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Law and Structure of Capital Markets¹

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Abstract

In this paper, we examine whether the 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 find that a country's legal system, especially investor protection, determines the structure of capital market. Our results show that in countries with stronger creditor rights the bond markets are more developed than the equity markets. In opposition, in countries with stronger shareholder rights the equity markets are more developed than the bond markets. Additionally, we find that the effects of countries' financial reforms are strongly dependent on the strength of investor protections and information disclosure.

JEL Classification: G10; G20; G28

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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) document that legal rules and origins influence protection of corporate shareholders and creditors, and consequently may have an impact on financial development. Additionally, they present that the equity markets are more developed in common law countries than those in civil law countries. As a result common law countries tend to have market-based financial systems, while civil law countries are more likely to have bank-based financial systems. Additionally, Demirgüç-Kunt and Levine (1999) find that countries with more legal protection to minority shareholders tend to have more developed equity market. Based on cross-country evidences, Djankov, McLiesh and Shleifer (2007, henceforth DMS) document positive correlations between creditor rights and the size of credit markets. A series of other studies, including Modigliani and Perotti (2000), Ergungor (2004), Liberti and Mian (2010), all provide evidences that legal institutions promote degree of financial system development or determine its structure. It can be suggested 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 system and less financial constraints with lower interest rate spread. There are also some studies focusing on laws and financial contracts in terms of bank loans. Qian and Strahan (2007) examine the relationship between legal differences and terms of bank loans around the globe and argue that under strong creditor protection, loans have more concentrated ownership, longer maturities and lower interest rate. Haselmann et al. (2010) also investigate the effect of legal change on the bank lending and find that banks increase the supply of credit subsequent to legal changes.

However, scant attention has been paid so far to the composition of the capital markets. In this paper, we examine how laws affect the structure of market-financing in terms of the development of bond market relative to equity market and how financial reforms in the past decades impact on the associations between law and market finance. Our analyses centre 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 market. 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 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 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 are particularly important for financial system development.

Our second hypothesis is that financial reforms, especially securities market reforms enhance the development of bond markets in countries with stronger creditor rights, and equity markets in countries with stronger shareholder rights as well. Abiad et al. (2008) show that in the past decade financial reform policies on securities market covered the policies to encourage development of these markets, such as tax incentive or development of depository and settlement system.

Our third hypothesis is that better information disclosure improves the effectiveness of institutional reforms on securities markets. We assume therefore that in countries with better information disclosure the effects of financial reforms 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 on securities market should improve the bond market development significantly. 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 bond or equity market development.

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 countries legal origins, debt contract enforcement and bond contract covenant. The existing research shows that these legal factors are also correlated with countries' financial system development (LLSV, 1998; Nenova, 2006; Djankov et al. 2007; DLLS, 2008; Spamann, 2010). Additionally, we also investigate the impact of systemic financial crises on the relationship between law and capital markets development, and compare the results with those during normal periods (Allen et al., 2012).

Our initial empirical strategy is to run cross-country regressions to explore the relationships between the existing investor protections and the development of the structure of the capital market. Specifically, we also examine how the other 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 on the development of the capital markets, whereas we focus especially on the effects of creditor rights and shareholder rights on the development of 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 countries' capital market. This diff-in-diff strategy approach gets around 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 also 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, consistently with our first hypotheses, we find that countries with stronger creditor rights relative to shareholder rights tend to have 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 more developed bond market than English common law countries do. Moreover, our results show that restrictive bond covenants, which serve as alternative ex-post mechanism to protect bondholder, are mostly negatively associated with the relative development of bond market to stock market. Lastly, we show that countries that have stronger debt contract enforcement have more developed bond market than stock market, while generally the 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 bond market more than that of stock market in countries with stronger creditor protections in the past decades, while the reforms in countries with stronger shareholder protections enhance the development of stock market more than that of bond market. The results indicate that the effect of financial reforms is strongly dependent on a country's legal system and the structure of its financial system. 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 stock market. Additionally, we document that greater information disclosure improves the effect of the financial reforms on financial development.

