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Abstract

We examine whether investor protection affects capital markets in terms of the development of corporate bond markets versus that of equity markets. Using a dataset of 42 countries, we show that in countries with stronger creditor rights, corporate bond markets are more developed than equity markets. In opposition, we find only weak evidence that in countries with stronger shareholder protection, equity markets are more developed than corporate bond markets. Additionally, we find that the effects of financial reforms on capital markets are strongly dependent on the strength of investor protections in a given country and information disclosure.

JEL Classification: G10; G20; G28

Keywords: corporate bond market, equity market, investor protection, financial reform, information disclosure, crisis

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1. Introduction

In a seminal paper, La Porta et al. (1998) documented that legal origins influence a country's law regarding creditor and shareholder rights, its level of bank credit and its stock market development. Their results indicated that equity markets are more likely to be developed in countries with common law origins than with civil law origins. Well-developed equity markets, in turn, make it easier for firms to attract financing for their investment needs (Rajan and Zingales, 1998).

Thus far, the literature has primarily concentrated on the equity market and not paid much attention to the development of the structure of capital markets, but corporate bond markets are an important part of the capital markets . According to Tendulkar and Hancock (2014) corporate bond markets have almost tripled in size since 2000, reaching $49 trillion in 2013. In the wake of the financial crisis, growth has slowed down as banks have begun to deleverage their balance sheets, but the amount outstanding from non-financial firms has continued to expand. Indeed, according to the 'spare tire view', a financial crisis can be less severe if a country has the necessary legal infrastructure so that their capital market can provide alternative financing to firms when their banking systems cannot. Recently, Levine, Lin, and Xie (2015) showed that in countries with stronger shareholder protection laws, firms increase the volume of equity issuances in response to a systematic banking crisis. These findings hold particularly strongly for firms that depend heavily on external finance. Hence, the results suggest that shareholder protections ameliorate the adverse effects of banking crises by providing alternative financing through the equity market.

In response to a banking crisis, due to its similar characteristics to bank loans, the corporate bond market seems to be more suitable than the equity market for firms looking for

alternative financing (Boyd and Smith, 1998). In addition, on average, the bond yield is lower than the bank interest rate for the lowest-risk borrowers, but bond issuance is limited to firms with large sales revenues (Russ and Valderrama, 2012). The higher marginal cost of bank lending is the outcome of the specialization of banks, who spend significant resources to acquire information and monitor borrowers. In contrast, bonds are acquired by a dispersed pool of investors who cannot or choose not to monitor the activities of the issuers and therefore are commonly also referred to as "unmonitored" lending (Russ and Valderrama, 2012). These differences may also explain why the corporate bond market is more resilient during recessions or times of financial distress than the banking sector. De Fiore and Uhlig (2015) showed, however, that a shift in corporate debt from bank finance to bonds was followed by an increasing cost of debt securities relative to bank loans during the financial crisis of 2007. More importantly, De Fiore and Uhlig (2015) documented that total bank loans behaved in a markedly procyclical manner during the financial crisis, whereas corporate bond markets did not. They also showed that when firms have no access to the bond market, the negative effects on investment and output of a shock that reduces bank profitability are amplified. Thus, the corporate bond market development is important from a macroeconomic perspective because it reduces the adverse consequences on economic activity of periods of financial distress. However, it remains largely unknown why and how corporate bond markets develop across countries.

The following study investigates how laws and legal institutions affect the development of corporate bond markets relative to that of equity markets using a sample of 42 developed and developing countries over the period of 1978 to 2011. In the study, we employ several different measures as proxies for creditor and shareholder protections. We also control for

other legal factors, such as country legal origins, debt contract enforcement and bond contract covenants. The existing research indicates that these legal factors are correlated with financial system development, and the link remains robust after controlling for religious composition and other national characteristics (Beck, Demirgüç-Kunt, and Levine, 2003). Lastly, we investigate the effects of financial crises on the relationship between law and capital market development (Allen, Gu, and Kowalewski 2012).

Our initial empirical strategy is to run cross-country regressions to determine the effects of creditor and shareholder rights on the development of the corporate bond market relative to that of the equity market. We control for macro-economic country characteristics that are likely to affect capital market development. We also employ a natural experiment with a generalized difference-in-difference (diff-in-diff, henceforth) estimator to explore whether financial reforms in past decades have any effect on the association between the law and the development of the structure of the capital market within a country. This diff-in-diff strategy avoids the econometric concern that institutional factors such as creditor or shareholder rights are endogenous, and it presents an alternative to the instrumental variable techniques that have been criticized by Djankov et al. (2007).

Our results support the logic underlying the finance literature and the law literature, which have linked investor protection to the development and structure of financial systems. First, we find that countries with stronger creditor rights tend to have a more developed corporate bond market relative to the equity market. Moreover, the results indicate that restrictive bond covenants, which serve as an alternative ex-post mechanism to protect the bondholder, are primarily negatively associated with the development of the bond market relative to that of the stock market. Additionally, we demonstrate that countries that have stronger

debt contract enforcement have a more developed bond market than stock market, but generally, information sharing is more helpful for equity market development. In addition, we find some evidence that shareholder protection predicts the development of the equity market relative to that of the corporate bond market.

Second, we find that financial reforms improve the development of corporate bond markets more than that of equity markets in countries that have stronger creditor protections. In contrast, our results indicate that financial system reforms in countries with stronger shareholder protections enhance the development of the equity market more than that of the corporate bond market. The results suggest that the effect of financial reforms is strongly dependent on a country's legal system. For instance, in countries with stronger creditor protection, financial reforms play a more important role further corporate bond market development. Additionally, we document that greater information disclosure improves the effect of financial reforms on the development of capital markets.

Third, the relationship between law and the structure of the capital market is not as significant during crisis periods as it is during normal periods. We find that in many advanced economies, the bond market develops faster than the equity market but only in the short term during a crisis period. Additionally, during a crisis period, we do not find significant evidence that indicates that in countries with stronger creditor rights, the bond market is developing faster than the equity market. Moreover, we find similar results for emerging economies. Consequently, the observed association between the legal system and the structure of the capital market is partly offset during a crisis period. Indeed, our results are in line with the findings of Allen et al. (2012), who documented significant short-term reversals in the development of financial system structures during a financial crisis.

However, they indicated that after a crisis, the financial system reverts to its previous structure. Thus, we also assume that after a financial crisis, the legal system still largely determines the structure of the capital market.

Overall, our results document that legal factors are important in explaining the development of corporate bond markets versus that of equity markets across countries. We argue that in countries with stronger creditor rights, the corporate bond market is more developed than the stock market during normal periods. Moreover, the effects of financial reforms on the capital market development also tend to depend on the legal system, particularly the investor protections in the country.

Our study contributes to the literature by filling the gap regarding the effect of laws on financial system development. First, in contrast to the previous studies, we use the corporate bond market instead of private bank credit and hence provide new insights into capital market development across countries. We find a strong relationship between creditor protection and corporate bond market development. Our results are in contrast to those of Musacchio (2008), who employed data for Brazil from 1885 to 2003 and found no stable relationship between creditor protections and bond market development in the long run. In our study, however, we use a large dataset of countries, and consequently, the results are more general. Second, Allen et al. (2012) demonstrated that the corporate bond market moves in the same direction as bank credit and experiences a short-term reversal with the stock market during a crisis. However, they concentrated only on the structure of the financial system, whereas we present the effects of crises only on the structure of capital markets.

