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The international effect of managerial social capital on the cost of equity☆

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ABSTRACT

We examine the effect of managerial social capital on the firm's cost of equity capital. We argue that social ties alleviate information asymmetry and agency problems, which in turn leads to a decrease in the cost of equity. Using a large panel of companies from 52 countries over the period 1999–2012, we document that social capital inversely affects the cost of equity. Our evidence suggests that the association between social capital and the cost of equity capital is stronger in underdeveloped financial markets and those characterized by weak legal protection. The marginal effect of social capital is also stronger for constrained firms with profitable investment opportunities. Our results are robust to alternative model specifications and tests for endogeneity.

1. Introduction

The distortionary forces of financial market frictions, such as asymmetric information and agency problems, limit a firm's access to external finance (Myers and Majluf, 1984; Rajan and Zingales, 1998; Stein, 2003) and create a wedge between the internal and external costs of funds. Mechanisms that mitigate these forces have important implications for the firm's cost of capital. Prior research tests the effects of various mechanisms such as institutions and securities regulations (Hail and Leuz, 2006; Khurana et al., 2006), cross-listing (Hail and Leuz, 2009), voluntary disclosure (Francis et al., 2004), and corporate governance (Chen et al., 2009, 2011) on the cost of funds for firms. Our study expands that research by examining whether social capital resident in managerial social networks is one such mechanism that can reduce the cost of equity financing.

Social capital is defined as the information, trust, and norms of reciprocity inherent in a social network (Woolcock, 1998). Social capital is broadly discussed in disciplines such as economics, sociology, political science, and anthropology (e.g., Dasgupta, 2005; Fafchamps, 2002; Knack and Keefer, 1995; Portes, 1998; Putnam, 1993; Schneider, 2006), but has received only limited attention in finance. This study reinforces the growing awareness among finance researchers that managerial social capital matters in corporate finance practices. We examine the effects of managerial social capital on a firm's cost of equity financing. Particularly, we study whether social capital in managerial networks with financiers affects the firm's cost of equity capital, and how that relation is influenced by various country, firm, and network characteristics. Further, we explore the mechanism through which social capital reduces the cost of equity.

Social capital eases potential inefficiencies in the financial markets through information-sharing, trust, and contract enforcement channels. Social capital facilitates the sharing of information and reduces information asymmetry within a network (e.g., Cohen et al., 2008, 2010; Kuhnen, 2009; Hong et al., 2004, 2005). Prior evidence suggests that firms which reduce information asymmetry through disclosure enjoy a lower cost of capital (e.g., Francis et al., 2004; Hail, 2002; Verrecchia, 2001; Botosan, 1997). The fundamental problem facing financial market investors willing to transact concerns trust. As the means for creating trust (Dasgupta, 1988), social capital induces cooperative and efficient behavior within a social structure. Trust reduces the need for costly monitoring enabling economic agents to accomplish financial transactions at a lower cost.

Social capital facilitates honest dealing in transactions by imposing punishment through reputation loss (Kandori, 1992; McMillan and Woodruff, 2000). Consequently, socially connected parties demand less price protection from possible expropriation

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and breach. Fafchamps (1996) and Platteau (1994) discuss punitive mechanics for breach available through social capital. Because social capital provides mechanisms for information sharing and punishment through reputation loss, it also reduces agency cost between a firm and its investors by increasing the expected cost of expropriation. Consistent with these conjectures, Engelberg et al. (2012) show that social connections between banks and borrowers reduce borrowing costs. Also firm performance improves following completion of deals that contain a social connection, suggesting that social networks lead to better information flow and monitoring. This evidence leads to our claim that social capital reduces information asymmetry and agency problems, which in turn lowers the cost of equity.

We expect the marginal benefits of social capital in reducing the cost of equity to be stronger when greater frictions or distortions exist in the capital market. Consequently, we argue that social capital with financiers is more valuable in countries with weak legal protection of shareholders or in countries with underdeveloped financial markets. In addition, we contend that social capital has a stronger effect on the cost of equity financing for financially constrained firms. Those firms are small, young, and less visible with more pronounced information asymmetry and agency issues.

