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Capital Controls and the Cost of Debt

Eugenia Andreassen, Martin Schindler, Patricio Valenzuela

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I N T E R N A T I O N A L M O N E T A R Y F U N D

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Capital Controls and the Cost of Debt

Prepared by **Eugenia Andreasen, Martin Schindler, Patricio Valenzuela***

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Abstract

Using a panel data set for international corporate bonds and capital account restrictions in advanced and emerging economies, we show that restrictions on capital inflows produce a substantial and economically meaningful increase in corporate bond spreads. A number of heterogeneities suggest that the effect of capital controls on inflows is particularly strong for more financially constrained firms, establishing a novel channel through which capital controls affect economic outcomes. By contrast, we do not find a robust significant effect of restrictions on outflows.

JEL Classification Numbers: F3, F4, G1, G3

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Authors' E-Mail Addresses: eugenia.andreasen@usach.cl; mschindler@imf.org; patriciov@dii.uchile.cl

*Andreasen is at the University of Santiago of Chile; Schindler is at the International Monetary Fund and the Joint Vienna Institute; and Valenzuela is at the University of Chile. Emails: eugenia.andreasen@usach.cl (E. Andreasen); mschindler@imf.org (M. Schindler); patriciov@dii.uchile.cl (P. Valenzuela). We have benefited from helpful comments from Arpad Abraham, Franklin Allen, Elena Carletti, Oren Levintal, Peter Lindner, Jun “QJ” Qian, Tsuyoshi Sasaki and seminar participants at the Central Bank of Chile, the Joint Vienna Institute, the University of Santiago of Chile, the 2014 Latin America and the Caribbean Economic Association Annual Meeting, the IFABS 2016 Barcelona Conference, the MBF 2016 Rome Conference, and the 43rd Annual Conference of the Eastern Economic Association. Patricio Valenzuela wishes to thank the Institute for Research in Market Imperfections and Public Policy, ICM *IS130002* (Ministerio de Economía, Fomento y Turismo), for their financial support. Eugenia Andreasen wishes to thank the Fondecyt Initiation Project #11160494 and Dicyt (Universidad de Santiago de Chile).

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I. Introduction

Over the past four decades, the global economy has become ever more financially integrated, engendering a range of potential benefits, such as more efficient allocation of capital and better risk diversification. However, this process has also increased financial vulnerability by allowing adverse shocks to travel more easily from one economy to another. In recent years, these concerns have triggered an increased use of capital controls while spurring a renewed interest in understanding the effects of financial openness (Ostry et al., 2010; Blanchard and Ostry, 2012).

Despite the potential benefits of capital controls from a macroeconomic perspective, any such benefits should be weighed against the cost of restricting firms' access to foreign capital. A growing body of research shows that capital account restrictions are detrimental to financial markets and economic growth. Henry's (2000a, 2000b) findings suggest that capital controls on stock markets lead to a higher cost of equity capital and to a decline in the growth rate of real private investment. Forbes (2007a) examines how the *encaje* (taxes on short-term capital inflows) that Chile adopted between 1991 and 1998 affected investment and financial constraints for different types of publicly-traded firms. The main finding is that during the *encaje*, smaller firms experienced significant financial constraints, which decreased as the size of the firm increased. Bekaert et al. (2011) demonstrate that the easing of capital controls positively affects capital stock growth and total factor productivity. Prati et al. (2012) and Andreasen and Valenzuela (2016) find a strong negative effect of capital account restrictions on corporate credit ratings.

This paper contributes to the literature on the costs of capital controls by exploring how they affect the credit spreads of bonds issued in international markets by advanced and emerging-market borrowers. Although most of the empirical research on capital controls focuses on stock markets, it is well documented that debt issues in public markets are a more important source of capital than equity issues for firms and that debt markets are more internationalized than equity markets (Gozzi et al., 2010). Thus, understanding of the effects of capital account restrictions on firms' cost of international debt is crucial. To our knowledge, this is the first empirical paper to directly explore the effect of capital controls on the cost of international debt capital and to examine whether this effect is asymmetric across different types of restrictions.

The effect of capital controls on corporate bond spreads is likely shaped by the financial constraints that firms face. Firms that are more financially constrained are potentially more vulnerable to the introduction of capital account restrictions. Extensive empirical evidence shows that smaller firms tend to be more financially constrained than larger firms (Stein, 2001; Hubbard, 1998); that firms located in economies with lower levels of financial development are more credit-constrained (Love, 2003; Laeven, 2003); and that during episodes of global financial distress, firms have more difficulty accessing capital (Clarke et al., 2012). These findings raise a number of important additional questions: Do larger firms have a greater capacity for mitigating the impact of capital account restrictions? Are capital controls less binding for firms with access to more developed financial markets? Is the impact of controls magnified during times of financial distress?

This paper addresses all of these issues by using a new cross-country, bond-level panel data set for corporate bonds placed in international markets by advanced and emerging-market borrowers. The key finding is that restrictions on capital inflows produce a substantial and economically meaningful increase in corporate bond spreads. In addition, disaggregating the capital control restrictions by type of security, we find that restrictions on bond flows trigger the highest increase in credit spreads. Finally, we show that the effect of capital controls on inflows is mitigated for bonds issued by larger firms and by firms located in economies: (i) with deeper financial markets; (ii) that belong to the European Union; (iii) with market-based financial markets; and (iv) with English legal origins. On the contrary, the effect of capital controls on inflows is magnified during periods of market illiquidity and financial distress. Overall, our results suggest that capital controls on inflows have a particularly strong effect on the cost of debt for more financially constrained firms, establishing a novel channel through which capital controls affect economic outcomes. By contrast, we find no robust significant effect of restrictions on outflows.

Endogeneity concerns stemming from potential omitted variables and reverse causality are clearly present at the time of identifying a causal effect of capital controls on corporate bond spreads. We mitigate potential endogeneity concerns associated with omitted variables by estimating panel models with firm and time fixed effects and by controlling for all the standard determinates of corporate bond spreads at the bond, firm, and country level (Merton, 1974; Campbell and Taskler, 2003; Valenzuela, 2016). Additionally, we address reverse causality concerns by considering capital account restrictions of the previous year and by using bond-level data, since the credit spread of an individual bond is unlikely to affect a country's process of financial openness. Finally, the heterogeneities found in the impact of capital account restrictions on corporate bond spreads are consistent with a causal interpretation rather than a simple correlation between capital controls and the cost of international debt.

The data set we use in this paper allows us to address at least two shortcomings of the literature. First, most widely-used capital control indicators are crude measures that ignore variations in the degree of capital account restrictiveness, thus curtailing the possibility of properly identifying the consequences of financial openness. In this regard, the detailed measures of legal restrictions used in this paper capture subtler differences in capital control regimes across countries and time. Moreover, our measures of capital controls can be disaggregated by direction of flows or type of transactions, allowing for additional and innovative tests of our hypotheses. Second, the widespread use of aggregate data in the literature may hide important heterogeneities, making it difficult to detect significant average effects. In contrast, the cross-country, bond-level panel data set used in this paper allows us to explore a variety of heterogeneities at the firm, country and global levels. These heterogeneities suggest a causal interpretation, in which restrictions on capital inflows worsen firms' access to foreign capital, particularly for more financially constrained firms.