The remainder of the paper proceeds as follows. In Section 2, we consider the literature

that indicates a link between legal origins and corporate bond market development. In Section 3, we describe our data, and in Section 4, we present the methodology and the results. Section 5 offers concluding remarks.

2. Motivation

Several related strands of literature are reviewed here. To begin, we present a short review of the large body of empirical research on the effects of legal origins on financial system development. Next, we briefly discuss the papers that have linked financial reforms with financial system development. Finally, we present the empirical literature that has investigated the relationships between financial disclosure and financial system development.

La Porta et al. (1998) differentiated countries with corporate law derived from legal origins in England, France, Germany, and Scandinavia. They showed that countries with English common law and French civil law origins lie at the extremes; that is, countries with an English origin (French origin) provide the strongest (weakest) legal protections to both shareholders and creditors. Using this distinction, La Porta et al. (1998) found a positive relation between shareholder protection and stock market financing, and they found a similar effect for creditor protection on the ratio of debt over GNP. In line with their results, Ergungor (2004) showed that legal tradition determines the structure of a financial system, whereas Demirgüç-Kunt and Levine (2004) found that countries with strong protection for shareholder rights tend to have a more market-based financial system. Djankov et al. (2008) confirmed the previous findings and linked the shareholder protection with the stock market development.

In contrast, Levine (1999) found that financial intermediaries develop more in countries

with legal systems that assign a higher priority to creditor rights. More recently, Djankov, Mcliesh, and Shleifer (2007), using data for 129 countries, showed that better creditor rights are associated with a higher ratio of private credit to GDP. Additionally, they reported that ratio of private credit to GDP rises following improvements in creditor rights, but they found little convergence in the scores of creditor rights among legal origins over a 25-year period. In contrast, Musacchio (2008) did not find a strong relationship between creditor protection and bond market development in Brazil. He argued that creditor rights are a necessary condition for bond market development, but the market's further development is more influenced by international capital flows and macroeconomic stability than legal variables. Consequently, the existing empirical evidence on the relationship between creditor rights and bond markets is limited and ambiguous.

Hypothesis 1: *In countries with stronger creditor rights, corporate bond markets are more developed than equity markets.*

Abiad and Mody (2005) documented that financial reforms advanced despite stops and reversals in the last quarter century. Moreover, they found that when initial reforms occurred, the financial sector became only partially repressed, and the likelihood of further reforms increased substantially. They used as an example Japan, where financial liberalization that aimed to develop the government bond market created demand for reduced restrictions on the corporate bond market. Consequently, the financial reforms in those years induced the development of the corporate bond market in Japan.

Financial reforms often consist of the removal of administrative controls that restrain credit growth, which can in turn result in a lending boom. Tornell and Westermann (2002) confirmed that financial liberalization is followed by a lending boom, but they also reported

that sometimes, the boom ends in twin currency and a banking crisis. Notably, the lending boom usually ends with 'a soft landing', whereby credit gradually decelerates. Moreover, the authors argued that the financial flows that take place after financial liberalization do not do so through equity or bond markets because there are severe enforceability problems. Thus, the previous results of analyzing the effects of financial reforms on capital market development are ambiguous.

Hypothesis 2: *Financial system reforms enhance corporate bond market development in countries with stronger creditor rights.*

In the pure adverse selection model developed by Pagano and Jappelli (1993), information sharing improves the pool of borrowers, decreases defaults and reduces the average interest rate. Hence, information sharing can improve the functioning of the market and increase the volume of lending. Levine (1999) found a strong positive link between financial intermediary development and information disclosure, whereas the relationship was weaker than that for creditor rights. Jappelli and Pagano (2002) showed that bank lending is approximately twice as large in countries where lenders share information. Thus, previous results show that information disclosure matters, and we assume in addition that it may influence the effects of financial reforms. In line with our second hypothesis, we expect that in countries with stronger creditor rights and better information disclosure, further institutional reforms in the securities market should significantly improve corporate bond market development. In formulating this hypothesis, we assume that investor protections and information theories serve as substitution mechanisms for market development (Djankov, Mcliesh, and Shleifer (2007); that is, both ex ante or interim better information sharing and ex post stronger creditor rights or shareholder rights can help

reduce market friction and contribute to the development of bond markets or equity markets.

Hypothesis 3: *Better information disclosure improves the effectiveness of institutional reforms on securities markets.*

3. Data and Descriptive Statistics

We construct the indicators of the development of corporate bond and equity markets using the revised financial structure dataset of Beck, Demirguc-Kunt, and Levine (2000). The legal origin variables and the variables to control for creditor rights and shareholder rights are based on La Porta et al. (1998), and we use various sources to collect them. We control for bond covenant, information disclosure and debt contract enforcement using the data of Abiad and Mody (2005). We employ the data for the set of control variables for financial reforms from Abiad, Detragiache, and Tressel (2010). Lastly, we use the data from Laeven and Valencia (2013) to control for systemic banking crises. Because there is limited overlap between the datasets, we end up with a total of 42 developed and developing countries over the sample period of 1978 to 2011. All variables and its sources are presented in Table A1 in the Appendix.

3.1 Variable definitions

3.1.1 Corporate bond market and equity market development

The dependent variable *Structure* is the ratio of corporate bond market capitalization to equity market capitalization. Both variables measure the size of the market, and their relationship presents the structure of the capital market in a country. To measure robustness, we use an alternative dependent variable, $Structure_{Total}$, which is the ratio of the market value of the private and public bond market to the equity market. Replicating

our regressions using the alternative dependent variable, which also takes into account the bonds issued by public entities, yields minor differences and is only shortly discussed in the following section for brevity.

3.1.2 Legal determinants

We assume that countries' level of creditor protection may determine corporate bond market development. We use the *creditor rights index* of Djankov et al. (2007) as a proxy for country-level bondholder protection. The index, which ranges from zero (weak) to four (strong), measures the number of laws and regulations that limit expropriation from secured creditors in a country. This index has been demonstrated to be remarkably stable over time and relevant in explaining patterns in total capital market development (Miller and Reisel, 2012).

Creditor rights are an ex-post mechanism that protects bondholders upon firm defaults. Therefore, we control additionally for restrictive covenants that limit the actions of the managers prior to defaults and serve as ex-ante mechanisms to protect creditors. Miller and Reisel (2012) argued that bond contracts are more likely to include restrictive covenants in countries with weak creditor protection. Hence, both bond covenants and creditor rights contribute to investor protection and can be substitutes at the country level. Following Miller and Reisel (2012), we proxy for *bond covenants* using the average number of covenants attached to corporate bond contracts issued by non-U.S. firms. The proxy reflects covenants in three categories: restrictions on financing activities, restrictions on investment activities and restrictions on payouts. The total possible number of covenants ranges between 0 and 13.

