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Abstract

In this paper, we examine whether legal systems affect the structure of capital markets in terms of the development of bond markets versus equity markets. Using a dataset of 42 developed and developing countries, we document that a country's legal system, especially investor protections, determines the structure of the capital markets in a country. Our results indicate that in countries with stronger creditor rights, the bond markets are more developed than the equity markets. Alternatively, in countries with stronger shareholder rights, the equity markets are more developed than the bond markets. Additionally, we determine that the effects of financial reforms are strongly dependent on the strength of investor protections and information disclosure.

JEL Classification: G10; G20; G28

Keywords: bond market, equity market, law, financial reform, information disclosure, crisis

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1. Introduction

In the last decade, the finance and law literatures have linked investor protection with the development and structure of the financial system. In a seminal paper, La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997, 1998, henceforth LLSV) indicated that legal rules and origins influence the protection of corporate shareholders and creditors and consequently may determine the development of the financial system within a country. Their results indicated also that the equity markets are more developed in countries with common law origins than with civil law origins. As a result, common law countries tend to have a market-based financial system, while civil law countries have a bank-based financial system. Additionally, Demirgüç-Kunt and Levine (1999) found that countries with more legal protection for minority shareholders tend to have a more developed equity market. Djankov, McLiesh and Shleifer (2007, henceforth DMS), using cross-country data, documented a positive correlation between creditor rights and the size of credit markets. Finally, Modigliani and Perotti (2000), Ergungor (2004), Liberti and Mian (2010) provided evidence that legal institutions promote degree of financial system development or determine its structure.

The existing evidence suggests that the mechanism through which law affects financial development is that investor protection cuts the cost of external financing and reduces financial constraints. Thus, countries with stronger legal institutions tend to have more developed financial systems and less financial constraints with lower interest rate spreads. Qian and Strahan (2007) examined the relationship between legal differences and terms of bank loans around the globe and argued that under strong creditor

protection, loans have more concentrated ownership, longer maturities and lower interest rates. Haselmann et al. (2010) also investigated the effect of legal change on bank lending and found that banks increase the supply of credit subsequent to legal changes.

In the literature, however, little attention has been paid so far to the determinants of the structure of the capital markets. In this paper, we examine how laws affect the structure of capital markets in terms of the development of the bond market relative to the equity market. Additionally, we investigate how financial reforms have had an impact on the associations between law and market finance in the past decades. Our analyses focus on three hypotheses. The first hypothesis is that in countries with stronger creditor rights relative to shareholder rights, the bond markets are more developed relative to the equity markets. In line with the literature, we use market capitalization as a proxy for market development and the ratio of bond market capitalization to equity market capitalization as a proxy for the relative development of bond market to stock market. We test how the creditor rights and shareholder rights in one country impact on the development of the bond market and stock market. In formulating this, we assume that laws do not affect all market participants in the same manner, and legal origins matter for the financial development of different countries. Furthermore, we also assume that the economic development is correlated with the development of the legal system and financial system (LLSV 1997, 1998; DMS, 2007). More developed countries are more likely to encourage more functional legal systems, so that both creditor and shareholder power can be important in these countries, which is particularly important for financial system development.

Our second hypothesis is that reforms of the financial system, especially those related

to securities markets, enhance the development of bond markets in countries with stronger creditor rights, as well as equity markets in countries with stronger shareholder rights. Abiad et al. (2008) indicated that in the last decade, financial reforms in the securities market covered the policies to encourage development of these markets, such as tax incentives or the development of a depository and settlement system.

Our third hypothesis is that better information disclosure improves the effectiveness of institutional reforms on the securities markets. We assume that in countries with better information disclosure, the effects of the reforms of the financial system should be more significant. 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 improve significantly the development of the bond market. In formulating this hypothesis, we assume that the investor protection and information theories serve as substitution mechanisms for market development (Jappelli and Pagano, 2002; DMS, 2007), that is, both ex ante or interim better information sharing and ex post stronger creditor rights or shareholder rights can contribute to the development of the bond market or equity market.

We test these hypotheses using a sample of 42 developed and developing countries over a period from 1978 to 2011. We use several different measures as proxies for creditor protection and shareholder protection. In our study, we also control for other legal factors such as country legal origins, debt contract enforcement and bond contract covenant. The existing research indicates that theses legal factors are correlated with financial system development (LLSV, 1998; Nenova, 2006; Djankovet al. 2007; DLLS, 2008; Spamann, 2010). In addition, we investigate the impact of systemic financial crises

on the relationship between law and capital market development and compare the results with these during normal periods (Allen et al., 2012).

Our initial empirical strategy is to run cross-country regressions to investigate the relationships between the prevailing investor protections and the development of the structure of the capital market. Specifically, we examine how the legal variables such as common and civil law origins, debt contract enforcement, bond covenant and information disclosure vary with the composition of capital markets. In our tests, we also control for country macro-economic characteristics that are likely to impact the development of the capital markets, whereas we focus especially on the effects of creditor rights and shareholder rights on the development of the bond market relative to the equity market. Then, we also employ a natural experiment with a difference-in-difference (diff-in-diff, henceforth) estimator to explore whether financial reforms in the past decades have any effect on the association between law and the development of the structure of the capital market within a country. This diff-in-diff strategy approach avoids the econometric concern that institutional factors such as creditor rights or shareholder rights are endogenous and presents an alternative to instrumental variable techniques that have been criticized by Glaeser, La Porta, Lopez-de-Silanes and Shleifer (2004) and DMS (2007).

Based on our results, we can draw three main conclusions. First, consistent with our first hypothesis, the results indicate that countries with stronger creditor rights relative to shareholder rights tend to have a more developed bond market than equity market. As German civil law countries are more likely to have stronger creditor protection relative to shareholder rights, they tend to have a more developed bond market than English common law countries do. Moreover, the results indicate that restrictive

bond covenants, which serve as an alternative ex-post mechanism to protect the bondholder, are for the most part negatively associated with the relative development of the bond market to the stock market. Additionally, we demonstrate that countries that have stronger debt contract enforcement have a more developed bond market than stock market, while, generally, information sharing is more helpful for equity market development.

Second, in line with our second hypothesis, we find that financial reforms improve the development of the bond markets more than that of the equity markets in countries that had stronger creditor protections. In contrast, our result indicates that the reforms of the financial system in countries with stronger shareholder protections enhance the development of the stock market more than that of the bond market. The results indicate that the effect of financial reforms is strongly dependent on a country's legal system and the existing structure of its capital markets. For instance, in English common law countries, whereas the shareholder protection is on average stronger and the equity market is more developed, the financial reforms may play a more important role in further development of the equity market. Additionally, we document that greater information disclosure improves the effect of the financial reforms on the development of the capital market.

Third, during crisis periods, the relationship between law and the structure of the capital market is not as significant as that during normal periods. We find that in many advanced economies, the bond market is developing faster than the stock market in the short term during a crisis period. Additionally, during a crisis period, we do not find significant evidence indicating that in countries with stronger creditor rights, the bond

market is more developed than the equity market. Moreover, we find similar results for the emerging economies. Additionally, we assume that the financial crisis results in an increase in risk premiums in the stock markets, which leads to faster development of the bond market in the short term. Consequently, the observed association between the legal system and the structure of the capital market is partly offset during a crises 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 the structures of the financial system during periods of financial crisis. However, they indicated that after a period, the financial system reverts to its previous structure. Henceforth, we also assume that after a financial crisis, the legal system determines to a large extent the structure of the capital market.

Overall, our results document that legal factors are important in explaining the development of bond versus equity markets across countries. We document that in countries with stronger creditor rights relative to shareholder rights, the bond market is more developed than the stock market during normal periods. Moreover, we demonstrate that the effects of financial reforms on the development of the capital markets also depend on the legal system, especially the investor protections in the country. Nevertheless, we find that the relationship between the legal system and the structure of the capital market is less significant during crisis periods. We assume, however, that this change presents only a short-term reversal in the development of the structure of the capital markets.

Our study is consistent with the results of Allen et al. (2012) on the structure of the financial system, crisis and reform, in which they demonstrated that the corporate bond

market moves in the same direction with bank credit and experiences a short-term reversal with the stock market during a crisis. Our study, however, indicates the impact of crises on the structure of the capital markets, whereas they concentrated only on the structure of the financial system. Moreover, our study is in line with the findings of LLSV (1997), who indicated that investor protections are strongly correlated with stock market size. LLSV (2002) indicated that the valuation of firms is higher in countries with better protection of minority shareholders.

