

Sovereign credit rating provision and financial development

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Abstract

This paper investigates the relevance of having a sovereign credit rating for a country's financial development. After controlling for endogeneity and selection bias, we compare different aspects of the financial sector and the capital markets of recently rated countries with otherwise similar, but unrated countries. We find that obtaining a sovereign credit rating changes the composition of the assets of domestic banks and leads to a growth in bank assets. With a sovereign rating, the government is less dependent on bank financing and can tap international bond markets instead. Banks subsequently provide more credit to the private sector, which translates into a riskier credit portfolio, resulting in an increase in the banks' risk-weighted assets. A sovereign credit rating provision leads to a growth in local currency bond issues and increases the weight of foreign currency bond issues in the total bond issue activity. We also show that a sovereign credit rating attracts foreign investors, both FDI and portfolio investments. Hence, we conclude that a sovereign credit rating provision plays a crucial role in enabling the financial development in a country.

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1 Introduction

When a country solicits for a sovereign credit rating from one of the globally recognized ratings agencies (Moody's, Standard & Poor's and Fitch), this typically reflects the intention to borrow internationally. Credit ratings signal the debt issuer's default risk and help investors determine the risk premium they should demand to compensate for this risk. When countries get rated for the first time, uncertainty about the credit risk of opaque sovereigns shrinks, which in turn will help channel more funds towards these typically less developed countries. A credit rating is instrumental for attracting investments because many investors prefer rated securities over unrated ones of apparently similar credit risk and rated securities are priced at a higher level (Duff and Einig, 2015). Boot et al. (2005) show that credit rating agencies play an economically meaningful role in reducing financial fragility in two ways. First, the agencies' credit watch procedures reduce monitoring costs. Second, credit ratings play a crucial role in the investment allocation decision of institutional investors like pension fund managers who are bound by regulatory constraints. Rating-contingent regulation as in Basel III guidelines consist of a preferential treatment of highly rated securities which implies that better rated countries face lower regulatory compliance costs (Opp et al., 2013). The importance of sovereign credit ratings is further highlighted by Kim and Wu (2008) who show that foreign currency debt ratings encourage financial sector development and are a catalyser in attracting capital flows.

Although there is general consensus in the literature that being rated is of great economic importance for a country, to our knowledge no study is able to determine the precise impact of a sovereign credit rating provision on the country's financial markets. The only exception is Kim and Wu (2008), who run a panel regression to explain different measures of financial development by sovereign credit ratings. They find that long-term credit ratings have a positive impact on financial sector development and coincide with an increase in capital inflows, while short-term credit ratings retard financial development and capital flows. Kim and Wu's results are encouraging, but the methodology used is not immune for endogeneity issues, more specifically reverse causality and sample selection bias. By construction, their study only covers rated countries which prevents a comparison of these countries with rated, but otherwise similar counterparts.

In this paper, we investigate the impact of a sovereign credit rating provision on a country's domestic and international financial development. Figure 1 illustrates the idea. We make a distinction between the domestic financial sector and a country's integration in the international financial markets. The contribution of our paper is twofold. Our first contribution is methodological. Establishing a causal link between credit rating provision and financial development is an exercise plagued by reverse causality issues and selection bias. We control for both problems simultaneously by preprocessing the data with an entropy balancing approach and a Heckman selection correction. This process ensures a valid comparison of rated and unrated countries and we are able to pinpoint the precise impact a credit rating has on the

country's financial sector. Other studies mainly focus on rated countries only and the impact of down- and upgrades on their financial markets. Our focus is different. We investigate whether and to what extent having a sovereign rating has an impact on a country's financial development. This differentiation of rated and unrated countries in terms of financial development has, to our best knowledge, not yet been investigated so far. Including also unrated countries in the analysis prevents to assign the effect of a rating to a general trend of improved financial development across the globe.

The second contribution of this work is empirical. We find that when a country receives its initial rating, the government can borrow from other sources than the banking sector. As a result, local banks lend less to the government and increase their lending to the private sector. This is not just a substitution effect though, local banks also experience total asset growth in the post-rating years. The result of the growth in bank assets and the rebalancing of the asset portfolio leads to a growth in the banks' risk-weighted assets. Next to the asset holdings, we show that a sovereign credit rating provision leads to an increase in the liquidity position of the banks. Banks experience a growth in liquid assets and in short term liabilities which reflects an easier access to short term financing. With respect to the bond markets, we find that rated countries issue longer maturity bonds compared to unrated countries, hereby reducing the maturity mismatch that burdens developing country debt. The currency mismatch in borrowing is reduced as well, we report a significant increase in local currency bond issue size for rated countries. We also find that a sovereign credit rating helps attract foreign investors. After a country is rated, its ratio of inward foreign direct debt investments to GDP is three percent lower and ratio of foreign direct equity investments to GDP is one percent higher compared to unrated countries. Foreigners also hold more portfolio investments from recently rated countries. After receiving the initial rating, portfolio debt investments to GDP is one percent higher and portfolio equity investments to GDP is one percent lower in rated countries. Subsequent to a rating provision, the international banking activities in terms of foreign loans and deposits is higher in rated countries than in unrated countries.

To summarize, we find that having a sovereign credit rating is beneficial for the financial development of the country, even if the rating is below investment grade. This means that credit rating agencies act as important providers of information, especially in countries where information gathering costs are high.

The paper is structured as follows. Section 2 reviews the relevant literature on the impact of sovereign credit risk on a country's financial market. In Section 3 we explain the methodology and Section 4 describes the data. We examine the impact of an initial sovereign credit rating on financial development in Section 5 and in Section 6 we provide the results of the robustness checks. Section 7 concludes.

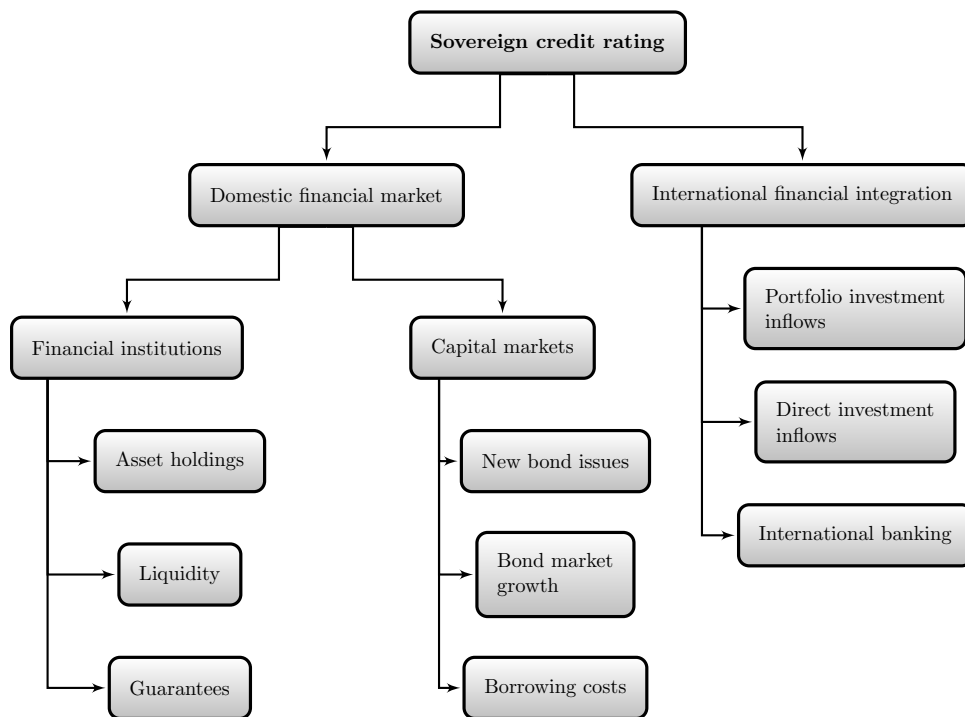


Figure 1: The impact of sovereign credit rating provision on financial development

2 Sovereign credit risk and financial development

To get a better understanding of the potential spillover effects of a sovereign credit rating, the following sections review the literature on the transmission channels of sovereign credit risk to the financial system. More specifically, we discuss the spillover effects from sovereign credit risk to respectively the banking sector, bond and stock markets and international capital flows. We then develop the hypotheses that will be tested in Section 5.¹

2.1 Sovereign credit risk and the banking sector

Based on a report of a study group at the Bank of International Settlements BIS (2011) and Drago and Gallo (2017), we distinguish four channels that transmit sovereign credit risks to financial institutions, notably an *asset holdings channel*, a *liquidity channel*, a *guarantee channel* and a *rating channel*. We discuss each of the transmission channels in the following paragraphs.

First, the asset holdings channel refers to the potential losses in a bank's balance sheet assets resulting from an increase in sovereign credit risk. Angeloni and Wolff (2012) show that during the Euro debt crisis in 2011, banks' holdings of sovereign bonds of vulnerable

¹Throughout the text, we use the terms sovereign credit risk and sovereign credit ratings interchangeably because a sovereign credit rating is supposed to be a good proxy for sovereign credit risk.

countries were severely affected which resulted in a negative stock market performance of banking shares. This negative effect on stock market performance was only temporary and the impact of sovereign distress on banks' performances was highly dependent on the banks' geographical location. The asset holdings channel is also found to be an important cause of contagion between bank and sovereign default risk by DeBruyckere et al. (2013) who show that banks that have high sovereign debt exposures suffer more contagion from sovereign credit risk. Drago and Gallo (2017) study the impact of sovereign rating revisions on banking activity and find that a sovereign rating downgrade significantly increases the risk-weighted assets of banks. Becker and Ivashina (2018) show that a form of financial repression arises in periods of sovereign financial distress. Governments put pressure on local banks to buy newly issued government debt at below market rates. As a result, the corporate lending of banks gets crowded out and the composition of the banks' assets changes dramatically with an increasing weight in sovereign debt holdings.

Second, the liquidity channel implies that sovereign financial distress reduces the value of the collateral to obtain short-term financing from the central bank and the interbank market. DeBruyckere et al. (2013) and Drago and Gallo (2017) find that the impact of deteriorating sovereign credit quality on banks' capital ratios and lending supply is amplified if they rely heavily on short-term funding during periods of sovereign distress. Negative liquidity shocks are quickly transmitted across banks and internationally. During the European sovereign debt crisis of 2011, U.S. branches of euro-area banks suffered dollar liquidity shortage in the form of reduced access to large time deposits from U.S. money market funds. This liquidity shock led to a decrease in corporate lending in the U.S., which negatively affected U.S. firms' investment (Correa et al., 2016). Popov and VanHoren (2014) come to the same conclusion about the spillover effects of sovereign distress on bank lending. They show that a deteriorating creditworthiness of foreign sovereigns reduces the lending activity of banks holding the distressed sovereign debt. Directly linking credit ratings to banks' access to funding, Mensah et al. (2017) and Kim and Wu (2011) show that a positive sovereign rating announcement helps banks to access capital from the international interbank market at lower costs. Funding costs of banks in emerging markets are inversely related to the sovereign credit rating of the home country.

The third transmission channel of sovereign credit risk to financial institutions is the guarantee channel. The value of government guarantees depends crucially on the government's fiscal position. Banks traditionally benefited from an implicit (in some cases even an explicit) government guarantee which lowered the banks' funding cost. However, if the fiscal position of a sovereign deteriorates, so does the value of its government guarantees, which then increases the cost of funding (Acharya et al., 2014). Correa et al. (2014) emphasize that investors perceive sovereign and bank risks as interconnected through the government guarantee channel. They find that sovereign rating downgrades have a pronounced negative impact on banks' stock returns, especially if these banks are expected to receive strong support from their government. Alter and Schuler (2012) find that sovereign CDS spreads impact the spreads of banks' CDS

after the government interventions on distressed banks during the European debt crisis. The government guarantee channel is especially relevant for large financial institutions that are considered to be too-big-to-fail. For large banks, the government is expected to intervene when a default is imminent. Seemingly contradicting this expectation, DeBruyckere et al. (2013) find that in general global banks are less sensitive to spillover effects from increased sovereign credit risk. However, the impact of bank size on the spillover effects of sovereign credit risk is reversed when tested on domestic banks. The excess correlation between bank default risk and the home country's sovereign credit risk is larger for large domestic banks because these banks' perceived riskiness depends crucially on the probability of government intervention.² Williams et al. (2015) assess the impact of sovereign rating actions on banks in emerging countries and find that the guarantee channel does not play a role of importance to explain the impact of sovereign downgrades on bank valuation. Instead, Williams et al. find the rating channel as discussed below to be the main transmission channel of sovereign credit risk to bank valuation.

The fourth transmission channel of sovereign to financial institutions' default risk is identified as a rating channel, which implies that sovereign credit ratings have a strong spillover effect on the home country's bank ratings (Alsakka et al., 2014, Williams et al., 2013). The sovereign debt ceiling plays a crucial role here. Empirical evidence has shown that credit ratings of private-sector bonds are typically lower than the sovereign ratings of the home country of the bond issuers (Borensztein et al., 2013). Williams et al. (2013) study the impact of sovereign rating actions on bank ratings in emerging markets and find that bank ratings in emerging countries closely follow the ratings of their home country, irrespective of the ownership structure of the bank (state-owned, foreign-owned, or local privately-owned). In a follow-up study, Williams et al. (2015) show that sovereign credit rating actions have a significant effect on emerging market bank valuations, especially when the rating action considers new rating information. The sovereign rating actions of S&P are found to have the biggest effect on bank valuation.