Djankov et al. (2008) documented that the efficiency of debt enforcement is an

economically and statistically significant predictor of the development of debt markets across countries. We control for it by employing the variable *debt enforcement*, which measures of the number of days it takes to enforce a debt contract.

In contrast, shareholder protection may result in equity market development. We control for shareholder protection using three different proxies: anti-director rights, anti-self-dealing and anti-takeover provisions. The *anti-director rights index* (*ADRI*) of La Porta et al. (1998) aggregates six dimensions of shareholder protection rules. Of the six components, three are concerned with shareholder voting, including voting by mail, voting without blocking shares and calling an extraordinary meeting; the others are concerned with minority protection, including proportional board representation, preemptive rights and judicial remedies. Pagano and Volpin (2005), however, criticized the ADRI for its ad hoc nature and mistakes in coding. In response, Djankov et al. (2008) provided a *revised ADRI*, which was better theoretically grounded and more reliably weighted for 72 countries. The results indicated that the correlation between the *original* and *revised ADRI* was only 0.60. Spamann (2010) further improved the index involving leading local lawyers and provided a *corrected ADRI* for forty-six countries. The corrected ADRI differed substantially from the original ADRI (ρ=0.53) and the *revised ADRI* (ρ=0.67). Spamann (2010) demonstrated that many empirical results established using the original index may not be replicable with the *corrected ADRI*. In particular, the corrected index failed to support the earlier findings that shareholder protection is stronger in common law countries than in civil law countries. Therefore, we use the *revised ADRI* and the *corrected ADRI* to control for the index's potential limitations in the study.

Djankov et al. (2008) introduced a new measure of legal protection of minority

shareholders against expropriation by corporate insiders, called the *Anti-self-dealing* index. The index covers both ex-ante and ex-post mechanisms that can limit anti-self-dealing transactions, including disclosure and approval by minority shareholders, independent review and standing to sue. Although both the *ADRI* and *Anti-self-dealing index* capture the strength of shareholder rights, there are still significant differences between them. Djankov et al. (2008) indicated that anti-director rights is the central problem of corporate governance in many countries compared to self-dealing. Thus, they suggested that in general, anti-self-dealing is preferable to the *ADRI* in cross-county studies. Additionally, the empirical evidence indicates that the *Anti-self-dealing* index is a more robust predictor of stock market development than the *ADRI*.

We also use the *Anti-takeover* index developed by Nenova (2006), which captures the set of rules and regulations concerned with changes in corporate control, takeovers, tender offers and general acquisition activity across countries. Nenova (2006) showed that good takeover laws positively affect the number of listed companies, market capitalization, and value traded on stock exchanges, controlling for to the general level of national economic growth.

The empirical literature also suggests that legal origin may matter for creditor rights and shareholder protections (La Porta et al., 1998). Therefore, we control for the legal origin and employ the dummy variable *L_English*, which equals one if the country has a legal origin of English common law and zero otherwise. Dummy variables for countries with French (*L_French*) and German civil law origins (*L_German*) are constructed identically. However, the few countries with a Scandinavian civil law origin (L_Scandinavian) are captured in the regressions by the constant.

3.1.3 Information disclosure and financial reforms

Better information disclosure contributes to credit market development (Jappelli and Pagano, 2002). La Porta et al. (2006) documented that the development of stock markets is strongly associated with extensive disclosure requirements. The Center for Financial Analysis and Research (CIFAR) created an index by rating the annual reports on the inclusion or omission of 90 items, which we employ to control for the level of *information disclosure* across countries.

The data on financial reforms come from the dataset of Abiad, Detragiache, and Tressel (2010). Their database comes with several indices related to specific financial reforms plus an aggregate index. The financial reform index is a sum of seven different dimensions: credit controls and reserve requirements, interest rate controls, entry barriers, state ownership in the banking sector, capital account restrictions, prudential regulations, and supervision of the banking sector, and securities market policy. For each dimension, a country is given a score graded from 0 (high repression) to 3 (full liberalization); thus, the index takes values between 0 and 21. We employ a dummy *financial reforms*, which equals 1 if the first difference of the index is greater than 0 and 0 otherwise. The dummy variable controls for the year when there are policy changes in a country, whereas the values of the index are stable for the majority of normal years.

3.1.4 Banking crisis

In a systemic banking crisis, non-performing loans increase dramatically, and much of the aggregate banking system capital is shortly exhausted. As a result, a systematic banking crisis always leads to output losses in the economy. We use the starting dates of systemic banking crises provided by Laeven and Valencia (2013), and we focus on those crises with

an output loss of over 10%. We assume that only a large systematic banking crisis might lead to significant capital market development. Using this criterion, we are able to identify 144 systemic banking crises across countries.

3.2 Descriptive statistics

In Panel A of Table 1, we present the descriptive statistics. Variation in the capital market measures across countries is noticeable The variable *Structure* exhibits high cross-sectional variability, ranging from 0.00 to 5.68 with a mean of 1.44, which indicates that compared to stock market development, there are huge differences with corporate bond market development across countries. The alterative variable $Structure_{Total}$, which is defined as the development of the public to private bond market versus the stock market, exhibits even higher variation, ranging from 0.00 to 5.68 with a mean of 0.58.

The variable *Structure* identifies Iceland, Ireland, Denmark, Austria and Italy as having, on average, the highest market capitalization of the corporate bond market relative to the equity market from 2007-2011. Conversely, Hong Kong, the Philippines, Luxembourg, Columbia, and Turkey have the lowest ratio of corporate bond market capitalization to stock market capitalization in the five years. When we include the public bond market, the highest average ratios of bond market capitalization to stock market capitalization are reported Italy, the Slovak Republic, Iceland, Austria and Ireland, and the lowest are reported for Chile, Switzerland, South Africa, Hong Kong, and Luxembourg for the last five years.

The independent variables exhibit high cross-sectional variation, whereas the variable *Creditor rights* ranges from 0 to 4, with an average of 1.80. The value indicates that

countries in our sample provide, on average, low protection to creditors. The results are strengthened by the *revised ADRI* and *corrected ADRI,* with average values of 3.37 and 3.74, respectively. The *Anti-self-dealing* index has an average of 0.44, and its scores range from 0.08 to 1.00. The *Anti-takeover* index has an average of 0.46, and the scores range from 0.04 to 0.97.

Panel B in Table 1 presents a matrix of the correlation between explanatory variables and the proxies for investor protection and the control variables. As expected, the two regressors *Structure* and $Structure_{Total}$ that proxy for bond market development are highly correlated. The variable *Creditor rights* is significantly and positively related to the variable *Structure.* In contrast, it is insignificantly related to $Structure_{Total}$. Hence, the results indicate that creditor protection is important for the development of corporate bond markets. In contrast, we may assume that public bond market development is driven more by fiscal and monetary credibility. In line with our expectations, the variable *Anti-takeover index*, which proxies for shareholder protection, is significantly and negatively correlated with the variable *Structure* and its alternative. The results are consistent with our hypothesis that stronger creditor rights are positively associated with the higher development of the corporate bond market relative to the equity market, whereas stronger shareholder protection has a negative effect on the development of the corporate bond market versus that of the stock market.