Our study is similar to those of Prati et al. (2012) and Andreasen and Valenzuela (2016), who explore the effects of financial openness on corporate credit ratings. However, unlike those studies, this is the first paper that uses bond-level data to explore the effect of capital controls on corporate credit spreads. These spreads are a direct indicator of the effective cost of debt capital, while credit

ratings are merely an opinion about debt issuers' probability of default. Moreover, our analysis explores the effect of capital controls on corporate bond spreads after controlling for credit ratings and the standard determinants of corporate credit risk.

The remainder of the paper is organized as follows. Section 2 describes the main distinctions between different types of capital account restrictions and presents our main hypotheses. Section 3 reports the data set used in this paper and summary statistics. Section 4 presents our econometric framework and results. Section 5 concludes.

II. Capital Controls and Firms' Financial Constraints

Capital controls are far from being homogeneous. To begin with, capital account restrictions on inflows and those on outflows are policy tools with different purposes. While capital controls on inflows have typically been used as a crisis-prevention tool, capital controls on outflows have a long tradition as a crisis-containment tool (Demirguc-Kunt and Serven, 2010). Furthermore, capital controls also differ by the type of instrument whose trade is being restricted: shares, bonds, money market instruments or collective investment securities. Therefore, to the extent that different types of controls have different effects in financial markets, studies using aggregate indexes of capital account restrictions may hide important asymmetries, making it difficult to detect significant average effects.

Capital account restrictions on inflows might affect the cost of firms' debt for several reasons. First, firms residing in a country with restrictions on capital inflows face a more restricted supply of international capital (Schmukler and Vesperoni, 2001). Second, when capital account restrictions on inflows are in place, firms incur additional costs when raising capital. These costs can be due to the higher taxes or fees on capital flows due to the restriction or to the efforts to circumvent the capital controls. The restricted supply and increased cost of capital should typically have a greater effect on firms that are more financially constrained, such as smaller firms and those in less financially developed economies. Finally, times of financial distress tend to increase the financial constraints on all firms. Thus, we also examine a series of potential heterogeneous effects of introducing restrictions on inflows, depending on the size of the firm, the development and structure of the domestic financial market, and the degree of global market illiquidity and financial instability.

The expected effect of capital account restrictions on outflows is more ambiguous. On the one hand, capital controls on outflows may reduce the cost of the firm's domestic financing by keeping national savings 'captive' in the domestic financial markets (Gallego and Hernandez, 2003; Giovannini and Melo, 1993). On the other hand, capital controls on outflows restrict the firm's investment possibilities, reducing its ability to better diversify risk, thereby increasing the volatility of the firm's value and its credit spread (Merton, 1974; Forbes, 2007b).

III. Data

For the purpose of this paper, we merge two data sets. The first data set contains information on corporate bonds placed in international markets by developed and emerging-market borrowers. It builds on Valenzuela's (2016) data set, which includes all fixed-rate bonds denominated in U.S. dollars, available in Bloomberg as of June 2009, with the exception of bonds issued by firms located in the U.S. or England.¹ Although the dataset assembled by Valenzuela (2016) contains bonds issued by publicly traded firms in the financial and nonfinancial sectors, this paper focuses only in the nonfinancial sector.

The majority of bonds included in the sample correspond to Yankee bonds, Euro-Dollar bonds, and Global bonds. This data set also includes a comprehensive set of firm-level control variables, as well as sovereign credit ratings and a set of macro-variables. The second data set contains information on capital account restrictions. We construct this data set using the methodology introduced by Schindler (2009), which is based on information provided in the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER).

To reduce the potential for errors in coding, we clean the data set in four ways. First, we eliminate the top and bottom 0.5% of the spreads from our analysis. Second, we drop all observations in the accounting variables that exceed the sample mean by more than five standard deviations. Third, we do not consider bonds issued in countries with fewer than 30 observations in total. Fourth, we restrict the sample to bonds that are issued by firms with a Standard and Poor's (S&P) credit rating between AAA and B-. After cleaning the data, we obtain a final sample—including all of our control variables—that contains 3,740 bond-quarter observations for the period from 2005:Q1 to 2009:Q2. These observations correspond to 335 different bonds issued by 166 firms located in 22 countries.²

Note that the sample that we use in this paper contains only firms that issue international bonds denominated in U.S. dollars. Given that only certain types of firms choose—and are able—to access offshore financing, the results in this paper cannot be extrapolated to the entire universe of firms. However, research on international debt financing is important since 35% of the total amount raised through debt issues in developed economies is raised abroad, while in emerging economies, this figure is 47% (Gozzi et al., 2010). Moreover, international debt issues tend to be denominated in foreign currencies, particularly in U.S. dollars (Gozzi et al., 2015). Finally, as Valenzuela (2016) demonstrates, the data on corporate bond spreads used in this paper are representative of the universe of bonds denominated in U.S. dollars. Therefore, sample selection bias is unlikely to drive our results.³

¹ These two countries had fully liberalized capital accounts throughout the sample period. Thus, their exclusion matters little for our study, which exploits mainly the time variation on capital account regulations.

² Argentina, Belgium, Brazil, Canada, Chile, Colombia, Finland, France, Germany, Ireland, Republic of Korea, Malaysia, Mexico, Netherlands, Norway, Peru, Philippines, Singapore, Spain, Sweden, Switzerland and Thailand.

³ Valenzuela (2016) compares the average OASs from his data with OAS indexes reported by the Bank of America (BoFA) Merrill Lynch for identical credit rating categories. The indexes constructed from the data set used in this paper adequately mimic the behavior of the BoFA Merrill Lynch OAS indexes.

A. Corporate bond spreads

The dependent variable is the corporate *option-adjusted spread* (OAS) from Bloomberg Professional. The OAS measures the yield on a corporate bond in excess of a comparable U.S. Treasury security, after accounting for the value of any embedded option.⁴ The use of the OAS in this study is important, as many corporate bonds contain embedded options. Indeed, approximately 60% of the bonds in our sample contain contingent cash flows owing to call or put features. Notably, the OAS methodology does not affect the main results in this paper, as they are robust to the use of a sub-sample of bonds without embedded options. The OAS of a bond without any embedded option (i.e., a non-callable bond) is computed as the constant spread that must be added to the spot interest rate to make the price of the risk-free bond identical to the observed market price of the corporate bond.

B. Capital account restrictions

This paper uses two main measures of capital account restrictions that allow us to identify the channels through which they affect corporate bond spreads. The first measure captures capital account restrictions on inflows (KA_IN). This measure is the simple average of eight dummy variables that capture restrictions on capital account transactions that involve: (1) the sale or issue of financial assets abroad by residents; and (2) the purchase of financial assets locally by nonresidents, where assets are disaggregated into four categories: shares, money market instruments, bonds, and collective investment securities.