We test our predictions using a panel of companies from 52 countries for the period 1999–2012. We measure social connections using the data from the BoardEx databases (Engelberg et al., 2012; Fracassi, 2012). BoardEx by Management Diagnostics Limited contains relational links between executives based on prior overlap in employment, education, and memberships in non-profit organizations. We measure social capital by counting the number of social connections between corporate executives and directors with their counterparties in financier firms. We estimate the cost of equity capital as the ex ante cost of equity based on four different models introduced by Claus and Thomas (2001); Gebhardt, Lee and Swaminathan (2001); Easton (2004), and Ohlson and Juettner-Nauroth (2005). Our regressions include controls for the risk-factors and firm characteristics shown in prior research to affect the cost of equity financing.

Our results are consistent with theoretical predictions. We find a significant negative association between social capital and the implied cost of equity. In addition, we find that the inverse association between social capital and the cost of equity is stronger in underdeveloped financial markets and in markets characterized by the weak legal protection of investors. The marginal effect of social capital on reducing the cost of equity is also stronger for financially constrained firms with profitable investment opportunities. These results are robust to alternative model specifications and variable measurement. Our findings are also robust to various controls for endogeneity including the placebo test and the instrumental variable method.

Our paper makes important contributions to the existing literature. First, the study adds new understanding to the cost of capital literature. Prior research has shown the effects of various factors (e.g., institutions and securities regulations, cross-listing, voluntary disclosure) on the cost of capital. We provide the analysis of the effect of a previously unexamined factor – social capital - on the cost of capital, and document that social capital negatively affects a firm's cost of obtaining equity capital.

Second, our study is related to the emerging literature on the effect of social capital on corporate decision-making and capital markets. For instance, Engelberg et al. (2012) show that social connections between banks and borrowers reduce borrowing costs. Cai et al. (2012) document a positive relation between a firm's social connections and trading costs. Cohen et al. (2008) find social networks to be an important mechanism for the information flows that shape asset prices in the mutual fund industry. Cai and Sevilir (2012) find that social connections improve information flow between a target and an acquirer. Our study focuses on the influence of social capital on the firm's cost of equity. It directly contributes to our understanding of the influences of social capital on corporate finance policies and decisions.

2. Background and hypotheses development

2.1. Social capital and its channels of influence

Social capital can be broadly defined as the information, trust, and norms of reciprocity inherent in a social network (Woolcock, 1998). Social networks are the media through which social capital is created, maintained, and used. The importance of social capital for organizations stems from the resource dependency theory (Pfeffer and Salancik, 1978; Pfeffer, 1987; Finkelstein, 1997). The central theme of this theory is that firms face resource scarcities and manage resource environment by maintaining external linkages to organizations on which they depend for critical resources. Prior research (e.g., Burt, 1983; Lang and Lockhart, 1990; Westpal et al., 2006) shows that corporate executives maintain informal ties to leaders of other organizations in order to reduce uncertainty about the access to needed resources.

Social capital exerts causal influence on the practices of corporate finance through the information-sharing, trust, and contract enforcement channels. Through the information-sharing channel, social capital facilitates the sharing of information that would otherwise be difficult to exchange. Information is likely to be given a higher value and reliability if it originates from social acquaintances. In addition, the cost of information acquisition within a social network is low because the information can be acquired passively during social interactions.

Social capital induces cooperative and efficient behavior within a social structure through trust. Trust is the fundamental problem financial market participants face because virtually every transaction encompasses an element of trust (Arrow, 1972). Trust is important because financial transactions can be accomplished at a lower cost in a high-trust environment. Trust reduces the need for costly monitoring enabling economic agents to operate more efficiently. Trust also minimizes the negative consequences of incomplete contracts and therefore affects the contracting costs of external financing (Grossman and Hart, 1986). In addition, trust makes it easier for financial market participants to renegotiate their contractual obligations, thereby providing flexibility in responding to external shocks (Bigsten et al., 2000).

Social capital facilitates honest dealings among parties in transactions by imposing a reputational loss on parties that are dishonest (Kandori, 1992; McMillan and Woodruff, 2000).[1] This ability to punish and reward represents yet another manner by which social capital reduces the need for costly monitoring. Socially connected parties can engage in exchanges that are not governed by detailed contracts because social capital provides a complementary mechanism for contract enforcement. In addition, social capital offers an alternative for dispute resolution through voluntary cooperation that can further reduce the need for costly formal legal remedies. Consequently, socially connected parties engaging in financial or other transactions demand less price protection against possible expropriation and breach.