Mclean, Zhang and Zhao (2012) indicated that investor protections promote share prices and reduce financial constraints. On the other hand, Roberts and Sufi (2009) found that the effect of creditor actions on debt policy is strongest when the borrower's alternative sources of finance are costly and the incentive conflicts play an important role in shaping corporate finance policy. Acharya et al. (2011) indicated that stronger creditor rights are one way to mitigate stockholder expropriation, and they may also induce managers to reduce risk and to stifle even non-opportunistic risk taking that would be beneficial to all claimholders. Henceforth, stronger creditor protections may reduce firm financial leverage, which contradicts previous studies arguing that stronger creditor rights bring about a greater level of lending. In our study, we argue that stronger creditor rights may reduce firm risk-taking and negatively influence corporate valuation. As a result in countries with stronger creditor rights, the valuation for the equity market is lower and firms are more likely to finance their investment using the bond market.

Our study contributes to the literature, as it fills an existing gap on the impact of the law on financial system development. In contrast to the previous studies, we use the bond market instead of private bank credit and hence provide new insights on the structure of

the capital markets across countries. Additionally, we do not examine the absolute level of the bond market development, but we focus on the relative development of the bond market to the stock market. In general, English common law countries have more detailed creditor and shareholder laws and enforce laws more effectively than civil law countries. Thus, based on the existing research, the capital markets are more likely to be developed in common law countries. In contrast, bank-based financial systems are more likely to emerge as primary contract enforcers in civil law countries. Our argument is that compared to creditor protections, shareholder protections are in general stronger in common law countries. Hence, equity markets are more likely to develop in those countries than bond markets. However, in civil law countries, especially those of French civil law origin, the overall financial systems are less developed than in common law countries. However, in these countries, the bond markets are more developed than the equity markets, as the creditor protections are stronger. Our results are in contrast to 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. However, in our study, we use a large dataset of countries and consequently the results are more general.

The remainder of the paper proceeds as follows. In Section 2, we describe the data. In Section 3, we present the methodology and the baseline model. Next, we show our main empirical results and the robustness test. In Section 4, we discuss the effect of financial reforms on the relationships between the legal system and capital markets. In Section 5, we discuss the evolvement of bond markets versus stock markets during systemic crises. Section 6 presents the paper's conclusions.

2. Data and Descriptive Statistics

Our dataset is comprised of data for 42 developed and developing countries over the sample period of 1978 to 2011, whereas we use different data sources to collect the data. We use the revised financial structure dataset of Beck et al. (2001, 2010, 2012, 2013) to construct the indicators of the development of the bond versus equity market. The legal variables that control for creditor rights and shareholder rights are from various sources including LLSV (1998), Nenova (2006), Djankov et al. (2007), DLLS (2008) and Spamann (2010). In the study, we also control for legal origins, bond covenant, information disclosure and debt contract enforcement, which may determine the way the legal system influences the development of the bond market versus stock market. Additionally, we also control for financial reform and systemic banking crises because they may influence firm decisions on bond financing or equity financing. We use the data from Abiad and Mody (2005) and Abiad et al. (2008) for the set of control variables for financial reforms. In addition, we follow Laeven and Valencia (2008, 2012) and refer to a systemic banking crisis when a country's corporate and financial sectors experience numerous defaults. Table 1 presents the descriptions for all the variables used in this study.

2.1 Variable definitions

2.1.1 Measures of bond market and equity market development

As our main indicators, we employ variables for the bond market and equity market size to establish the structure of countries capital market. We follow the literature and use

as a proxy of the size of the equity markets in the country the current value of listed shares divided by the GDP. Similarly, we use the bond market capitalization to GDP as a measure of the size of the bond markets. Next, we construct our first dependent variable *Structure_1*, which is the ratio of bond market capitalization to equity market capitalization, as an indicator of the structure of the capital markets in the country.

The bond market capitalization, however, includes the present value of both private and public bond securities. Henceforth, we use a second dependent variable *Structure_2*, which includes only the ratio of private bond market capitalization to equity market capitalization.

2.1.2 Measures of legal determinants

In our study, we focus on how two dimensions of the legal systems determine the structure of capital markets, namely, creditor protection and shareholder protection. However, in the regressions, we also control for country legal origins, bond covenants, debt contract enforcement and information disclosure.

We use the creditor rights index of Djankov et al. (2007) as a measure of legal rights of creditors in the countries in our study. The index, ranging from zero (weak creditor rights) to four (strong creditor rights), measures the number of laws and regulations that limit expropriation from secured lenders in a country. This index has been used as a measure of creditor power and has been demonstrated to be remarkably stable over time. As noted by Miller and Reisel (2012), the index not only matters to secured lenders but is relevant in interpreting patterns of the capital market. Therefore, in our study, we use the creditor rights index as a main proxy for country-level bondholder protection.

It should be noted that creditor rights are an ex-post mechanism, which protects bondholders upon firm defaults. We therefore control also for restrictive covenants, which limit the actions of the managers prior to defaults and serve as the ex-ante mechanisms to protect investors. Miller and Reisel (2012) argued that bond contracts are more likely to include restrictive covenants in countries with weak creditor protection. Henceforth, bond covenants are an alternative mechanism to protect investors at the country level. In the study, we employ the average number of bond covenants from the Yankee Bond Market (Miller and Reisel, 2012) as a proxy for bond covenants, which ranges from zero (low covenant intensity) to thirteen (high covenant intensity). The proxy reflects three major categories of covenants: restrictions on financing activities, restrictions on investment activities and restrictions on payouts.

In addition to laws on the books, the quality of law enforcement is also likely to determine the structure of the capital markets. Consequently, we also control for law enforcement with a measure of the number of days it takes to enforce a debt contract. DHMS (2008) documented that the efficiency of debt enforcement are economically and statistically significant predictors of the development of debt markets across countries.

Similarly, we control for shareholder protection using three different proxies: anti-director rights, anti-self-dealing and anti-takeover provisions. The index of anti-director rights (ADR) introduced by LLSV (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 of shares and calling an extraordinary meeting; and the others are concerned with minority protection including proportional board representation, preemptive rights and judicial remedies. The index, however, has

been criticized for its ad hoc nature, for mistakes in coding and the conceptual ambiguity in the definitions of some of its components (Pagano and Volpin, 2005; Spamann, 2010). Thus, DLLS (2008) provided a revised version of the ADR index, which was conceptually continuous with the original one but more clearly defined and more reliably weighted for 72 countries. The results indicated that the correlation between the original and revised ADR was only 0.60. However, some issues such as ambiguous definitions still remain in the revised ADR index. Hence, Spamann (2010), using the legal data for forty-six countries and improved coding with leading local lawyers involved in the research questionnaires, provided a corrected ADR index. The corrected ADR index differs substantially from the original (ρ=0.53) and from the revised index (ρ=0.67). Furthermore, Spamann (2010) also demonstrated that many empirical results established using the original index cannot be replicable with corrected values. In particular, the corrected value fails to support some widely influential claims such as that shareholder protection is higher in the common law countries than in civil law countries. Thus, in this study, we employ both the revised ADR index from DLLS (2008) and the corrected ADR index from Spamann (2010) to control for its potential limitations.

The index of shareholder rights focuses on anti-self-dealing and tunneling. DLLS (2008) presented a new measure of legal protection of minority shareholders against expropriation by corporate insiders based on answers to a questionnaire distributed to 102 law firms from 72 countries, named the anti-self-dealing index. The index covers both ex-ante and ex-post mechanisms that can limit anti-self-dealing transactions, including the disclosure and approval by minority shareholders, independent review and standing to sue. While both the ADR index and anti-self-dealing index capture the strength of

shareholder rights, there are still significant differences between them, which may lead to different interpretations of the results of our study. DLLS (2008) indicated that anti-director rights compared to self-dealing is the central problem of corporate governance in many countries in recent years. Thus, they suggested that, in general, anti-self-dealing is preferable to the ADR index 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 ADR index.

Finally, we also employ the anti-takeover index, 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). The strict takeover laws have benefits for minority shareholders by helping them share some of the value released during acquisitions (Gompers et al., 2003). On the other hand, they have a negative effect on the private benefits of the controlling corporate owner, which is especially significant for emerging economies where other mechanisms of protecting minority shareholders are limited. Nenova (2006) also indicated that the takeover laws affect the depth of capital markets and are robust to the general level of national economic growth.