The second measure represents capital account restrictions on outflows (KA_OUT). Similar to our measure of capital restriction on inflows, this one is the simple average of eight dummy variables that capture restrictions on capital account transactions that involve: (1) the sale or issue of financial assets locally by nonresidents; and (2) the purchase of financial assets abroad by residents, where assets are disaggregated as in the previous paragraph. Table I reports the transaction categories that we use in this study and that are subject to capital account restrictions according to the AREAER.⁵

C. Other corporate bond spread determinants

To control for other variables that could directly affect corporate bond spreads, we control for the standard determinants of corporate bond spreads according to structural credit-risk models and the empirical literature on the determinants of corporate bond spreads (Merton, 1974; Collin-Dufresne

⁴ For details on the OAS computation, see Cavallo and Valenzuela (2010) and Valenzuela (2016). Other studies using OASs include Becchetti et al. (2012), Huang and Kong (2003), and Pedrosa and Roll (1998).

⁵ For a detailed description of capital control restrictions by country, see Schindler (2009) and Fernández, Klein, Rebucci, Schindler and Uribe (2016).

et al., 2001; Campbell and Taksler, 2003). At the bond level, our regressions control for years to maturity, issue size, and coupon rate. At the firm level, control variables include the S&P corporate credit rating, as well as the issuer's equity volatility and a standard set of accounting variables: firm size and the ratios of operating income to sales; short-term debt to total debt; and total debt to assets.

Since financial, macroeconomic, and political reforms are usually part of an entire package of structural reforms, to ensure that our results do not capture the effects of other contemporaneous reforms, we also consider a set of country-level variables. Following Bekaert, Campbell and Lundblad (2011), we consider private credit to GDP, private bond market capitalization to GDP, public bond market capitalization to GDP, trade to GDP, and political risk.⁶ We also consider the growth rate of the economy and the GDP per capita to control for growth opportunities and economic development, and the exchange rate to control for the fact that capital controls may affect spreads through the exchange rate.

For example, capital controls on inflows may lead to an exchange rate depreciation by containing capital inflows. This depreciation may increase the cost (in domestic currency) of dollar-denominated debt, leading to increased default risk and to higher corporate bond spreads.⁷ Therefore, to rule out this indirect effect of capital controls, we control for exchange rate in all our regressions.⁸ Finally, because sovereign credit ratings are a significant determinant of corporate credit risk (Borensztein et al., 2013), we also include them as part of our control variables. Table II presents the definitions, units, and sources of the variables used in this paper. Table III reports the descriptive statistics of the variables and Table AI in the appendix presents a more granular description of the firms and bonds in the sample.

IV. Empirical Analysis and Results

The primary objective of this study is to explore whether capital account restrictions affect corporate bond spreads, while distinguishing between the effects of capital account restrictions on inflows (KA_IN) and outflows (KA_OUT). To reduce potential biases associated with reverse causality, we consider capital account restrictions of the previous year. Thus, our baseline econometric model is:

$$\text{Bond Spread}_{bft} = \alpha + \beta X_{bft} + \varphi Y_{ft} + \delta Z_{ct-1} + \gamma \text{KA_IN}_{ct-1} + \theta \text{KA_OUT}_{ct-1} + A_f + B_t + \varepsilon_{bft},$$

where the subscripts refer to bond b , firm f , country c , and time t . X_{bft} is a set of bond characteristics; Y_{ft} is a set of firm-level performance indicators; and Z_{ct} is a set of macroeconomic variables. A_f is a vector of either industry or firm dummy variables that account for industry or

⁶ The political risk measure is a survey-based assessment of political stability contained in the ICRG database.

⁷ To rule out this channel, all our regressions control for exchange rate movements.

⁸ Our results are qualitatively identical whether we control (or not) for exchange rate.

firm fixed effects, depending on the regression.⁹ B_t is a vector of time dummy variables accounting for time fixed effects and ε_{bft} is the error term.

Given that our sample includes bonds issued by firms located in countries that liberalized their capital account at different moments in time, our specification including firm and time fixed effects is analogous to a difference-in-differences estimator in a multiple-treatment-groups and multiple-time-periods setting (Imbens and Wooldridge, 2009). The identification assumption is that, in the absence of capital controls, the spreads of bonds issued by firms located in countries that have or have not already liberalized their capital account are exposed to similar global shocks. We believe that this is a plausible assumption, given the homogeneous nature of the bonds included in our sample—that is, international bonds denominated in U.S. dollars.

Endogeneity concerns stemming from potential omitted variables and reverse causality are clearly present at the time of identifying a causal effect of capital controls on corporate bond spreads. We mitigate potential endogeneity concerns associated with omitted variables by estimating panel models with firm and time fixed effects and by controlling for all the standard determinates of corporate bond spreads at the bond, firm, and country level (see, e.g., Merton, 1974; Campbell and Taskler, 2003; Valenzuela, 2016). While firm fixed effects control for average firm-level characteristics, time fixed effects control for global factors such as global financial crises, the world business cycle, and variations in the U.S. Treasury interest rate.¹⁰

Although firm and time fixed effects mitigate potential endogeneity concerns associated with omitted variables, they do not correct for endogeneity biases associated with reverse causality. This is an important concern given a potential effect running from credit spreads to the imposition (or abolition) of capital controls. While it is likely that policymakers are more inclined to impose capital controls during times of financial instability (usually reflected in spread widening); policymakers are more inclined to abolish capital controls during times of financial stability (usually reflected in spread narrowing). We mitigate reverse causality biases by considering capital account restrictions of the previous year and by using bond-level data. Given that the credit spread of an individual bond is unlikely to affect a country's process of financial openness, results from studies using bond-level data are less likely to be driven by reverse causality bias than are those from studies using aggregated country-level measures of credit risk or the cost of debt.

Finally, it is important to highlight that in section 4.3 we find a number of heterogeneities in the impact of capital account restrictions on corporate bond spreads—at the firm, country, and global level—that are consistent with a causal interpretation rather than a simple correlation between capital controls and the cost of international debt.

⁹ For robustness purposes, we also consider both bond and industry-time fixed effects. The results are qualitatively identical.

¹⁰ A decline in the U.S. interest rate may produce massive capital inflows in some emerging economies, triggering the imposition of capital controls and a mechanic increase of the credit spreads of bonds denominated in U.S. dollars.

A. Capital account restrictions and credit spreads

Table IV presents the results from the estimation of our baseline regression by ordinary least squares (OLS) with errors clustered at the country-time level. Columns 1 and 2 report the results for our baseline specification with industry and firm fixed effects, respectively. The results suggest that capital account restrictions on inflows and outflows have sharply asymmetric effects. Capital account restrictions on inflows increase corporate bond spreads with a statistically significant and economically meaningful magnitude. That is, a one-standard-deviation increase in KA_IN increases corporate bond spreads by between 45 and 54 basis points. By contrast, capital account restrictions on outflows tend to decrease corporate bond spreads; however, this result is not robust to the inclusion of firm fixed effects.¹¹

Most of the estimated coefficients of our control variables are statistically significant in the expected direction. Consistent with the predictions of structural credit-risk models, the results from our specification *including* firm-fixed effects show that equity volatility is positively related to credit spreads. Moreover, firms with higher-quality credit ratings exhibit smaller credit spreads, and firms with a higher short-term debt to total debt ratio have larger spreads. This last result is consistent with the argument that a higher proportion of short-term debt exposes firms to rollover risk (Valenzuela, 2016).