The literature on the transmission of sovereign credit risk to the banking sector allows us to develop testable hypotheses regarding the impact of a sovereign credit rating provision. Based on the asset holdings transmission channel we expect that a sovereign credit rating provision has a positive effect on the banks' total assets. Not only do we expect a growth in bank assets, we also argue that the composition of the asset portfolio may change. When sovereigns are able to tap international bond markets, they are no longer solely dependent on bank borrowing. As a consequence, banks will have spare funds to grant more loans to the private sector. Because of the sovereign debt rating ceiling, the rebalancing of the banks' asset portfolios result in higher risk-weighted assets. Thus, we define the first set of hypotheses as follows:

²Excess correlation is equal to the correlation between bank and sovereign CDS spreads over and above what is explained by common factors.

Hypotheses set 1: In recently rated countries a) banks' assets are larger, b) banks provide more (less) credit to the private sector (sovereign state), and c) banks have higher risk-weighted assets than in unrated countries.

We also want to assess the effect of a sovereign credit rating provision on the liquidity position of banks. The literature shows that a decrease in sovereign credit risk improves the liquidity position of banks. Receiving an initial credit rating may be considered as a positive rating event because the rating provision reduces information asymmetries and monitoring costs for banks. Hence, we expect that banks' access to short term capital improves. We formulate the second set of hypotheses as:

Hypotheses set 2: In recently rated countries a) banks experience a larger growth in liquid assets, b) banks experience a larger growth in short term liabilities, and c) financial liquidity is higher than in unrated countries.

2.2 Sovereign credit risk and bond and stock markets

The literature on the influence of sovereign credit ratings on stock and bond markets focuses on market responses to rating changes with respect to (i) return and volatility, (ii) market liquidity and (iii) cross-country contagion. Although each of the studies discussed in the following paragraphs investigate the impact of sovereign credit risk on different aspects of bond or stock markets, there are two common findings. First, negative rating events like downgrades and negative outlooks have a significant effect on the capital markets, while upgrades hardly seem to matter. Second, the impact of rating events on stock and bond markets is larger for countries with lower levels of development.

Several studies have demonstrated that a change in the home country's sovereign credit rating or its outlook has a significant effect on bond yields, stock returns and stock and bond market volatility. The effects of rating changes on bond and stock returns are stronger for countries with high inflation and bigger fiscal deficits (Pukthuanthong-Le et al., 2007). For bond market returns, Pukthuanthong-Le et al. (2007) find that a change in the rating outlook has a greater impact than actual rating up- or downgrades, suggesting that investors anticipate the change in a rating. The effect of a change in the outlook is asymmetric: only negative rating announcements have a discernible impact on bond and equity returns and volatility (Afonso et al., 2014, Brooks et al., 2004, Pukthuanthong-Le et al., 2007, Treepongkaruna and Wu, 2012).³ The effects of a rating downgrade are magnified during crises, and especially in case of a loss of investment grade status. An imminent downgrade further destabilizes the stock market by increasing the volatility and depressing market returns (Brooks et al., 2015).

³An exception is Hooper et al. (2008), who finds that upgrades significantly improve the return and decrease the volatility of U.S. dollar denominated stocks.

Sovereign credit rating announcements also affect market liquidity because investors re-balance their portfolios with rating announcements inducing international capital flows from downgraded to upgraded countries (Gande and Parsley, 2014, Kim and Wu, 2008). Sovereign rating downgrades induce significant capital outflows, especially for countries that score badly on the transparency index. Odders-White and Ready (2005) study the relationship between corporate credit ratings and stock market liquidity and find both to be inversely related: companies with poor credit ratings have higher bid-ask spreads. Studying the impact of sovereign debt rating changes on stock market liquidity, Lee et al. (2016) find a positive relationship between sovereign rating events and stock market liquidity. In line with what is found for returns, only downgrades seem to have an impact on the stock market. Especially losing the investment grade status has a strongly negative effect on stock market liquidity, while the positive impact of rating upgrades is negligible.

Sovereign credit ratings serve as an important channel of international financial contagion between emerging countries and this contagion effect is magnified during crisis periods (Li et al., 2008, Glick and Rose, 1999, Ferreira and Gama, 2007, Kaminsky, 2002). Contagion of sovereign credit risk to neighboring countries is also found when credit risk is measured by bond or CDS spreads. The contagion effects of sovereign spreads and ratings are found to be asymmetric, downgrades and increases in credit spreads have a much larger effect than upgrades or narrowing spreads. One exception to this finding is Ismailescu and Kazemi (2010) who find that positive rating events have a greater impact on CDS markets and they are more likely to spill over to other emerging countries, while negative events are found to be anticipated by the market. Christopher et al. (2012) provide evidence for positive rating spillover effects in the stock markets and negative rating spillover effects in the bond markets. Rating upgrades benefit other countries' stock markets in the region, while rating downgrades result in investors shifting their funds from the downgraded stock market to neighboring countries' stocks. So sovereign ratings and outlooks are positively related to regional stock market co-movement. In bonds markets however, sovereign ratings and outlooks negatively impact cross-country market movements, suggesting contagion during rating downgrades.

In this study, we will assess the impact of a sovereign credit rating provision on the development of a country's bond markets.⁴ We assume that countries solicit for a sovereign credit rating when they have the intention to issue internationally traded debt securities in the future. Therefore, we expect that receiving a sovereign credit rating has an immediate effect on the country's bond markets and on the issuance activity of international bonds. Because the provision of a sovereign credit rating can be considered as a positive rating event, we expect that the rating provision will have an impact on borrowing terms with respect to borrowing costs

⁴We do not look at the impact of a rating provision on the stock market because of data scarcity. Our sample is limited to countries that received a credit rating after 2000. These are all low developed countries, most of which do not have a stock exchange.

and bond maturity. The hypotheses regarding the effect of a sovereign credit rating provision on the bond markets are stated as follows:

Hypotheses set 3: Recently rated countries a) issue a larger amount of bonds, b) issue longer maturity bonds, and c) face lower borrowing costs than unrated countries.

In the following section we turn to the importance of sovereign credit risk in attracting international investors.

2.3 International capital flows

If countries are open to investments from abroad, capital can be attracted under the form of foreign direct investments (FDI) or portfolio investments. Conditional on sufficient absorptive capacities, foreign capital can contribute significantly to economic growth. In the case of FDI, there is an additional benefit for the host country because FDI typically comes with a transfer of know-how and technology from the home to the recipient country (Borensztein et al., 1998, Prasad et al., 2007). Although foreign capital has the potential to boost economic growth in the country, foreign investors can also disrupt the economy and may be a cause of instability. The literature shows that both net and gross capital flows are volatile and pro-cyclical.⁵ There is a retrenchment in capital inflows during crisis periods (Broner et al., 2013, Palma, 2002, Mohamed, 2006). Albuquerque (2003) shows that FDI inflows are far less volatile than other forms of foreign capital flows because investments in FDI are much harder to unwind than portfolio holdings.

Over the last two decades, developing countries have attracted a steadily increasing amount of foreign capital under the form of FDI, portfolio debt and portfolio equity flows. This development was caused by the surging capital account liberalization process of the host countries combined with periods of near-zero interest rates in the developed countries which led to a search for yield by investors residing in these countries. Konopczak and Konopczak (2017) show that foreign capital flows are related to sovereign credit risk in two opposing ways. On the one hand, the increasing demand for a country's debt securities decreases bond yields. On the other hand, the over-reliance on external financing and the increased vulnerability to sudden stops of capital inflows increases the sovereign bond yields. There is empirical evidence that for emerging markets, the demand effect outweighs the vulnerability effect (for example Carvalho and Fidora (2015), Andritzky (2012)). Yet, Konopczak and Konopczak (2017) find that the effects depend on the length of the time horizon studied. They show that in the short run, the demand effect prevails reflecting the immediate effect of demand pressure. In the long run however, the emerging market sovereign yields increase with increasing foreign capital flows, reflecting a dominance of the vulnerability effect.

⁵Net capital flows are equal to the difference in gross capital flows, i.e. the net purchases of domestic assets by foreign investors minus the net purchases of foreign assets by domestic investors.

Investigating the drivers of capital flows into BRICS countries, Swamy and Narayana-murthy (2018) find that, amongst other factors, sovereign credit ratings have a significantly positive effect on inward foreign capital. Similarly, Kim and Wu (2008) show that FDI inflows, international banking and portfolio inflows increase significantly when long-term foreign currency ratings of emerging countries improve. Thus, based on the literature, we expect to find a positive effect of a sovereign credit rating provision on a country's inflow of foreign capital because of a reduction of information gathering costs for foreign investors. This assumption leads to the following set of hypotheses:

Hypotheses set 4: Recently rated countries a) attract more FDI inflows, b) attract more foreign investors in debt and equity instruments, and c) have more internationally oriented banks than unrated countries.

3 Methodology: Entropy balancing with Heckman selection

Establishing a causal relation between sovereign credit rating provision and a country's financial development is challenging because of potential reverse causality issues and a sample selection bias.⁶ We combine three techniques so as to reduce these endogeneity issues. First, we apply an entropy balancing approach to preprocess the data to obtain a control set that is as similar as possible to the treatment data set. A detailed description of this approach is provided in the following paragraphs. Second, we control for simultaneity and reverse causality by using lagged values of the predictors in our panel regressions. Third, we control for country and time fixed effects to address a potential omitted variable bias. In addition, our selection of variables is based on a broad literature review and continuous and time-varying variables are added to the model following a two-directional selection procedure. Apart from endogeneity, a self selection bias may occur in our sample of rated countries. This is because sovereign credit ratings are typically solicited for by the government. A country that solicits for a credit rating has prepared for a credit risk evaluation process and therefore a sovereign credit rating cannot be considered as a random event. We address the sample selection bias by following a three-stage approach, combining the entropy balancing approach with the Heckman two-stage model (Heckman, 1976, 1979). Entropy balancing addresses the selection bias due to observed characteristics by eliminating the difference between two groups such that an exact matching of moments is obtained in the final sample. The Heckman two-stage model addresses the selection bias due to unobserved characteristics. To summarize, the model structure is as follows:

1. Compute the rebalancing weights for the control group
2. Determine the Inverse Mills Ratio (IMR) from the selection equation

⁶Endogeneity problems occur when the dependent variable is measured with error, the predictor(s) and the dependent variable are determined simultaneously, or if the model suffers from omitted variables.

3. Estimate a weighted least squares model controlling for the IMR

Each stage of the methodology is explained in detail below.

3.1 Reweighing the control group

In the first stage of our methodology, we apply the entropy balancing data preprocessing technique developed by Hainmueller (2012) to achieve a covariate balance between the treated group and the control group.⁷ In entropy balancing, a covariate balance is obtained by imposing a set of balance constraints that require an equal pretreatment of the covariate means, variances and skewness across the treated and the non-treated groups. By doing so, it is ensured that the sample of unrated countries contains units that are as similar as possible to the rated countries.

In our research setup, obtaining a sovereign credit rating represents the treatment while the level of financial development (for example the size of the banking sector) represents the outcome variable. The units of observation are country-year observations. We consider a sample of n_1 countries that are rated during our sample period as the treatment group and a sample of n_0 countries for which a rating is absent for all years as the control group. Each unit i is exposed to a binary treatment $R_i \in \{1, 0\}$; $R_i = 1$ if unit i has a rating and $R_i = 0$ if i has no rating. Next, we consider X , a matrix of J exogenous pretreatment variables, where $X_{i,j}$ refers to the value of the j th characteristic for unit i such that $X_i = [X_{i,1}, X_{i,2}, \dots, X_{i,J}]$ is the row vector of characteristics for unit i . The densities of the treatment group (control group) are denoted as $f_{X|R=1}$ ($f_{X|R=0}$). $Y_i(R_i)$ denotes the pair of potential outcomes that country i attains if it is rated or not. Observed outcomes, i.e. levels of financial development ($FinDev$), for each country are realized as $FinDev_i = FinDev_i(1)R_i + (1 - R_i)FinDev_i(0)$ such that we simultaneously observe the triple $(R_i, FinDev_i, X_i)$.

The measure of interest is the average treatment effect on the treated country (ATT), which is defined as:

$$ATT = E[FinDev_1|R = 1] - E[FinDev_0|R = 1] \quad (1)$$

The first expectation in equation (1) is the level of financial development when a country is rated. This can be easily estimated from the treatment group data. The second expectation in equation (1) is unobserved. It is the counterfactual outcome for a country that is rated, i.e. the level of financial development that a country would have if it was not rated. To estimate the unobservable expectation, an appropriate proxy should be used. If being rated is a random event, we could compute the ATT by simply comparing the level of financial development of

⁷Since its introduction by Heinmueller, the entropy balancing technique is commonly used in observational studies with binary treatments. In an economic context, entropy balancing has been applied by Neuenkirch and Neumeier (2016) and Balima (2017).

rated and unrated countries (Balima, 2017). However, we expect that being rated is endogenous to macroeconomic variables. One way to solve this is to use a matching approach to mimic randomization with respect to the assignment of the credit rating. In entropy balancing, the rated and unrated units are matched as close as possible with respect of pretreatment characteristics that are (1) correlated with being rated or not and (2) associated with the level of financial development. Thus, equation (1) can be rewritten as follows:

$$ATT = E[FinDev_1|R = 1, X = x] - \int E[FinDev_0|R = 0, X = x]f_{X|R=1}(x)dx, \quad (2)$$

where x is a vector of pretreatment characteristics that affect both the likeliness of being rated and the level of financial development. The last term in equation (2) is equal to the covariate adjusted mean, or the estimated mean of Y in the source population if its covariates were distributed as in the target population (Hainmueller, 2012).

