are on exports of

goods and services. If most businesses of the country depend on exports, they will be negatively affected by currency appreciation, as the demand for these exports will diminish. If businesses are instead dependent on imports, they will gain from the stronger currency value.

Our research has included both economies with floating exchange rates and fixed exchange rates. The analysis and implications differ if we specifically look at how Financial Repression affects a fixed exchange rate. As a fixed exchange rate will not be affected by the suppressed interest rate under Financial Repression, this will instead lead to lowered central bank currency reserves as capital flows out of the country. A sharp reduction of the currency reserves is not only bad as it drains the buffer for central banks to handle economic emergencies, but it may also lead to speculative attacks towards the currency that could harm the economy. In this light, Financial Repression is less attractive to economies with a fixed exchange rate as it is more risky than for economies with a floating exchange rate.

In our paper, we have assumed that countries can affect the domestic interest rate. In contrast, the world market interest rate remains unaffected, meaning that Financial Repression can only lower the cost of domestic debt. This assumption is not trivial in economic theory as it is usually assumed that economies that are large enough can affect the world market interest rate. If this were the case, suppressing interest rates through Financial Repression would be even more attractive to large economies as it lowers the interest rate on domestic and foreign debt.

To assume that large economies can affect the world market interest rate will not change the interpretation of our results regarding the exchange rate. Instead, with this assumption and the result from our research, we can expect that the recent debt surge in many large economies will invite them to impose Financial Repression, which will lead to currency appreciation for these economies. This could benefit emerging market economies as this would be equivalent to a depreciation of their currencies, which benefits their export sector. They will also benefit from the lower world market interest rate as this lowers their current debt and future investment costs.

6.2 Discussion of Different Measures of Financial Repression

Financial Repression is a complex concept and could be described as a suitcase word; it contains nothing in itself, but we can pack a lot of stuff in it. For our study, we define Financial Repression as policies that try to reduce the burden of high debt levels. As no individual variable can capture all this, and only this, we chose to use three different measures with their own strengths and weaknesses to capture the phenomena. Because of this, a comprehensive discussion of the measures chosen and their characteristics is needed.

IRC is a measure of Financial Repression with a critical advantage: it directly captures the government's policies that aim to suppress interest rates. This makes it a good measure of the "input" of Financial Repression, compared to measures like Real Interest Rate and TRD, which only capture its effects. However, IRC has limitations. It is tightly defined and may not capture increases in Financial Repression from other sources. It may also pick up policies aimed at financial stability rather than government debt reduction. For example, Table 21 in Appendix 5 shows that IRC reacts to both financial stability and government debt, while the Real Interest Rate and TRD do not. Further analysis reveals that at least two out of seven variables used to calculate IRC do not fit our definition of Financial Repression. These two indicators are linked to the Basel Convention and should be classified as financial stability regulations rather than Financial Repression.

Real Interest Rate and TRD are measures of Financial Repression that focus on the "output" of policies, meaning their actual effects on the economy. This allows them to capture instances when Financial Repression is present but implemented in a less outspoken and more reticent way than through policies that directly suppress interest rates. However, a low Real Interest Rate or high TRD does not always indicate that a country is trying to lower its debt burden. Factors like the real business cycle and decisions by the central bank can also affect these measures. As a result, these measures may sometimes interpret too much as Financial Repression, which could explain why we did not find a significant result for Real Interest Rate.

Despite these limitations, using all three measures - IRC, Real Interest Rate, and TRD - can give us a more complete understanding of how Financial Repression affects the exchange rate

and the current account. By considering the strengths and weaknesses of each measure, we can get a clearer picture of the complex phenomenon of Financial Repression.

7. Concluding Remarks

7.1 Summary and Conclusion

This paper has aimed to investigate how Financial Repression affects the exchange rate and the current account. For the exchange rate, there have been limited previous studies on the subject, except for the anecdotal evidence of how China and Japan have used financial regulation policies to keep their currency undervalued. We have conducted the first large-scale empirical analysis on this subject and found evidence that Financial Repression has a negative impact on the exchange rate. The findings aligned with our hypothesis, where we proposed that governments use Financial Repression policies to lower the cost of government debt by appreciating the domestic currency. Our approach of considering various models and including three measures of Financial Repression makes us believe that the results are robust. Nevertheless, we remain humble in our conclusions, recognizing the need for further research. Hopefully, this serves as an initial stride within the literature to unravel the connection between Financial Repression and the exchange rate.