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 most advanced economies the bond market is developing faster than the stock market in the short term during the crisis periods. Additionally, during the crisis periods we do not find significant evidences showing 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 in our sample. We interpret this as the fact 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 run. Consequently, the observed association between the legal system and the structure of the capital market is partly offset during crises periods. Indeed, our results are in line with the findings of Allen et al. (2012), who document significant short-term reversals in the development of the financial structure during financial crisis periods. However, they show that after a period the financial system revert to its

previous structure. Henceforth, we also assume that after the crisis still the legal system determine 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 market across countries. 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 show that the effects of financial reforms on the development of the capital market 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 crises periods. We assume that this change presents only short-term reversals in the development of the structure of the capital markets.

Our study is consistent with the results of Allen et al. (2012) on financial structure, crisis and reform, in which they show that the corporate bond market moves in the same direction with the bank credit and experiences the short-term reversal with the stock market during crises. This study, however, shows the impact of the crises on the structure of the capital markets, whereas they concentrate only on the structure of the financial system.

Moreover, our study is broadly in line with the findings of LLSV (1997), which indicate that investor protections are strongly correlated with stock market size, and also with LLSV (2002), which show that the valuation of firms is higher in countries with better protection of minority shareholders. Mclean, Zhang and Zhao (2012) show that investor protection promotes share prices and reduce financial constraints. On the other hand, Roberts and Sufi (2009) find 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) show that stronger creditor right is one way to mitigate stockholder expropriation, but it 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 protection may reduce firms' financial leverage, contradicting with previous studies, which argue that stronger creditor rights bring about greater level of lending. In our study we argue that stronger creditor rights may reduce firms' risk-taking and negatively influence corporate valuation. As a result in countries with stronger creditor rights the valuation for equity market is lower and firms are more likely to finance their investment using the bond market.

Our study contributes the literature as it fills an existing gap on the impact of law on financial system development. In contrast to the previous studies, we use bond market instead of private bank credit and henceforth 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 bond market to 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 develop in common law countries. In contrast, bank based financial system 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 generally stronger in common law countries. Henceforth, the equity markets are more likely to develop in those countries than the bond markets. In opposition in civil law countries, especially with French civil law origin, the overall financial system 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 employs data for Brazil from 1885 to 2003 and find no stable relationship between creditor protections and bond market development from the long-run. In our study we use a large dataset of countries and consequently are 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 market versus stock market during systemic crises. Section 6 concludes the paper.

2. Data and Descriptive Statistics

Our dataset comprises 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 which 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 how the legal system influence the development of the bond market versus stock market. Additionally, we also control for financial reform and systemic banking crises, because they may influence firms' 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. Further, 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 and equity market development

As our main indicators we employ variables for bond market and equity market size to establish the structure of countries capital market. We follow the literature and use the present value of listed shares in the country divided by the GDP as a proxy of the size of the equity market. 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.

However, the bond market capitalization 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 the 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 countries' legal origins, bond covenants, debt contract enforcement and information disclosure.

We use the creditor rights index from 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 shown that is remarkably stable over time. As pointed out by Miller and Reisel (2012), the index not only matters to secured lenders but is also relevant in interpreting patterns of 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 ex-post mechanism, which protect bondholders upon firms' 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) argue 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) document that

the efficiency of debt enforcement is 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) aggregate 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 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) provide a revised version of the ADR index, which is conceptually continuous with the original one, but more clearly defined and more reliably weighted for 72 countries. The results show that the correlation between the original and revised ADR is only 0.60. However, some issues such as ambiguous definitions still remain in the revised ADR index. Henceforth, Spamann (2010) uses the legal data for forty-six countries, improve coding, with leading local lawyers involved in the research questionnaires, and provide a corrected ADR index. The corrected ADR index differs substantially from the original one ($\rho=0.53$) and from the revised one ($\rho=0.67$). Furthermore, Spamann (2010) also demonstrates 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) in order to control for its potential limitations.