At the macro level, the results indicate that trade over GDP, economic growth and sovereign credit ratings are negatively related to credit spreads, while a higher ratio of public bond market capitalization to GDP and a more depreciated currency are associated with higher credit spreads. The coefficient on the ratio of public bond market capitalization to GDP is consistent with findings that countries with excessive debt are more prone to financial crises (Arcand et al., 2015) and that high levels of sovereign debt are likely to affect corporate bond spreads through sovereign risk (Borensztein et al., 2013; Andreasen, 2015). The coefficient on the exchange rate is in line with the fact that a depreciation of the currency increase the cost (in domestic currency) of dollar-denominated debt, leading to increased default risk. It is worth noting that, in spite of our sample's relatively short time span, the variability in the data still allows us to identify our effects of interest.

¹¹ In unreported regressions, available upon request, we replicate our baseline model while excluding bonds with embedded options to rule out potential biases that could arise from the measurement of our dependent variable. Our results remain qualitatively unchanged from our previous results.

B. Capital account restrictions by type of securities

Capital flows are far from being homogeneous, and restrictions on each type of flow (bonds, shares, money market and collective investment) have their own characteristics. Furthermore, according to the pecking-order theory, firms are not indifferent among alternative sources of financing. Owing to the information asymmetries between the firm and potential investors, the firm will prefer retained earnings to debt and debt to equity (Myers and Majluf, 1984). Therefore, capital controls on different types of flows might have different effects on corporate bond spreads. In particular, we expect capital controls on bond flows to have a greater effect on credit spreads, given their direct link to the firm's cost of debt and since they imply a restriction on the most preferred source of external financing.

In this section, we take advantage of the disaggregation of our data, presented in Table I, and explore the effects of imposing capital account restrictions on different types of transactions: shares, bonds, money market instruments and collective investments. Columns 1, 2 and 4 of Table V show that capital account restrictions on inflows of transactions involving shares, bonds, and collective investments continue to have a positive and significant effect on corporate bond spreads. Column 3 shows that restrictions on money market instruments are also positively correlated with credit spreads; however, the coefficient is not statistically significant. The finding that the coefficient is considerably larger in the case of restrictions on bonds than in the case of restrictions on other securities is consistent with the status of debt as the primary financing tool for corporations and with the pecking-order theory. Additionally, the results show that restrictions on capital inflows tend to increase credit spreads, regardless of the type of transaction, as they restrict the pool of financing sources for firms, which make firms more vulnerable to negative shocks and tend to increase the weighted average cost of capital (WACC). As before, capital controls on outflows do not have a robust, significant effect on corporate bond spreads.

C. Heterogeneous effects of capital account restrictions

The restricted supply and increased cost of capital should typically have a greater effect on firms that are more financially constrained, such as smaller firms and those in less financially developed economies. Additionally, times of financial distress tend to increase the financial constraints on all firms. Then, this section explores whether there are potential heterogeneities in the impact of capital account restrictions on corporate bond spreads at the firm, country, and global level; and whether they reflect a causal interpretation rather than a simple correlation between capital controls and the cost of international debt.

Table VI reports that the effect of capital account restrictions on inflows on corporate bond spreads is mitigated for bonds issued by larger firms (columns 1 through 8) and for bonds issued by firms located in economies: (i) with deeper financial markets (columns 1 and 5); (ii) that belong to the European Union (columns 2 and 6); (iii) with market-based financial markets (columns 3 and 7);

and (iv) with English legal origins (columns 4 and 8). On the contrary, the effect of capital controls on inflows is magnified during periods of market illiquidity (columns 1 to 4) and financial distress (columns 5 to 8). Thus, our results suggest that the effect of capital controls on inflows on the cost of international debt is particularly strong for more financially constrained firms, establishing a novel channel through which capital controls affect economic outcomes. We do not find any significant heterogeneity in the effect of capital restrictions on outflows on corporate bond spreads.

The finding that the spreads of bonds issued by larger firms are less vulnerable to the imposition of capital controls on inflows is consistent with previous evidence suggesting that firm size is a relevant variable in determining financial constraints and the effects of capital controls on firms' cost of financing. Both Edwards (1999) and Forbes (2007a) find that financial constraints were significantly greater for smaller firms than for larger firms during the *encaje* adopted in Chile between 1991 and 1998.

At the country level, it is well documented that certain financial system characteristics and the level of financial development reduce firms' financial constraints (Love, 2003; Klein and Olivei, 2008). Along these lines, Demirguc-Kunt and Vojislav (2002) find that market-based financial systems—i.e., those with larger, more active and more efficient stock markets as compared to banks (Demirguc-Kunt and Levine, 1999)—improve the availability of long-term financing.¹² Additionally, as La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) argue, the English legal tradition seems to be more conducive to financial development, as it provides more creditor protection and is more adaptable to new economic circumstances.¹³ In line with this evidence, our findings show that the spreads of bonds issued by firms located in economies with four particular characteristics—those that have deeper financial markets; that have market-based financial markets; that belong to the European Union; and that have English legal origins—are less vulnerable to the imposition of capital controls on inflows. Table II provides the description of our measures of these four variables.

Regarding periods of financial distress, market illiquidity and financial instability tend to tighten firms' financial constraints. Therefore, during these periods, one would expect firms in countries with capital account restrictions to face deeper financing problems than during normal times, as their sources of financing falter. In line with this argument, we find that capital controls on inflows have a stronger effect on corporate bond spreads during periods of high market illiquidity and financial instability. We measure market illiquidity by using the Gamma measure of debt market illiquidity constructed by Bao, Pan, and Wang (2011). Using information from the U.S. secondary corporate bond markets, this measure corresponds to the negative of the autocovariance of bond price changes. Since transitory price movements produce negatively serially correlated price

¹² Specifically, the market-based variable is a dummy that takes the value 1 for higher than mean values of an aggregate Structure index. Structure index is the means-removed average of relative size, relative activity and relative efficiency measures. Relative size is given by the ratio of stock market capitalization to total assets of deposit money banks; relative activity is defined as the total value of stocks traded divided by bank credit to the private sector; and, finally, relative efficiency is given by the product of total value traded on the stock market and average overhead costs of banks in the country.

¹³ The English legal tradition seems to enhance effective property rights protection (Claessens and Laeven, 2004), efficiency and flexibility at the procedural level (Djankov et al., 2003; Acemoglu and Johnson, 2005), and transparency of accounting standards and disclosure requirements (Rajan and Zingales, 1998; Djankov et al., 2008).

changes, the Gamma measure creates a meaningful measure of debt market illiquidity that captures the impact of illiquidity on prices. We measure financial instability with the VIX index, which is a measure of the implied volatility of the S&P500 index options.