A country's legal origin has been demonstrated to be an important determinant of both creditor rights and shareholder rights in a number of studies (LLSV, 1997, 1998; Levine, 1999; Beck et al. 2003a, 2003b; DLLS, 2008, Spamann, 2010). Following LLSV (1997, 1998), we identify four main legal origins: English, French, German and Scandinavian. The dummy variable *L_English* equals one if the country has the legal origin of English common law. The dummy for countries with French (*L_French*) and German civil law origin (*L_German*) are constructed in an identical manner as with the English common

law legal origin dummy. However, the few countries with Scandinavian civil law origin (L_Scandinavian) are captured in the regressions by the constant. LLSV (1997, 1998) indicated that the original ADR index is on average statistically significantly higher for the common law countries than for the civil law countries both as a whole and within each of the three sub-families, French civil law countries, German civil law countries and Scandinavian civil law countries. DLLS (2008) noted that, consistent with the original index, the revised ADR index also exhibits sharply higher value in common law countries than in French civil law countries. The existing research indicates also that the legal origin also matters for creditor rights. LLSV (1998) found that common law countries offer creditor stronger legal protections against managers, while the French civil law countries provide creditors the weakest protections. This is also consistent with the findings of Djankov et al. (2007), who investigated legal creditor rights in 129 countries.

Better information disclosure can be both ex-ante and interim mechanism, which can contribute to credit market development (Jappelli and Pagano, 2002). La Porta et al. (2006) documented that information disclosure can especially benefit the public bondholders. Thus, in this study, we also control for the index of information disclosure released by the Center for Financial Analysis and Research's (CIFAR) International Accounting and Auditing Trends. CIFAR created an index aggregating 90 items such as general information, income statements, balance sheets, etc. by examining and rating the annual reports of approximately 1,000 industrial companies across countries. This index has been used by a number of papers (Rajan and Zingales, 1998; Bushman et al. 2004).

[Table 1]

2.1.3 Definitions of 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. In this paper, we use the starting dates of systemic banking crises provided by Laeven and Valencia (2012). However, we focus only on those banking crises with an output loss of over 10% as we assume that only a large banking crisis might lead to significant changes in the structure characteristics of financial systems regarding the bond market and stock market. Based on the criteria and using the database of Laeven and Valencia (2012), we are able to identify 144 systemic banking crises across countries from 1970 to 2011.

2.2 Descriptive statistics

Table 2 presents the descriptive statistics and the contemporaneous correlations for all the variables used in the following regression analysis. For all the variables, the dataset covers 42 countries from 1978 to 2011. The results in Table 2 indicate a large variation between bond market development and stock market development across countries.

The variable *Structure_1* exhibits high cross-sectional variability ranging from 0.01 to 9.52 with a mean of 1.44, which indicates that compared to stock market development, there are huge differences with bond market development across countries. The variable *Structure_2*, which is defined as the development of the private bond market versus the stock market also exhibits high variability, ranging from 0.00 to 5.68 with a mean of 0.58. For example, the averages of the last five years (2007-2011) for Italy, the Slovak Republic, Iceland, Austria and Ireland have the highest ratio of bond market capitalization to stock market capitalization. In contrast, the lowest ratios of bond market

capitalization to stock market capitalization are those of Chile, Switzerland, South Africa, Hong Kong and Luxembourg. If we remove the public bond market, Iceland, Ireland, Denmark, Austria and Italy have the highest ratio of bond market capitalization to stock market capitalization in the last five years, while Hong Kong, Philippine, Luxembourg, Columbia and Turkey have the lowest ratio of bond market capitalization to stock market capitalization. Taking the US as an example, the value of the total bond market to stock market is 1.56, and the value of the private bond market to the stock market is 0.89. The creditor rights index ranges from 0 to 4 with an average of 1.80, which indicates that there are more countries around the globe with lower creditor rights. The revised ADR index and corrected ADR index range from 1 to 5 and 2 to 6 with an average of 3.37 and 3.74, respectively. The anti-self-dealing index has an average of 0.44, and its scores are from 0.08 to 1.00. The anti-takeover index has an average of 0.46, and the scores are from 0.04 to 0.97.

The statistics in Table 2 indicate that the two variables of the development of the bond market versus stock market are highly correlated with a correlation of 0.79. The creditor rights exhibit both significant and positive associations with *Structure_2* but are positive and insignificant with *Structure_1*. In addition to the anti-takeover index, the other variables of shareholder rights are all significantly and negatively correlated to both *Structure_1* and *Structure_2*. These are consistent with our hypothesis that stronger creditor rights are positively associated with higher development of the bond market relative to the stock market, while stronger shareholder rights should have a negative impact on the development of the bond market versus the stock market.

Table 2 also indicates positive correlation between creditor rights and shareholder

rights. The prior evidence from the US firms, for instance, Cremers et al. (2007) and Chava et al. (2009), emphasized the shareholder/ bondholder conflicts, as strong shareholder rights will be negative to bondholders by increasing the likelihood of wealth transfers to shareholders. However, recently, more research from the international evidence, for instance, Johnson et al. (2000) and Djankov et al. (2008), demonstrated that strong minority shareholder rights can prevent the expropriation of assets from all stakeholders, which can alleviate the conflicts between shareholders and bondholders. The English legal origin is significantly positively associated with both the creditor rights and shareholder rights, while the French legal origin exhibits completely opposite correlations. The German legal origin indicates significantly positive correlations with creditor rights but mixed associations with shareholder rights.

The bond covenant exhibits significantly negative associations with both *Structure_1* and *Structure_2* and also exhibits significantly negative correlations with creditor rights, which is also consistent with our assumption that bond covenants should exhibit as an alternative way to protect the creditor rights. The association between bond covenants and shareholder rights are quite mixed. Johnson et al. (2000) and Djankov et al. (2008) also presented ambiguous results on this issue. As we have mentioned, prior evidence from the U.S. firms indicates that strong shareholder rights may harm bondholders; thus, it should be supplemented by high bond covenant intensity to protect bondholders. However, recent papers based on cross-country evidence suggest that strong minority shareholder rights will ease the conflicts between shareholders and bondholders. The variable of information disclosure exhibits positive correlation with both credit rights and shareholder rights, and the variable of the time it takes to enforce a debt contract exhibits

negative associations with both rights.

[Table 2]

3. Methodology and Results

3.1 Baseline model

We use different methods in this study to assess the impact of law on the development of the bond market versus equity market. First, we begin by employing random effects estimates using generalized least squares (GLS) to explore the influence of creditor rights and shareholder rights on the structure of market-financing:

$$\frac{Bond\ market\ cap._{t\cdot}}{Stock\ market\ cap._{\cdot t}} = \alpha_i + \beta_t + \gamma \cdot Creditor\ rights_{i,t} + \delta \cdot Shareholder\ rights_{i,t} + \theta \cdot X_{i,t} + \varepsilon_{i,t} \quad (1)$$

where *i* indexes countries, *t* indexes years, and the ratio of bond market capitalization to stock market capitalization is the dependent variable of interest, which evaluates the development of the bond market versus stock market. The variables α_i and β_t are country and year fixed effects, and $X_{i,t}$ denotes the set of control variables, which include legal origins, bond covenants, information disclosure and variables of macroeconomic environment such as log of GDP, log of GDP per capita and inflation. $\varepsilon_{i,t}$ is an error term. Random effects estimates are more efficient than pooled OLS estimates and assume that country effects are uncorrelated with the regressors, while fixed effects allow country effects to be correlated with regressors. Thus, we examine by fitting both FE and RE models if possible. As the variable *Revised ADR index* and *Anti-self-dealing index* do not vary over time, we do not include these two variables into the FE model, as time-

invariant measures have no explanatory power in the FE framework.

3.2 Random Effects Estimates

In this section, we present the main results from our baseline model. We regress the dependent variable on the creditor rights index and each of the variables of shareholder rights.

Table 3 indicates that the coefficient for creditor rights is significant and positively correlated to the relative development of the bond market to equity market in all the specifications. Additionally, the coefficients for the different variables reflecting shareholder rights are significant and have a negative sign in many of the specifications Only the coefficient for the variable *Anti-takeover* does not enter with a statistically significant sign in the regressions. We find that both the revised ADR and the corrected ADR enter with significant and negative signs at least at the 5% level. In terms of economic magnitude, a 1% increase in the score of the creditor rights will bring a 0.27% increase in the relative level of development of the bond market relative to the equity market. In contrast, a 1% decrease in the score of the revised ADR results in the relative decline of the level of bond market to stock market by 0.54%, and the situation is similar with both the anti-self-dealing index and the corrected ADR index.

In the regressions, we also control for other macroeconomic variables employing log of GDP, log of GDP per capita and inflation. The exogenous macroeconomic situations of the country may determine the growth of the bond market and stock market. Including the additional control variables does not change our basic results. In the specification (5)-(8), the creditor rights and shareholder rights remain positively and negatively associated,

respectively, with the relative growth of the bond market versus the equity market. In addition, we also find that the GDP level is significantly and negatively correlated with the relative level of the bond market to stock market development, indicating that countries with higher GDP volume are more likely to have a more developed stock market relative to the bond market.