The index of shareholder rights focuses on anti-self-dealing and tunneling. DLLS (2008) present 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) show that anti-director rights compared to self-dealing is the central problem of corporate governance in most countries in recent years. Thus, they suggest that in general anti-self-dealing is preferable to the ADR index in cross-country studies. Additionally, the empirical evidences show that the anti-self-dealing index is a more robust predictor of stock market development than the ADR index.

Lastly, we also employ anti-takeover index, which captures the set of rules and regulations concerned with changes of 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 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 shows 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 shown 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. While, the few countries with the Scandinavian civil law origin (*L_Scandinavian*) are captured in the regressions by the constant. LLSV (1997, 1998) showed that the original ADR index is on average statistically significantly higher for the common law countries than the civil law countries both as a whole and each of the three sub-families, French civil law countries, German civil law countries and Scandinavian civil law

countries. DLLS (2008) point out that consistent with the original index, the revised ADR index also shows sharply higher value in common law countries than in French civil law countries. The existing research shows also that the legal origin also matters for creditor rights. LLSV (1998) find 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 investigate 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) document 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 about 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 most of the aggregate banking system capital is shortly exhausted. As a result 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 system 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 shows that compared to stock market development, there are huge differences on the bond market development across countries. The variable *Structure_2*, which is defined as the development of private bond market versus stock market, also shows high variability ranging from 0.00 to 5.68 with a mean of 0.58. Take the average of the last five year (2007-2011) as an example, Italy, Slovak Republic, Iceland, Austria and Ireland have the highest ratio of bond market capitalization to stock market capitalization. In contrast, Chile, Switzerland, South Africa, Hong Kong and Luxembourg have the lowest ratio of bond market capitalization to stock market capitalization. If we take out the public bond market, then Iceland, Ireland, Denmark, Austria and Italy have the highest ratio of bond market capitalization to stock market capitalization in the last five year; while Hong Kong, Philippine, Luxembourg, Columbia and Turkey have the lowest ratio of bond market capitalization to stock market capitalization. Taking the US for an example, the value of total bond market to stock market is 1.56 and the value of private bond market to 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 have 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 show that the two variables of the development of bond market versus stock market are highly correlated with the correlation of 0.79. The creditor rights exhibit both significant and positive associations with *Structure_2*, but positive and insignificant with *Structure_1*. Besides 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 hypotheses that stronger creditor rights are positively associated with higher development of bond market relative to stock market while stronger shareholder rights should have a negative impact on the development of bond market versus stock market.

Table 2 also shows positive correlation between creditor rights and shareholder rights. The prior evidences from the US firms, for instance, Cremers et al. (2007) and Chava et al. (2009), emphasize on 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 evidences, for instance, Johnson et al. (2000) and Djankov et al. (2008), demonstrate that the strong minority shareholder rights can prevent expropriating assets from all stakeholders, which can alleviate the conflicts between shareholders and bondholders. The English legal origin is significantly positive associated with both the creditor rights and shareholder rights, while the French legal origin shows completely opposite correlations. The German legal origin shows significantly positive correlations with creditor rights but mixed associations with shareholder rights.

The bond covenant shows significantly negative associations with both *Structure_1* and *Structure_2*, and also shows 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 associations between bond covenants and shareholder rights are quite mixed. Johnson et al. (2000) and Djankov et al. (2008) also present ambiguous results on this issue. As we have mentioned, prior evidences from the U.S. firms show 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 evidences suggest that the 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 shows 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 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:

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

where i indexes countries, t indexes years, the ratio of bond market capitalization to stock market capitalization is the dependent variable of interest, which evaluates the development of 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 effect 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, therefore, 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 creditor rights index and each of the variables of shareholder rights.

Table 3 shows that the coefficient for creditor rights is significant and positively correlated to

the relative development of bond market to equity market in all the specifications. Additionally, the coefficients for the different variables reflecting shareholder rights are significant and negative sign in most of the specifications. Only the coefficient for the variable *Anti-takeover* does not enter with 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 5% level. In terms of economic magnitude, 1% increase in the score of the creditor rights will bring 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 bond market and stock market, in that the additional control variables does not change our basic results. In the specification (5)-(8) the creditor rights and shareholder rights remain respectively positively and negatively associated with the relative growth of bond market versus equity market. In addition, we also find that the GDP level is significantly and negatively correlated with the relative level of bond market to stock market development, indicating that countries with higher GDP volume are more likely to have more developed stock market relative to bond market.