In entropy balancing, the control units are reweighted to match the first three moments of the treatment group. The weights w_i for each control unit are obtained by minimizing the Kullback and Leibler (1951) divergence metric $h(\cdot)$ using a set of base weights $q_i = 1/n_0$, where n_0 is the number of unrated countries. More specifically, the optimization problem is equal to:

$$\text{minimise}_{w_i} H(w) = \sum_{[i|R=0]} h(w_i) = \sum_{[i|R=0]} w_i \ln(w_i/q_i) \quad (3)$$

subject to

$$\sum_{[i|R=0]} w_i c_{si}(X_i) = m_s \text{ with } s \in 1, \dots, S \text{ and} \quad (4)$$

$$\sum_{[i|R=0]} w_i = 1 \text{ and} \quad (5)$$

$$w_i \geq 0 \text{ for all } i \text{ such that } R = 0, \quad (6)$$

where $c_{si}(X_i) = m_s$ describes a set of S balance constraints imposed on the covariate moments of the reweighted control group. More specifically, we impose three balancing constraints to match the first three moments of the variables in X from the target population (rated countries) with the control group (unrated countries). Constraints (5) and (6) represent two normalization constraints. The first condition requires the weights to sum to unity and the second condition imposes a nonnegativity constraint. The mean, variance and skewness of the covariates used in the entropy balancing approach are shown in Table 1. The first three moments of the distribution of the covariates for the treatment group and the control are shown before balancing (Panel A) and after rebalancing (Panel B).

3.2 Selection equation

Following Renders et al. (2010), we control for a sample selection bias caused by unobserved characteristics of the sample countries. We estimate the Heckman (1976, 1979) selection equa-

Table 1: Summary statistics of the covariates used in the entropy balancing

<i>Panel A: Before balancing</i>						
	mean		variance		skewness	
	treat	control	treat	control	treat	control
GDP per capita	7.2705	6.8554	1.1172	1.4834	0.0090	0.8219
FCY reserves	6.4043	5.1538	5.5001	5.0866	-0.7890	-0.1411
Unemployment	0.0963	0.0634	0.0058	0.0034	1.3312	3.1508
Trade/GDP	0.8472	0.8000	0.1204	0.2830	0.8423	3.6453
Current A.C./GDP	-0.0593	-0.0521	0.0089	0.0618	-0.0981	5.3460
Inflation	0.0801	0.0685	0.0106	0.0085	2.8045	2.3918
GDP growth	0.0462	0.0424	0.0015	0.0036	0.9018	4.9328
External debt/GDP	0.5370	0.6737	0.1398	0.6892	1.6190	4.2432
Previous Default	0.1869	0.1611	0.1005	0.0838	1.6415	1.8971
Rule of Law	-0.5080	-0.6689	0.2359	0.5457	0.4259	0.6280
Government Effectiveness	-0.4750	-0.7451	0.1856	0.4644	0.4568	0.7542
Political Stability	-0.2594	-0.4052	0.5078	0.9615	-0.2991	-0.0095
Banking Crises	0.0264	0.0284	0.0257	0.0276	5.9099	5.6771

<i>Panel B: After balancing</i>						
	mean		variance		skewness	
	treat	control	treat	control	treat	control
GDP per capita	7.2705	7.2705	1.1172	1.1172	0.0090	0.0090
FCY reserves	6.4043	6.4043	5.5001	5.5001	-0.7890	-0.7890
Unemployment	0.0963	0.0963	0.0058	0.0058	1.3312	1.3312
Trade/GDP	0.8472	0.8472	0.1204	0.1204	0.8423	0.8423
Current A.C./GDP	-0.0593	-0.0593	0.0089	0.0089	-0.0981	-0.0981
Inflation	0.0801	0.0801	0.0106	0.0084	2.8045	3.6197
GDP growth	0.0462	0.0462	0.0015	0.0015	0.9018	0.9018
External debt/GDP	0.5370	0.5370	0.1398	0.1398	1.6190	1.6190
Previous Default	0.1869	0.1869	0.1005	0.1005	1.6415	1.6415
Rule of Law	-0.5080	-0.5080	0.2359	0.2359	0.4259	0.4259
Government Effectiveness	-0.4750	-0.4750	0.1856	0.1856	0.4568	0.4568
Political Stability	-0.2594	-0.2594	0.5078	0.5078	-0.2991	-0.2991
Banking Crises	0.0264	0.0264	0.0257	0.0257	5.9099	5.9099

Note: The rated countries are the treatment group (*treat*) and the unrated countries represent the control group.

tion that provides the Inverse Mills Ratio (IMR) for the treatment effect as follows:

$$E(1_{i,t}^{sel}) = Probit(\zeta_{i,t}X_{i,t}), \quad (7)$$

where $E(1_{i,t}^{sel})$ is a dummy that is equal to unity if country i is in the treatment group and zero otherwise and X_i is the matrix of J exogeneous pretreatment variables and ζ_i is a vector of unknown parameters. Thus the probit regression in equation (7) estimates the probability to be rated. The IMR is then generated from the probit model and is defined as the ratio of the standard normal density ϕ divided by the standard normal cumulative distribution function Φ :

$$IMR(\hat{\zeta}) = \frac{\phi(\hat{\zeta}X)}{\Phi(\hat{\zeta}X)} \quad (8)$$

3.3 Output equation: weighted least squares

In the third stage, the weights estimated from the first stage are used in a weighted least squares (WLS) regression where a measure of financial development $FinDev$ for country i in year t is explained by a dummy variable R that controls for a country being rated or not in the previous year. The WLS regression specification is as follows:

$$FinDev_{i,t} = \alpha + \beta_1 R_{B,i,t-1} + \beta_2 R_{BB,i,t-1} + \sum_{j=1,J} \gamma_j X_{i,j,t-1} + \delta IMR_{i,t} + \varepsilon_{i,t}, \quad (9)$$

The control variables $X_{i,j}$ are added to the regression model in a stepwise manner. The candidate variables for the stepwise selection procedure are the same covariates as listed in the summary statistics table, but because of the stepwise procedure the final selection of control variables will be only a subset of the original group of candidate variables. Potential variables are selected at each step by adding or dropping them from the full by minimizing the AIC criterion.⁸ The data has an unbalanced panel structure, and we control for country and time fixed effects. The pre-rating period starts in 1999 for each country. The treatment is considered to start in the year preceding the year of the initial rating.

Compared to propensity score matching, entropy balancing provides specific advantages. First, in contrast to nearest neighbor matching, where many data points are discarded, entropy balancing reweights all units to achieve balance, hereby preventing a loss of information. Second, by applying entropy balancing we do not have to specify an empirical model for the rating event, which avoids potential problems of model misspecification or multicollinearity (Neuenkirch and Neumeier, 2016). Third, after running a horse race between different propensity scoring methods and entropy balancing, Harvey et al. (2017) conclude that entropy

⁸For some measures for financial development like the banks' risk-weighted assets and liquid assets, we use first differences instead of levels because of stationarity concerns. In these cases, the model is estimated as a first difference equation.

balancing achieves higher estimation accuracy. In addition, they show that entropy balancing does not require post-processing of the data and effectively mitigates the selection bias in observational studies.⁹ Nevertheless, we provide the estimation results using propensity score matching, propensity score weighting and a matched difference-in-difference analysis in the section with robustness checks.

4 Data

We collect data for countries that received an initial credit rating in the year 1998 or later, the treatment group, and for unrated countries, the control group. Table 2 shows the list of rated countries, the date of the initial rating, the credit rating received and the name of the agency that assigned the initial rating. The last column in Table 2 shows the full period for which data is available. Credit ratings and the initial rating dates are obtained from the websites of the rating agencies and from Thomson Reuters. All the 50 rated countries are developing countries and the variety in the initial ratings is minimal. Initial ratings range from BB+/BB for three countries to CCC+ for Malawi. The low variety in initial sovereign credit ratings justifies the interpretation of the rating event as a binary treatment. One could argue that the impact of sovereign credit rating provision is conditional upon the level of the rating. This cannot be tested in this setting since all ratings are fairly similar. The control group consists of 33 developing countries that are unrated on December 31st, 2018.¹⁰

Our proxies for financial development focus on the banking sector, the bond market and international financial integration. A description of the variables and the data source is provided in Table 3. A first aspect of financial development is the growth of the local banking sector. We measure composition and the size of the assets of the domestic banking sector by (1) the ratio of bank claims on the government to GDP, (2) the ratio of domestic credit provided by the banking sector to GDP, (3) the ratio of total bank assets to GDP, and (4) the growth in the banks' risk-weighted assets. The liquidity position of the banking sector is measured by the growth in the banks' liquid assets and short term liabilities. We also measure a country's financial liquidity more broadly by the variable broad money scaled by GDP. This liquidity measure is used by many researchers as a proxy of financial development. It reflects the depth of the financial market and the overall financial liquidity in a country. It serves as a more

⁹Note that entropy balancing only solves the selection bias resulting from observed characteristics. To solve the selection bias caused by unobserved characteristics of our sample, we apply a Heckman selection correction.

¹⁰The unrated countries are Afghanistan, Algeria, Antigua and Barbuda, Bhutan, Brunei, Burundi, Central African Republic, Chad, Comoros, Djibouti, Dominica, Equatorial Guinea, Eritrea, Guinea, Guinea Bissau, Guyana, Haiti, Kosovo, Laos, Liberia, Mauritania, Myanmar, Nepal, Niger, Samoa, Sao Tome and Principe, Sierra Leone, St. Kitts and Nevis, Tanzania, Togo, Tonga, Vanuatu, Zimbabwe. Tanzania received its initial rating from Moody's on March 2 of 2018. Since, there is no post-rating data for Tanzania in our sample, we include Tanzania in the control group

Table 2: Treatment group: Recently rated countries

Country	Initial rating date	Initial rating	Agency	Sample period
Albania	2007-06-29	B+	Moody's	1996–2018
Angola	2010-05-19	B+	Moody's	2003–2018
Armenia	2006-05-24	BB-	Fitch	1996–2018
Azerbaijan	2000-07-03	B+	Fitch	1996–2018
Bangladesh	2010-04-05	BB-	S&P	1996–2018
Belarus	2007-08-21	B+	S&P	1996–2018
Belize	1999-01-21	BB	Moody's	1996–2018
Benin	2003-12-29	B+	S&P	1996–2018
Bolivia	1998-05-29	B+	Moody's	1996–2018
Bosnia And Herzegovina	2004-03-29	B-	Moody's	1997–2018
Burkina Faso	2004-03-05	B	S&P	1996–2018
Cambodia	2007-04-19	B+	S&P	1996–2018
Cameroon	2003-09-04	B	Fitch	1996–2018
Cape Verde	2003-08-15	B+	Fitch	1996–2018
Cote D' Ivoire	2014-07-08	B+	Moody's	1996–2018
Ethiopia	2014-05-09	B+	Moody's	1996–2018
Fiji	1999-03-31	BB+	Moody's	1996–2018
Gabon	2007-10-29	BB-	Fitch	1996–2018
Gambia	2002-11-11	B-	Fitch	1996–2018
Georgia	2005-12-06	B+	S&P	1996–2018
Ghana	2003-09-04	B+	S&P	1996–2018
Grenada	2002-03-22	BB-	S&P	1996–2018
Honduras	1998-09-29	B	Moody's	1996–2018
Iran	1999-06-10	B	Moody's	1996–2018
Jamaica	1998-03-30	BB-	Moody's	1996–2018
Kenya	2006-09-08	B+	S&P	1996–2018
Kyrgyzstan	2015-12-09	B	Moody's	1996–2018
Lesotho	2002-09-02	B+	Fitch	1996–2018
Macedonia	2004-07-30	BB	S&P	1996–2018
Madagascar	2004-05-25	B	S&P	1996–2018
Malawi	2003-05-20	CCC+	Fitch	1996–2018
Maldives	2016-09-02	B	Moody's	1996–2018
Mali	2004-04-30	B-	Fitch	1996–2018
Mongolia	1999-12-23	B	S&P	1996–2018
Morocco	1998-03-02	BB	S&P	1996–2018
Mozambique	2003-07-15	B	Fitch	1996–2018
Nicaragua	1998-03-27	B	Moody's	1996–2018
Nigeria	2006-01-30	BB-	Fitch	1996–2018
Papua New Guinea	1998-12-31	B+	Moody's	1996–2018
Rep Of Congo	2013-10-11	BB-	Moody's	1996–2018
Rwanda	2006-12-16	B-	Fitch	1996–2018
Senegal	2000-12-18	B+	S&P	1996–2018
Serbia	2004-11-01	B+	S&P	1999–2018
Seychelles	2006-09-14	B	S&P	1996–2018
Solomon Islands	2015-11-26	B-	Moody's	1996–2018
St. Vincent And The Grendines	2007-12-10	B+	Moody's	1996–2018
Suriname	1999-11-17	B-	S&P	1996–2018
Uganda	2005-03-17	B	Fitch	1996–2018
Ukraine	1998-02-06	B	Moody's	1996–2018
Zambia	2011-03-02	B+	Fitch	1996–2018

general measure of domestic financial development than the banking measures.

Our second indicator of financial development is the development of a country's bond market. Because our sample consists of developing countries only, data availability is low, which implies that we are limited to study the effect of a rating provision on bond issuing activity and on the average bond yield. We measure bond market development by foreign currency (local currency) bond issue size divided by total bond issue size and distinguish between long-term, medium term and short-term bond issues. Next to the relative importance of foreign currency versus local currency issues in the total issuance activity, we also consider the growth in total bond issue size for foreign currency and local currency sovereign bonds. Lastly, we assess the impact of a sovereign credit rating provision on the average 10-year sovereign bond yield.

The third aspect of financial development is the ability to attract foreign capital under the form of foreign direct investments, portfolio investments and international bank flows. Capital inflows can come under the form of foreign direct investment or as portfolio investments, depending on the size of the foreign ownership stake. A foreign involvement of 10 percent or more of ordinary shares or voting power is considered to be a direct investment, while any involvement below 10 percent is considered as a portfolio investment. We use the following capital inflow variables: (1) direct debt investments, (2) direct equity investments, (3) debt portfolio and (4) equity portfolio investments. All capital inflow variables are scaled by the home country's GDP. To measure the internationalisation of the banking sector, we consider the ratio of foreign loans and deposits of local banks vis-a-vis the banking sector as a percentage of total domestic bank deposits.