[Table 3]

Table 4 displays the results, for which we add proxies for country legal origins into the specifications. Adding additional control variables does not change the results presented in Table 3. The new results confirm that creditor rights and shareholder rights affect the relative development of the bond market to the equity market. We find that the English common law countries tend to have a more developed stock market, whereas the coefficient for English origin is negative and significant only in specification (2). In contrast, our results indicate that the German civil law countries tend to have a more developed bond market. However, the coefficient for German law is positive and insignificant. This is consistent with the previous research indicating that common law countries are more likely to have stronger shareholder rights than the civil law countries in general (LLSV, 1997, 1998). Ergungor (2004) documented also that countries with civil law are more likely to have a bank-oriented financial system than common law countries. Our results add to the existing research by indicating that the legal origins may determine the structure of the capital markets. We find weak evidence that German civil law countries tend to have more developed bond markets relative to stock markets than do the English common law countries.

[Table 4]

Next, we add variables that control for the restrictive bond covenant. Bond covenants may serve as an alternative ex-post mechanism to protect bondholders. The results in Table 5 indicate that the bond covenants are for the most part negatively associated with the relative development of the bond market to the equity market. This is consistent with the results in Table 3 and 4, as countries that have a more developed bond market tend to have stronger creditor protection; thus, they are less likely to include restrictive bond covenants in bond contracts.

Additionally, we control also for information disclosure and log of days of debt contract enforcement in the regressions. Adding these two control variables does not change our main results presenting the impact of creditor rights and shareholder rights on the structure and development of the capital markets. The results indicate that countries that have better information disclosure mechanisms have more developed equity instead of bond markets. The coefficient for information disclosure is negative and significant in many of the specifications. In contrast, we find that countries with better debt contract enforcement have a more developed bond market. The coefficient for log of days of debt contract enforcement is positive and significant only in the last specification.

In sum, the results confirm the impact of legal determinants on the development of the structure of the capital market, and they indicate that countries with stronger creditor rights and weaker shareholder rights are more likely to have a more developed bond market relative to an equity market. We find weak evidence that countries with German civil law, which are more likely to have stronger creditor protection, tend to have more developed bond markets than do English common law countries. Improvements in information disclosure helps to develop equity markets more, while stronger bond

contract enforcement is more helpful in developing bond markets.

[Table 4]

3.3 Robustness

To check the robustness of our main results presented in Table 3, we exclude the public bond market and use the ratio of private bond market capitalization to equity market capitalization as the dependent variable. We present the results in Table A.1 in the Appendix.

The change in the construction of the dependent variable does not alter our main results. The results confirm that countries with stronger creditor protection tend to have more developed private bond markets relative to equity markets. In contrast, countries with stronger shareholder protection tend to have more developed stock markets.

When we add more legal determinants to our baseline model, the results are consistent with the results in Table 4. We find that the coefficient for bond covenant remains significant and are negatively associated with the development of the bond market. Similarly, the coefficient for the proxy for debt contract enforcement, as an ex-post mechanism to protect bondholders, is again negatively related to bond market development. Finally, the results indicate again that information disclosure is negatively correlated with the relative development of the bond market to the stock market.

4. Financial Reform, Law and Development of the Bond versus Stock Market

To investigate the impact of financial reforms on the relationship between legal determinants and the development of the structure of the capital market, we apply a natural experiment using a diff-in-diff estimator. This methodology basically compares

the effect of an event (a financial policy-change in our setting) on groups more affected by the policy changes (namely, the treated group) with those that are less affected by the changes (namely, the control group). In our setting, we assume that the development of the bond market versus equity market of the countries with a higher ratio of creditor rights to shareholder rights should be more affected by financial reforms. Thus, we use the ratio of the creditor rights to shareholder rights of pretreatment to classify countries into treated (the top 33% of the whole sample) and control groups (the bottom 33% of the whole sample). We test the following specification:

$$\frac{Bond\ market\ cap._t}{Stock\ market\ cap._t} = \alpha_i + \beta_t + \sigma \cdot Treated * Post\_reform + \gamma \cdot Creditor\ rights_{i,t} + \delta \cdot Shareholder\ rights_{i,t} + \theta \cdot X_{i,t} + \varepsilon_{i,t} \quad (2)$$

where treated=1 if unit is in treated group and equals zero otherwise; *Post_reform* is the lag term of the dummy of reform; thus, it denotes the year after financial reforms and equals zero otherwise. Both the dummy of reform and the financial reform index are from the IMF Financial Reform Database. The financial reform index, ranging from zero to twenty-one, is a sum of seven different dimensions of financial sector policy, including credit controls and excessively high reserve requirements, interest rate controls, entry barriers, state ownership in 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 zero (high repression) to three (full liberalization). The values of the index are quite stable for the majority of normal years but are changing if there are reforms in the financial sector. Not all of the seven

dimensions have a direct influence on the development of the capital market. Additionally, we assume that some of the reforms may affect both the bond market and equity market. The regulation and supervision of the banking sector may affect the capital market environment and the firm financing decision on bond issuing or equity issuing.

The dummy of reform is defined as follows. It equals one if the first-difference of the financial reform index is greater than zero, and otherwise, it equals zero. Thus, it stands for the year when there are financial policy changes. Hence, the lag term of the reform dummy (Post_reform) represents the first year after the financial reforms. We do not add the dummy Post_reform as an independent variable separately as it will be collinear with the year fixed-effects. Hence, the estimates on Post_reform separately will be just random intercepts with no meanings. The diff-in-diff effect is captured by σ.

Table 6 reports the effects of financial reform on the association between law and capital market structure development employing the diff-in-diff strategy. We examine our hypotheses by fitting both fixed-effects and random models and then compare their estimates. First, adding a diff-in-diff estimator does not change the main results presented in Table 3. The relationship between creditor rights, shareholder rights and market development remains statistically significant and the sign of the coefficients does not change. Second, the effects of financial reforms are all statistically significant in the specifications. We find that the financial reforms do improve the development of the bond market more than that of the stock market in countries with stronger credit protections relative to shareholder protections. This indicates that financial reforms promote the development of the bond market if the countries have stronger creditor rights. Third, we also add the interaction term between information disclosure and

financial reform. The results indicate that in countries with better information disclosure, the effects of financial reforms are more efficient and significant.

[Table 6]

In the regressions, we have treated countries with a higher ratio of the creditor rights index to shareholder rights index as the treated group and countries with a lower ratio as the control group. Next, we further test the robustness by adding the interaction terms between the legal variables and the Post_reform dummy. As indicated by Table 7, after financial reforms, the relations between legal determinants and market development do not change: Stronger creditor rights are still significantly helpful for improving bond market development, and stronger shareholder protection is good for equity market development. However, the significance for the impact of shareholder protections is now lower, especially for both the revised ADR and the corrected ADR.

[Table 7]

One explanation is that there may still exist cross-sectional heterogeneity among countries, such as the information disclosure system or other related regulatory and supervisory factors. Thus, it is natural to expect that for countries with better information disclosure, the effects of financial reform may be more significant. Hence, we interact the treatment dummy (Post_reform dummy) with the variable for information disclosure. The results in Table 7 confirm our hypothesis that the financial reforms will be more effective in countries with better information sharing; however, the results are again for countries with strong creditor rights rather than shareholder rights. This is reasonable, as the information disclosure index that we are using is more focused on bondholder benefits[3].

[3] Similarly with Miller and Reisel (2012), in this paper, we use the index of information disclosure from Bushman et al. (2004), which is aggregated from disclosure practice and enforcement of accounting

The results are also consistent with Sorge and Zhang (2014), who document that the ex-ante better credit information acts as a substitute for ex-post stronger creditor protection, especially in less developed countries. La Porta et al. (2006) also argue that the availability of corporate disclosure would likely be important to public bondholders.

[Table 7]

5. Development of the Bond Market versus Stock Market during Crises

Finally, we investigate how the bond market and equity market respond to systemic banking crises. The crises can be considered relatively exogenous shocks; however, they obviously do not dramatically change the creditor and shareholder protection environment in countries that experience crises in those short periods. On the other hand, Johnson et al. (2000) and Lemmon and Lins (2003) have argued that as the expected investment return fell during crisis, the incentives for preventing the shareholder from transferring wealth from other stakeholders increased. Thus, during crises periods when the economic growth outlook deteriorates, the legal determinants such as rights for creditors and shareholders, debt contract enforcement and bond covenants should play more important roles.

Therefore, if creditor and shareholder rights affect the relative development of bond market and stock market, one would expect that the structure of the capital market should switch more to stock market in countries with stronger shareholder rights, or switch more to the bond market in countries with stronger creditor rights. However, we assume that it should also be dependent on the development of the bond market or stock market itself. In most developing economies, for instance, bond market development is still at the

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standards and thus is more relevant to bondholders. There are also several other indexes of disclosure, such as those contained in La Porta et al. (2006), which focus more on shareholder benefits.

initial stage, and firm financing is more reliant on the equity market or bank lending. Thus, even creditor protection is stronger than shareholder protection[4], and it is not likely that the bond market will experience fast development during short periods of crises.