[Table 3]

Table 4 shows the results, whereas we add proxies for countries 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 bond market to equity market. We find that the English common law countries tend to have 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 more developed bond market. However, the coefficient for German law is positive, yet insignificant. This is consistent with the previous research showing that common law countries are more likely to have stronger shareholder rights than the civil law countries in general (LLSV, 1997, 1998). Ergungor (2004) also documents 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 showing that on 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 market relative to stock market than do the English common law countries.

[Table 4]

Next, we add the variable, which control for restrictive bond covenant. Bond covenants may serve as alternative ex-post mechanism to protect bondholders. The results in Table 5 show that the bond covenants are mostly negatively associated with the relative development of bond market to equity market. This is consistent with the results in Table 3 and 4 as countries that have 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 right and shareholder rights on the structure and development of the capital markets. The results show that countries that have better information disclosure mechanism are having more developed equity instead of bond market. The coefficient for information disclosure is negative and significant in most of the specifications. In contrast, we find that countries with better debt contract enforcement are having more developed bond market. The coefficient for log of days of debt contract enforcement is positive, yet 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, whereas they indicate that countries with stronger creditor rights and weaker shareholder rights are more likely to have a more developed bond market relative to 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 market than do

English common law countries. Improvement in information disclosure helps more to develop equity market, while stronger bond contract enforcement is more helpful in developing bond market.

[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 market relative to equity market. In contrast, countries with stronger shareholder protection tend to have more developed stock market.

When we add more legal determinants into our baseline model, the results are consistent with the results in Table 4. We find that the coefficient for bond covenant remains significant and is 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 also negatively related to bond market development. Lastly, the results show again that information disclosure is negatively correlated with the relative development of bond market to stock market.

4. Financial reform, law and development of bond versus stock market

In order 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 (financial policy-change in our setting) on groups more affected by the policy changes (namely, treated group) with those that are less affected by the changes (namely, control group). In our setting, we assume that the development of the bond market versus equity market of the countries with 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 (top 33% of the whole sample) and control groups (bottom 33% of the whole sample). We test the following specification:

$$\begin{aligned} & \frac{\text{Bond market cap.}_t}{\text{Stock market cap.}_t} \\ &= \alpha_i + \beta_t + \sigma \cdot \text{Treated} * \text{Post_reform} + \gamma \cdot \text{Creditor rights}_{i,t} \\ &+ \delta \cdot \text{Shareholder rights}_{i,t} + \theta \cdot X_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (2)$$

where $\text{treated}=1$ if unit is in treated group and equals zero otherwise; Post_reform is the lag term of the dummy of reform, thus it denotes for 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 most normal years, yet are changing if there are reforms in financial sector. Not all of the seven dimensions are having 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 on banking sector may affect the capital market environment and the firms' 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 for 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 reforms on the association between law and capital market's 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 specifications. We find that the financial reforms do improve the development of bond market more than that of 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 show 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 higher ratio of creditor rights index to shareholder rights index as the treated group and countries lower ratio of that 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 shown by Table 7, after financial reforms, the relations between legal determinants and market development do not change- stronger creditor rights are still significantly helpful to improve the bond market development and stronger shareholder protection are good to 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 information disclosure system, or other related regulatory and supervisory factors. Thus, it is natural to expect that countries with better information disclosure, the effects of financial reform may be more significant. Henceforth, 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, yet the results are again are stronger for countries with strong creditor rights than shareholder rights. This is reasonable as the information disclosure index that we are using is more focusing on bondholders' benefits². 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. The development of 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 as 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 to controlling shareholder to transferring wealth from other stakeholders increased. Thus, during crisis 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.

² 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 standards thus is more relevant to bondholder. There are also several other indexes of disclosure, such as those contained in La Porta et al. (2006), which focus more on shareholders' benefits.