Panel B in Table 1 shows a positive correlation between creditor rights and shareholder rights. This finding is not surprising; usually, countries with well-developed legal systems and institutions provide similar protections to shareholders and creditors. Indeed, we find that a English legal origin is significantly and positively associated with both creditor rights

and shareholder rights, whereas a French legal origin exhibits completely opposite correlations. A German legal origin indicates significantly positive correlations with creditor rights but mixed associations with shareholder rights. These results are in line with those of La Porta et al. (1998), who showed that all legal families provide roughly the same protections to creditors and shareholders. Our results also confirm that countries with an English legal origin give both shareholders and creditors the strongest protection; French civil law countries, the weakest. The only exception is German civil law countries, which are more protective of creditors than shareholders.

The variables *Bond covenant* and *Enforcement* exhibit significantly negative associations with the variable *Structure* and significantly negative correlations with creditor rights. Hence, the results confirm that corporate bond contracts are more likely to include covenants in countries with weak creditor rights, which we assume would negatively affect the bond market development. Moreover, debt enforcement shows not only a negative association with bond market development but also a positive relationship with shareholder and creditor protection.

[Table 2]

4. Methodology and Results

4.1 Baseline model

We begin our analysis by employing random effects estimates using generalized least squares to explore the influence of creditor rights and shareholder rights on the structure of the capital market.

$$Structure_{i,t} = \alpha_i + \beta_t + \gamma \cdot Creditor\ rights_{i,t} + \delta \cdot Shareholder\ rights_{i,t} + \theta \cdot X_{i,t} + \varepsilon_{i,t} \quad (1)$$

where $Structure_{i,t}$ is the market value of the bond market to the stock market. $Creditor\ rights_{i,t}$ and $Shareholder\ rights_{i,t}$ denote the set of variables proxying for creditor and shareholder protection, respectively. $X_{i,t}$ denotes the set of control variables, which include legal origins, bond covenants, information disclosure, and variables of the macroeconomic environment, such as the log of GDP, the log of GDP per capita, and inflation. Variables α_i and β_t are country and year fixed effects, $\varepsilon_{i,t}$ is the error term, and *i* and *t* denote country and time period, respectively.

Random-effects estimates are more efficient than pooled OLS estimates and assume that country effects are uncorrelated with regressors, whereas fixed-effects models allow country effects to be correlated with regressors. Therefore, we employ both estimation methods for the panel regressions to establish the effect of creditor rights on corporate bond market development. Although the variables of interest, such as creditor and shareholder protection, change over time, they are characterized by variations that are not sufficiently sizable to be significant. Fixed-effects estimation requires significant within-group variations in the independent variable to generate a consistent and efficient estimator (Wooldridge, 2002). Thus, the fixed-effects estimator is prone to yielding imprecise coefficients for variables representing creditor and shareholder rights. Moreover, fixed effects can aggravate the problem of multicollinearity (Baltagi, 2005). Therefore, we prefer and report primarily the results of the random-effects method for brevity[2]. In all regressions, the independent variables are jointly significant at levels below 1%. Thus, we do not comment further on these aspects.

[2] For brevity, we do not report the results for the fixed-effects estimations, but they are available upon request. The results based on fixed-effects estimators are similar to those obtained using random-effects estimators.

4.2 Baseline results

Table 2 presents the results of the random-effects estimations. In specifications (1)-(4), we regress the explanatory variable *Structure* against the variable *Creditor rights* and then progressively change the extensive set of variables controlling for shareholder protections. To check the robustness of our results in specifications (5)-(8), we repeat the estimation using the alternative regressor $Structure_{Total,}$ which additionally includes the government bond market. In all regressions, we include macroeconomic control variables, such as the log of GDP, the log of GDP per capita and inflation. The exogenous macroeconomic situations of the country may determine the growth of the corporate bond market and the stock market.

The regressions reveal that creditor rights are positively correlated to the bond market development, and the coefficient is statistically significant at the 1% level in all specifications. Adding proxies for shareholder protections hardly changes the coefficient for the variable *Creditor rights*. In terms of economic magnitude, specification (1) implies that the increase in the creditor rights index by one point results in the increase in the market capitalization of the corporate bond market relative to the equity market by 0.33%. This result implies that in countries where creditor rights are protected, represented by the higher value of the index, corporate bond markets are more developed. This finding is in accordance with Hypothesis 1.

In Table 2, the coefficients for the different variables reflecting shareholder rights are negative and statistically significant in almost all specifications. The results imply that better shareholder protection results in the development of the equity market relative to the

corporate bond market. When examine the results in more detail, we find confirmation of the differences between the different shareholder rights indices, including the two anti-director rights indexes. We find that the anti-takeover provisions are weak predictors of the development of the equity market because the coefficient for the variable *Anti-takeover* is statistically significant at only the 10% level, whereas it is insignificant when we use the alternative explanatory variable $Structure_{Total}$. Hence, it seems that the *corrected ADRI* and *revised ADRI* are better predictors of the development of the equity market relative to that of the bond market, whereas both of them increase their prediction power when the government bond market is used. However, only the coefficient for the *Anti-self-dealing* index is statistically significant at the 1% level in both specifications. Therefore, the variable seems to be the best predictor of equity market development. The results support the findings of Djankov et al. (2008), who also reported that the *Anti-self-dealing* index is a more robust predictor than the *Anti-director rights* index. The control variables included in the regressions are signed as expected in general terms but are insignificant. Adding control variables hardly changes the coefficients of *Creditor rights* or the proxies for shareholder protections.

[Table 2]

In Table 3, we present the results and control for legal origins and other factors that may determine corporate bond market development. In columns (1) to (4), we control for countries legal origins. Adding new control variables does not change the coefficient for *Creditor rights*, which remains statistically significant at the 1% level. In contrast, the coefficients for the proxies for shareholder protection have the expected sign but lose statistical significance. Only the coefficient for the *Anti-self-dealing* index is statistically

significant at the 5% level.

All coefficients for legal origins are negative, but only for English common law are the coefficients statistically significant in almost all specifications. In contrast, the coefficients for German or French civil law are almost never significant or are significant at only the 10% level. On one hand, the results confirm the finding of La Porta et al. (1998) that investor protection varies systematically across legal origins but is higher in common law than in civil law countries. However, the negative coefficients for all legal origin dummies suggest that all legal families more strongly protect shareholders than creditors. In fact, the results are in line with Djankov et al. (2008), who did not find a significant influence of legal origin on private credit.

Next, we add variables that control for the restrictive bond covenant, information disclosure, and log of days of debt contract enforcement in the regressions. The results are presented in columns (5) to (8). Surprisingly, none of the control variables is significantly related to corporate bond market development. However, the coefficient for *Creditor rights* barely changes after the new control variables are added, indicating that the additional variables do not contain information, which affects corporate bond market development. In contrast, all proxies for shareholder protection lose significance. We thus conclude that creditor rights are more robust predictors of corporate bond market development than shareholder protections for equity markets. Overall, we find strong support for Hypothesis 1, which states that in countries with stronger creditor rights, corporate bond markets are more developed than equity markets.