As for the current account, previous studies by Johansson and Wang (2012) found a positive relationship between Financial Repression and the current account. However, we aimed to improve and expand their research by addressing the issues that arise in an empirical analysis of panel data, such as heteroskedasticity and autocorrelation. Our analysis yielded different results. We found no significant relationship between IRC and Real Interest Rate with the current account, while TRD significantly impacted the current account. We suggest that our results are trustworthy. Nonetheless, the big difference between our and previous research is still worrisome. There could be several reasons for the discrepancy between our findings and previous research. It is possible that some aspects of Financial Repression do not affect the current account, while other measures do. Alternatively, the relationship between Financial Repression and the current account may depend on the period and country. Our study covered a more extended period and included more countries, which could have contributed to the difference in results. In summary, more research is needed within this area. Our findings suggest that the relationship is unclear at best.

7.2 Further Research

A suggestion for further research would be to investigate how governments use their financial repression policies to lower debt levels. We have found a correlation between more Financial Repression and an appreciation of the domestic currency. Do governments intend to appreciate the domestic currency when implementing these policies, or does Financial Repression lead to appreciation regardless of whether this is the intention?

Our non-significant result for how Financial Repression affects the current account was both surprising and contradicting to previous research. This should inspire further research to clarify the relationship between Financial Repression and the current account or establish no such relationship. As we find it hard to believe that Financial Repression should not affect the current account, we hope that further research can find the relationship we did not manage to capture.

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Appendix

Appendix 1

In Table 12, we list every country included in our study. We list if they are indexed as an advanced or emerging market economy and report for which years we have observations for the respective measure of Financial Repression. What we define as an advanced economy is what is considered an industrial economy by the IMF and Abiad et al. (2010). All other economies are what we consider emerging market economies.

Table 12. List of all countries included in our dataset.

List of countries	Advanced economy	Interest Rate Controls	Real Interest Rate	Taylor Rule Reviation
Albania	No	1991-2017	1991-2017	-
Algeriet	No	1973-2017	1995-2017	-
Argentina	No	1973-2017	2010-2017	-
Australien	Yes	1973-2017	1973-2017	1990-2017
Austria	Yes	1973-2017	-	1999-2017
Azerbaijan	No	1991-2017	1998-2017	-
Bangladesh	No	1973-2017	1976-2017	-
Belarus	No	1992-2017	1992-2017	-
Belgium	Yes	1973-2017	-	1999-2017
Bolivia	No	1973-2017	1987-2017	-
Brazil	No	1973-2017	1997-2017	-
Bulgaria	No	1991-2017	1992-2017	-
Burkina-Faso	No	1973-2017	2005-2017	-
Cameron	No	1973-2017	-	-
Canada	Yes	1973-2017	1998-2017	1996-2017
Chile	No	1973-2017	1985-2017	1995-2017

China	No	1981-2017	1981-2017	-
Colombia	No	1973-2017	1986-2017	-
Costa Rica	No	1973-2017	1982-2017	-
Cote d Ivore	No	1973-2017	2005-2017	-
Czech Republic	No	1990-2017	1993-2017	1996-2017
Denmark	Yes	1973-2017	-	1987-2017
Dominican Republic	No	1973-2017	1991-2017	-
Ecuador	No	1973-2017	-	-
Egypt	No	1973-2017	1976-2017	-
El Salvador	No	1973-2017	-	-
Estonia	No	1991-2017	-	1999-2017
Ethiopia	No	1973-2017	1985-2017	-
Finland	Yes	1973-2017	-	1999-2017
France	Yes	1973-2017	-	1999-2017
Georgia	No	1991-2017	2003-2017	-
Germany	Yes	1973-2017	-	1999-2017
Ghana	No	1973-2017	-	-
Greece	Yes	1973-2017	-	1999-2017
Guatemala	No	1973-2017	1997-2017	-
Hong Kong SAR	No	1973-2017	1990-2017	-
Hungary	No	1990-2017	1992-2017	1995-2017
India	No	1973-2017	1978-2017	-
Indonesia	No	1973-2017	1986-2017	-
Ireland	Yes	1973-2017	-	1999-2017
Israel	No	1973-2017	2013-2017	1995-2017
Italy	Yes	1973-2017	1989-2017	1999-2017