Therefore, if creditor and shareholder rights affect the relative development of bond market and stock market, one would expect that the structure of capital market should switch more to the 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 bond market or stock market itself. In most developing economies, for instance, the bond market development is still at the initial stage and the firms' financing is more reliable on the equity market or bank lending. Then even creditor protection is stronger than shareholder protection³, it is still hardly to expect 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, the East Asian economies and Latin-American economies. Table 9 presents the results with the full sample of countries. The results in columns (1), (3) and (5) show that crises exhibit significant and positive association with bond market development relative to stock market development. The Table 9 shows that stock market capitalization decline during the crisis period, which we attribute to deterioration of economic growth and as well companies future profits. As the same time we find that the bond market capitalization increases relative to the equity market.

During normal time, the relation between the development of bond market versus 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 bond market and stock market is not significant. This may be related to the fact that during the period that 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 system, especially the capital markets.

[Table 9]

In order to examine the effects of crises further, we collect three sub-groups from our sample: advanced economies with GDP per capita over 10,000 USD, East Asian economies and Latin-America economies. For advanced economies, most of them have more developed bond market than emerging market and developing countries do. For East Asian economies, seven of them experienced severe crises from 1997-1998. 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 market to stock market are more significant for advanced economies than both East Asian economies and Latin American economies. As we have mentioned, during the East Asian crises, the bond market in most 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 the average ratio of 0.86. However, from the long-run, bond market is growing in these emerging areas with the development of both economic and financial system. Therefore, the effects of 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 the 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 stock market during the crises from 1970 to 2011. The bond market, however, turned back to the

³ As the creditor rights are also positively associated with bank lending, the emerging economies that we assume here may have more dominant banking system than stock market.

growth trend soon after the crises. Second, for the advanced economies, it shows consistent evidences with our hypotheses that for countries with stronger creditor rights, during crises the bond market will experience faster development than stock market although the effect is less significant than 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 law affects the structure of market finance in terms of the development of bond market versus stock market using a dataset of 42 developed and developing countries from 1978 to 2011. Our results show that a country's legal system, especially investor protection, 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 bond market more than that of equity market in countries with stronger creditor protections. In our opinion, these results show how laws affect the capital market development and present an explanation why some countries have a more developed bond market relative to equity market. Additionally, we find that the relationship between law and capital market development is less significant during the crisis periods.

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

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Table 1 Definitions of the main variables

Variable	Definition	Source
<i>Financial Structure</i>		
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	
<i>Law</i>		
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	International Accounting and Auditing Trends, Center for Financial Anaysis and Research

	higher number indicating more disclosure. These items include: general information, income statements, balance sheets, funds flow statement, etc. At least three companies in one country were studied	(CIFAR);
Debt enforcement	Equals the logarithm of the number of days to resolve a payment dispute through courts	Djankov, S. (2008)
<i>Financial Reforms</i>		
Financial reforms index	An index of financial reforms, normalized to be between 0 and 1.	
Reform	Dummy=1 if the 1 st difference term of financial reform index higher than 0	Abiad et al. (2008)
<i>Crises</i>		
Systemic banking crises	Represents a banking crisis when a country's corporate and financial sectors experience numerous defaults	Laeven and Valencia (2012)
<i>Macroeconomic control variables</i>		
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

This table reports the descriptive statistics and correlations of the main variables in the paper.

	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*	0.01	0.26*	0.35*	0.16*	0.46*	0.66*	0.38*	-0.53*	-0.10*	-0.25*	1		
	(0.00)	(0.79)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)			
Log of days of contract enforcement	0.05	-0.20*	-0.15*	-0.24*	-0.34*	-0.16*	-0.38*	-0.12*	0.23*	-0.05*	0.03	-0.35*	1	
	(0.13)	(0.00)	(0.0)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.13)	(0.0)		
Financial reform	0.02	0.15*	0.10*	0.07*	-0.00	0.09*	0.32*	-0.05*	-0.13*	0.17*	-0.23*	0.38*	-0.25*	1
	(0.73)	(0.00)	(0.00)	(0.00)	(0.88)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	

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

Table 3 Creditor rights, shareholder rights and bond v.s. stock market development: basic results