We test the assumption including the dummy of banking crises and interact it with the variables proxying for legal rights. Moreover, we first test use the whole sample and then split the sample into the sub-groups of advanced economies, namely, the East Asian economies and Latin American economies. Table 9 presents the results for which we use in the regression the full sample of countries. The results in columns (1), (3) and (5) indicate that crises exhibit significant and positive association with bond market development relative to stock market development. Table 9 indicates that stock market capitalization declines during the crisis period, which we attribute to deterioration of economic growth as well as company future profits. At the same time, we find that the bond market capitalization increases relative to the equity market.

During normal times, the relation between the development of the bond market versus the stock market and legal rights are still significant in these specifications, while we find that during crises, the sensitivity of the interactions between legal rights and relative capitalization of the bond market and stock market is not significant. This may be related to the fact that during the period, the full sample covers the years from 1978 to 2011. In this period, there were more crises in emerging market economies than advanced economies, which have less developed financial systems, particularly the capital markets.

[Table 9]

To examine the effects of the crises further, we collect three sub-groups from our

[4] As the creditor rights are also positively associated with bank lending, the emerging economies that we assume here may have more dominant banking systems than the stock market.

sample: advanced economies with GDP per capita over 10,000 USD, East Asian economies and Latin American economies. For advanced economies, many of them have more developed bond markets than emerging markets and developing countries do. For East Asian economies, seven of them experienced severe crises from 1997 to 1998. Thus, our subsample for this group covers: Indonesia, Malaysia, Philippines, South Korea, Thailand, Hong Kong and Singapore, which is consistent with Johnson et al. (2000), Mitton (2002) and Bae and Goyal (2009). However, we exclude Taiwan, as we are missing control variables for Taiwan. We also collect a sub-group for Latin American economies as they had higher frequency of crises in the past decades. Instead of using the dummy of banking crisis separately, we use the interaction term between region indicator and banking crisis dummy in this specification.

Table 10 presents the results with these sub-groups. First, the effects of crises on the relative development of bond markets to stock markets are more significant for advanced economies than for both East Asian economies and Latin American economies. As we have mentioned, during the East Asian crises, the bond market in many of these economies is much less developed than the stock market. The average ratio of bond market capitalization to stock market capitalization in this group is 0.63, much lower than the mean value for the whole sample 1.44 and even much lower than the mean value for the sub-sample of the advanced economies 2.05. It is the similar case with the sub-group of Latin American economies, which has an average ratio of 0.86. However, in the long run, the bond market is growing in these emerging areas with the development of both the economic and financial system. Therefore, the effects of the banking crises may last for a very short period or could also be insignificant and partly offset by the long-run

economic growth trend.

[Table 10]

The relationship is presented in Figure 1. In the sub-groups of East Asia and Latin America, the economies experienced very short-term faster growth in the bond market relative to the stock market during the crises from 1970 to 2011. The bond market, however, returned to the growth trend soon after the crises. Second, for the advanced economies, there is consistent evidence for our hypotheses that for countries with stronger creditor rights, during crises, the bond market will experience faster development than the stock market, although the effect is less significant than in normal periods, while for East Asian economies and Latin American economies, the effects are quite mixed.

[Figure 1]

6. Conclusions

In the study, we examine whether the law affects the structure of market finance in terms of the development of the bond market versus stock market using a dataset of 42 developed and developing countries from 1978 to 2011. Our results indicate that a country's legal system, especially investor protections, determines the structure of the capital market. We find that in countries with stronger creditor rights, the bond markets are more developed than the equity markets. In contrast, the existing shareholder rights positively influence the development of the equity market.

Moreover, our results indicate that financial reforms improve the development of the bond market more than that of the equity market in countries with stronger creditor protections. In our opinion, these results indicate how laws affect the capital market

development and present an explanation for why some countries have a more developed bond market relative to the equity market. Additionally, we find that the relationship between law and capital market development is less significant during a crises period.

This paper fills the existing gap in the literature of the relationship between law and bond market development, as the existing literature focused mainly on bank and equity finance. Stronger creditor rights mitigate stockholder expropriation and in the meanwhile reduce corporate risk taking and have a negative impact on corporate valuation as well. Thus, one explanation for the relationship between the law and the bond market is that for countries with stronger creditor rights, firms may be more willing to obtain financing through the bond market with the valuation of the equity market lower. However, in this paper, we did not discuss the tradeoff between improvement of creditor rights and shareholder rights. It would be interesting to investigate the optimal structure of the country capital markets related to long-term economic growth, as well as the tradeoffs between creditor and shareholder protections; however, we leave this subject for further research.

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Table 1
Definitions of the main variables

Variable	Definition	Source
Financial Structure		
Bond market capitalization	Private and public bond market capitalization divided by GDP	
Private bond market	Private bond market capitalization divided by GDP	
Equity market capitalization	Equals stock market capitalization divided by GDP	
Structure_1	The ratio of bond market capitalization to stock market capitalization	Beck et al. (2001, 2010); Cihak, M. et al. (2012)
Structure_2	The ratio of private bond market capitalization to stock market capitalization	
Law		
Creditor rights index	An index aggregating creditor rights. The index ranges from 0 (weakest creditor rights) to 4 (strongest creditor rights)	Djankov, S. et al. (2007)
Revised anti-director rights index (Revised ADRI)	A revised index of the original anti-director rights index, which aggregates shareholder protection in over a hundred articles, including shareholder voting and minority protection	LLSV (1998) DLLS (2008)
Corrected anti-director rights index (Corrected ADRI)	A further corrected index of the original anti-director rights index, with improved data collection, coding and documentation	Spamann (2010)
Anti-self-dealing index	An index summarizing the strength of minority shareholders in limiting expropriation by corporate insiders	DLLS (2008)
Antitakeover 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	International Accounting and Auditing Trends, Center for Financial Analysis and Research (CIFAR);

	disclosure. These items include: general information, income statements, balance sheets, funds flow statement, etc. At least three companies in one country were studied	
Debt enforcement	Equals the logarithm of the number of days to resolve a payment dispute through courts	Djankov, S. (2008)
Financial Reforms		
Financial reforms index	An index of financial reforms, normalized to be between 0 and 1.	
Reform	Dummy=1 if the 1st difference term of financial reform index higher than 0	Abiad et al. (2008)
Crises		
Systemic banking crises	Represents a banking crisis when a country's corporate and financial sectors experience numerous defaults	Laeven and Valencia (2012)
Macroeconomic control variables		
Log of GDP	Logarithm of gross national product (current US dollars)	World Development Indicators (2013)
Log of GDP per capita	Logarithm of gross national product per capita	World Development Indicators (2013)
Inflation	Annual growth rate of consumer price index	World Development Indicators (2013)

Table 2
Descriptive statistics and correlations

	Structure_1	Structure_2	Creditor rights	Revised ADR	Corrected ADR	Anti-self-dealing	Antitakeover	L_English	L_French	L_German	Bond covenant	Information disclosure	Log of days of contract enforcement	Financial reform
Panel A: Descriptive Statistics														
Mean	1.44	0.58	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.	1.45	0.75	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.	0.01	0.00	0	1	2	0.08	0.04	0	0	0	0	56	3.30	0
Max.	9.52	5.68	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	1													
Structure_2	0.79* (0.00)	1												
Creditor rights	0.01 (0.77)	0.15* (0.00)	1											
Revised ADR	-0.29* (0.00)	-0.08* (0.03)	0.20* (0.00)	1										
Corrected ADR	-0.22* (0.00)	-0.08* (0.03)	0.17* (0.00)	0.69* (0.00)	1									
Anti-self-dealing	-0.33* (0.00)	-0.24* (0.00)	0.30* (0.00)	0.56* (0.00)	0.35* (0.00)	1								
Antitakeover	-0.07 (0.07)	0.06 (0.13)	0.34* (0.00)	0.49* (0.00)	0.37* (0.00)	0.51* (0.00)	1							
L_English	-0.32* (0.00	-0.22* (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	0.10* (0.00)	-0.12* (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	0.16* (0.00)	0.14* (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	-0.29* (0.00)	-0.39* (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	-0.25* (0.00)	0.01 (0.79)	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		
Log of days of contract enforcement	0.05 (0.13)	-0.20* (0.00)	-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	0.02 (0.73)	0.15* (0.00)	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% level, respectively

Table 3

Main results: Creditor rights, shareholder rights and bond vs. stock market development