The control variables in the panel regressions are macroeconomic, political and institutional indicators. The description of the control variables and their source is provided in Table 4.

5 The influence of a sovereign credit rating on financial development

We investigate recently rated countries to determine to what extent the sovereign credit rating had an impact on the country's subsequent financial development. As illustrated in Figure 1 in the introduction, we distinguish between domestic financial development and international financial integration. The domestic financial development of a country is measured through the banking sector and the domestic bond market. As an element of international financial integration, we study the impact of the credit ratings on foreign direct investment, equity and debt holdings of foreigners, the participation in international bond markets and international bank flows. In this section we analyse the short-term impact of a credit rating provision. That is, we only include the first five years post rating for the rated countries.

Table 3: Definition and source of the variables measuring financial development

Datasets	Definition	Source
Banking sector		
Bank claims on government/GDP	Financial corporations' (except central banks) claims on central government divided by GDP.	TR – IFS
Domestic credit by banks/GDP	Financial resources provided to private sectors by financial institutions (except central banks) through loans, trade credits, non-equity securities and other accounts receivables	TR – WDI
Bank assets/GDP	Gross financial and non-financial assets of banks divided by GDP	TR – IFS
Δ risk weighted assets	Log ratio of bank assets weighted according to risk as established in the Basel framework at time t over t-1	TR – FSI
Δ liquid assets	Log ratio of liquid assets at t over t-1. Liquid assets include currency, deposits and other financial assets available either on demand or within 3 months or less; securities that are traded in liquid markets and readily converted to cash	TR – FSI
Δ short-term liabilities	Log ratio of short-term liabilities at t over t-1. Short-term liabilities include short-term elements of debt liabilities and net short term market value of financial derivatives positions	TR – FSI
Broad money/GDP	Broad money (M3) divided by GDP.	TR – WDI
Bonds market development		
FCY issues/total issues	Notional amount issued in foreign currency divided by total amount of bonds issued. Considered as foreign currency are (in alphabet:) AUD, GBP, EUR, JPY or USD.	TR
FCY long-term issues/total issues	Notional amount issued in foreign currency and bond maturity > 10 years divided by total amount of bonds issued.	TR
FCY medium-term issues/total issues	Notional amount issued in foreign currency and bond maturity > 5 years and < 10 years divided by total amount of bonds issued.	TR
FCY short-term issues/total issues	Notional amount issued in foreign currency and bond maturity < 5 years divided by total amount of bonds issued.	TR
LCY issues/total issues	Notional amount issued in local currency divided by total bond notional issued.	TR
LCY long-term issues/total issues	Notional amount issued in local currency with maturity > 10 years divided by total amount issued.	TR
LCY medium-term issues/total issues	Notional amount issued in local currency with maturity > 5 years and < 10 years divided by total amount issued.	TR
LCY short-term issues/total issues	Notional amount issued in local currency with maturity < 5 years divided by total amount issued.	TR
Bond yield	Average yield-to-maturity of fixed-coupon 10-year treasury bond.	IFS
International financial integration		
Direct debt investment/GDP	Direct investment involving debt securities on reporting economy divided by GDP.	TR – IIP
Direct equity investment/GDP	Direct investment involving equity and investment fund shares on reporting economy divided by GDP.	TR – IIP
Portfolio debt investment/GDP	Portfolio investment that serve as debt securities invested on reported economy divided by GDP.	CPIS
Portfolio equity investment/GDP	Portfolio investment on equity and investment fund shares on reported economy divided by GDP.	CPIS
Foreign loans and deposits	Foreign loans and deposits of reporting banks vis-a-vis the banking sector (% of domestic bank deposits)	GFD

Note: TR: Thomson Reuters Eikon; IMF: International Monetary Fund, IFS: International Financial Statistics, FSI: Financial Soundness Indicators, WDI: World Bank World Development Indicators, GFD: Global Financial Database, IDS: International Debt Statistics, OE: Oxford Economics, WEO: World Economic Outlook, WGI: World Bank World Governance Indicators, DOTS: Direction of Trade Statistics

Table 4: Definition and sources of the control variables

Datasets	Definition	Source
Current account/GDP	Current account balance of the reporting economy (% of GDP)	WDI
External debt/GDP	External debt stock position (USD) owed to non-residence divided by GDP	WDI, IDS, OE
FCY reserves	Natural logarithm of foreign currency reserves.	IFS
GDP growth	Annual percentage real GDP growth	WDI, WEO
GDP per capita	Natural logarithm of GDP per capita	WDI, WEO, OE
Inflation	Annual inflation rate	WDI
Political stability	Political stability and absence of violence index	WGI
Previous default	Exponential decay variable. 1 for defaulted/debt-restructured year t_0 and exponentially decay at the rate of 40% till year $t + 5$.	Standard and Poor's, Moody's Default Database, Paris Club Archive
Rule of law	Rule of law index: confidence in the rules of society	WGI
Government effectiveness	Quality of public and civil services and independence of political pressure	WGI
Trade/GDP	Total trade of the reporting economy (% of GDP)	WDI, DOTS, OE
Unemployment	Annual unemployment rate	WDI, WEO
Banking crisis	Dummy variable equal to 1 if the country suffered a banking crisis in the respective year	Laeven and Valencia (2013, 2018)

Note: TR: Thomson Reuters Eikon; IMF: International Monetary Fund, IFS: International Financial Statistics, FSI: Financial Soundness Indicators, WDI: World Bank World Development Indicators, GFD: Global Financial Database, IDS: International Debt Statistics, OE: Oxford Economics, WEO: World Bank World Economic Outlook, WGI: World Bank World Governance Indicators, DOTS: Direction of Trade Statistics

5.1 Impact of the sovereign credit rating on the domestic banking sector

We study the impact of sovereign credit rating provision on the banking sector by focusing on the banks' assets, notably the amount of claims on the government and credit provided to the private sector. We also consider whether the banks' size in rated countries, measured by the total assets, is different from the size of banks in unrated countries. Countries that do not have a credit rating rely for their financing mainly on banks, while rated sovereigns can tap a wider set of financing sources. Therefore, we expect that banks will hold a lower proportion of sovereign debt and a higher amount of private sector debt once a country is rated. Risk-weighted assets of domestic banks may change when a country receives an initial credit rating because of three reasons. First, the risk weight of the existing government debt may change if the allocated rating is above BB+ or below B-. According to Basel capital regulations, the risk weight for unrated sovereign debt is equal to 100%, which is comparable to sovereign bonds with a BB+ to B- rating. Sovereign debt that is rated below B- has a risk weight of 150%. In our sample of recently rated countries, Malawi is the only country whose initial rating is below B-, so the impact of receiving a rating on the risk weights of existing assets based should be zero or negative. A second cause of a change in the risk-weighted assets is a shift in the bank's asset portfolio. If, after a country is rated, more sovereign debt is placed elsewhere, the proportion of corporate and private debt in the bank's total assets will increase. Since corporate and private debt are typically riskier than sovereign debt, the rebalancing will lead to an increase in the risk-weighted assets. Third, the risk-weighted assets may increase simply because the total bank assets have increased.

The estimation results for the regressions estimating the impact of sovereign credit rating provision on the domestic banking sector are reported in Table 5. The variable of interest, *Rated B+ & lower* and *Rated BB+ to BB-*, is highlighted in light grey. We find that when a country obtains a sovereign credit rating, domestic banks decrease their holdings of sovereign debt and simultaneously increase credit provided to the private sector, which is in line with the portfolio rebalancing hypothesis. In the post-rating period, banks in rated countries not only have a different balance sheet composition, they are also larger in terms of total assets compared to banks in unrated countries. More specifically, we estimate that banks assets to GDP are two percent higher in *B* rated countries and five percent higher in *BB* rated countries once a rating is received. The combined effect of an increase in total assets and a larger weight of private credit in the asset portfolio leads to larger growth in risk-weighted assets for rated countries compared to their unrated counterparts.

We also assess the impact of sovereign rating provision on the liquidity buffer of the domestic banking sector. As discussed in the literature review, one channel through which a change in sovereign credit risk is transmitted to the banking sector is the liquidity channel. We measure the liquidity position of domestic banks by the change in their liquid assets and short-term liabilities. We find that receiving a sovereign rating leads to an increase in both liquid assets

Table 5: Domestic financial development: Banking sector

	Bank claims on govt./GDP	Domestic credit by banks/GDP	Banks assets/GDP	Δ Risk weighted assets	Δ Liquid assets	Δ Short term liabilities	Broadmoney/GDP
Banking Crises	0.01 (0.01)	0.02 (0.01)	-0.03 (0.02)	-0.23*** (0.02)	-0.02 (0.07)	0.38*** (0.03)	0.02 (0.02)
Current A.C./GDP	-0.07*** (0.01)	-0.09*** (0.01)	-0.19** (0.09)			0.04 (0.05)	0.04 (0.05)
GDP growth	-0.23*** (0.04)		-0.93*** (0.26)			-0.44*** (0.38)	-0.44*** (0.08)
GDP per capita	0.01* (0.01)	0.02 (0.01)	0.02 (0.02)		0.08 (0.15)	0.51*** (0.17)	-0.09*** (0.03)
Government Effectiveness	-0.04*** (0.01)		-0.26*** (0.07)		-0.14 (0.18)	-0.01 (0.12)	
Inflation	-0.06*** (0.02)	-0.07*** (0.02)	-0.31*** (0.08)	-0.21** (0.10)	-0.05 (0.12)	-0.48*** (0.16)	-0.18*** (0.03)
Political Stability	-0.01*** (0.00)	-0.02*** (0.01)	0.03 (0.02)		0.07 (0.04)	0.19*** (0.02)	0.01 (0.01)
Rule of Law	0.03*** (0.01)	0.08*** (0.02)	0.23*** (0.03)	0.20** (0.10)		0.09 (0.11)	0.03 (0.02)
Trade/GDP	-0.00 (0.02)			0.10*** (0.03)	-0.45*** (0.05)		
Unemployment	0.05 (0.07)		-0.09 (0.22)		-0.53 (1.45)	-1.78* (1.01)	-0.57*** (0.21)
External debt/GDP		0.04*** (0.00)	0.04 (0.02)	0.03 (0.10)	-0.14 (0.15)	0.12 (0.12)	0.03** (0.01)
Previous Default		0.04*** (0.02)	0.01 (0.02)	-0.40*** (0.06)		-0.10** (0.05)	
FCY reserves			0.00 (0.01)	0.11*** (0.02)	0.03** (0.01)	0.05*** (0.01)	0.01*** (0.00)
<i>Rated B+ & lower</i>	-0.01** (0.01)	0.01 (0.01)	0.02 (0.01)	0.07*** (0.03)	0.10*** (0.04)	0.07*** (0.02)	-0.02* (0.01)
<i>Rated BB+ to BB-</i>	0.01* (0.00)	0.03** (0.01)	0.05*** (0.02)	0.10*** (0.02)	0.09** (0.04)	0.00 (0.02)	0.06*** (0.01)
Inverse Mills Ratio	-0.20*** (0.03)	-0.16*** (0.04)	-1.21*** (0.38)	-0.50 (0.52)	-0.61 (0.44)	-1.10 (0.67)	-0.40*** (0.12)
Observations	1259	1286	910	215	223	202	1286
R ²	0.03	0.04	0.08	0.08	0.01	0.10	0.03
Country FE	Y	Y	Y	N	N	N	Y
Year FE	Y	Y	Y	N	N	N	Y

Note: The model only considers three years in the post-rating period. The standard errors are shown in parenthesis and are estimated according to the Driscoll and Kraay (1998) robust covariance matrix with four lags, taking into account cross-sectional dependence. Control variables are entered to model following a bidirectional stepwise approach based on the AIC score. The models with dependent variables Δ risk-weighted assets, Δ liquid assets and Δ short term liabilities are estimated as first difference models. The Inverse Mills Ratio is added to the model specification to correct for a selection bias. Significance levels are denoted as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

and short-term liabilities. This is consistent with the hypothesis that a sovereign credit rating provision is perceived by the market as a positive credit rating event, which increases the liquidity position of banks and facilitates their access to short term financing.

In the last column of Table 5, we test the effect of a sovereign credit rating on the domestic money supply in the country. The variable of interest is the amount of broad money scaled to GDP. We find that a sovereign credit rating provision has a small, but significantly mixed effect on the liquidity provision in a country. More specifically we find that once rated, the ratio of broad money to GDP is two percent higher in *B* rated countries and six percent higher in *BB* rated countries than in their unrated counterparts. Overall, we conclude that effect of a sovereign credit rating provision on the development of the domestic banking sector is important because it results in positive spillover effects in terms of bank size and liquidity. We now turn to the impact of a sovereign credit rating provision on the development of the bond market.

5.2 Sovereign credit rating provision and bond market development

Receiving a sovereign credit rating has an immediate impact on the international tradability of a country's sovereign debt and therefore we expect a strong impact on the development of the country's bond market. The distinction between domestic and international bonds is crucial here since we focus on foreign currency bond ratings. Table 6 shows the impact of a sovereign credit rating on the proportion of foreign and local currency bond issues relative to the total bond issues in panels A and B respectively. We make a distinction between long term (maturity more than ten years), medium term (maturity between five and ten years) and short term bond (maturity below five years) bond issues. Panel C of Table 6 contains the average 10-year government bond yield.