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 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 which affect bond and stock market development. Standard errors are reported in parentheses. ***, ** and * imply the significance at 99%, 95% and 90% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Creditor rights	0.27** (0.12)	0.22* (0.12)	0.30*** (0.12)	0.24*** (0.12)	0.23** (0.12)	0.27*** (0.12)	0.27*** (0.12)	0.20* (0.12)
Revised ADR	-0.54*** (0.17)				-0.58*** (0.17)			
Corrected ADR		-0.28*** (0.10)				-0.22** (0.10)		
Anti-self-dealing			-2.74*** (0.75)				-2.74*** (0.76)	
Antitakeover				-0.92 (0.98)				-0.65 (0.98)
Log of GDP					-0.27** (0.12)	-0.12 (0.14)	-0.23** (0.12)	-0.23* (0.13)
Log of GDP per capita					0.03 (0.13)	-0.08 (0.16)	0.03 (0.13)	0.00 (0.15)
Inflation					-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Cons	2.86*** (0.61)	2.07*** (0.47)	2.25*** (0.40)	1.33*** (0.55)	9.99*** (2.34)	5.92*** (2.67)	8.58*** (2.28)	7.42*** (2.66)
Country fixed effects	No	No	No	No	No	No	No	No
Obs.	794	720	794	653	794	720	794	653
R-sq.	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 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 which affect bond and stock market development. Standard errors are reported in parentheses. ***, ** and * imply the 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)
Log of 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)
Log of 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	-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	-0.71	-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)
Cons	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 fixed effects	No	No	No	No	No	No	No	No
R-sq.	0.1931	0.1953	0.1806	0.0889	0.2783	0.2389	0.2194	0.0894
Obs.	772	698	772	631	657	598	657	560

Table 5 Creditor rights, shareholder rights, legal origins, bond covenant and bond vs. stock market development (Cont.)

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 which affect bond and stock market development. Standard errors are reported in parentheses. ***, ** and * imply the significance at 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)		(0.12)				(0.11)
Revised ADR	(0.13)		(0.14)		(0.13)	(0.13)	(0.13)	
	-0.65**				-0.58**			
Corrected ADR	(0.28)				(0.27)			
		-0.25**				-0.24**		
Anti-self-dealing		(0.12)				(0.12)		
			-0.90				-0.76	
Antitakeover			(1.40)	2.80**			(1.32)	3.50***
				(1.22)				(1.06)
Log of GDP		-0.20		-0.24*				-0.25**
	-0.11	(0.15)	-0.29*	(0.13)	-0.14	-0.23	-0.32**	(0.11)
Log of GDP per capita	(0.17)		(0.15)		(0.16)	(0.15)	(0.15)	
	-0.20	-0.00	0.03	0.02	-0.13	0.05	0.10	0.11
Inflation	(0.20)	(0.17)	(0.18)	(0.16)	(0.20)	(0.17)	(0.17)	(0.13)
	-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)
Log of 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 fixed effects	No							
R-sq.	0.3969	0.4059	0.3237	0.4535	0.4156	0.4297	0.3645	0.5427
Obs.	576	576	576	494	576	576	576	494