This table reports results for the regression $^{Bond\ market\ cap.}/_{Stock\ market\ cap.} = \alpha_i + \beta_t + \gamma \cdot Creditor\ rights_{i,t} + \delta \cdot Shareholder\ rights_{i,t} + \theta \cdot X_{i,t} + \varepsilon_{i,t}$. The dependent variable is the relative capitalization of bond market to stock market. Here, i indexes countries, and t indexes year; $Creditor\ rights_{i,t}$and $Shareholder\ rights_{i,t}$ denote countries' creditor protection and shareholder protection, respectively; $X_{i,t}$ represents a series of control variables, which include a series of macroeconomic variables; α_i and β_t represent country and year fixed effects; $\varepsilon_{i,t}$ is the error term, which captures unobservable shocks that affect bond and stock market development. Standard errors are reported in parentheses. ***, ** and * imply significance at 99%, 95% and 90% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Creditor rights	0.27**	0.22*	0.30***	0.24***	0.23**	0.27***	0.27***	0.20*
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
Revised ADR	-0.54***				-0.58***			
	(0.17)				(0.17)			
Corrected ADR		-0.28***				-0.22**		
		(0.10)				(0.10)		
Anti-self-dealing			-2.74***				-2.74***	
			(0.75)				(0.76)	
Antitakeover				-0.92				-0.65
				(0.98)				(0.98)
GDP					-0.27**	-0.12	-0.23**	-0.23*
					(0.12)	(0.14)	(0.12)	(0.13)
GDP per capita					0.03	-0.08	0.03	0.00
					(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)
Constant	2.86***	2.07***	2.25***	1.33***	9.99***	5.92***	8.58***	7.42***
	(0.61)	(0.47)	(0.40)	(0.55)	(2.34)	(2.67)	(2.28)	(2.66)
Country dummy	No	No	No	No	No	No	No	No
Obs.	794	720	794	653	794	720	794	653
R^2	0.1804	0.0699	0.2354	0.0127	0.1563	0.0351	0.1739	0.0291

Table 4

Creditor rights, shareholder rights, legal origins, bond covenant and bond market vs. stock market development

This table reports results for the regression $^{Bond\ market\ cap.}/_{Stock\ market\ cap.} = \alpha_i + \beta_t + \gamma \cdot Creditor\ rights_{i,t} + \delta \cdot Shareholder\ rights_{i,t} + \theta \cdot X_{i,t} + \varepsilon_{i,t}$. The dependent variable is the relative capitalization of bond market to stock market. Here, i indexes countries, and t indexes year; $Creditor\ rights_{i,t}$and $Shareholder\ rights_{i,t}$ denote for countries' creditor protection and shareholder protection, respectively; $X_{i,t}$ represents a series of control variables, which include legal origins, restrictive bond covenants, information disclosure and debt contract enforcement and also a series of macroeconomic variables; α_i and β_t represent country and year fixed effects; $\varepsilon_{i,t}$ is the error term, which captures unobservable shocks that affect bond and stock market development. Standard errors are reported in parentheses. ***, ** and * imply significance at 99%, 95% and 90% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Creditor rights	0.24**	0.27**	0.24**	0.25**	0.25*	0.27**	0.25*	0.26*
	(0.12)	(0.13)	(0.12)	(0.12)	(0.14)	(0.13)	(0.14)	(0.14)
Revised ADR	-0.42**				-0.45*			
	(0.21)				(0.24)			
Corrected ADR		-0.23**				-0.20*		
		(0.10)				(0.12)		
Anti-self-dealing			-2.39*				-1.39	
			(1.27)				(1.49)	
Antitakeover				2.05				0.88
				(1.37)				(1.77)
GDP	-0.25**	-0.05	-0.23*	-0.16	-0.21	-0.12	-0.24	-0.15
	(0.13)	(0.15)	(0.13)	(0.15)	(0.16)	(0.18)	(0.16)	(0.17)
GDP per capita	0.00	-0.16	-0.03	-0.14	-0.12	-0.19	-0.10	-0.21
	(0.14)	(.17)	(0.15)	(0.17)	(0.18)	(0.19)	(0.18)	(0.19)
Inflation	-0.00	-0.00	-000	-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)
English origin	-0.71	-1.44**	-0.12	-1.24	-0.51	-1.15	-0.46	-1.07
	(0.71)	(0.68)	(0.84)	(0.90)	(0.80)	(0.76)	(0.97)	(1.02)
French origin	-0.16	-0.30	-0.15	0.70	0.27	0.18	0.29	0.75
	(0.68)	(0.66)	(0.69)	(0.85)	(0.74)	(0.73)	(0.77)	(0.94)
German origin	0.10	0.14	0.17	0.51	-0.20	0.02	0.08	0.28
	(0.70)	(0.75)	(0.71)	(0.86)	(0.78)	(0.83)	(0.79)	(0.96)
Restrictive bond covenant					-0.23**	-0.18	-0.16	-0.10
					(0.12)	(0.12)	(0.12)	(0.12)
Constant	9.29***	5.26**	8.52***	5.00*	10.19***	7.62**	9.45***	6.53*
	(2.43)	(2.59)	(2.37)	(2.88)	(2.78)	(3.09)	(2.82)	(3.41)
Country dummy	No	No	No	No	No	No	No	No
Obs.	772	698	772	631	657	598	657	560
R^2	0.1931	0.1953	0.1806	0.0889	0.2783	0.2389	0.2194	0.0894

Table 5

Creditor rights, shareholder rights, legal origins, bond covenant and bond market vs. stock market development

This table reports results for the regression $^{Bond\ market\ cap.}/_{Stock\ market\ cap.} = \alpha_i + \beta_t + \gamma \cdot Creditor\ rights_{i,t} + \delta \cdot Shareholder\ rights_{i,t} + \theta \cdot X_{i,t} + \varepsilon_{i,t}$. The dependent variable is the relative capitalization of bond market to stock market. Here, i indexes countries, and t indexes year; $Creditor\ rights_{i,t}$and $Shareholder\ rights_{i,t}$ denote countries' creditor protection and shareholder protection, respectively; $X_{i,t}$ represents a series of control variables, which include legal origins, restrictive bond covenants, information disclosure and debt contract enforcement and also a series of macroeconomic variables; α_i and β_t represent country and year fixed effects; $\varepsilon_{i,t}$ is the error term, which captures unobservable shocks that affect bond and stock market development. Standard errors are reported in parentheses. ***, ** and * imply significance at the 99%, 95% and 90% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Creditor rights	0.27**	0.27**	0.28*	0.30**	0.29**	0.30**	0.31**	0.37***
	(0.13)	(0.13)	(0.14)	(0.12)	(0.13)	(0.13)	(0.13)	(0.11)
Revised ADR	-0.65**				-0.58**			
	(0.28)				(0.27)			
Corrected ADR		-0.25**				-0.24**		
		(0.12)				(0.12)		
Anti-self-dealing			-0.90				-0.76	
			(1.40)	2.80**			(1.32)	
Antitakeover				(1.22)				3.50***
								(1.06)
GDP	-0.11	-0.20	-0.29*	-0.24*	-0.14	-0.23	-0.32**	-0.25**
	(0.17)	(0.15)	(0.15)	(0.13)	(0.16)	(0.15)	(0.15)	(0.11)
GDP per capita	-0.20	-0.00	0.03	0.02	-0.13	0.05	0.10	0.11
	(0.20)	(0.17)	(0.18)	(0.16)	(0.20)	(0.17)	(0.17)	(0.13)
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)
English origin	-0.59	-1.00*	-0.58	-1.67**	-0.66	-1.07*	-0.73	-1.64***
	(0.65)	(0.61)	(0.87)	(0.66)	(0.62)	(0.59)	(0.83)	(0.54)
French origin	-0.44	-0.11	0.05	0.15	-0.38	-0.09	0.07	0.64
	(0.68)	(0.63)	(0.65)	(0.61)	(0.64)	(0.61)	(0.61)	(0.53)
German origin	-0.45	-0.40	-0.31	-0.66	-0.36	-0.26	-0.14	0.18
	(0.72)	(0.69)	(0.72)	(0.71)	(0.69)	(0.68)	(0.68)	(0.65)
Restrictive bond covenant	-0.22**	-0.22**	-0.21**	-0.24**	-0.21**	-0.20**	-0.19**	-0.12
	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.09)	(0.09)
Information disclosure	-0.04	-0.06*	-0.05*	-0.11***	-0.04	-0.05*	-0.04	-0.08***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.25)	(0.03)
Days of enforcement					0.14	0.24	0.30	0.58***
					(0.26)	(0.25)	(0.25)	(0.18)
Cons	12.09***	12.27***	13.41***	14.52***	11.17***	10.66***	11.26***	7.56*
	(3.83)	(3.72)	(3.89)	(3.74)	(3.95)	(3.94)	(4.05)	(3.69)
Country dummy	No	No	No	No	No	No	No	No
Obs.	576	576	576	494	576	576	576	494
R^2	0.397	0.406	0.324	0.454	0.416	0.430	0.365	0.543