[Table 3]

4.2 Financial reforms and corporate bond market development

We use a natural experiment using a diff-in-diff estimator to investigate the effect of financial reforms on the relationship between legal determinants and corporate bond market development. This methodology basically compares the effect of an event (a financial policy change in our setting) on groups that are more affected by policy changes (i.e., the treated group) with those that are less affected by the changes (i.e., the control group). We assume that financial reforms have a stronger effect on the development of corporate bond markets than that of equity markets in countries with a higher creditor protection (Hypothesis 2). Therefore, we classify countries based on the pre-treatment level of creditor rights relative to shareholder rights. Countries are classified as treated groups when, based on the ratio, they are in the top third of the sample, and they are classified as control groups when they are in the bottom third of the sample. Using this methodology, we employ the following specification:

$$Structure_{i,t} = \alpha_i + \beta_t + \sigma \cdot Treated * Post\_reform + \gamma \cdot Creditor\ rights_{i,t} + \delta \cdot Shareholder\ rights_{i,t} + \theta \cdot X_{i,t} + \varepsilon_{i,t} \quad (2)$$

where *Treated* equals 1 if the country is in a treated group and 0 otherwise; *Post reform* is a dummy variable that takes the value of 1 in first year after a financial reform and zero otherwise. The diff-in-diff effect is captured by σ because we do not separately add the dummy *Post reform* as an independent variable. Separately, the dummy variable will be collinear with the year fixed-effects, and therefore, the estimates on *Post reform* will simply be random intercepts with no meanings (Gormley and Matsa, 2014).

Table 4 presents the effects of financial reform on the association between investor protection and corporate bond market development. We find that adding a diff-in-diff

estimator does not change the main results presented in Table 3. The relationship between creditor and shareholder protections and capital market development remains statistically significant, and the signs of the coefficients do not change. However, when we use the fixed-effects estimations, the coefficient for *Corrected ADR* loses significance, whereas that of creditor protection remains unchanged. Consequently, the results once again indicate that creditor protections are more important for corporate bond market development than shareholder protection for the equity market.

In all specifications, the coefficient for the interaction term *Treated*Post_reform* is positively related to corporate bond market development and is statistically significant at the 1% level, which indicates that in countries with stronger creditor protection than shareholder protection, financial reforms improve the corporate bond market development relative to the equity market. Consequently, we find support for our second hypothesis, which states that financial reforms promote corporate bond market development if the countries have stronger creditor rights.

We test the sensitivity of our results by introducing an interaction term between information disclosure and financial reform. The coefficient for the interaction term is positive and significant at the 5% level, which indicates that in countries with better information disclosure, the effects of financial reforms are more significant for corporate bond market development (Hypothesis 3).

[Table 4]

In Table 5, we further analyze the robustness of our results by adding an interaction term between the legal variables and the *Post reform* dummy. In columns (1)-(3), we interact the *Post reform* dummy with the proxies for investor protection. The coefficient for the

interaction term with *Creditor rights* is positive and significant in all specifications. In contrast, the coefficient for the interaction term with the proxies for shareholder rights is negative but significant only for the variable *Anti-self-dealing*. Overall, the results show that after financial reforms, the relations between legal determinants and capital market development do not change. Stronger creditor protection is a good predictor of corporate bond market development, whereas stronger shareholder protection is a good predictor of equity market development. However, once again, the results show that among the proxies for shareholder protection, the variable *Anti-self-dealing* is the best predictor of equity market development.

In columns (4)-(6), we add a triple interaction, including investor protection, a post reform dummy and information disclosure. We assume that there may exist cross-sectional heterogeneity among countries, such as information disclosure systems or other related regulatory and supervisory factors. We therefore expect that in countries with better information disclosure, the effects of financial reform may be more significant (Hypothesis 3). The results confirm our hypothesis: The coefficients for interaction terms that include *Creditor rights* are positive and significant in all specifications. In opposition, the coefficients for interaction terms that include the proxies for shareholder protection are negative and statistically significant only for the variables *Revised ADRI* and *Anti-self-dealing*. On one hand, the results indicate that financial reforms are more effective in countries with better information sharing. On the other hand, the results also show that information sharing is important only in countries characterized by high investor protection because the coefficient for *Information disclosure* was insignificant in Table 3.

Lastly, in all specifications, the coefficient creditor protections remains positively related

to corporate bond market development and statistically significant at the 1% level. Similarly, the coefficients for the proxies for shareholder protection are negative and statistically significant. Consequently, the results confirm once again that investor protections are important for the capital market development.

[Table 5]

4.3 Development of the corporate bond market during a banking crisis

According to the spare tire view, the capital market may provide financing during a banking crisis. We therefore assume that in countries with higher creditor protection, corporate bond markets are more likely to develop during a banking crisis and thus act as a 'spare tire'. Gormley, Johnson, and Rhee (2006) showed that in 1997, the severe currency crisis triggered a freeze in newly increased bank lending in South Korea; as a result, the corporate bond market sprang to life. One year later, the Korean bond market provided almost all funds raised by companies, whereas the surge in new issues was financed by household savings and the drawing down of bank deposits. Recently, Levine, Lin, and Xie (2015) documented that stronger shareholder protection facilitate equity financing during a banking crisis. These findings indicate that stronger investor protections may predict capital market development following a systemic banking crisis.

In Table 7, we evaluate the spare tire view and include the dummy variable *Banking crisis*. The coefficient for the dummy variable is positive and significant in all specifications. Hence, the results suggest that corporate bond markets develop during a banking crisis. However, the key explanatory variable is the interaction term between the crisis dummy and the measure of the strength of investor protections. In Table 7, the coefficient for the interaction term between the *Banking crisis* and *Creditor rights* is positive but insignificant.

Consequently, we do not find evidence that corporate bond markets are developing faster in countries with good pre-crisis creditor protection during a systematic banking crisis. Similarly, in columns (2) and (4), the coefficients for the interaction terms that include the *revised* and *corrected* ADRI are insignificant. In all specifications that include shareholder protections, only the interaction term that includes the variable *Anti-self-dealing* enters with a negative and statistically significant sign at the 10% level. We thus find weak evidence that pre-crisis anti-self-dealing protection is positively related to equity market development during a systematic banking crisis. These findings are consistent with those of Levine, Lin, and Xie (2015), who also used the anti-self-dealing index in their study.

[Table 6]

To examine the sensitivity of our results, we control for the economic development of the countries or regions. The results are shown in Table 6. For instance, in columns (1)-(2), we introduce the dummy variable Advanced, which takes the value of 1 if a country has a GDP per capita over 10,000 USD. We employ this dummy because there were more systematic banking crises in emerging markets than in developed countries from 1978-2011. Moreover, we assume that the capital markets may behave differently in advanced economies than in emerging countries during a systematic banking crisis.