D. Additional robustness checks

This section checks the robustness of our main results to the inclusion of bond and industry time fixed effects. While bond fixed effects control for average bond-level time-invariant characteristics, industry-time fixed effects control for time-variant factors specific to each industry. Therefore, these specifications attenuate potential concerns associated with endogeneity bias stemming from omitted variables. Column 1 of Table VII reports the results from estimating our baseline regression with bond and time fixed effects, while column 2 reports the results when considering bond and industry time fixed effects. The results are practically identical to our baseline regression with firm and time fixed effects (column 2 of Table IV).

V. Conclusions

Although a large body of research exists on the effects of capital account restrictions, whether it is optimal for countries to liberalize their capital accounts remains an open empirical question. While there are potential benefits of capital controls from a macroeconomic perspective, these benefits have to be weighed against the cost of restricting firms' access to foreign capital. This paper contributes to the literature on the costs of capital controls by showing that capital account restrictions have a significant effect on the cost of international debt capital for firms—as proxied by corporate bond spreads—and that this effect is asymmetric across different types of restrictions.

The paper's major finding is that capital account restrictions on inflows significantly increase corporate bond spreads. The results also suggest that the spreads of bond issued by larger firms and by firms located in economies with four particular characteristics—those that have deeper financial markets; that have market-based financial markets; that belong to the European Union; and that have English legal origins—are less vulnerable to the imposition of capital controls on inflows. However, the effect of capital controls on inflows is magnified during periods of market illiquidity and financial distress. Overall, the paper's major findings suggest that capital controls on inflows have a particularly strong effect on the cost of debt for more financially constrained firms, establishing a novel channel (i.e., the cost of international debt channel) through which capital controls affect economic outcomes.

Tables

Table I. Types of Capital Transactions Potentially Subject to Restrictions

Inflows (KA_IN)	Outflows (KA_OUT)
<i>Shares or other securities of a participating nature</i>	
Purchase locally by nonresidents	Sale or issue locally by nonresidents
Sale or issue abroad by residents	Purchase abroad by residents
<i>Money market instruments</i>	
Purchase locally by nonresidents	Sale or issue locally by nonresidents
Sale or issue abroad by residents	Purchase abroad by residents
<i>Bonds or other debt securities</i>	
Purchase locally by nonresidents	Sale or issue locally by nonresidents
Sale or issue abroad by residents	Purchase abroad by residents
<i>Collective investment securities</i>	
Purchase locally by nonresidents	Sale or issue locally by nonresidents
Sale or issue abroad by residents	Purchase abroad by residents

Table II. Description of Variables

	Description	Units	Source
<i>Bond Characteristics</i>			
Option adjusted spread	Option-adjusted spread	Basis points	Bloomberg
Years to maturity	Years to maturity	Years	Bloomberg
Issue size	Amount issued	US\$ (in log)	Bloomberg
Coupon rate	Coupon bond	Basis points	Bloomberg
<i>Firm Specific</i>			
Equity volatility	Standard deviation of the day to day logarithmic price changes for the previous 180 days.	Percent	Bloomberg
Credit rating	S&P firm rating, long term debt, foreign currency	(1=D, ..., 21=AAA)	S&P
Operating income to sales	Operating income divided by net sales.	Ratio	Bloomberg
ST debt to total debt	Short term debt divided by total debt.	Ratio	Bloomberg
Total debt to asset	Total debt divided by total assets.	Ratio	Bloomberg
Size	Total assets	Millions of US\$ (in log)	Bloomberg
<i>Capital Account Restrictions</i>			
Capital account restrictions on inflows (KA_IN)	Restrictions on capital inflows	Index: 0=unrestricted to 1=restricted	IMF's AREAER
Capital account restrictions on outflows (KA_OUT)	Restrictions on capital outflows	Index: 0=unrestricted to 1=restricted	IMF's AREAER
Capital account restrictions on inflows: Shares	Restrictions on share trading capital inflows	Index: 0=unrestricted to 1=restricted	IMF's AREAER
Capital account restrictions on outflows: Shares	Restrictions on share trading capital outflows	Index: 0=unrestricted to 1=restricted	IMF's AREAER
Capital account restrictions on inflows: Bonds	Restrictions on bond trading capital inflows	Index: 0=unrestricted to 1=restricted	IMF's AREAER
Capital account restrictions on outflows: Bonds	Restrictions on bond trading capital outflows	Index: 0=unrestricted to 1=restricted	IMF's AREAER
Capital account restrictions on inflows: Money Market	Restrictions on money market capital inflows	Index: 0=unrestricted to 1=restricted	IMF's AREAER
Capital account restrictions on outflows: Money Market	Restrictions on money market capital outflows	Index: 0=unrestricted to 1=restricted	IMF's AREAER
Capital account restrictions on inflows: Collective Investment	Restrictions on collective investments capital inflows	Index: 0=unrestricted to 1=restricted	IMF's AREAER
Capital account restrictions on outflows: Collective Investment	Restrictions on collective investments capital outflows	Index: 0=unrestricted to 1=restricted	IMF's AREAER
<i>Country Characteristics</i>			
Exchange rate	Official exchange rate	LCU per US\$, period average	WDI
Private credit to GDP	Private credit divided by GDP	Ratio	FDSD
Private bond to GDP	Private bond market capitalization divided by GDP	Ratio	FDSD
Public bond to GDP	Public bond market capitalization divided by GDP	Ratio	FDSD
Trade to GDP	Exports plus imports divided by GDP	Ratio	WDI
Political risk	Assessment of the political stability in a country.	Index: 0=high risk to 100=low risk	ICRG
Growth	GDP growth rate	Rate	WDI
GDP per capita	GDP divided by total population	Constant 2000 US\$	WDI
Sovereign credit rating	S&P sovereign rating, long term debt, foreign currency	(1=D, ..., 21=AAA)	S&P
Financial depth	(Private credit+Private bond+Public bond) divided by GDP	Ratio	FDSD
European Union	European Union membership	Dummy: 1=EU Country, 0=non-EU Country	European Union
Market-based	Indicator of bank or stock based market structure	Dummy: 1=stock market-based, 0=bank-based	Demirguc-Kunt and Levine (1999)
English legal origin	Identifies the legal origin of the Company Law or Commercial Code of each country	Dummy: 1=English Common Law, 0=Other	La Porta et al. (1998)
<i>Distress Measures</i>			
Gamma measure	Negative of the autocovariance of price changes	Basis points	Bao et al. (2010)
VIX	Chicago Board Options Exchange Market Volatility Index	Percentage points	Bloomberg