Jamaica	No	1973-2017	1976-2017	-
Japan	Yes	1973-2017	1993-2017	1988-2017
Jordan	No	1973-2017	1997-2017	-
Kazakstan	No	1991-2017	-	-
Kenya	No	1973-2017	1973-2017	.
Korea	No	1973-2017	1996-2017	2009-2017
Kyrgyz Republic	No	1991-2017	1996-2017	-
Latvia	No	1992-2017	-	1999-2017
Lithuania	No	1992-2017	-	2002-2017
Madagascar	No	1973-2017	1989-2017	-
Malaysia	No	1973-2017	1973-2017	-
Mexico	No	1973-2017	1993-2017	2008-2017
Morocco	No	1973-2017	-	-
Mozambique	No	1973-2017	1997-2017	-
Nepal	No	1973-2017	-	-
Netherlands	Yes	1973-2017	1999-2013	1999-2017
New Zealand	Yes	1973-2017	1998-2017	1999-2017
Nicaragua	No	1973-2017	1998-2017	-
Nigeria	No	1973-2017	1973-2017	-
Norway	Yes	1973-2017	2013-2017	1991-2017
Pakistan	No	1973-2017	2004-2017	-
Paraguay	No	1973-2017	1994-2017	-
Peru	No	1973-2017	1985-2017	-
Philippines	No	1973-2017	1976-2017	-
Poland	No	1990-2017	-	1998-2017
Portugal	Yes	1973-2017	-	1999-2017
Romania	No	1990-2017	1993-2017	2003-2017

Russia	No	1993-2017	1997-2017	-
Senegal	No	1973-2017	2005-2017	-
Singapore	No	1973-2017	1978-2017	-
South Africa	Yes	1973-2017	1973-2017	-
Spain	Yes	1973-2017	-	1999-2017
Sri Lanka	No	1973-2017	2001-2017	-
Sweden	Yes	1973-2017	1992-2006	1994-2017
Switzerland	Yes	1973-2017	2008-2017	2000-2017
Tanzania	No	1973-2017	1992-2017	-
Thailand	No	1973-2017	1976-2001, 2004-2017	-
Tunisia	No	1973-2017	-	-
Turkey	Yes	1973-2017	-	2002-2017
Uganda	No	1973-2017	1983-1992, 1994-2017	-
Ukraine	No	1991-2017	1992-2017	-
United Kingdom	Yes	1973-2017	1973-2014	1985-2017
United States	Yes	1973-2017	1973-2017	1990-2017
Uruguay	No	1973-2017	1976-2017	
Uzbekistan	No	1991-2017	2013-2017	-
Venezuela	No	1973-2017	1984-2014	-
Vietnam	No	1990-2017	1993, 1996-2017	-
Zimbabwe	No	1973-2017	2012-2017	-

Appendix 2

Table 13. Description and source of variables included in our study.
Abbreviations:
WEO - World Economic Outlook, provided by IMF
IMF - International Monetary Fund
WDI - World Development Indicators, provided by World Bank

Variable	Source	Description	Unit
CA	WEO	Current account balance, calculated as net exports plus net investments	Percentage of GDP
logEX	WEO, IMF	Nominal exchange rate (annual average)	Logarithm of national currency units per U.S. dollar
IRC	Jafarov et al. (2019)	Index of interest rate controls	Qualitative scale (0–3)
Real Interest Rate	WDI	The real interest rate	Percent
TRD	IMF, WEO, Jafarov et al. (2019)	The Taylor rule deviation, calculated by subtracting the estimated Taylor rule interest rate with the central bank interest rate	Percentage points
money	WEO	Stock of broad money	National currency; various units depending on currency
rbondintr	WEO	Real interest rate on government bonds	Percent
inflation	WEO	Annual inflation rate (percent change in the consumer price index)	Percent
rgdpna	Jafarov et al. (2019)	Real GDP at constant 2011 national prices	Millions of 2011 dollars

growth	WEO	Annual real GDP growth	Percent
openness	WEO	Openness to trade, calculated, calculated by summing exports and imports of goods in service	Percentage of GDP
pcg	WEO	Real annual per capita growth	Percent
deficit	WEO	Fiscal balance	Percent of fiscal year GDP
nfa	WDI, IMF	Net foreign assets. The sum of foreign assets held by monetary authorities and deposit money banks	National currency; various units depending on currency
rpcy	WEO	Relative income, calculated as the ratio of per capita GDP to the US per capita GDP	Percent
adt	WDI	Age dependency ratio	Percent of working-age population

Appendix 3

Table 14. Test statistics for stationarity, heteroskedasticity and autocorrelation for the logarithm of the exchange rate.