Next, we interact the dummy variable with the variable *Banking crisis* and the proxies for investor protection. In column (1), the coefficient for the interaction term *Region*Banking crisis* is significant and positive, whereas in column (2), it loses significance. Hence, we find only weak evidence that corporate bond markets develop faster in advanced economies than in emerging markets during a banking crisis. We employ also a triple interaction term that includes the proxies for investor protections. Only the coefficient for the interaction

term that includes the variable *Revised ADRI* is statistically significant and negative in specification (1). The results indicate that pre-crisis shareholder protection proxied by the revised ADRI may predict equity market development during a systematic banking crisis. Next, we decide to evaluate whether there are differences in the results depending on the region of the crisis and its frequency. In columns (3)-(4), the variable *Region* controls for the Asian crisis of 1997[3], whereas in columns (5)-(6), the variable *Region* controls for the frequent systematic banking crises in Latin America from 1978-2011[4]. In contrast to our expectations, we find that in none of the specifications is the coefficient for the interaction between the variables *Region* and *Banking crisis* significant. Moreover, we find that none of the coefficients for the triple interaction term that includes the proxies for investor protection is significant. The results indicate that in neither of the regions are creditor or shareholder rights determined by capital market development during a crisis. The results support the findings of Gormley, Johnson, and Rhee (2006), who showed that in Korea, the corporate bond market was growing during the Asian crisis, but it was not determined by the prevailing institutions. As a result, they showed that the allocation of the newly issued bonds was highly concentrated, and the credit screening was poor during the crisis in Korea.

[Table 10]

Figures 1 graphically presents the development of the corporate bond market relative to that of the equity market in all sample countries, the advanced economies and the two regions. We can see that on average, the corporate bond market starts to grow one year

[3] The dummy variable controls for Indonesia, Malaysia, Philippines, South Korea, Thailand, Hong Kong, and Singapore, which experienced a severe crisis from 1997 to 1998.
[4] The dummy variable controls for systematic banking crisis in Argentina, Brazil, Columbia, Mexico and Peru from 1970-2011.

prior to the systematic banking crisis in the years of 1970-2011. The corporate bond 33market expands during a crisis but starts to decline relatively to the equity market after the crisis. The results are consistent with those of Allen, Gu, and Kowalewski (2012), who showed that following a crisis, changes in the structure of the financial system are only short-term effects. In our sample, only the corporate bond market in Latin American countries is steadily growing relatively to the equity market, whereas the crisis period does not seem to influence its development.

[Figure 1]

5 Conclusions

We examine whether investor protection determines the development of the corporate bond market relative to that of the equity market. On one hand, we find that countries' level of creditor rights predicts corporate bond market development. On the other hand, the results also show that shareholder rights positively influence equity market development.

Moreover, our results show that financial reforms may predict corporate bond market development in countries with stronger creditor protections. Last but not the least, we find that the corporate bond market develops in response to systemic banking crises. However, the growth is only short term because it is not determined by the level of pre-crisis creditor rights. In our opinion, these results indicate how investor protection affects capital market development and present an explanation of why some countries have a more developed corporate bond market than equity market.

Our study fills a gap in the current literature on presenting the relationship between law and corporate bond market development. However, in this paper, we do not discuss the tradeoff between the improvement of creditor rights and shareholder rights. It would be

interesting to investigate the optimal structure of country capital markets related to long-term economic growth. We are aware of these shortcomings, but we leave these topics for further research.

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Appendix

Table A1

Definitions of the main variables

Variable	Definition	Source
Financial Structure		
Structure	The ratio of private bond market capitalization to stock market capitalization	Beck et al. (2001, 2010); Cihak, M. et al. (2012)
$Structure_{Total}$	The ratio of bond market capitalization to stock market capitalization	
Law		
Creditor rights	An index aggregating creditor rights. The index ranges from 0 (weakest creditor rights) to 4 (strongest creditor rights)	Djankov, S. et al. (2007)
Revised ADRI	A revised index of the original anti-director rights index, which aggregates shareholder protection in over one hundred articles, including shareholder voting and minority protection	LLSV (1998) DLLS (2008)
Corrected ADRI	A corrected index of the original anti-director rights index, with improved data collection, coding and documentation	Spamann (2010)
Anti-self-dealing	An index summarizing the strength of minority shareholders in limiting expropriation by corporate insiders	DLLS (2008)
Anti-takeover provisions	An index measuring the extent of anti-takeover regulations across countries	Nenova (2006)
Bond covenant	An index aggregating heterogeneous rights attached to bonds	Miller. D. and N. Reisel. (2012)
Information disclosure	An index created by examining and rating companies' annual reports on their inclusion or omission on 90 items, with a higher number indicating more disclosure.	International Accounting and Auditing Trends, Center for Financial Analysis and Research
Debt enforcement	Equals the logarithm of the number of days to resolve a payment dispute through courts	Djankov, S. (2008)

Financial Reforms		
Financial reforms	An index of financial reforms, normalized to be between 0 and 1	Abiad et al. (2008)
Reform	Dummy=1 if the 1st difference term of financial reform index is higher than 0	
Crises		
Banking crises	A dummy variable that equals 1 during a severe systematic banking crisis and zero otherwise.	Laeven and Valencia (2012)
Macroeconomic control variables		
GDP	Logarithm of gross national product (current US dollars)	World Development Indicators
GDP per capita	Logarithm of gross national product per capita	World Development Indicators
Inflation	Annual growth rate of consumer price index	World Development Indicators

Table 1
Descriptive statistics and correlations

	Structure	$Struture_{Total}$	Creditor rights	Revised ADR	Corrected ADR	Anti-self-dealing	Anti-takeover	L_English	L_French	L_German	Bond covenant	Information disclosure	Enforcement	Financial reform
	Panel A: Descriptive Statistics													
Mean	0.58	1.44	1.80	3.37	3.74	0.44	0.46	0.27	0.48	0.13	2.50	71.62	5.79	0.49
Std. Dev.	0.75	1.45	1.18	1.13	0.95	0.23	0.24	0.45	0.50	0.33	2.38	8.07	0.65	0.30
Min.	0.00	0.01	0	1	2	0.08	0.04	0	0	0	0	56	3.30	0
Max.	5.68	9.52	4	5	6	1	0.97	1	1	1	7	85	7.29	1
Obs.	856	856	4,080	3,692	2,340	3,692	2,496	6,812	6,812	6,812	2,444	1,924	6,708	2,539
	Panel B: Correlations													
Structure	1													
$Struture_{Total}$	0.79* (0.00)	1												
Creditor rights	0.15* (0.00)	0.01 (0.77)	1											
Revised ADRI	-0.08* (0.03)	-0.29* (0.00)	0.20* (0.00)	1										
Corrected ADRI	-0.08* (0.03)	-0.22* (0.00)	0.17* (0.00)	0.69* (0.00)	1									
Anti-self-dealing	-0.24* (0.00)	-0.33* (0.00)	0.30* (0.00)	0.56* (0.00)	0.35* (0.00)	1								
Anti-takeover	0.06 (0.13)	-0.07 (0.07)	0.34* (0.00)	0.49* (0.00)	0.37* (0.00)	0.51* (0.00)	1							
L_English	-0.22* (0.00)	-0.32* (0.00	0.30* (0.00)	0.48* (0.00)	0.17* (0.00)	0.60* (0.00)	0.35* (0.00)	1						
L_French	-0.12* (0.00)	0.10* (0.00)	-0.41* (0.00)	-0.38* (0.00)	-0.28* (0.00)	-0.39* (0.00)	-0.41* (0.00)	-0.59* (0.00)	1					
L_German	0.14* (0.00)	0.16* (0.00)	0.15* (0.00)	-0.15* (0.00)	0.12* (0.00)	-0.15* (0.00)	0.19* (0.00)	-0.24* (0.00)	-0.37* (0.00)	1				