The estimation results in panel A of Table 6 show that when a country has obtained a sovereign credit rating, the proportion of foreign currency bond issues is three percent higher compared to unrated countries. This result is not surprising. The credit rating may be obtained after a government solicited for a rating at one of the rating agencies with the clear intention to tap the international capital markets by issuing international bonds. The impact of a credit rating provision is similar for all maturities of foreign currency bond issues. Obviously, the increase in the proportion of foreign currency bond issues comes at the cost of local currency bond issues, which is shown in panel B of Table 6. Interestingly, we find that the substitution effect is not symmetric in terms of maturity. After obtaining a sovereign credit rating, there is a significantly lower proportion in short term local currency bond issues which is compensated by a higher proportion of long term foreign currency bond issues. Thus, we find that obtaining a sovereign credit rating does not help to reduce the problem of original sin in the strict sense, since countries will issue more debt in a foreign currency, but it does alleviate the problem of a maturity mismatch. Obtaining a sovereign credit rating allows the country to issue debt

Table 6: Bonds market development: foreign and local currency bonds issues

	Panel A: Foreign Currency Bonds					Panel B: Local Currency Bonds					Panel C: Yield		
	FCY issues/total	FCY long-term/total	FCY med-term/total	FCY short-term/total	FCY issues/total	FCY long-term/total	FCY med-term/total	FCY short-term/total	LCY issues/total	LCY med-term/total	LCY short-term/total	Bond yield	Bond yield
Banking Crises	-0.00 (0.02)	-0.03* (0.02)	0.04** (0.02)	-0.01 (0.01)	0.13*** (0.03)	0.03*** (0.01)	-0.01 (0.01)	0.10*** (0.03)				-1.54*** (0.58)	
GDP growth	0.14* (0.08)	-0.03 (0.03)		0.04 (0.03)								4.40 (5.15)	
GDP per capita	0.01 (0.01)	0.01* (0.00)	0.00 (0.00)	0.00 (0.01)	0.13*** (0.04)			-0.04 (0.03)				-0.68 (1.77)	
Inflation	0.10** (0.05)	-0.02 (0.02)	-0.02 (0.04)	0.12*** (0.04)	-0.26*** (0.07)	-0.02 (0.02)	-0.10*** (0.03)	-0.14** (0.06)				-1.50 (2.98)	
Political Stability	0.00 (0.01)		0.00 (0.00)			0.02 (0.01)						-3.71*** (0.84)	
Previous Default	0.01 (0.01)				-0.09* (0.05)							2.29*** (0.67)	
Rule of Law	0.01 (0.02)		-0.00 (0.01)					0.14*** (0.03)				3.10** (1.52)	
Unemployment	0.07 (0.13)	-0.01 (0.04)		-0.05 (0.06)		0.54 (0.51)							
Current A.C./GDP	0.00 (0.01)				0.18*** (0.05)	0.09*** (0.02)	0.04 (0.02)	0.05* (0.03)				-8.21* (4.52)	
FCY reserves	0.00 (0.00)				0.03* (0.02)	0.01*** (0.00)	0.01** (0.01)	0.01 (0.01)				-0.87*** (0.27)	
Government Effectiveness					0.29*** (0.05)	0.12*** (0.03)							
Trade/GDP					0.20*** (0.01)	0.05*** (0.01)							
<i>Rated B+ & lower</i>	0.03* (0.02)	0.02** (0.01)	0.01 (0.01)	-0.00 (0.01)	-0.09** (0.04)	-0.03 (0.02)	-0.02 (0.02)	-0.06** (0.03)				-1.41 (0.87)	
<i>Rated BB+ to BB-</i>	0.02 (0.03)	0.05 (0.04)	-0.04* (0.02)	0.00* (0.00)	-0.14*** (0.03)	-0.02 (0.02)	0.02 (0.03)	-0.14** (0.06)				0.41 (0.65)	
Inverse Mills Ratio	0.12*** (0.04)	-0.00 (0.02)	0.03* (0.02)	0.04*** (0.01)	0.57*** (0.12)	0.03 (0.05)	-0.25*** (0.09)	0.62*** (0.18)				2.10 (4.71)	
Observations	1320	1320	1320	1320	1320	1320	1320	1320				202	
R ²	0.39	0.24	0.16	0.47	0.56	0.39	0.27	0.10				0.18	
Country FE	Y	Y	Y	Y	Y	Y	Y	Y				Y	
Year FE	Y	Y	Y	Y	Y	Y	Y	Y				Y	

Note: The model considers only three years in the post-rating period. The standard errors are shown in parenthesis and are estimated according to the Driscoll and Kraay (1998) robust covariance matrix with four lags, taking into account cross-sectional dependence. Control variables are entered into the model following a bidirectional stepwise approach based on the AIC score. The Inverse Mills Ratio is added to the model specification to correct for a selection bias. Significance levels are denoted as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 7: Bonds market development: growth of bond issues (notional amount)

	Δ FCY issues	Δ FCY Long-term	Δ FCY Med-term	Δ FCY issues Short-term	Δ LCY issues	Δ LCY Long-term	Δ LCY Med-term	Δ LCY issues Short-term
Banking Crises	-2.01 (1.60)	0.06 (0.98)	-2.00 (1.34)	-3.80*** (0.81)	-0.27** (0.12)	-0.03 (0.18)	2.46 (1.70)	-0.28*** (0.09)
GDP growth	-3.78 (3.16)	-6.00*** (2.11)		2.71* (1.56)				
GDP per capita	0.32 (1.28)	1.41 (1.05)	-0.02 (0.40)	-0.48 (0.39)	0.98 (0.60)			1.24 (0.78)
Inflation	0.97 (1.69)	-0.89 (0.71)	-0.64 (1.13)	2.74*** (0.97)	0.40 (1.06)	2.43* (1.37)	1.19 (1.75)	-0.20 (0.98)
Political Stability	0.76* (0.39)		0.29** (0.12)			3.20*** (0.60)		
Previous Default	-0.17 (0.72)	0.38 (0.42)			-0.37** (0.16)			0.23 (0.26)
Rule of Law	-0.01 (0.66)		0.08 (0.26)				1.63*** (0.46)	0.45 (0.47)
Unemployment	-1.46 (7.24)	-3.11 (4.29)		-0.50 (1.93)		-2.44 (6.41)		8.12 (7.47)
Current A.C./GDP		1.35*** (0.42)			2.80*** (0.64)	-1.68 (1.04)	3.56*** (0.62)	2.50*** (0.68)
FCY reserves		-0.48 (0.39)			0.17 (0.33)	0.23 (0.27)	0.04 (0.28)	-0.21 (0.28)
Government Effectiveness				0.19 (0.18)	1.42* (0.77)	2.62* (1.47)		0.25 (0.36)
Trade/GDP				0.32* (0.17)	1.46*** (0.48)	0.69*** (0.27)	1.23*** (0.39)	0.83*** (0.25)
<i>Rated B+ & lower</i>	-0.03 (0.32)	0.19 (0.26)	0.11 (0.17)	0.04 (0.15)	0.49 (0.32)	0.02 (0.15)	0.24 (0.31)	0.38 (0.23)
<i>Rated BB+ to BB-</i>	-0.03 (0.79)	-0.03 (0.83)	-0.00 (0.34)	0.00 (0.26)	0.02 (0.07)	-0.27 (0.53)	-0.01 (0.32)	0.37 (0.30)
Inverse Mills Ratio	-0.85 (3.32)	-2.17 (1.60)	1.53 (0.98)	2.12* (1.19)	9.36*** (2.75)	0.39 (1.91)	5.34*** (1.34)	6.61*** (1.90)
Observations	1236	1236	1236	1236	1236	1236	1236	1236
R ²	0.01	0.02	0.01	0.14	0.01	0.09	0.02	0.01
Country FE	N	N	N	N	N	N	N	N
Year FE	N	N	N	N	N	N	N	N

Note: The model considers only three years for the post-rating period. The standard errors are shown in parenthesis and are estimated according to the Driscoll and Kraay (1998) robust covariance matrix with four lags, taking into account cross-sectional dependence. The models are estimated as first difference equations and control variables are added following a bidirectional stepwise approach, based on the AIC score. The Inverse Mills Ratio is added to the model specification to correct for a selection bias. Significance levels are denoted as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

with a longer maturity. Panel C in Table 6 shows that the impact of a sovereign credit rating provision on the average borrowing costs for the government is estimated to be negative. We find that recently rated countries have bond yields that are on average 1.41 percent lower for *B* rated countries and 0.41 percent higher for *BB* rated countries than those of unrated countries, but we do not find this effect to be statistically significant.

The proportions of foreign versus local currency bond issues show the composition of a country's debt issues, but they do not tell us anything about the growth of the bond market as a whole. Therefore, in Table 7 we show the impact of sovereign credit rating provision on the growth of bond issuance, measured by the logratio of the total notional amount issued in a year relative to the notional amount issued the previous year. The models are estimated as first difference equations, therefore the country and time fixed effects are removed. The results in Table 7 are not fully in line with the results of Table 6. We do not find a significant effect of a sovereign credit rating provision on the growth in issue size for the country's foreign currency bonds. The coefficient estimate is positive in three out of four model specifications, but never statistically different from zero. In contrast, we do find a significantly positive effect on the size of the country's local currency bond issues, both with a medium term and a long term maturity. In short, our analysis reveal that rated countries issue more bonds than unrated countries, especially when the bonds are issued in local currency. Thus, even the provision of a long-term foreign-currency rating has a positive effect on the size of the local bond market. This is an important finding because several studies have shown the importance of a well functioning local bond market for the financial development of a country (Kim and Wu, 2008, Burger and Warnock, 2007).

5.3 Sovereign credit ratings and international financial integration

As a third aspect of financial development, Table 8 shows the impact of receiving a sovereign credit rating on the international financial attractiveness of a country. We measure international integration by a country's ability to attract foreign capital and by the international activities of its domestic banking sector. The first two columns show the effect of a rating on inward foreign direct investment (FDI) in a country. The third and fourth column of Table 8 show the impact of the initial sovereign credit rating on inward portfolio investments, split up in debt and equity investments respectively. The dependent variable in the last column is equal to the amount of foreign loans and deposits of the banking sector as a percentage of domestic bank loans and deposits and proxies for the internationalization of the domestic banking sector.

With respect to attracting foreign capital, we find that sovereign credit rating provision has a significantly mixed effect on both direct inward FDI and portfolio investment. When a country receives a sovereign credit rating its ratio of FDI equity inflows to GDP is one percent higher than for unrated countries. The positive effect on FDI inflows is found for equity

investments only. Whereas, the negative effect of three percent is found for debt investments in FDI inflows. For portfolio investments, the rating effect is positive for debt and negative for equity investments. More specifically, portfolio investments in debt to GDP is one percent higher on average for rated countries.

We also find supporting evidence for the hypothesis that sovereign credit ratings improve the international orientation of banks. The ratio of foreign loans and deposits vis-a-vis the banking sector to domestic deposits is nine percent higher for recently rated countries, on average, than for unrated countries.

5.4 Long-term impact of sovereign rating provision

The estimation results in Tables 14 to 17 show the long-term effect of a sovereign credit rating provision on the financial sector following the publication of the initial rating. Developing a country's financial sector is a lengthy and challenging process, especially for the countries under consideration given their initially low levels of development. However, part of the observed changes in the financial sector during the post-rating period may be attributable to other events for which we do not control. Also, the panel regressions are very imbalanced due to the large variation in initial rating dates. This implies that the rating effect is estimated over different periods across countries.

In this section we analyse the long-term impact of a credit rating provision. That is, we only include the all years post rating for the rated countries. The long-term impact effect of a sovereign credit rating provision on the banking sector, the bond market and the international orientation of a country is shown in the appendix in Tables 14 to 17 respectively. Overall, the long term impact effect of a sovereign credit rating is in line its short run effect. We find a negative effect on banks' holdings of sovereign debt, a positive effect on their holdings of private debt and a positive impact on banks' total assets to GDP. Hence, once rated banks experience an increase in risk-weighted assets. We find that receiving a sovereign credit rating induces a long-term growth in the banks' liquid assets and short term liabilities. The long term impact of a sovereign credit rating on the money supply in a country is positive, in line with the short run effect.