Table 6 Effects of financial reform on bond vs. stock market development

This table reports results for the regression $\frac{Bond\ market\ cap.}{Stock\ market\ cap.} = \alpha_i + \beta_t + \sigma \cdot Treated_{i,t} \cdot Post_reform_{i,t} + \gamma \cdot Creditor\ rights_{i,t} + \delta \cdot Shareholder\ rights_{i,t} + \theta \cdot X_{i,t} + \varepsilon_{i,t}$. 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 for 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 which affect bond and stock market development. Standard errors are reported in parentheses. ***, ** and * imply the significance at 99%, 95% and 90% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Creditor rights	0.27**	0.28*	0.32***	0.27*	0.30***	0.28*	0.31**	0.26*	0.25**	0.32*	0.28**	0.28*
Revised ADR	(0.12) -0.53***	(0.16) -	(0.13) -0.75***	(0.18) -	(0.12)	(0.16)	(0.13)	(0.14)	(0.12)	(0.17)	(0.13)	(0.16)
Anti-self-dealing	(0.17)	-	(0.19)	-	-2.71***	-	-2.69***	-				
Corrected ADR					(0.71)	-	(0.79)	-	-0.53***	-0.37**	-0.57***	-0.44**
Treated*Post reform	0.74***	0.72***	1.05***	0.96***	0.79***	0.72***	1.09***	0.96***	(0.14)	(0.19)	(0.15)	(0.21)
Information disclosure * Post reform	(0.20)	(0.20)	(0.29)	(0.29)	(0.20)	(0.20)	(0.29)	(0.29)	(0.23)	(0.23)	(0.29)	(0.29)
			0.003*	0.003*			0.003*	0.003*			0.003*	0.003*
Cons.	11.54***	20.13***	(0.002) 10.61***	(0.002) 22.07***	10.06***	20.13***	(0.002) 10.09***	(0.001) 22.07***	8.97***	20.72***	(0.002) 9.04***	(0.002) 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											
Country FE	No	Yes										
R-sq.	0.0835	0.0302	0.2752	0.0120	0.1298	0.0302	0.1689	0.0120	0.0726	0.0025	0.1233	0.0013
Obs.	564	564	470	470	564	564	470	470	517	517	470	470

Table 7 Financial reform, 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 for 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 which affect bond and stock market development. Standard errors are reported in parentheses. ***, ** and * imply the significance at 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*
Revised ADR	(0.12) -0.57***	(0.13)	(0.12)	(0.13)	(0.13)	(0.17)
Anti-self-dealing	(0.17)	-	-2.57***	-	-	-
Corrected ADR			(0.71)	-	-0.51***	-0.33*
Creditor rights * post reform	0.17**	0.30***	0.31***	0.30***	0.14*	0.15*
Revised ADR * post reform	(0.08) -0.03	(0.09) -0.81**	(0.09)	(0.09)	(0.08)	(0.08)
Anti-self-dealing * post reform	(0.05)	(0.34)	-0.81**	-0.81**		
Corrected ADR * post reform			(0.35)	(0.34)	0.01	-0.01
Cons.					(0.05)	(0.05)
	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 FE	No	Yes	No	Yes	No	Yes
R-sq.	0.0803	0.0314	0.1166	0.0314	0.0211	0.0112

Table 8 Financial reform, information disclosure, 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 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 which affect bond and stock market development. Standard errors are reported in parentheses. ***, ** and * imply the significance at 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 *			-0.012**	-0.001		
			(0.006)	(0.001)		
Information disclosure * Corrected ADR*					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
R. ²	0.2328	0.0235	0.1073	0.0235	0.0277	0.0019
Obs.	470	470	470	470	470	470

Table 9 Banking crises, creditor rights, shareholder rights and bond vs. stock market development

This table reports results for the regression $Bond\ market\ cap./Stock\ market\ cap. = \alpha_i + \beta_t + \sigma \cdot Banking\ crisis_{i,t} + \gamma \cdot Creditor\ rights_{i,t} + \delta \cdot Shareholder\ rights_{i,t} + \theta \cdot X_{i,t} + \varepsilon_{i,t}$. 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 for 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 which affect bond and stock market development. Standard errors are reported in parentheses. ***, ** and * imply the significance at 99%, 95% and 90% level, respectively.

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

R-sq.	0.1142	0.1095	0.0981	0.1049	0.0367	0.0535
Obs.	663	663	663	663	589	589

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Table 10 Banking crises and bond v.s. stock market development: Advanced economies v.s. 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 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 for 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 which affect bond and stock market development. Standard errors are reported in parentheses. ***, ** and * imply the significance at 99%, 95% and 90% level, respectively.