Testing for	**Name of test**	**Null– hypothesis**	**P-value**
Stationarity	Fisher-type unit root test	All panels contain unit root	0.000
Heteroskedasticity	Breush and Pagan Lagrange Multiplier test for heteroskedasticity	Homoscedastic errors	0.000
Autocorrelation	Breusch-Godfrey test for autocorrelation	No autocorrelation	0.000

Table 15. Test statistics for stationarity, heteroskedasticity and autocorrelation for the current account.

Testing for	**Name of test**	**Null– hypothesis**	**P-value**
Stationarity	Fisher-type unit root test	All panels contain unit root	0.000
Heteroskedasticity	Breush-Pagan LM Lagrange test for heteroskedasticity	Homoscedastic errors	0.000
Autocorrelation	Breusch-Godfrey test for autocorrelation	No autocorrelation	0.000

Table 16. Correlation between measures of Financial Repression and control variables with the logarithm of the exchange rate as the dependent variable.

Control variables	**IRC**	**Real Interest Rate**	**TRD**
$logEX_{t-1}$	0.48	-0.45	0.07
$money$	-0.13	0.38	-0.13
$rbondintr$	0.01	-0.64	0.33
$inflation$	0.22	-0.65	**-0.90**
$rgdpna$	-0.09	-0.23	0.25
$growth$	0.38	**0.84**	-0.04
ADV	0.22	0.38	-0.20

Table 17. Correlation between measures of Financial Repression and control variables with the current account as the dependent variable.

Control variables	**IRC**	**Real Interest Rate**	**TRD**
$logCA_{t-1}$	0.06	0.27	0.31
$openess$	-0.02	0.11	-0.22
pcg	-0.10	-0.13	-0.31
$deficit$	-0.28	-0.34	-0.01
nfa	-0.16	0.11	0.25
$logEX$	0.18	0.37	-0.49
$rpcy$	0.08	0.23	-0.23
adt	-0.57	0.10	-0.09
ADV	-0.18	0.01	-0.06

Table 18. Alternative regression for the logarithm of the exchange rate excluding growth. The result does not significantly differ from the regression including growth.

$VARIABLES$	(1)	(2)	(3)	(4)
$logEX$	Pooled OLS	RE OLS	FE OLS	MLE
$Real\ Interest\ Rate$	0.002	0.002	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
$logEX_{t-1}$	0.975***	0.975***	0.811***	0.855***
	(0.005)	(0.008)	(0.059)	(0.060)
$money$	1.32e-10**	1.32e-10**	-6.60e-12	4.68e-11
	(6.06e-11)	(5.20e-11)	(1.38e-11)	(3.02e-11)
$rbondintr$	0.001***	0.001***	0.001**	0.001***
	(0.000)	(7.78e-05)	(0.001)	(0.001)
$inflation$	-0.004	-0.004	0.003	0.002
	(0.003)	(0.003)	(0.009)	(0.008)
$rgdpna$	-6.36e-09**	-6.36e-09*	4.24e-08***	3.31e-08**
	(2.76e-09)	(3.48e-09)	(1.29e-08)	(1.32e-08)
ADV	-0.106**	-0.106*	-	-0.307
	(0.049)	(0.057)	-	(0.251)
$constant$	0.112***	0.112***	0.448***	0.412**
	(0.024)	(0.028)	(0.139)	(0.173)
$Observations$	1,592	1,592	1,592	1,592
$R-squared$	0.98	0.98	0.97	-

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 19. Alternative regression for the logarithm of the exchange rate excluding inflation. The result does not significantly differ from the regression including inflation.