Table III. Descriptive Statistics

	Mean	Std. Dev.	Min.	Max.
<i>Bond Characteristics</i>				
Option adjusted spread	3.02	3.05	0.32	26.71
Years to maturity	5.80	2.31	0.09	13.97
Issue size	19.64	0.88	10.92	21.82
Coupon rate	6.79	1.63	4.00	11.75
<i>Firm Specific</i>				
Equity volatility	37.56	18.86	12.57	140.69
Credit rating	13.22	2.70	6	20
Operating income to sales	0.16	0.15	-0.87	0.72
ST debt to total debt	0.14	0.13	0.00	0.94
Total debt to asset	0.29	0.12	0.00	0.77
Size	9.67	1.31	5.38	12.74
<i>Capital Account Restrictions</i>				
Restrictions on inflows (KA_IN)	0.17	0.24	0	1
Restrictions on outflows (KA_OUT)	0.24	0.36	0	1
Restrictions on inflows: Shares	0.36	0.32	0	1
Restrictions on outflows: Shares	0.25	0.39	0	1
Restrictions on inflows: Bonds	0.09	0.25	0	1
Restrictions on outflows: Bonds	0.24	0.37	0	1
Restrictions on inflows: Money Market	0.09	0.25	0	1
Restrictions on outflows: Money Market	0.21	0.36	0	1
Restrictions on inflows: Collective Investment	0.12	0.31	0	1
Restrictions on outflows: Collective Investment	0.25	0.40	0	1
<i>Country Characteristics</i>				
Exchange rate	118.79	324.79	0.68	2628.61
Private credit to GDP	1.24	0.54	0.10	1.84
Private bond to GDP	0.32	0.17	0.00	0.73
Public bond to GDP	0.42	0.14	0.09	0.92
Trade to GDP	0.96	0.78	0.25	4.38
Political risk	81.96	7.24	55.00	94.00
Growth	2.75	1.87	-0.26	10.67
GDP per capita	20.43	9.67	1.03	41.21
Sovereign credit rating	18.74	3.75	1	21
Financial depth	1.98	0.73	0	1
European Union	0.19	0.39	0	1
Market-based	0.89	0.31	0	1
English legal origin	0.48	0.49	0	1
<i>Distress Measures</i>				
Gamma measure	18.99	24.79	3.09	103.19
VIX	22.29	10.98	10.27	60.72

Table IV. Corporate Bond Spreads and Capital Account Restrictions

	(1)	(2)
<i>Bond Characteristics</i>		
Years to maturity	0.029* (0.016)	0.019 (0.012)
Issue size	-0.011 (0.030)	0.062** (0.025)
Coupon rate	0.141*** (0.031)	0.055*** (0.020)
<i>Firm Specific</i>		
Equity volatility	0.042*** (0.004)	0.037*** (0.005)
Credit rating	-0.417*** (0.036)	-0.682*** (0.106)
Operating income to sales	-2.111*** (0.393)	-0.822 (0.652)
ST debt to total debt	1.759*** (0.608)	2.462*** (0.794)
Total debt to asset	0.557 (0.386)	-0.774 (0.881)
Size	-0.008 (0.060)	0.213 (0.204)
<i>Capital Account Restrictions</i>		
Capital account restrictions on inflows (KA_IN)	1.895*** (0.421)	2.260** (0.987)
Capital account restrictions on outflows (KA_OUT)	-1.093*** (0.255)	-0.023 (0.366)
<i>Country Characteristics</i>		
Exchange rate	0.001*** (0.000)	0.001 (0.001)
Private credit to GDP	-0.567*** (0.193)	0.848 (0.761)
Private bond to GDP	1.024** (0.471)	-3.395 (2.110)
Public bond to GDP	1.084** (0.523)	9.199*** (2.143)
Trade to GDP	0.120 (0.093)	-2.591** (1.049)
Political risk	0.036** (0.018)	0.086*** (0.025)
Growth	-0.024 (0.049)	-0.133*** (0.047)
GDP per capita	0.016 (0.010)	0.127 (0.097)
Sovereign credit rating	-0.108* (0.062)	-0.258* (0.156)
Observations	3,740	3,740
Adjusted R-squared	0.698	0.801
Industry Fixed Effects	YES	NO
Firm Fixed Effects	NO	YES
Time Fixed Effects	YES	YES

Note: This table reports estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. The regressions control for industry (firm) and time fixed effects, respectively. The sample covers the period from 2005:Q1 to 2009:Q2. Robust standard errors, clustered at the country-time level, are presented in parentheses below each coefficient estimate. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table V. Capital Account Restrictions by Type of Securities

	Shares	Bonds	Money Market	Collective Investment
	(1)	(2)	(3)	(4)
<i>Bond Characteristics</i>				
Years to maturity	0.019* (0.012)	0.018 (0.012)	0.019* (0.012)	0.019* (0.012)
Issue size	0.062** (0.025)	0.060** (0.024)	0.062** (0.025)	0.063** (0.025)
Coupon rate	0.055*** (0.020)	0.054*** (0.020)	0.057*** (0.020)	0.057*** (0.020)
<i>Firm Specific</i>				
Equity volatility	0.036*** (0.005)	0.037*** (0.005)	0.036*** (0.005)	0.036*** (0.005)
Credit rating	-0.679*** (0.106)	-0.688*** (0.105)	-0.662*** (0.106)	-0.670*** (0.106)
Operating income to sales	-0.862 (0.655)	-0.741 (0.655)	-0.922 (0.654)	-0.909 (0.656)
ST debt to total debt	2.448*** (0.793)	2.469*** (0.795)	2.489*** (0.792)	2.490*** (0.793)
Total debt to asset	-0.673 (0.877)	-0.789 (0.881)	-0.782 (0.910)	-0.882 (0.895)
Size	0.218 (0.204)	0.227 (0.205)	0.180 (0.207)	0.191 (0.205)
<i>Capital Account Restrictions</i>				
Capital account restrictions on inflows (KA_IN)	0.555* (0.329)	3.398*** (1.122)	1.039 (1.086)	1.733** (0.816)
Capital account restrictions on outflows (KA_OUT)	-0.265 (0.322)	0.375 (0.337)	0.672 (0.421)	-0.151 (0.295)
<i>Country Characteristics</i>				
Exchange rate	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)	0.000 (0.001)
Private credit to GDP	1.010 (0.789)	0.138 (0.792)	0.822 (0.745)	1.121 (0.785)
Private bond to GDP	-3.620 (2.195)	-1.765 (2.194)	-3.472* (2.057)	-4.378** (2.221)
Public bond to GDP	8.946*** (2.101)	7.757*** (1.917)	9.921*** (2.424)	10.469*** (2.514)
Trade to GDP	-2.368** (1.138)	-3.468*** (1.066)	-3.027*** (0.989)	-2.967*** (0.969)
Political risk	0.088*** (0.026)	0.078*** (0.024)	0.096*** (0.026)	0.084*** (0.025)
Growth	-0.143*** (0.047)	-0.119** (0.048)	-0.135*** (0.046)	-0.142*** (0.046)
GDP per capita	0.139 (0.095)	0.108 (0.099)	0.132 (0.097)	0.139 (0.099)
Sovereign credit rating	-0.245 (0.152)	-0.297* (0.156)	-0.311* (0.174)	-0.312* (0.188)
Observations	3,740	3,740	3,740	3,740
Adjusted R-squared	0.801	0.802	0.801	0.801
Firm Fixed Effects	YES	YES	YES	YES
Time Fixed Effects	YES	YES	YES	YES