With respect to the bond market development, the long run effect of a credit rating provision is generally in line with the short run effect, except for the impact on the average bond yield. Within a period of five years, obtaining a sovereign credit rating leads to an increase in bond yield of 0.41 percent on average, while the long term impact is estimated to be negative and insignificant. This indicates that when a country receives a sovereign credit rating, bond yields initially increase, but over the long run bond yields decrease. This contradicts the finding of Konopczak and Konopczak (2017) who find a decrease in sovereign bond yields in the short run due to a demand effect and an increase in the long run. A potential explanation for our finding is that, when the government issues more and larger bonds upon receiving a

Table 8: International financial integration: Capital inflows

	Direct debt/GDP	Direct equity/GDP	Portfolio debt/GDP	Portfolio equity/GDP	Foreign loans and deposits
Current A.C./GDP	-0.01 (0.01)	-0.08 (0.08)	0.06** (0.03)	0.03 (0.03)	-0.11 (0.08)
External debt/GDP	-0.05*** (0.01)	0.08 (0.05)	0.03*** (0.01)	0.12*** (0.03)	-0.05 (0.03)
FCY reserves	0.01*** (0.00)	-0.00 (0.01)	0.00 (0.00)	-0.02 (0.01)	0.00 (0.01)
GDP per capita	-0.05*** (0.01)	0.04 (0.02)	0.04*** (0.01)	0.02 (0.02)	-0.09 (0.05)
Government Effectiveness	0.11*** (0.02)	0.01 (0.12)	0.08*** (0.03)	0.02 (0.09)	-0.15 (0.09)
Inflation GDP Deflator	-0.02 (0.03)	-0.05 (0.15)	0.08*** (0.03)	0.07*** (0.02)	0.17* (0.10)
Political Stability	-0.04*** (0.00)	-0.02*** (0.01)	-0.00* (0.00)	-0.02* (0.01)	-0.04 (0.03)
Previous Default	-0.00 (0.01)	0.02 (0.04)	0.03*** (0.01)	-0.01 (0.03)	
Rule of Law	-0.03*** (0.01)	0.01 (0.08)	-0.06*** (0.02)	-0.02 (0.08)	-0.07 (0.08)
Trade/GDP	0.01 (0.01)	0.05 (0.04)	0.04*** (0.01)	0.05** (0.02)	-0.03 (0.06)
Unemployment	0.15 (0.11)	-0.46 (0.42)	0.25*** (0.09)	0.12 (0.17)	-0.09 (0.57)
GDP growth		0.00 (0.38)	0.34*** (0.13)		0.87** (0.44)
Banking Crises				-0.09*** (0.03)	-0.08* (0.04)
<i>Rated B+ & lower</i>	-0.00 (0.01)	0.01** (0.01)	0.01 (0.01)	-0.01 (0.01)	0.09** (0.04)
<i>Rated BB+ to BB-</i>	-0.03*** (0.01)	-0.01 (0.02)	0.00 (0.01)	-0.01 (0.01)	-0.08 (0.08)
Inverse Mills Ratio	0.31*** (0.11)	-0.11 (0.65)	0.41*** (0.16)	0.17 (0.11)	-0.17 (0.42)
Observations	555	553	1017	1017	1154
R ²	0.13	0.51	0.51	0.46	0.25
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y

Note: The model estimates the impact of a sovereign credit rating provision on inward foreign capital investments and foreign loans and deposits of local banks. We consider only three years for the post-rating period. The standard errors are shown in parenthesis and are estimated according to the Driscoll and Kraay (1998) robust covariance matrix with four lags, taking into account cross-sectional dependence. Control variables are entered to model following a bidirectional stepwise approach based on the AIC score. The Inverse Mills Ratio is added to the model specification to correct for a selection bias. Significance levels are denoted as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

credit rating, it initially offers investors an extra attractive yield. Lastly, we find that recently rated countries attract more equity-based FDI and foreign investors hold more debt securities as portfolio investments, which is in line with the estimated effects in the short run.

6 Robustness checks

Our three-step approach is crucial to control for endogeneity issues and ensures the comparability between countries prior to the credit rating event. We could have used alternative methods like propensity score matching or a difference-in-difference analysis. Table 9 shows how each these alternative methods solve data and estimation issues. Our approach combines the first two methods, entropy balancing and the Heckman correction, and ticks off all the boxes. Nevertheless, we run a series of robustness checks using these competing methods. We report the coefficient estimates of the dummy variable *RatedB* and *RatedBB* in Table 10 to Table 13. For comparison, the first row of the tables with robustness checks shows the estimation results for our baseline analysis.

Table 9: How different methods handle data and estimation issues

Problem	Entropy balancing	Heckman correction	Diff-in-diff rated only	Matched diff-in-diff	Propensity score matching	Propensity score weighting
Selection bias observed characteristics	✓	✗	✗	✓	✓	✓
Selection bias unobserved characteristics	✗	✓	✗	✗	✗	✗
Max. number of unrated countries	✓	✗	✗	✗	✗	✓

Note: Our baseline analysis combines the first two methods, entropy balancing and Heckman correction

First, we show how the results are affected if the entropy balancing approach without the correction for the selection bias is applied (check 1). Similarly, we also perform the analysis by applying the two-stage Heckman selection correction only (check 2). Third, we focus on the rated countries only and perform a difference-in-difference (diff-in-diff) analysis (check 3). By only considering the rated countries, we overcome the problem of imperfect matching between rated and unrated countries. The diff-in-diff framework requires a treatment group dummy, a post-treatment dummy and the interaction between both. Using only the treatment group in our setting, the post-treatment and interaction dummy are the same, so the analysis collapses to a simple difference test on pre and post-rating financial development for rated countries. To solve this problem and to implement a genuine diff-in-diff framework, we need a post-treatment period for the control group as well. This is what is done in the fourth robustness check by implementing a matched diff-in-diff analysis (check 4). In a standard diff-in-diff analysis, the intervention time starts in the same year for the treatment and the control group. However, in our setting, countries do not receive a credit rating at the same time and the countries in the control group have no rating at all. We solve this by running a K-nearest neighbour

(K-NN) matching algorithm to obtain the counterfactual initial rating year for the countries in the control group.¹¹ Countries that cannot be matched with treated countries are omitted from the subsequent regression analysis. After matching, we generate a post-rated dummy and the interaction between the treatment group dummy and the post-rated dummy. The interpretation of the coefficient estimate of this interaction variable corresponds to that of the variables *RatedB* and *RatedBB* in the baseline analysis.

Finally, we consider two alternative data pre-processing methods notably propensity score matching (check 5) and propensity score weighting (check 6). Propensity score matching is a two-step approach. First, a propensity score for being rated is estimated for each country-year observation with a logistic regression. We use the same control variables as in the entropy balancing approach to predict the propensity scores. In the second step, each country of the treatment group is matched to a country of the control group based on the propensity scores and then the average treatment effect of being rated is estimated. We use the K-nearest neighbor method to do the matching.¹² A disadvantage of matching is that data are thrown away, because the treatment and control groups are shrunk down to the same size. In propensity score weighting, all observations are kept in play but they are reweighed according to the propensity score.

Table 10 shows the estimation results for the alternative methods that assess the impact of a sovereign credit rating provision on the banking sector. We find the results for credit provided to the government, credit provided to the private sector and total bank assets to be very robust. When a country receives a sovereign credit rating, banks provide more credit to the private sector and less to the government, hence stimulating private investment. In addition, the banks' balance sheets are larger in rated countries than in their unrated counterparts. Five out of six checks are in line with our finding that banks experience a growth in risk-weighted assets once the sovereign obtains a sovereign credit ratings. The other one check finds significant and negative effect. The result with respect to the impact of a credit rating on the banks' liquidity provision is confirmed by the robustness checks. Five out of six checks are in line with our finding that bank experience a growth in liquid assets with the sovereign credit rating provision. Five out of six checks are in line with our finding of growth in banks' short-term liabilities. And, we do find confirmation for the positive effect of a sovereign credit rating on the supply of broad money. All six tests find a positive effect for BB+ to BB- rated countries.

Tables 11 and 12 contain the robustness checks for the effect of a sovereign credit rating

¹¹The number of nodes K used for matching is 10. Matched countries should have minimum distance between treated countries and a particular control country. We run the matching for each country in the control group.

¹²We also applied other matching methods and results are similar. We opt for K-NN because of the shorter computation time.

Table 10: Alternative methods: Sovereign credit rating provision and the banking sector

Method	Bank claims on govt./GDP	Domestic credit by banks/GDP	Banks assets/GDP	Δ Risk weighted assets	Δ Liquid assets	Δ Short term liabilities	Broadmoney/GDP
<i>Entropy balancing with selection corr</i>							
B+ and lower	-0.01** (0.01)	0.01 (0.01)	0.02 (0.01)	0.07*** (0.03)	0.10*** (0.04)	0.07*** (0.02)	-0.02* (0.01)
BB+ to BB-	0.01* (0.00)	0.03** (0.01)	0.05*** (0.02)	0.10*** (0.02)	0.09** (0.04)	0.00 (0.02)	0.06*** (0.01)
<i>Check 1: Entropy balancing</i>							
B+ and lower	-0.02*** (0.01)	0.01** (0.01)	0.02 (0.01)	0.07*** (0.02)	0.09*** (0.03)	0.07*** (0.02)	-0.01 (0.01)
BB+ to BB-	0.01* (0.01)	0.03*** (0.01)	0.05*** (0.02)	0.09*** (0.02)	0.08** (0.04)	-0.00 (0.02)	0.06*** (0.01)
<i>Check 2: Heckman selection corr</i>							
B+ and lower	-0.02*** (0.01)	0.02*** (0.01)	0.00 (0.01)	0.09*** (0.03)	0.08*** (0.03)	0.08*** (0.02)	-0.01 (0.01)
BB+ to BB-	0.01 (0.00)	0.04*** (0.01)	0.04*** (0.01)	0.10*** (0.02)	0.06* (0.03)	0.02 (0.02)	0.06*** (0.01)
<i>Check 3: Diff-in-diff (rated only)</i>							
B+ and lower	-0.01* (0.01)	-0.00 (0.01)	-0.03*** (0.01)	0.05** (0.02)	0.07*** (0.02)	0.07*** (0.02)	-0.01* (0.01)
BB+ to BB-	0.01 (0.01)	0.02** (0.01)	0.02 (0.02)	0.10*** (0.02)	0.02 (0.04)	0.01 (0.02)	0.05*** (0.01)
<i>Check 4: Matched diff-in-diff</i>							
B+ and lower	-0.02*** (0.01)	0.03*** (0.01)	-0.02 (0.02)	-0.08*** (0.03)	-0.11*** (0.03)	-0.04 (0.03)	0.00 (0.01)
BB+ to BB-	0.01 (0.01)	0.05*** (0.02)	0.03 (0.02)	-0.06** (0.02)	-0.17*** (0.05)	-0.11*** (0.03)	0.06*** (0.01)
<i>Check 5: Propensity score matching</i>							
B+ and lower	-0.01*** (0.00)	0.03*** (0.01)	0.02 (0.02)	0.06*** (0.02)	0.11*** (0.04)	0.05** (0.03)	0.01 (0.01)
BB+ to BB-	0.01*** (0.00)	0.06*** (0.01)	0.04*** (0.01)	0.11*** (0.02)	0.11** (0.04)	-0.03 (0.03)	0.09*** (0.01)
<i>Check 6: Propensity score weighting</i>							
B+ and lower	-0.02*** (0.01)	0.04*** (0.02)	0.04* (0.02)	0.06*** (0.02)	0.09*** (0.03)	0.06** (0.02)	0.02 (0.02)
BB+ to BB-	0.01** (0.00)	0.08*** (0.02)	0.06*** (0.02)	0.11*** (0.02)	0.09** (0.04)	-0.01 (0.03)	0.11*** (0.02)

Note: This table presents estimated impact of a sovereign credit rating provision on the banking sector by using alternative methodologies. The dependent variables are in the column headings. The reported coefficients estimates are for the *Rating* dummy. The control variables include the lagged values of GDP per capita, FCY reserves, unemployment rate, trade/GDP, current account/GDP, inflation, real GDP growth, external debt/GDP, previous default dummy, rule of law, government effectiveness and a banking crisis dummy. The control variables are introduced in a step-wise manner based on statistical significance. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 11: Alternative methods: Sovereign credit rating provision and foreign and local currency bonds issues

Method	FCY total	FCY long-term/total	FCY med-term/total	FCY short-term/total	LCY total	LCY long-term/total	LCY med-term/total	LCY short-term/total	Bond yield
<i>Entropy balancing with selection corr</i>									
B+ and lower	0.03* (0.02)	0.02** (0.01)	0.01 (0.01)	-0.00 (0.01)	-0.09** (0.04)	-0.03 (0.02)	-0.02 (0.02)	-0.06** (0.03)	-1.41 (0.87)
BB+ to BB-	0.02 (0.03)	0.05 (0.04)	-0.04* (0.02)	0.00* (0.00)	-0.14*** (0.03)	-0.02 (0.02)	0.02 (0.03)	-0.14** (0.06)	0.41 (0.65)
<i>Check 1: Entropy balancing</i>									
B+ and lower	0.03* (0.02)	0.02** (0.01)	0.01 (0.01)	-0.00 (0.01)	-0.08** (0.04)	-0.03 (0.02)	-0.02 (0.01)	-0.04* (0.02)	-1.36 (0.84)
BB+ to BB-	0.02 (0.03)	0.05 (0.04)	-0.04* (0.02)	0.00** (0.00)	-0.14*** (0.03)	-0.02 (0.02)	0.03 (0.03)	-0.14** (0.06)	0.38 (0.60)
<i>Check 2: Heckman selection corr</i>									
B+ and lower	0.03* (0.02)	0.02** (0.01)	0.01 (0.01)	-0.00 (0.01)	-0.00 (0.03)	0.01 (0.01)	0.00 (0.01)	-0.01 (0.03)	-1.33 (0.94)
BB+ to BB-	0.02 (0.03)	0.05 (0.04)	-0.04* (0.02)	0.00** (0.00)	-0.06 (0.04)	0.01 (0.02)	0.03 (0.02)	-0.09* (0.06)	0.71 (0.55)
<i>Check 3: Diff-in-diff (rated only)</i>									
B+ and lower	0.01 (0.02)	0.02* (0.01)	0.00 (0.01)	0.00 (0.01)	-0.00 (0.03)	0.00 (0.01)	0.00 (0.01)	-0.01 (0.03)	0.58 (0.60)
BB+ to BB-	-0.01 (0.03)	0.04 (0.05)	-0.05** (0.03)	0.00* (0.00)	-0.06 (0.04)	0.00 (0.02)	0.03** (0.02)	-0.08* (0.04)	2.74*** (0.97)
<i>Check 4: Matched Diff-in-diff</i>									
B+ and lower	0.02 (0.01)	0.02** (0.01)	0.01 (0.01)	-0.00 (0.01)	0.06** (0.03)	0.02 (0.01)	0.02* (0.01)	0.03* (0.02)	-0.75 (1.16)
BB+ to BB-	0.01 (0.03)	0.05 (0.04)	-0.05** (0.02)	0.01** (0.00)	0.00 (0.04)	0.01 (0.02)	0.05** (0.02)	-0.04 (0.07)	0.92 (0.84)
<i>Check 5: Propensity score matching</i>									
B	0.03*** (0.02)	0.02* (0.01)	0.01* (0.01)	0.00 (0.01)	-0.03 (0.03)	-0.00 (0.01)	-0.01 (0.01)	-0.04* (0.02)	-1.41 (0.86)
BB+ to BB-	0.03 (0.03)	0.04 (0.04)	-0.03 (0.02)	0.00*** (0.00)	-0.07** (0.03)	0.01 (0.01)	0.04* (0.02)	-0.12** (0.05)	0.71 (0.50)
<i>Check 6: Propensity score weighting</i>									
B+ and lower	0.04* (0.02)	0.02** (0.01)	0.01 (0.01)	0.00 (0.01)	-0.03 (0.03)	-0.01 (0.01)	-0.02 (0.01)	-0.01 (0.02)	-1.43 (0.90)
BB+ to BB-	0.03 (0.03)	0.05 (0.04)	-0.04* (0.02)	0.01** (0.00)	-0.08*** (0.03)	-0.01 (0.02)	0.03 (0.03)	-0.10* (0.06)	0.50 (0.53)