Table 6

Effects of financial reform on bond vs. stock market development

This table reports results for the regression $^{Bond\ market\ cap.}/_{Stock\ market\ cap.} = \alpha_i + \beta_t + \sigma \cdot Treated_{i,t} \cdot Post\_reform_{i,t} + \gamma \cdot Creditor\ rights_{i,t} + \delta \cdot Shareholder\ rights_{i,t} + \theta \cdot X_{i,t} + \varepsilon_{i,t}$. The dependent variable is the relative capitalization of bond market to stock market. Here, i indexes countries and t indexes year; $Creditor\ rights_{i,t}$and $Shareholder\ rights_{i,t}$ denote countries' creditor protection and shareholder protection, respectively; $Treated_{i,t}$ =1 if the unit is in treated group and equals zero otherwise; $Post\_reform_{i,t}$ =1 if year t is the next year after financial reform and equals zero otherwise. $X_{i,t}$ represents a series of control variables, which include the interactions between creditor protection or shareholder protection and the post-reform dummy and also a series of macroeconomic variables; α_i and β_t represent country and year fixed effects; $\varepsilon_{i,t}$ is the error term, which captures unobservable shocks that affect bond and stock market development. Standard errors are reported in parentheses. ***, ** and * imply significance at the 99%, 95% and 90% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Creditor	0.27**	0.28*	0.32***	0.27*	0.30***	0.28*	0.31**	0.26*	0.25**	0.32*	0.28**	0.28*
	(0.12)	(0.16)	(0.13)	(0.18)	(0.12)	(0.16)	(0.13)	(0.14)	(0.12)	(0.17)	(0.13)	(0.16)
Revised ADR	-0.53***		-0.75***									
	(0.17)		(0.19)									
Anti-self-dealing					-2.71***		-2.69***					
					(0.71)		(0.79)					
Corrected ADR									-0.53***	-0.37**	-0.57***	-0.44**
									(0.14)	(0.19)	(0.15)	(0.21)
Treated*Post reform	0.74***	0.72***	1.05***	0.96***	0.79***	0.72***	1.09***	0.96***	1.07***	0.94***	1.15***	0.99***
	(0.20)	(0.20)	(0.29)	(0.29)	(0.20)	(0.20)	(0.29)	(0.29)	(0.23)	(0.23)	(0.29)	(0.29)
Information disclosure * Post reform			0.003*	0.003*			0.003*	0.003*			0.003*	0.003*
			(0.002)	(0.002)			(0.002)	(0.001)			(0.002)	(0.002)
Cons.	11.54***	20.13***	10.61***	22.07***	10.06***	20.13***	10.09***	22.07***	8.97***	20.72***	9.04***	21.41***

	(2.71)	(3.49)	(2.98)	(4.22)	(2.57)	(3.49)	(3.00)	(4.22)	(2.80)	(3.90)	(2.93)	(4.21)
Macro controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummy	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Obs.	564	564	470	470	564	564	470	470	517	517	470	470
R^2	0.084	0.030	0.275	0.012	0.130	0.030	0.169	0.012	0.073	0.003	0.123	0.001

Table 7

Financial reform, creditor rights, shareholder rights and bond market vs. stock market development

This table reports results for the regression $Bond\ market\ cap./_{Stock\ market\ cap.} = \alpha_i + \beta_t + \gamma \cdot Creditor\ rights_{i,t} + \delta \cdot Shareholder\ rights_{i,t} + \theta \cdot X_{i,t} + \varepsilon_{i,t}$. The dependent variable is the relative capitalization of bond market to stock market. Here, i indexes countries, and t indexes year; $Creditor\ rights_{i,t}$and $Shareholder\ rights_{i,t}$ denote countries' creditor protection and shareholder protection, respectively;$X_{i,t}$ represents a series of control variables, which include the interactions between creditor protection or shareholder protection and the post-reform dummy and also a series of macroeconomic variables; α_i and β_t represent country and year fixed effects; $\varepsilon_{i,t}$ is the error term, which captures unobservable shocks that affect bond and stock market development. Standard errors are reported in parentheses. ***, ** and * imply significance at the 99%, 95% and 90% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Creditor rights	0.26**	0.23*	0.25**	0.23*	0.26**	0.31*
	(0.12)	(0.13)	(0.12)	(0.13)	(0.13)	(0.17)
Revised ADR	-0.57***					
	(0.17)					
Anti-self-dealing			-2.57***			
			(0.71)			
Corrected ADR					-0.51***	-0.33*
					(0.15)	(0.18)
Creditor rights * post reform	0.17**	0.30***	0.31***	0.30***	0.14*	0.15*
	(0.08)	(0.09)	(0.09)	(0.09)	(0.08)	(0.08)
Revised ADR * post reform	-0.03	-0.81**				
	(0.05)	(0.34)				
Anti-self-dealing * post reform			-0.81**	-0.81**		
			(0.35)	(0.34)		
Corrected ADR * post reform					0.01	-0.01
					(0.05)	(0.05)
Cons.	11.41***	19.95***	9.49***	19.95***	10.13***	20.41***
	(2.74)	(3.49)	(2.56)	(3.49)	(3.00)	(3.96)
Macro controls	Yes	Yes	Yes	Yes	Yes	Yes
Country dummy	No	Yes	No	Yes	No	Yes
Obs.	564	564	564	564	517	517
R^2	0.080	0.031	0.117	0.031	0.021	0.011

Table 8

Financial reform, information disclosure, creditor rights, shareholder rights and bond market vs. stock market development

This table reports results for the regression $Bond\ market\ cap./_{Stock\ market\ cap.} = \alpha_i + \beta_t + \gamma \cdot Creditor\ rights_{i,t} + \delta \cdot Shareholder\ rights_{i,t} + \theta \cdot X_{i,t} + \varepsilon_{i,t}$. The dependent variable is the relative capitalization of bond market to stock market. Here, i indexes countries, and t indexes year; $Creditor\ rights_{i,t}$ and $Shareholder\ rights_{i,t}$ denote for countries' creditor protection and shareholder protection, respectively; $X_{i,t}$ represents a series of control variables, which include the interactions among information sharing, creditor protection or shareholder protection and the post-reform dummy and also a series of macroeconomic variables; α_i and β_t represent country and year fixed effects; $\varepsilon_{i,t}$ is the error term, which captures unobservable shocks that affect bond and stock market development. Standard errors are reported in parentheses. ***, ** and * imply significance at the 99%, 95% and 90% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Creditor rights	0.32**	0.27*	0.29**	0.27*	0.31**	0.30*
	(0.13)	(0.14)	(0.14)	(0.14)	(0.14)	(0.18)
Revised ADR	-0.81***					
	(0.19)					
Anti-self-dealing			-2.79***			
			(0.87)			
Corrected ADR					-0.55***	-0.40*
					(0.16)	(0.21)
Information disclosure * Creditor rights * post reform	0.004**	0.004**	0.005***	0.004**	0.001*	0.002*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.000)	(0.001)
Information disclosure * Revised ADR* post reform	-0.001	-0.001				
	(0.001)	(0.001)				
Information disclosure * anti-self-dealing * post reform			-0.012**	-0.001		
			(0.006)	(0.001)		
Information disclosure * Corrected ADR* post reform					0.000	-0.000
					(0.000)	(0.000)
Cons.	11.12***	22.64***	11.53***	22.64***	11.26***	21.86***
	(3.05)	(4.26)	(3.15)	(4.26)	(3.16)	(4.28)
Macro controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	Yes	No	Yes	No	Yes
Obs.	470	470	470	470	470	470

R^2	0.233	0.024	0.107	0.024	0.028	0.002

Table 9

Banking crises, creditor rights, shareholder rights and bond market vs. stock market development