Bond covenant	-0.39* (0.00)	-0.29* (0.00)	-0.27* (0.00)	-0.05* (0.03)	-0.23* (0.00)	0.20* (0.00)	-0.24* (0.00)	0.21* (0.00)	0.15* (0.00)	-0.27* (0.00)	1			
Information disclosure	0.01 (0.79)	-0.25* (0.00)	0.26* (0.00)	0.35* (0.00)	0.16* (0.00)	0.46* (0.00)	0.66* (0.00)	0.38* (0.00)	-0.53* (0.00)	-0.10* (0.00)	-0.25* (0.00)	1		
Enforcement	-0.20* (0.00)	0.05 (0.13)	-0.15* (0.0)	-0.24* (0.00)	-0.34* (0.00)	-0.16* (0.00)	-0.38* (0.00)	-0.12* (0.00)	0.23* (0.00)	-0.05* (0.00)	0.03 (0.13)	-0.35* (0.0)	1	
Financial reform	0.15* (0.00)	0.02 (0.73)	0.10* (0.00)	0.07* (0.00)	-0.00 (0.88)	0.09* (0.00)	0.32* (0.00)	-0.05* (0.01)	-0.13* (0.00)	0.17* (0.00)	-0.23* (0.00)	0.38* (0.00)	-0.25* (0.00)	1

Standard errors are reported in parentheses. ***, ** and * imply significance at the 99%, 95% and 90% levels, respectively

Table 2
Creditor rights, shareholder rights and bond vs. stock market development

This table reports results for the random-effects regression for 42 countries over the period 1978-2011. The dependent variables are, in specifications (1)-(4), corporate bond market capitalization and, in (5)-(8), the ratios of total bond market capitalization to stock market capitalization. The independent variables proxy for creditor and shareholder protection, which are defined in Table A1. The macroeconomic control variables are log of GDP, log of GDP per capita and inflation. In all regressions, constant and time dummies are included but are not reported for brevity. Standard errors are reported in parentheses. *, **, and *** represent 10%, 5%, and 1% significance levels, respectively.

	Corporate bond market				Total bond market			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Creditor rights	0.30***	029***	0.32***	0.31***	0.23**	0.27***	0.27***	0.20*
	(0.06)	(0.06)	(0.06)	(0.05)	(0.12)	(0.12)	(0.12)	(0.12)
Revised ADRI	-0.20**				-0.58***			
	(0.08)				(0.17)			
Corrected ADRI		-0.07*				-0.22**		
		(0.04)				(0.10)		
Anti-self-dealing			-1.17***				-2.74***	
			(0.36)				(0.76)	
Anti-takeover				-0.72*				-0.65
				(0.41)				(0.98)
GDP	-0.06	-0.04	-0.04	-0.09*	-0.27**	-0.12	-0.23**	-0.23*
	(0.06)	(0.07)	(0.05)	(0.06)	(0.12)	(0.14)	(0.12)	(0.13)
GDP per capita	0.10	0.10	0.08	0.09	0.03	-0.08	0.03	0.00
	(0.06)	(0.08)	(0.06)	(0.06)	(0.13)	(0.16)	(0.13)	(0.15)
Inflation	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00

	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Obs.	772	698	772	631	794	720	794	653
R^2	0.14	0.09	0.19	0.08	0.16	0.04	0.17	0.03

Table 3
Legal origins, bond covenants and information disclosure, and corporate bond market development

This table reports the results for the random-effects regression for 42 countries over the period 1978-2011. The dependent variable is the ratio of corporate bond market capitalization to stock market capitalization. The independent variables proxy for creditor and shareholder protection, and we additionally control for countries' legal origin, bond covenant, information disclosure and days of debt contract enforcement. All variables are defined in Table A1. In all specifications, macroeconomic control variables are specified in Table 2. Year dummies and constants are also not shown for brevity. Standard errors are reported in parentheses. *, **, and *** represent 10%, 5%, and 1% significance levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Creditor rights	0.32***	0.32***	0.33***	0.34***	0.34***	0.35***	0.36***	0.34***
	(0.06)	(0.06)	(0.06)	(0.05)	(0.07)	(0.07)	(0.07)	(0.06)
Revised ADRI	-0.13*				-0.08			
	(0.06)				(0.17)			
Corrected ADRI		-0.08*				-0.07		
		(0.04)				(0.06)		
Anti-self-dealing			-1.08**				-0.81	
			(0.05)				(0.82)	
Anti-takeover				0.31				1.10
				(0.56)				(0.71)
English origin	-0.86***	-1.05***	-0.59	-1.00***	-0.2**	-0.89**	-0.53	-1.17***
	(0.33)	(0.35)	(0.38)	(0.37)	(0.38)	(0.37)	(0.52)	(0.37)
French origin	-0.54*	-0.53	-0.54*	-0.21	-0.46	-0.44	-0.38	-0.16
	(0.31)	(0.34)	(0.31)	(0.35)	(0.40)	(0.39)	(0.38)	(0.36)
German origin	-0.59*	-0.33	-0.59*	-0.23	-0.47	-0.48	-0.47	-0.13
	(0.33)	(0.38)	(0.32)	(0.35)	(0.43)	(0.43)	(0.43)	(0.44)

Restrictive bond covenant					-0.08	-0.08	-0.08	-0.05
					(0.06)	(0.06)	(0.06)	(0.06)
Information disclosure					-0.02	-0.02	-0.-2	-0.02
					(0.02)	(0.02)	(0.02)	(0.02)
Enforcement					0.09	0.10	0.10	0.18
					(0.16)	(0.16)	(0.16)	(0.13)
Obs.	772	698	772	631	576	576	576	494
R^2	0.23	0.28	0.25	0.24	0.44	0.44	0.46	0.52

Table 4

Effects of financial reform on corporate bond market development

This table reports the results for the random-effects regression for 42 countries over the period 1978-2011. The dependent variable is the ratio pf corporate bond market capitalization to stock market capitalization. The independent variables proxy for creditor and shareholder protection and information disclosure. All variables are defined in Table A1. The dummy variable Treated equals 1 if the unit is in the treated group and 0 otherwise. The dummy variable Post_reform equals 1 if year t is the next year after financial reform and 0 otherwise. In all specifications, macroeconomic control variables are specified in Table 2. Year dummies and constants are also not shown for brevity. Standard errors are reported in parentheses. *, **, and *** represent 10%, 5%, and 1% significance levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Creditor rights	0.32***	0.35***	0.32***	0.34***	0.33***	0.35***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	(0.06)
Revised ADR	-0.18**	-0.25**				
	(0.08)	(0.11)				
Corrected ADR			-0.17***	-0.18***		
			(0.06)	(0.07)		
Anti-self-dealing					-1.23***	-1.27***
					(0.35)	(0.41)
Treated	0.37***	0.51***	0.51***	0.53***	0.38***	0.51***
*Post-reform	(0.09)	(0.13)	(0.10)	(0.12)	(0.09)	(0.12)
Information disclosure		0.00**		0.00**		0.00**
* Post-reform		(0.00)		(0.00)		(0.00)
Obs.	564	470	517	470	564	470
R^2	0.12	0.22	0.11	0.20	0.19	0.31