Note: This table presents estimated impact of a sovereign credit rating provision on the proportion of foreign (local) currency bond issues to total bond issues. The dependent variables are in the column headings. The reported coefficients estimates are for the *Rating* dummy. The control variables include the lagged values of GDP per capita, FCY reserves, unemployment rate, trade/GDP, current account/GDP, inflation, real GDP growth, external debt/GDP, previous default dummy, rule of law, government effectiveness and a banking crisis dummy. The control variables are introduced in a step-wise manner based on statistical significance. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 12: Alternative methods: Sovereign credit rating provision and growth of foreign and local currency bonds issues

	Δ FCY issues	Δ FCY Long-term	Δ FCY Med-term	Δ FCY issues Short-term	Δ LCY issues	Δ LCY Long-term	Δ LCY Med-term	Δ LCY issues Short-term
<i>Entropy balancing with selection corr</i>								
B+ and lower	-0.03 (0.32)	0.19 (0.26)	0.11 (0.17)	0.04 (0.15)	0.49 (0.32)	0.02 (0.15)	0.24 (0.31)	0.38 (0.23)
BB+ to BB-	-0.03 (0.79)	-0.03 (0.83)	-0.00 (0.34)	0.00 (0.26)	0.02 (0.07)	-0.27 (0.53)	-0.01 (0.32)	0.37 (0.30)
<i>Check 1: Entropy balancing</i>								
B+ and lower	-0.03 (0.32)	0.20 (0.26)	0.11 (0.17)	0.04 (0.15)	0.52 (0.34)	0.03 (0.15)	0.24 (0.24)	0.40 (0.24)
BB+ to BB-	-0.03 (0.80)	-0.04 (0.83)	0.00 (0.34)	0.02 (0.27)	0.04 (0.07)	-0.27 (0.53)	-0.00 (0.32)	0.38 (0.31)
<i>Check 2: Heckman selection corr</i>								
B+ and lower	-0.06 (0.32)	0.13 (0.28)	0.12 (0.17)	0.05 (0.15)	0.71** (0.33)	0.12 (0.14)	0.24 (0.30)	0.59** (0.27)
BB+ to BB-	-0.07 (0.80)	-0.08 (0.84)	0.01 (0.33)	0.02 (0.27)	0.20** (0.08)	-0.26 (0.49)	-0.03 (0.32)	0.55* (0.30)
<i>Check 3: Diff-in-diff (rated only)</i>								
B+ and lower	-0.13 (0.39)	0.06 (0.30)	0.14 (0.19)	0.08 (0.16)	0.72** (0.37)	0.16 (0.13)	0.32 (0.33)	0.63* (0.33)
BB+ to BB-	-0.11 (0.81)	-0.15 (0.87)	0.05 (0.34)	0.04 (0.28)	0.22** (0.09)	-0.22 (0.47)	0.02 (0.31)	0.62 (0.38)
<i>Check 4: Matched Diff-in-diff</i>								
B+ and lower	-0.25 (0.37)	0.33 (0.30)	0.03 (0.15)	-0.02 (0.12)	-0.21 (0.43)	-0.20 (0.26)	-0.39 (0.28)	-0.17 (0.32)
BB+ to BB-	-0.24 (0.77)	0.11 (0.86)	-0.07 (0.33)	-0.05 (0.28)	-0.72*** (0.19)	-0.58 (0.49)	-0.69* (0.39)	-0.20 (0.27)
<i>Check 5: Propensity score matching</i>								
B+ and lower	-0.17 (0.28)	0.02 (0.22)	0.03 (0.20)	0.05 (0.14)	0.58* (0.35)	0.16 (0.16)	0.33 (0.27)	0.37 (0.27)
BB+ to BB-	-0.06 (0.80)	-0.10 (0.85)	0.03 (0.34)	0.03 (0.27)	0.17** (0.07)	-0.23 (0.50)	-0.01 (0.31)	0.42 (0.30)
<i>Check 6: Propensity score weighting</i>								
B+ and lower	-0.04 (0.32)	0.17 (0.27)	0.11 (0.17)	0.04 (0.15)	0.59* (0.32)	0.08 (0.14)	0.20 (0.29)	0.49** (0.25)
BB+ to BB-	-0.05 (0.80)	-0.05 (0.84)	0.00 (0.34)	0.02 (0.26)	0.11 (0.08)	-0.28 (0.51)	-0.02 (0.32)	0.45 (0.30)

Note: This table presents estimated impact of a sovereign credit rating provision on the growth of foreign (local) currency bond issues. The dependent variables are in the column headings. The reported coefficients estimates are for the *Rating* dummy. The control variables include the lagged values of GDP per capita, FCY reserves, unemployment rate, trade/GDP, current account/GDP, inflation, real GDP growth, external debt/GDP, previous default dummy, rule of law, government effectiveness and a banking crisis dummy. The control variables are introduced in a step-wise manner based on statistical significance. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 13: Alternative methods: Sovereign credit rating provision and capital inflows and international banking

Method	Direct debt/GDP	Direct equity/GDP	Portfolio debt/GDP	Portfolio equity/GDP	Foreign loans and deposits
<i>Entropy balancing with selection corr</i>					
B+ and lower	-0.00 (0.01)	0.01** (0.01)	0.01 (0.01)	-0.01 (0.01)	0.09** (0.04)
BB+ to BB-	-0.03*** (0.01)	-0.01 (0.02)	0.00 (0.01)	-0.01 (0.01)	-0.08 (0.08)
<i>Check 1: Entropy Balancing</i>					
B+ and lower	0.00 (0.01)	0.01** (0.01)	0.01 (0.01)	-0.01 (0.01)	0.09** (0.04)
BB+ to BB-	-0.03*** (0.01)	-0.01 (0.02)	0.00 (0.01)	-0.01 (0.01)	-0.08 (0.08)
<i>Check 2: Heckman selection corr</i>					
B+ and lower	0.00 (0.01)	0.03** (0.01)	0.01 (0.01)	-0.05*** (0.01)	0.12*** (0.05)
BB+ to BB-	-0.03** (0.02)	0.00 (0.02)	-0.01 (0.01)	-0.07*** (0.02)	-0.06 (0.08)
<i>Check 3: Diff-in-diff (rated only)</i>					
B+ and lower	0.02 (0.01)	-0.01 (0.01)	0.01 (0.01)	0.01** (0.00)	0.09*** (0.02)
BB+ to BB-	-0.01 (0.01)	-0.04** (0.02)	-0.00** (0.00)	-0.01** (0.00)	-0.07 (0.04)
<i>Check 4: Matched diff-in-diff</i>					
B+ and lower	-0.00 (0.01)	0.02* (0.01)	-0.05* (0.03)	-0.17*** (0.06)	0.18*** (0.06)
BB+ to BB-	-0.03*** (0.01)	-0.03 (0.02)	-0.06** (0.02)	-0.16** (0.07)	0.03 (0.09)
<i>Check 5: Propensity score matching</i>					
B+ and lower	0.01 (0.01)	-0.01 (0.01)	0.02** (0.01)	0.01*** (0.00)	0.09** (0.04)
BB+ to BB-	-0.02*** (0.01)	-0.01 (0.02)	0.01* (0.00)	-0.01 (0.01)	-0.09 (0.07)
<i>Check 6: Propensity score weighting</i>					
B+ and lower	0.01 (0.01)	0.01* (0.01)	0.01 (0.01)	-0.01 (0.01)	0.10** (0.05)
BB+ to BB-	-0.03** (0.01)	0.01 (0.02)	0.00 (0.01)	-0.01 (0.01)	-0.09 (0.08)

Note: This table presents estimated impact of a sovereign credit rating provision on inward foreign direct investments, portfolio investments and foreign loans and deposits provided to the banking sector. The dependent variables are in the column headings. The reported coefficients estimates are for the *Rating* dummy. The control variables include the lagged values of GDP per capita, FCY reserves, unemployment rate, trade/GDP, current account/GDP, inflation, real GDP growth, external debt/GDP, previous default dummy, rule of law, government effectiveness and a banking crisis dummy. The control variables are introduced in a step-wise manner based on statistical significance. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

on the development of the bond market. In general, the alternative methodologies lead to the same conclusions, although not all results are statistically significant for all methods. There is a general agreement among the different checks that the weight of foreign currency bond issues is larger and the weight of short-term local bond issues is smaller for rated countries. In six model specifications, we find that rated countries experience a larger growth of their local currency bond issues. Only for the matched diff-in-diff analysis this result cannot be confirmed.

Lastly, the alternative estimation results for the impact of a sovereign credit rating on the attraction of foreign capital and international banking is shown in Table 13. Three out of six tests agree that obtaining a sovereign credit rating leads to higher inflows of portfolio investment in debt securities. Four out of six robustness checks also find a positive impact of credit rating provision on inward FDI equity investments. For one test, the diff-in-diff analysis, the coefficient estimate is significantly different from zero and finds a negative effect. With respect to international banking activities, all tests find a positive impact of a rating provision on foreign loans and deposits of local banks that are domiciled in *B+* and *lower* rated countries.

Overall, we conclude that the alternative estimation methodologies confirm most of the findings of our baseline analysis. The results reported by our baseline analysis, the entropy balancing approach with the Heckman correction, are the most reliable because they simultaneously correct for endogeneity issues and a selection bias caused by observed and unobserved characteristics for the control and treatment groups.

7 Conclusion

Moody's, Standard and Poor's and Fitch, three privately owned and U.S.-based credit rating agencies, have nontrivial power over debt issuers all around the world. By assigning credit ratings, credit rating agencies provide opinions about the default risk of a borrower. Although the credit rating is just an opinion, rating agencies dictate the actions of sovereign borrowers. This is because being rated is a necessary condition for tapping the international capital markets. The quality of the credit rating determines the interest rates governments have to pay to service their debt. In addition, credit ratings play an important role in the legal system. Most institutional investors like pension funds are only allowed to invest in securities rated above a specific level and the capital ratio's of banks depend on the credit ratings of the assets they hold on their balance sheets. In short, having a credit rating is of utmost importance if a country aims to issue publicly traded debt.

Income per capita is generally low in emerging economies, which translates into low savings, on average. In addition, domestic financial institutions are not efficient enough to mobilize these savings for capital formation. Access to international capital markets is important for emerging countries to guarantee investment and economic growth. International investors

bring not only the capital but also managerial expertise and technical know-how to the host countries (Schnitzer, 2002). However, investment in low-income countries is generally perceived to be risky. Not only because of the high volatility and significant political risk that is typically associated with these countries, but also because of important information asymmetries disfavoring international investors. The provision of a sovereign credit rating can improve the information provision regarding the sovereign credit risk of the low-income countries. We show in this study that increased transparency about the sovereign default risk creates positive spillover effects to the domestic banking sector and can be a catalyser to develop the country's financial markets.

We find that the impact of a sovereign credit rating provision on the financial markets of low income countries is important in several ways. First and foremost we find that sovereign credit ratings foster foreign inward investment, both in terms of FDI and portfolio investments. Rated countries have a ratio of FDI equity inflows to GDP that is five percent higher than unrated countries. Portfolio investments to GDP are one percent higher for rated countries. We also show that banks rebalance their asset portfolio. Credit to the private sector to GDP increases by four percent to ten percent and lending to the government decreases by three percent. This increase in private lending activity by domestic banks may foster private investment in the country. Our results further show that a sovereign credit rating provision increases the risk-weighted assets of domestic banks, which is a logical consequence of the rebalancing of the asset portfolio and the growth in bank assets. We find an impact of sovereign credit rating provision on the sovereign's debt issuing behavior. Countries that are rated have a four percent higher proportion of foreign currency denominated debt and an twenty-eight percent lower proportion of short term local currency debt in their total debt than unrated countries. In addition, the growth in local currency bond issues is forty percent larger in rated countries. Thus, our results show that a sovereign credit rating reduces the risk for currency and maturity mismatches in sovereign borrowing, a problem known as original sin. Low-income countries generally rely on shorter term financing than developed countries. We find that when a country gets rated, it issues less short term debt and more long term debt. In addition, we find a significant increase in the size of the local bond market, not the foreign currency bonds, during the post-rating period.

Overall, we conclude that receiving a sovereign credit rating has positive effects on the financial market of the rated country. Our findings are in line with the hypothesis that credit rating agencies act as information providers and overcome at least part of the problems typically associated with the assessment of the creditworthiness of low-income countries, notably high information asymmetries, monitoring and data gathering costs. However, a large number of low-income countries remains unrated today. Our work may open the debate on the necessity of an independent (specialized) rating agency that provides a credit risk assessment for every country.