This table reports results for the regression $Bond\ market\ cap./_{Stock\ market\ cap.} = \alpha_i + \beta_t + \sigma \cdot Banking\ crisis_{i,t} + \gamma \cdot Creditor\ rights_{i,t} + \delta \cdot Shareholder\ rights_{i,t} + \theta \cdot X_{i,t} + \varepsilon_{i,t}$. The dependent variable is the relative capitalization of bond market to stock market. Here, i indexes countries, and t indexes year; $Banking\ crisis_{i,t}$ is a dummy standing for banking crises; $Creditor\ rights_{i,t}$ and $Shareholder\ rights_{i,t}$ denote countries' creditor protection and shareholder protection, respectively;$X_{i,t}$ represents a series of control variables, which include the interactions between legal variables and banking crisis and the macroeconomic variables; α_i and β_t represent country and year fixed effects; $\varepsilon_{i,t}$ is the error term, which captures unobservable shocks that affect bond and stock market development. Standard errors are reported in parentheses. ***, ** and * imply significance at the 99%, 95% and 90% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Creditor rights index	0.27**	0.26**	0.27**	0.28**	0.27**	0.27*
	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)
Revised anti-director index	-0.47**	-0.45**				
	(0.20)	(0.19)				
Anti-self-dealing			-2.07**	-2.15**		
			(0.96)	(0.96)		
Corrected ADR					-0.22**	-0.26**
					(0.11)	(0.11)
Banking crisis	0.52***	1.05**	0.51***	0.42*	0.55***	0.01
	(0.10)	(0.41)	(0.10)	(0.24)	(0.11)	(0.49)
Creditor rights * Banking crisis		0.01		-0.06		0.00
		(0.10)		(0.10)		(0.10)
Revised ADR * Banking crisis		-0.15				
		(0.11)				
Anti-self-dealing * Banking crisis				0.42		
				(0.49)		
Corrected ADR * Banking crisis						0.14
						(0.12)
Cons.	10.25***	10.51***	9.30***	9.16***	8.29***	7.85***
	(2.16)	(2.18)	(2.08)	(2.08)	(2.38)	(2.33)
Macro controls	Yes	Yes	Yes	Yes	Yes	Yes
Country dummy	No	No	No	No	Yes	Yes
Obs.	663	663	663	663	589	589

R^2	0.114	0.110	0.098	0.105	0.037	0.054

Table 10 Banking crises and bond vs. stock market development: Advanced economies vs. Emerging economies

This table reports results for the regression $Bond\ market\ cap._{/Stock\ market\ cap.} = \alpha_i + \beta_t + \sigma \cdot Region\ indicator_i \cdot Banking\ crisis_{i,t} + \gamma \cdot Creditor\ rights_{i,t} + \delta \cdot Shareholder\ rights_{i,t} + \theta \cdot X_{i,t} + \varepsilon_{i,t}$. The dependent variable is the relative capitalization of the bond market to stock market. Here, i indexes countries, and t indexes year; $Banking\ crisis_{i,t}$ is a dummy standing for banking crises; $Creditor\ rights_{i,t}$ and $Shareholder\ rights_{i,t}$ denote countries' creditor protection and shareholder protection, respectively; $X_{i,t}$ represents a series of control variables, which include the interactions between legal variables and banking crisis and the macroeconomic variables; α_i and β_t represent country and year fixed effects; $\varepsilon_{i,t}$ is the error term, which captures unobservable shocks that affect bond and stock market development. Standard errors are reported in parentheses. ***, ** and * imply significance at the 99%, 95% and 90% level, respectively.

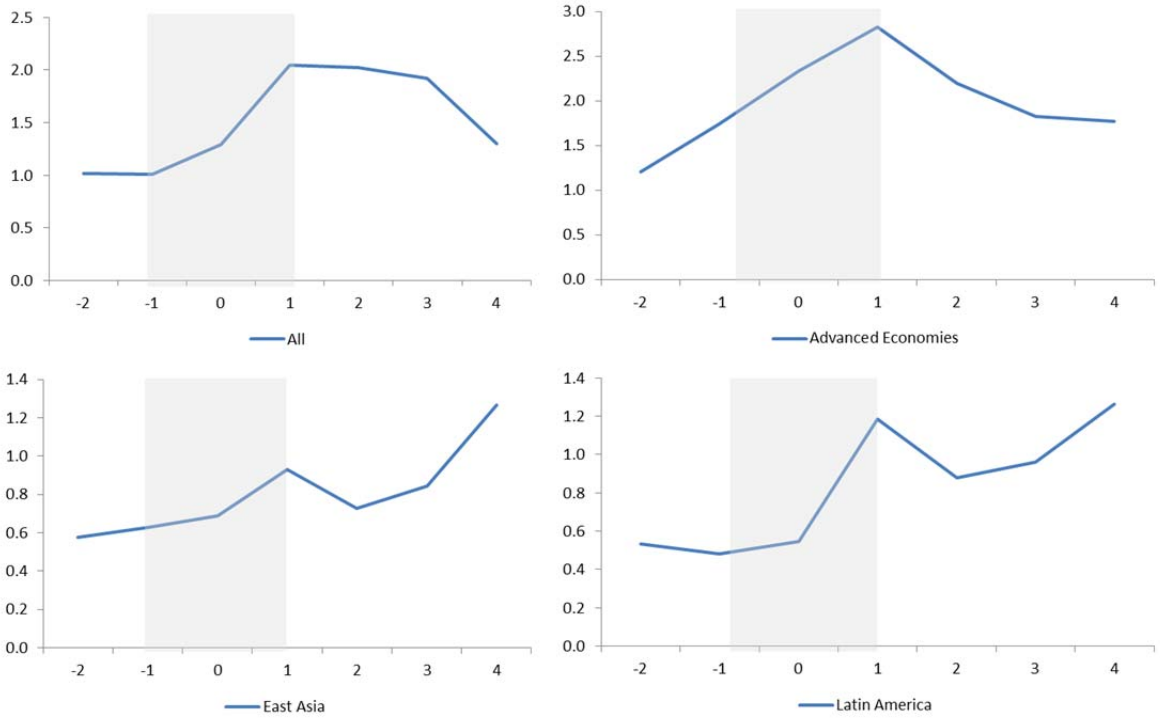
	Advanced		East Asian		Latin American	
	(1)	(2)	(3)	(4)	(5)	(6)
Creditor Rights	0.39***	0.40***	0.28**	0.30**	0.42***	0.41***
	(0.14)	(0.14)	(0.13)	(0.13)	(0.14)	(0.14)
Revised ADR	-0.48		-0.38*		-0.50**	
	(0.19)		(0.21)		(0.19)	
Anti-self-dealing		-2.13**		-1.74*		-2.23**
		(1.00)		(0.95)		(1.01)
Advanced * Banking crisis	0.85***	0.85***				
	(0.31)	(0.30)				
East Asia * Banking crisis			-0.96	-1.01*		
			(0.60)	(0.57)		
Latin America * Banking crisis					-0.44	-0.27
					(0.53)	(0.38)
Creditor rights * Banking crisis	0.03	0.02	0.05	-0.01	0.06	-0.01
	(0.16)	(0.12)	(0.10)	(0.09)	(0.24)	(0.18)
Revised ADR * Banking crisis	-0.00		0.10		-0.13	
	(0.08)		(0.10)		(0.13)	
Anti-self-dealing * Banking crisis		-0.50		0.93*		0.76
		(0.62)		(0.48)		(0.71)
Cons.	8.95***	8.11**	10.12***	9.24***	8.72***	7.97**
	(3.27)	(3.23)	(2.16)	(2.06)	(3.29)	(3.25)
Macro controls	Yes	Yes	Yes	Yes	Yes	Yes
Country dummy	No	No	No	No	No	No

Obs.	448	448	663	663	448	448
R^2	0.113	0.079	0.170	0.170	0.109	0.074

Figure 1

Plot of relative capitalization of bond market to stock market during systemic banking crises (1970-2011)

The Y-axis represents the average ratio of bond market capitalization to stock market capitalization; the X-axis represents the year 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. The advanced economies stand for the economies with GDP per capita over 10,000 USD; the East Asian economies include seven economies that experienced severe crises from 1997-98; the Latin American economies include Argentina, Brazil, Colombia, Mexico and Peru.



Appendix

Table A.1 Creditor rights, shareholder rights, legal origins, bond covenant and private bond vs. stock market development

	(1)	(2)	(3)	(4)	(5)	(6)
Creditor rights index	0.33***	0.34***	0.31***	0.33***	0.35***	0.31***
	(0.06)	(0.06)	(0.06)	(0.07)	(0.07)	(0.07)
Revised anti-director index	-0.19**			-0.26**		
	(0.09)			(0.13)		
Anti-self-dealing		-1.22***			-1.25**	
		(0.38)			(0.53)	
Corrected ADR			-0.05			-0.07
			(0.05)			(0.06)
Bond covenant				-0.11*	-0.09	-0.12**
				(0.06)	(0.06)	(0.05)
Information disclosure				-0.01	-0.00	-0.02
				(0.02)	(0.02)	(0.01)
Days of contract enforcement				-0.02	0.04	-0.04
				(0.15)	(0.15)	(0.15)
Constant	0.61*	0.51**	0.18	1.94	0.94	1.80
	(0.31)	(0.21)	(0.24)	(2.02)	(2.04)	(2.03)
Macro controls	Yes	Yes	Yes	Yes	Yes	Yes
Country dummy	No	No	No	No	No	No
Obs.	794	794	720	576	576	576
R^2	0.062	0.128	0.033	0.230	0.311	0.241