$VARIABLES$	(1)	(2)	(3)	(4)
$logEX$	Pooled OLS	RE OLS	FE OLS	MLE
TRD	-0.021	-0.004***	-0.004**	-0.004***
	(0.016)	(0.001)	(0.001)	(0.001)
$logEX_{t-1}$	1.003***	1.003***	0.860***	1.003***
	(0.002)	(0.001)	(0.020)	(0.001)
$money$	3.91e-09***	-1.15e-10***	-1.17e-10***	-9.44e-11***
	(1.96e-10)	(1.08e-11)	(1.09e-11)	(1.42e-11)
$rbondintr$	0.001	0.006*	0.006	0.005
	(0.001)	(0.004)	(0.004)	(0.004)
$rgdpna$	-4.89e-08***	-1.35e-09	-1.30e-08	1.17e-09***
	(1.78e-18)	(1.78e-10)	(1.79e-08)	(3.79e-10)
$growth$	0.045*	0.011***	0.002***	0.011***
	(0.023)	(0.002)	(0.001)	(0.002)
ADV	-0.308	0.377	-	0.388
	(0.237)	(1.040)		(1.043)
$constant$	-0.002	-0.002	0.165	-0.002
	(0.006)	(0.005)	(0.023)	(0.355)
$Observations$	585	585	585	585
$R-squared$	0.99	0.99	0.99	-

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 4

Table 20. Alternative regression for the logarithm of the exchange rate with Real Interest Rate as measure for Financial repression and excluding the real interest rate on government bonds.

$VARIABLES$	(1)	(2)	(3)	(4)
$logEX$	Pooled OLS	RE OLS	FE OLS	MLE
$Real\ Interest\ Rate$	0.002	0.002	0.001	0.001
	(0.002)	(0.002)	(0.001)	(0.002)
$logEX_{t-1}$	0.977***	0.977***	0.814***	0.935***
	(0.005)	(0.008)	(0.062)	(0.018)
$money$	1.06e-10*	1.06e-10*	-1.21e-11	1.05e-10
	(6.07e-11)	(5.73e-11)	(8.10e-12)	(7.06e-11)
$inflation$	0.001***	0.001***	0.001**	0.001***
	(0.001)	(7.14e-05)	(0.001)	(5.72e-05)
$rgdpna$	-2.98e-09	-2.98e-09	4.18e-08***	1.35e-08*
	(2.65e-09)	(3.65e-09)	(1.28e-08)	(7.69e-09)
$growth$	-0.015**	-0.015*	-0.006	-0.012
	(0.007)	(0.008)	(0.010)	(0.008)
ADV	-0.152***	-0.152**	-	-0.221*
	(0.053)	(0.062)		(0.133)
$constant$	0.166***	0.166***	0.468***	0.263***
	(0.049)	(0.046)	(0.124)	(0.084)
$Observations$	1,592	1,592	1,592	1,592
$R-squared$	0.98	0.98	0.98	-

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix 5

IRC may catch more than just policies aiming to decrease the cost of high debt levels. To test this, we have created the following model.

$$(6)\ Financial\ Repression_{it} = \beta_1 + \beta_2 laggedZscore_{it} + \beta_3 laggedGovDebt_{it} + \varepsilon_{it}$$

Where the dependent variable is $Financial\ Repression$ which is measured in three different ways; IRC, Real Interest Rate and TRD. As explanatory variables, we have $laggedZscore$ and $laggedGovDebt$ where the first is the lagged value of the country's Z-score, and the latter is the lagged value of the country's government debt. Z-score is a common measure of financial stability calculated by adding the Z-score of every individual financial institution relative to its size. A high Z-score indicates high financial stability. We have a Z-score for 90 countries ranging from 2000 to 2017 (IMF database). The lagged value of the country's government debt is collected from Jafarov et al. (2019) and contains the same 90 countries as for the Z-score, ranging from 1973 to 2017. For a complete list of countries, please refer to Appendix 1. The result of the regression is presented in Table 20.

Table 21. Reason for Financial Repression.

Variable	IRC	Real Interest Rate	TRD
Lagged Z-score	0.006**	-0.034	0.081
	(0.004)	(0.055)	(0.084)
Lagged Government Debt	0.005***	-0.027**	-0.036**
	(0.001)	(0.016)	(0.016)

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As seen in Table 20, IRC is positively related with both explanatory variables at 5 respectively 1 percent significance level, indicating that IRC reacts to both financial stability and government debt. This is evidence that IRC fails to distinguish between policies that aim to ease the burden of government debt and policies that aim to stabilize the financial market. However, it is surprising that a high Z-score, meaning high financial stability, leads governments to increase the pressure of Financial Repression.