Note: This table reports estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. All regressions control for firm and time fixed effects. The sample covers the period from 2005:Q1 to 2009:Q2. Robust standard errors, clustered at the country-time level, are presented in parentheses below each coefficient estimate. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table VI. Heterogeneous Effects of Capital Account Restrictions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Capital account restrictions on inflows (KA_IN)	14.470*** (4.327)	10.548*** (3.700)	16.926*** (5.211)	14.384*** (4.148)	13.749*** (3.839)	10.057*** (3.400)	17.618*** (4.150)	14.031*** (3.694)
Capital account restrictions on inflows (KA_IN) x Size	-1.244*** (0.351)	-1.184*** (0.376)	-1.312*** (0.368)	-1.365*** (0.383)	-0.960*** (0.343)	-0.939*** (0.352)	-1.136*** (0.344)	-1.143*** (0.354)
Capital account restrictions on inflows (KA_IN) x Financial depth	-2.296* (1.177)				-2.499** (0.997)			
Capital account restrictions on inflows (KA_IN) x European Union		-6.154* (3.525)				-7.967** (3.621)		
Capital account restrictions on inflows (KA_IN) x Market-based			-6.157** (2.793)				-7.485*** (1.990)	
Capital account restrictions on outflows (KA_OUT) x English legal origin				-7.589*** (2.035)				-8.707*** (1.793)
Capital account restrictions on inflows (KA_IN) x VIX	0.110*** (0.029)	0.118*** (0.032)	0.092*** (0.025)	0.101*** (0.030)				
Capital account restrictions on inflows (KA_IN) x Gamma					0.035** (0.017)	0.039** (0.018)	0.031* (0.016)	0.036** (0.017)
Capital account restrictions on outflows (KA_OUT)	-0.428 (3.828)	-0.517 (3.802)	1.750 (4.226)	-1.289 (3.834)	-2.327 (3.742)	-2.575 (3.675)	0.575 (4.166)	-3.008 (3.664)
Capital account restrictions on outflows (KA_OUT) x Size	0.166 (0.442)	0.035 (0.372)	-0.115 (0.393)	0.047 (0.374)	0.266 (0.425)	0.225 (0.365)	0.014 (0.387)	0.223 (0.362)
Capital account restrictions on outflows (KA_OUT) x Financial depth	-1.184 (0.853)				-0.609 (0.824)			
Capital account restrictions on outflows (KA_OUT) x European Union		-0.708 (0.630)				-0.503 (0.600)		
Capital account restrictions on outflows (KA_OUT) x Market-based			-1.179 (0.901)				-1.293 (0.854)	
Capital account restrictions on outflows (KA_OUT) x English legal origin				-9.910 (9.260)				-12.593 (8.509)
Capital account restrictions on outflows (KA_OUT) x VIX	-0.005 (0.015)	-0.010 (0.015)	-0.004 (0.015)	-0.001 (0.016)				
Capital account restrictions on outflows (KA_OUT) x Gamma					0.000 (0.009)	-0.002 (0.009)	-0.000 (0.009)	-0.000 (0.009)
Observations	3,740	3,740	3,740	3,740	3,740	3,740	3,740	3,740
Adjusted R-squared	0.805	0.804	0.806	0.806	0.804	0.803	0.805	0.805
Control Variables	YES							
Firm Fixed Effects	YES							
Time Fixed Effects	YES							

Note: This table reports estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. All regressions control for firm and time fixed effects. The sample covers the period from 2005:Q1 to 2009:Q2. Robust standard errors, clustered at the country-time level, are presented in parentheses; ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table VII. Bond and Industry-Time Fixed Effects

	(1)	(2)
<i>Firm Specific</i>		
Equity volatility	0.038*** (0.005)	0.039*** (0.005)
Credit rating	-0.686*** (0.110)	-0.689*** (0.116)
Operating income to sales	-0.853 (0.662)	-0.862 (0.693)
ST debt to total debt	2.439*** (0.820)	2.402*** (0.869)
Total debt to asset	-0.779 (0.920)	-0.701 (0.954)
Size	0.219 (0.207)	0.190 (0.207)
<i>Capital Account Restrictions</i>		
Capital account restrictions on inflows (KA_IN)	2.077** (0.919)	2.413*** (0.930)
Capital account restrictions on outflows (KA_OUT)	0.054 (0.382)	-0.019 (0.386)
<i>Country Characteristics</i>		
Exchange rate	0.001 (0.001)	0.001 (0.002)
Private credit to GDP	0.732 (0.795)	0.628 (0.906)
Private bond to GDP	-2.967 (2.193)	-2.953 (2.669)
Public bond to GDP	8.921*** (2.145)	8.912*** (2.132)
Trade to GDP	-2.623** (1.088)	-2.299** (1.078)
Political risk	0.087*** (0.026)	0.102*** (0.030)
Growth	-0.131*** (0.048)	-0.135*** (0.050)
GDP per capita	0.112 (0.102)	0.032 (0.106)
Sovereign credit rating	-0.271* (0.158)	-0.303* (0.156)
Observations	3,740	3,740
Adjusted R-squared	0.802	0.807
Bond Fixed Effects	YES	YES
Time Fixed Effects	YES	NO
Time-Industry Fixed Effects	NO	YES

Note: This table reports estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. The regressions control for bond fixed effects and time (industry-time) fixed effects, respectively. The sample covers the period from 2005:Q1 to 2009:Q2. Robust standard errors, clustered at the country-time level, are presented in parentheses below each coefficient estimate. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Appendix

Table A1. Granular Data by Country Income Level

	Observations	Mean	Std. Dev.	Min.	Max.
<i>Firm size</i>					
High income: OECD	2660	9.897	1.321	5.383	12.744
Hig income: Non-OECD	167	8.633	0.866	7.296	10.146
Upper middle income	827	9.242	1.103	6.139	12.556
Lower middle income	86	8.574	0.831	6.726	10.328
<i>Corporate credit rating</i>					
High income: OECD	2660	13.558	2.683	6	20
Hig income: Non-OECD	167	11.712	1.948	10	17
Upper middle income	827	12.604	2.677	6	20
Lower middle income	86	11.720	2.095	6	14
<i>Size of bond issue</i>					
High income: OECD	2660	19.673	0.971	10.915	21.821
Hig income: Non-OECD	167	19.513	0.786	17.659	21.023
Upper middle income	827	19.567	0.581	18.133	20.671
Lower middle income	86	19.532	0.179	19.231	19.806