2.2. Hypothesis development

We develop a set of hypotheses regarding the causal effect of social capital on the cost of equity capital. First, we hypothesize that social capital with financiers reduces a firm's cost of equity for several reasons.

[1] Kreps (1990) presents a formal analysis of reputation in economic games.

Through the information-sharing channel, social capital reduces information asymmetry between the firm (financee) and its investors (financiers), and consequently negatively affects the cost of equity. Hong et al. (2004, 2005), Kuhnen (2009), and Cohen et al. (2008, 2010) show that social capital facilitates the sharing of information and reduces information asymmetry within a network. Firms which reduce information asymmetry through disclosure have a lower cost of capital (Botosan, 1997; Hail, 2002; Verrecchia, 2001; Francis et al., 2004). In addition, lower information asymmetry reduces out-of-pocket monitoring costs borne by investors, and the compensation they demand for holding equity (Lombardo and Pagano, 2000). Hail and Leuz (2009) show that firms in countries with stronger securities regulations and more extensive disclosure requirements reduce the level of information asymmetry and consequently the cost of equity. Bhattacharya and Daouk (2002) demonstrate that the insider trading regulations that reduce the information asymmetry between insiders or outsiders also lower the firm's cost of capital. Easley and O' Hara (2004) investigate the role of information in affecting a firm's cost of external financing and show that information asymmetry positively influences the firm's cost of capital.

Through its trust and contract enforcement channels, social capital lowers the cost of equity by reducing the costs of and the need for external monitoring. The costs of external monitoring that financiers usually incur include the costs of collecting information about managerial expropriation and the costs of punishing when expropriation is detected. When financiers trust the financee, they spend fewer resources on protecting their rights which results in a lower cost of capital. Social capital offers an alternative mechanism of dispute resolution over contract performance because social rules within social networks stimulate voluntary cooperation without any need for costly legal intervention. Social capital also plays a critical role in circulating information about the breach of contract, thereby enabling socially connected groups to penalize and exclude cheaters (Kandori, 1992; McMillan and Woodruff, 2000). Because social capital provides mechanisms of information sharing and punishment through reputational loss, it reduces managerial incentives to expropriate, lessens agency problems, reduces contracting costs, and consequently reduces the costs of external capital. Thus, we hypothesize:

H1: The social capital in managerial social networks with financiers is negatively associated with the cost of equity capital.

Second, we hypothesize that social capital has a stronger effect on the cost of equity financing for financially constrained firms because they have a greater need to reduce information asymmetry and agency problems. Specifically, we argue that social capital is significant in reducing the cost of equity financing for small, young, and less visible firms. Conversely, social capital is less important for financially unconstrained firms that enjoy ready access to external financing. Lemmon and Zender (2010) argue that small and/or young firms are more likely to be constrained. As firms become mature, larger, and more visible, information asymmetries decrease and it becomes easier to raise capital. In addition, we hypothesize that social capital has a stronger effect on the cost of equity financing for financially constrained firms with abundant growth opportunities, because those firms are in high need of external capital for their investments. Our second hypothesis:

H2A: The inverse relation between social capital and the cost of equity capital is stronger for financially constrained firms.

H2B: The inverse relation between social capital and the cost of equity capital is stronger for financially constrained firms with profitable investment opportunities.

Third, we hypothesize that social capital is more valuable in countries with weak legal protection of shareholders and underdeveloped financial markets because investors in those countries cannot rely on the legal system and market mechanisms alone to prevent expropriation and enforce contracts. Social capital can foster fair treatment of the contracting parties in the absence of strong legal investor protection mechanisms and well-developed capital market structures. Well-functioning legal systems protect outside investors which in turn improves firms' ability to raise external finance and reduces the cost of capital. Daouk et al. (2006) find that the improvements in the capital market governance are associated with a reduction in the national average cost of equity capital. Hail and Leuz (2006) demonstrate that the differences in securities regulations explain differences in the average cost of equity capital at the country level. Developed financial markets help overcome problems of moral hazard and adverse selection between financiers and financees. In contrast, these problems are aggravated in less financially developed markets. LLSV (1997, 1998) and Djankov et al. (2008) show that countries with strong legal protection of investors have more developed stock markets than those with weaker protections. Therefore, we hypothesize:

H3: The inverse relation between social capital and the cost of equity is stronger in countries with underdeveloped financial markets or weak legal protection of investors.