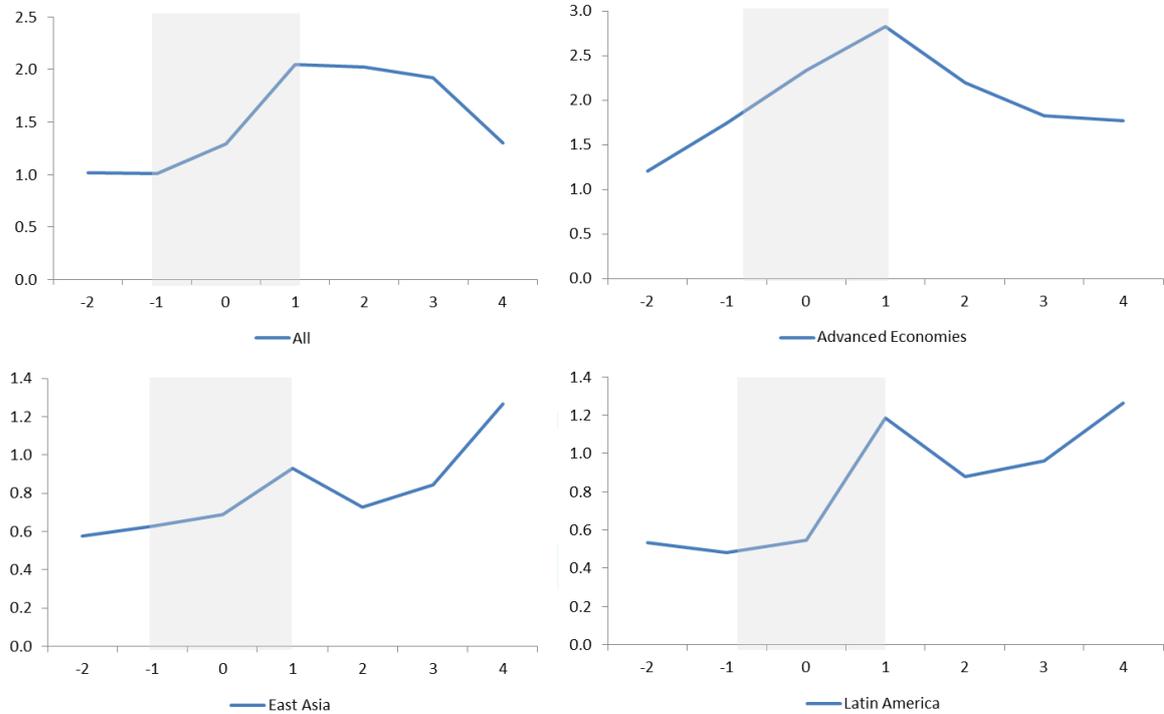
	Advanced economies		East Asian economies		Latin American economies	
	(1)	(2)	(3)	(4)	(5)	(6)
Creditor Rights	0.39*** (0.14)	0.40*** (0.14)	0.28** (0.13)	0.30** (0.13)	0.42*** (0.14)	0.41*** (0.14)
Revised ADR	-0.48 (0.19)		-0.38* (0.21)		-0.50** (0.19)	
Anti-self-dealing		-2.13** (1.00)		-1.74* (0.95)		-2.23** (1.01)
Advanced * Banking crisis	0.85*** (0.31)	0.85*** (0.30)				
East Asia * Banking crisis			-0.96 (0.60)	-1.01* (0.57)		
Latin America * Banking crisis					-0.44 (0.53)	-0.27 (0.38)
Creditor rights * Banking crisis	0.03 (0.16)	0.02 (0.12)	0.05 (0.10)	-0.01 (0.09)	0.06 (0.24)	-0.01 (0.18)
Revised ADR * Banking crisis	-0.00 (0.08)		0.10 (0.10)		-0.13 (0.13)	
Anti-self-dealing * Banking crisis		-0.50 (0.62)		0.93* (0.48)		0.76 (0.71)
Cons.	8.95*** (3.27)	8.11** (3.23)	10.12*** (2.16)	9.24*** (2.06)	8.72*** (3.29)	7.97** (3.25)
Macro controls	Yes	Yes	Yes	Yes	Yes	Yes

country fixed effects	No	No	No	No	No	No
R-sq.	0.1128	0.0788	0.1698	0.1699	0.1089	0.0740
Obs.	448	448	663	663	448	448

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