References

- Acemoglu, Daron and Simon Johnson, 2005, Unbundling institutions, *Journal of Political Economy* 113, 949-995.
- Andreasen, Eugenia, 2015, Sovereign default, enforcement and the private cost of capital, *International Review of Economics and Finance* 39, 411-427.
- Andreasen, Eugenia, and Patricio Valenzuela, 2016, Financial openness, domestic financial development and credit ratings, *Finance Research Letters* 16, 11-18.
- Bao, Jack, Jun Pan, and Jiang Wang, 2011, The illiquidity of corporate bonds, *Journal of Finance* 66, 911-946.
- Becchetti, Leonardo, Andrea Carpentieri, and Iftekhar Hasan, 2012, Option-adjusted delta credit spreads: A cross-country analysis, *European Financial Management* 18, 183-217.
- Bekaert, Geert, Campbell R. Harvey, and Christian Lundblad, 2011, Financial openness and productivity, *World Development* 39, 1-19.
- Blanchard, Olivier, and Jonathan Ostry, 2012, The multilateral approach to capital controls, article available from VoxEu.
- Borensztein, Eduardo, Kevin Cowan, and Patricio Valenzuela, 2013, Sovereign ceilings “lite”? The impact of sovereign ratings on corporate ratings, *Journal of Banking and Finance* 37, 4014-4024.
- Campbell, John Y., and Glen B. Taksler, 2003, Equity volatility and corporate bond yields, *Journal of Finance* 58, 2321-2349.
- Cavallo, Eduardo, and Patricio Valenzuela, 2010, The determinants of corporate risk in emerging markets: An option-adjusted spread analysis, *International Journal of Finance and Economics* 15, 59-74.
- Claessens, Stijn, and Luc Laeven, 2004, What drives bank competition? Some international evidence, *Journal of Money, Credit and Banking* 36, 563-583.
- Collin-Dufresne, Pierre, Robert S. Goldstein, and J. Spencer Martin, 2001, The determinants of credit spread changes, *Journal of Finance* 56, 2177-2208.
- Clarke, George, Robert Cull, and Gregory Kisunko, 2012, External finance and firm survival in the aftermath of the crisis: Evidence from Eastern Europe and Central Asia, *Journal of Comparative Economics* 40, 372-392.
- Demirguc-Kunt, Asli and Levine, 1999, Financial structures across countries: Stylized facts, Washington, D. C.: World Bank, mimeo.

Demirguc-Kunt, Asli and Maksimovic, Vojislav, 2002, Funding growth in bank-based and market-based financial systems: evidence from firm-level data, *Journal of Financial Economics* 65(3), 337-363.

Demirguc-Kunt, Asli, and Luis Servén, 2010, Are all the sacred cows dead? Implications of the financial crisis for macro- and financial policies, *World Bank Research Observer* 25, 91-124.

Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2003, Courts, *The Quarterly Journal of Economics* 118, 453-517.

Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2008, The law and economics of self-dealing, *Journal of Financial Economics* 88, 430-465.

Edwards, Sebastian, 1999, How effective are capital controls? *Journal of Economic Perspectives* 13, 65-84.

Fernández, Andrés, Michael Klein, Alessandro Rebucci, Martin Schindler and Martín Uribe, 2016, Capital control measures: A new dataset, *IMF Economic Review* 64, 548-574.

Forbes, Kristin, 2007a, One cost of the Chilean capital controls: Increased financial constraints for small traded firms, *Journal of International Economics* 71, 294-323.

Forbes, Kristin, 2007b, The microeconomic evidence on capital controls: No free lunch. In: Edwards, S. (Ed.), *Capital Controls and Capital Flows in Emerging Economies: Policies, Practices and Consequences*. NBER book, 171-202.

Gallego, Francisco, and Leonardo Hernández, 2003, Microeconomic effects of capital controls: The Chilean experience during the 1990s, *International Journal of Finance and Economics* 8, 225-253.

Giovannini, Alberto, and Martha de Melo, 1993, Government revenue from financial repression, *American Economic Review* 83, 953-963.

Gozzi, Juan C., Ross Levine, and Sergio Schmukler, 2010, Patterns of international capital raising, *Journal of International Economics* 80, 45-47.

Gozzi, Juan C., Ross Levine, Maria Soledad Martinez, and Sergio Schmukler, 2015, How firms use corporate bond markets under financial globalization, *Journal of Banking and Finance* 58, 532-551.

Henry, Peter Blair, 2000a, Stock market liberalization, economic reform, and emerging market equity prices, *Journal of Finance* 55, 529-564.

Henry, Peter Blair, 2000b, Do stock market liberalizations cause investment booms?, *Journal of Financial Economics* 58, 301-334.

Huang, Jing-Zhi, and Weipeng Kong, 2003, Explaining credit spread changes: New evidence from option-adjusted bond indexes, *Journal of Derivatives* 11, 30-44.

Hubbard, R. Glenn, 1998, Capital-market imperfections and investment, *Journal of Economic Literature* 36, 193-225.

Imbens, Guido, and Jeffrey Wooldridge, 2009, Recent developments in the econometrics of program evaluation, *Journal of Economic Literature* 47, 5-86.

Klein, Michael W., and Giovanni Olivei, 2008, Capital account liberalization, financial depth, and economic growth, *Journal of International Money and Finance* 27, 861-875.

Laeven, Luc, 2003, Does financial liberalization reduce financial constraints? *Financial Management* 32, 5-35.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny, 1998, Law and Finance, *Journal of Political Economy* 106, 1113-1155.

Love, Inessa, 2003, Financial development and financing constraints: International evidence from the structural investment model, *Review of Financial Studies* 16, 765-791.

Merton, Robert C., 1974, On the pricing of corporate debt: The risk structure of interest rates, *Journal of Finance* 29, 449-470.

Myers, Stewart, and Nicholas Majluf, 1984, Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics* 13, 187-221.

Ostry, Jonathan D, Atish R. Ghosh, Karl Habermeier, Marcos Chamon, Mahvash S. Qureshi, and Dennis B.S. Reinhardt, 2010, Capital inflows: The role of controls, IMF Staff Position Note SPN/10/04.

Pedrosa, Monica, and Richard Roll, 1998, Systematic risk in corporate bond credit spreads, *Journal of Fixed Income* 8, 7-26.

Prati, Alessandro, Martin Schindler, and Patricio Valenzuela, 2012, Who benefits from capital account liberalization? Evidence from firm-level credit ratings data, *Journal of International Money and Finance* 31, 1649-1673.

Rajan, Raghuram and Luigi Zingales, 1998, Financial dependence and growth, *American Economic Review* 88, 559-586.

Schindler, Martin, 2009, Measuring financial integration: A new data set, *IMF Staff Papers* 56, 222-238.

Schmukler, Sergio, and Esteban Vesperoni, 2001, Globalization and firms' financing choices: Evidence from emerging economies, IMF Working Papers 01/95.

Stein, Jeremy, 2001, Agency, information and corporate investment. In: Constantinides, G., Harris, M., Stulz, R. (Eds.), *Handbook of the Economics of Finance*. Elsevier North Holland, Amsterdam, 111-165.

Valenzuela, Patricio, 2016, Rollover risk and corporate bond spreads, *Review of Finance* 20, 631-661.