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A Appendix

Table 14: Long Term Domestic financial development: Banking sector

	Bank claims on govt./GDP	Domestic credit by banks/GDP	Banks assets/GDP	Δ Risk weighted assets	Δ Liquid assets	Δ Short term liabilities	Broadmoney/GDP
Banking Crises	0.01** (0.01)	0.01 (0.02)	-0.06 (0.04)	-0.28*** (0.06)	-0.10 (0.08)	-0.13* (0.07)	0.02 (0.02)
Current A.C./GDP	-0.07*** (0.02)	-0.12*** (0.01)	-0.29*** (0.10)				-0.00 (0.06)
GDP growth	-0.24*** (0.06)	-1.29*** (0.37)	-1.29*** (0.10)			0.46 (0.48)	-0.55*** (0.10)
GDP per capita	0.01 (0.01)	0.04*** (0.01)	0.10*** (0.02)		-0.16 (0.25)	0.03 (0.30)	-0.05** (0.02)
Government Effectiveness	-0.04*** (0.01)	-0.28*** (0.07)	-0.28*** (0.07)		0.02 (0.21)	0.20 (0.23)	
Inflation	-0.06*** (0.01)	-0.07*** (0.03)	-0.38*** (0.09)	-0.09 (0.11)	0.19 (0.21)	0.16 (0.34)	-0.20*** (0.03)
Political Stability	-0.01*** (0.00)	-0.01 (0.01)	0.01 (0.01)		0.03 (0.05)	0.09*** (0.03)	0.02 (0.01)
Rule of Law	0.04*** (0.01)	0.06*** (0.02)	0.23*** (0.03)	0.20** (0.09)		0.06 (0.08)	0.01 (0.02)
Trade/GDP	-0.01 (0.02)			-0.05 (0.04)	-0.27*** (0.03)		
Unemployment	0.08 (0.07)		-0.34 (0.25)		0.07 (0.93)	-0.39 (1.25)	-0.59*** (0.17)
External debt/GDP		0.06*** (0.01)	0.12*** (0.03)	0.05 (0.08)	0.03 (0.12)	0.06 (0.11)	0.05*** (0.01)
Previous Default		0.04*** (0.01)	-0.01 (0.02)	-0.31*** (0.03)		-0.08** (0.03)	
FCY reserves			-0.00 (0.01)	0.20*** (0.02)	0.15*** (0.05)	0.19*** (0.04)	0.01** (0.00)
<i>Rated B+ & lower</i>	-0.01*** (0.00)	0.01* (0.01)	0.01 (0.01)	0.03 (0.03)	0.04 (0.04)	0.03 (0.03)	-0.01 (0.01)
<i>Rated BB+ to BB-</i>	0.01** (0.00)	0.05*** (0.02)	0.06** (0.03)	0.06** (0.02)	0.06** (0.03)	0.03* (0.02)	0.06*** (0.01)
Inverse Mills Ratio	-0.18*** (0.04)	-0.19** (0.07)	-1.57*** (0.50)	-0.15 (0.57)	0.24 (0.44)	0.63 (0.80)	-0.51*** (0.14)
Observations	1690	1717	1319	429	442	414	1716
R ²	0.05	0.08	0.10	0.07	0.01	0.03	0.04
Country FE	Y	Y	Y	N	N	N	Y
Year FE	Y	Y	Y	N	N	N	Y

Note: The standard errors are shown in parenthesis and are estimated according to the Driscoll and Kraay (1998) robust covariance matrix with four lags, taking into account cross-sectional dependence. Control variables are entered to model following a bidirectional stepwise approach based on the AIC score. The models with dependent variables Δ risk-weighted assets, Δ liquid assets and Δ short term liabilities are estimated as first difference models. The Inverse Mills Ratio is added to the model specification to correct for a selection bias. Significance levels are denoted as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 15: Long Term Bonds market development: foreign and local currency bonds issues

	Panel A: Foreign Currency Bonds					Panel B: Local Currency Bonds					Panel C: Yield	
	FCY issues/total	FCY long-term/total	FCY med-term/total	FCY short-term/total	FCY issues/total	LCY long-term/total	LCY med-term/total	LCY short-term/total	LCY issues/total	LCY short-term/total	Bond yield	
Banking Crises	0.01 (0.03)	-0.02 (0.03)	0.03 (0.02)	-0.00 (0.01)	0.11*** (0.03)	0.04*** (0.01)	0.01 (0.01)	0.08*** (0.03)			-0.35 (0.74)	
GDP growth	0.16* (0.09)	0.08 (0.05)		-0.04 (0.05)							1.83 (5.58)	
GDP per capita	0.04*** (0.02)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.06* (0.03)			-0.04 (0.03)			0.22 (1.25)	
Inflation	0.06 (0.06)	-0.02 (0.02)	-0.04 (0.03)	0.12** (0.05)	-0.23*** (0.07)	-0.04 (0.03)	-0.06* (0.03)	-0.14*** (0.04)			-0.38 (2.32)	
Political Stability	0.01 (0.01)		0.00 (0.00)			0.01* (0.01)					-2.37** (0.94)	
Previous Default	0.03* (0.02)	0.01 (0.01)			-0.15*** (0.02)			-0.12*** (0.02)			1.71*** (0.64)	
Rule of Law	-0.01 (0.02)		-0.01 (0.01)					0.12*** (0.03)			1.25 (1.13)	
Unemployment	0.37 (0.27)	0.20 (0.15)		-0.01 (0.05)		0.36 (0.32)						
Current A.C./GDP		0.01 (0.01)			0.13* (0.08)	0.06*** (0.02)		0.07** (0.03)			0.05 (2.68)	-4.15
FCY reserves		0.00 (0.00)			0.01 (0.02)	0.01*** (0.00)		0.00 (0.01)			0.00 (0.01)	-1.30*** (0.27)
Government Effectiveness				-0.00 (0.01)	0.23*** (0.06)	0.08*** (0.02)		0.03 (0.04)			0.03 (0.04)	
Trade/GDP				0.02*** (0.01)	0.12*** (0.04)	0.03*** (0.01)		0.02 (0.01)			0.02 (0.02)	
Rated B+ & lower	0.03** (0.01)	0.01* (0.01)	0.01* (0.00)	0.01 (0.01)	-0.02 (0.05)	-0.02 (0.02)	-0.01 (0.02)	-0.01 (0.04)			-1.31 (0.81)	
Rated BB+ to BB-	0.01 (0.04)	0.01 (0.04)	-0.02 (0.02)	-0.00 (0.00)	-0.11*** (0.04)	-0.01 (0.02)	0.01 (0.03)	-0.11* (0.06)			-0.76 (0.96)	
Inverse Mills Ratio	0.12** (0.06)	0.04 (0.05)	0.03 (0.02)	0.04* (0.02)	0.42* (0.22)	-0.02 (0.05)	-0.10 (0.10)	0.37** (0.16)			3.31 (3.56)	
Observations	1757	1757	1757	1757	1757	1757	1757	1757	1757	312		
R ²	0.50	0.42	0.29	0.47	0.55	0.27	0.18	0.18			0.12	
Country FE	Y	Y	Y	Y	Y	Y	Y	Y			Y	
Year FE	Y	Y	Y	Y	Y	Y	Y	Y			Y	

Note: The standard errors are shown in parenthesis and are estimated according to the Driscoll and Kraay (1998) robust covariance matrix with four lags, taking into account cross-sectional dependence. Control variables are entered into the model following a bidirectional stepwise approach based on the AIC score. The Inverse Mills Ratio is added to the model specification to correct for a selection bias. Significance levels are denoted as ***, ***, ***, * $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 16: Long Term Bonds market development: growth of bond issues (notional amount)

	Panel A: Foreign Currency Bonds				Panel B: Local Currency Bonds			
	Δ FCY issues	Δ FCY Long-term	Δ FCY Med-term	Δ FCY Short-term	Δ LCY issues	Δ LCY Long-term	Δ LCY Med-term	Δ LCY Short-term
Banking Crises	0.30 (1.63)	2.76 (1.79)	0.00 (1.47)	-2.39** (0.95)	-0.21 (0.17)	1.22 (1.42)	1.43 (0.95)	-0.20 (0.15)
GDP growth	-2.39 (3.88)	-5.90*** (2.08)		0.65 (1.90)				
GDP per capita	-0.44 (1.15)	0.69 (0.86)	-0.66 (0.51)	-0.65 (0.56)	0.68 (0.51)			1.38* (0.72)
Inflation	1.44 (1.89)	-1.28* (0.74)	0.33 (1.33)	2.23** (0.87)	0.14 (0.99)	1.13 (1.72)	0.67 (1.61)	-0.09 (0.76)
Political Stability	0.90*** (0.30)		0.45* (0.24)			2.49*** (0.52)		
Previous Default	0.23 (0.99)	0.66 (0.62)			-0.36** (0.16)			0.34 (0.25)
Rule of Law	-0.20 (0.78)		0.19 (0.47)				1.25*** (0.40)	0.21 (0.32)
Unemployment	-1.88 (10.55)	-5.05 (4.61)		1.27 (4.34)		-4.68 (5.72)		10.01 (9.08)
Current A.C./GDP		2.95*** (0.56)			2.05** (0.87)	-1.67* (0.93)	1.70** (0.77)	1.88* (1.02)
FCY reserves		-0.65 (0.45)			0.07 (0.57)	0.16 (0.29)	0.27 (0.45)	-0.51 (0.45)
Government Effectiveness				-0.01 (0.23)	1.41* (0.85)	2.45* (1.37)		0.16 (0.36)
Trade/GDP				0.26 (0.18)	1.04** (0.45)	0.24 (0.29)	1.33** (0.60)	0.73** (0.29)
<i>Rated B+ & lower</i>	-0.12 (0.44)	-0.00 (0.29)	0.00 (0.20)	0.01 (0.23)	-0.31 (0.80)	-0.12 (0.28)	-0.23 (0.52)	-0.17 (0.84)
<i>Rated BB+ to BB-</i>	-0.36 (0.65)	-0.09 (0.47)	-0.10 (0.32)	0.01 (0.10)	-0.45 (0.73)	-0.35 (0.56)	-0.27 (0.38)	-0.33 (0.77)
Inverse Mills Ratio	-3.22 (4.45)	-5.31* (3.20)	0.22 (1.06)	1.69 (1.17)	9.19*** (2.77)	-0.31 (1.89)	5.01*** (1.47)	7.98*** (2.02)
Observations	1673	1673	1673	1673	1673	1673	1673	1673
R ²	0.01	0.02	0.01	0.03	0.01	0.03	0.01	0.01
Country FE	N	N	N	N	N	N	N	N
Year FE	N	N	N	N	N	N	N	N

Note: The standard errors are shown in parenthesis and are estimated according to the Driscoll and Kraay (1998) robust covariance matrix with four lags, taking into account cross-sectional dependence. The models are estimated as first difference equations and control variables are added following a bidirectional stepwise approach, based on the AIC score. The Inverse Mills Ratio is added to the model specification to correct for a selection bias. Significance levels are denoted as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 17: Long Term International financial integration: Capital inflows

	Direct debt investments/GDP	Direct equity investments/GDP	Portfolio debt investments/GDP	Portfolio equity investments/GDP	Foreign loans and deposits
Current A.C./GDP	-0.29*** (0.05)	-0.36*** (0.12)	0.07** (0.03)	0.00 (0.02)	-0.19*** (0.06)
External debt/GDP	0.04** (0.02)	0.17*** (0.04)	0.02 (0.01)	0.12*** (0.04)	-0.03 (0.03)
FCY reserves	0.01** (0.00)	-0.01 (0.01)	0.00 (0.00)	-0.01* (0.01)	-0.00 (0.01)
GDP per capita	-0.08*** (0.03)	-0.05*** (0.02)	0.02*** (0.01)	0.02 (0.01)	-0.15*** (0.04)
Government Effectiveness	0.00 (0.03)	-0.14 (0.13)	0.09*** (0.03)	-0.00 (0.01)	-0.17** (0.08)
Inflation	-0.04 (0.04)	-0.31* (0.16)	0.09*** (0.03)	0.03* (0.01)	0.20*** (0.07)
Political Stability	-0.06*** (0.01)	0.02* (0.01)	-0.00 (0.00)	-0.01** (0.00)	-0.03 (0.02)
Previous Default	0.03 (0.04)	-0.03 (0.05)	0.03** (0.01)	-0.03 (0.02)	
Rule of Law	-0.01 (0.03)	0.10 (0.09)	-0.05*** (0.02)	-0.01 (0.01)	-0.08 (0.07)
Trade/GDP	0.08** (0.03)	0.00 (0.04)	0.04*** (0.01)	0.02 (0.03)	-0.06 (0.05)
Unemployment	0.34** (0.15)	-0.75 (0.53)	0.38*** (0.12)	-0.08 (0.10)	-0.48 (0.72)
GDP growth		-1.04** (0.52)	0.30** (0.12)		0.82** (0.36)
Banking Crises				-0.05*** (0.02)	-0.06** (0.03)
<i>Rated B+ & lower</i>	-0.02 (0.02)	0.03* (0.02)	0.01 (0.00)	0.00 (0.00)	0.10** (0.05)
<i>Rated BB+ to BB-</i>	-0.04*** (0.01)	0.02 (0.05)	0.00 (0.00)	-0.00 (0.01)	-0.08 (0.08)
Inverse Mills Ratio	-0.11 (0.13)	-1.34* (0.74)	0.47*** (0.18)	-0.00 (0.07)	-0.32 (0.24)
Observations	870	868	1454	1454	1455
R ²	0.35	0.38	0.52	0.42	0.36
Country FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y

Note: The standard errors are shown in parenthesis and are estimated according to the Driscoll and Kraay (1998) robust covariance matrix with four lags, taking into account cross-sectional dependence. Control variables are entered to model following a bidirectional stepwise approach based on the AIC score. The Inverse Mills Ratio is added to the model specification to correct for a selection bias. Significance levels are denoted as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.