Table 5

Financial reform, creditor rights, and corporate bond market development

This table reports the results of the random-effects regression for 42 countries over the period 1978-2011. The dependent variable is the ratio of corporate bond market capitalization to stock market capitalization. The independent variables proxy for creditor and shareholder protection and information disclosure. The dummy variable Treated equals 1 if the unit is in the treated group and 0 otherwise. The dummy Post_reform equals 1 if year t is the next year after financial reform and 0 otherwise. All variables are defined in Table A1. In all specifications, macroeconomic control variables are specified in Table 2. Year dummies and constants are also not shown for brevity. Standard errors are reported in parentheses. *, **, and *** represent 10%, 5%, and 1% significance levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Creditor rights	0.33***	0.33***	0.33***	0.36***	0.36***	0.35***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Revised ADR	-0.20**			-0.30**		
	(0.09)			(0.12)		
Corrected ADR		-0.15**			-0.18**	
		(0.07)			(0.08)	
Anti-self-dealing			-1.12***			-1.45***
			(0.37)			(0.46)
Post-reform	0.13	0.08	0.26***	0.25*	0.03	0.22**
	(0.13)	(0.19)	(0.10)	(0.15)	(0.18)	(0.11)
Information disclosure				0.01	0.00)	0.02
				(0.01)	(0.01)	(0.01)
Creditor rights *Post-reform	0.07*	0.06*	0.12***			
	(0.04)	(0.03)	(0.04)			
Revised ADRI *Post-reform	-0.03					
	(0.04)					
Corrected ADRI *Post-reform		-0.01				
		(0.05)				
Anti-self-dealing *Post-reform			-0.69***			
			(0.18)			
Creditor rights *Post-reform *Information disclosure				0.00**	0.00*	0.00***
				(0.00)	(0.00)	(0.00)
Revised ADRI * Post-reform *Information disclosure				-0.00*		
				(0.00)		
Corrected ADR *Post-reform *Information disclosure					0.000	
					(0.00)	

Anti-self-dealing *Post-reform *Information disclosure						-0.01*** (0.00)
Obs.	564	517	564	470	470	470
R^2	0.07	0.07	0.15	0.19	0.09	0.25

Table 6

Systematic banking crises and corporate bond market development

This table reports the results of the random-effects regression for 42 countries over the period 1978-2011. The dependent variable is the ratio of corporate bond market capitalization to stock market capitalization. The independent variables proxy for creditor and shareholder protection. The dummy variable Banking crisis equals 1 in the year of a systematic banking crisis and 0 otherwise. All variables are defined in Table A1. In all specifications, macroeconomic control variables are specified in Table 2. Year dummies and constants are also not shown for brevity. Standard errors are reported in parentheses. *, **, and *** represent 10%, 5%, and 1% significance levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Creditor rights	0.34***	0.34***	0.37***	0.37***	0.37**	0.36***
	(0.06)	(0.06)	(0.06)	(0.05)	(0.00)	(0.06)
Revised ADRI	-0.13*	-0.13*				
	(0.06)	(0.06)				
Corrected ADRI			-0.07	-0.08		
			(0.06)	(0.06)		
Anti-self-dealing					-0.86*	-0.85**
					(0.49)	(0.43)
Banking crisis	0.36***	0.34*	0.41***	0.40*	0.36***	0.22*
	(0.05)	(0.19)	(0.06)	(0.21)	(0.05)	(0.12)
Creditor rights * Banking crisis		0.00		0.05		0.02
		(0.05)		(0.12)		(0.05)
Revised ADRI * Banking crisis		0.00				
		(0.05)				
Corrected ADRI * Banking crisis				0.03		
				(0.06)		
Anti-self-dealing * Banking crisis						-0.39*
						(0.23)
Obs.	663	663	589	589	663	663
R^2	0.16	0.16	0.12	0.12	0.12	0.12

Table 8
Banking crises and corporate bond market development

This table reports the results if the random-effects regression for 42 countries over the period 1978-2011. The dependent variable is the ratio of corporate bond market capitalization to stock market capitalization. The independent variables proxy for creditor and shareholder protection. The dummy variable Banking crisis equals 1 in the year of a systematic banking crisis and 0 otherwise. The dummy variable Region equals 1 if the country is an advanced economy in specifications (1)-(2), for the Asian crisis of 1997 in (3)-(4) and for the Latin American crisis in (5)-(6) and 0 otherwise. All variables are defined in Table A1. In all specifications, macroeconomic control variables are specified in Table 2. Year dummies and constants are also not shown for brevity. Standard errors are reported in parentheses. *, **, and *** represent 10%, 5%, and 1% significance levels, respectively.

	Advanced		East Asian		Latin American	
	(1)	(2)	(3)	(4)	(5)	(6)
Creditor Rights	0.37***	0.42***	0.41***	0.42***	0.42***	0.42***
	(0.07)	(0.07)	(0.06)	(0.06)	(0.06)	(0.06)
Revised ADRI	-0.10*		-0.11		-0.11*	
	(0.05)		(0.09)		(0.06)	
Anti-self-dealing		-0.80*		-0.82*		-0.80*
		(0.39)		(0.49)		(0.43)
Region *Banking crisis	2.22**	-0.01	0.12	0.07	-0.33	-0.31
	(0.93)	(0.71)	(0.35)	(0.25)	(0.34)	(0.36)
Region*Creditor rights *Banking crisis	0.21	0.01	0.42	0.05	0.14	0.18
	(0.16)	(0.15)	(0.14)	(0.19)	(0.23)	(0.23)
Region*Revised ADRI *Banking crisis	-0.55**		-0.02		0.06	
	(0.28)		(0.11)		(0.10)	
Region*Anti-self-dealing *Banking crisis		1.22		-0.05		0.48
		(1.72)		(0.56)		(0.86)
Obs.	663	663	663	663	663	663
R^2	0.21	0.22	0.18	0.21	0.20	0.22

Figure 1
Relative capitalization of the corporate market to stock market during systemic banking crises

The Y-axis represents the average ratio of private bond market capitalization to stock market capitalization; the X-axis represents the years before, during and after banking crises. We assume that banking crises occur at year 0; thus, year=-2 represents two years before banking crises, and so forth. The crisis period is covered by the shadow boxes. Advanced economies are economies with a GDP per capita over 10,000 USD; East Asian economies include seven economies that experienced severe crises from 1997-98. Latin American economies include Argentina, Brazil, Colombia, Mexico and Peru.