3. Sample selection and measurement of variables

3.1. Data and sample construction

Our initial sample consists of firms in the BoardEx database of Management Diagnostic Limited. The database provides social networks data for senior executives and boards for more than fifteen thousand globally-listed firms starting from 1999. We match these firms with I/B/E/S to obtain the corresponding analysts' earnings forecasts, and with Datastream/Worldscope to obtain various financial and accounting variables. We require non-missing observations on all variables used in the analysis which results in a final sample of 37,712 firm-year observations. Our period of analysis is 1999 through 2012. The sample observations are distributed across 52 economies.[2] We retrieve country-level legal protection measures from La Porta et al. (1998, 2006), Djankov et al. (2008), and Spamann (2010). Financial development variables are obtained from the World Bank's WDI database.

Panel A of Table 1 presents a geographical distribution of our sample. The majority of our sample firms are incorporated in North America (53%) and Europe (26%). We note that most of our sample firms (92%) are located in developed economies. Firms incorporated in common law countries account for 74% of the sample, while 12% of sample firms are located in German civil law jurisdictions and 11% in French Civil Law jurisdictions. Less than 4 percent of the sample firms are incorporated in Scandinavian civil law countries.

3.2. Measuring managerial social capital

Our empirical measure of managerial social capital is based on the structural theories of social capital (Burt, 1992; Lin, 1999). This

[2] Our sample countries are: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Colombia, Cyprus, Czech Republic, Denmark, Egypt, Finland, France, Germany ,Greece, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, South Korea, Luxembourg, Malaysia, Malta, Mauritius, Mexico, Netherlands ,New Zealand, Norway, Papua New Guinea, Philippines, Poland, Portugal, Russian Federation, Saudi Arabia, Singapore, Slovenia, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, United Arab Emirates, United Kingdom, and United States.

Table 1
Sample Descriptive Statistics
Panel A of this table reports sample distribution across geographic location, development status, and legal regime origin. Country development status is according to International Monetary Fund classification. Legal regimes are defined according to La Porta et al. (2008) classification. Panel B reports summary statistics for the main variables. *SC(Total), SC(Educ), SC(Empl)* and *SC(Other)* are the measures of social connections between executives of capital accessing firms and of financier firms by the number of total connections, education connections, employment connections, and other connections, respectively. *R(peg), R(gls), R(rct),* and *R(oj)* are estimates of the cost of equity based on Easton (2004); Gebhardt, Lee and Swaminathan (2001); Claus and Thomas (2001), and Ohlson and Juettner-Nauroth (2005). *R(average)* is the average of four measures of the cost of equity. r_f, the risk-free rate, measured as the yield on the three-month government bill, is subtracted from the cost of capital estimates. *Liquidity* is estimated by Lesmond (2005) method and equals the proportion of non-zero return days in the previous quarter. *Forecast Error* is the absolute value of analysts' earnings forecast error for the fiscal year, estimated as the absolute value of actual earnings minus the earnings forecast scaled by the stock price. *Governance Index* is the corporate governance index from Aggarwal et al. (2008). *Beta* is calculated from the regression of the previous 24 and up to 60 monthly stock returns on the contemporaneous MSCI world market index returns. *BM* is the book-to-market ratio measured at the end of the previous fiscal year. *Size* is defined as of the equity market value at the end of the previous fiscal year. *Momentum* is measured as the compounded returns over the previous six months. *Leverage* is the ratio of long-term debt to total assets. *Growth* is the analysts' forecast of the long-term earnings growth rate. *Inflation* is the country inflation rate.

Panel A: Sample Geographical Distribution

Region	Firm-Year Observations	Percent
Africa	480	1.27%
Asia	4716	12.51%
Australia/New	2112	5.60%
Central America	168	0.45%
Europe	9784	25.94%
Middle East	147	0.39%
North America	20,078	53.24%
South America	227	0.60%
Total	37,712	100%
Development	**Firm-Year Observations**	**Percent**
Developed	34,558	91.64%
Developing	129	0.34%
Newly Industrialized Economies	3025	8.02%
Total	37,712	100.00%
Legal Regime	**Firm-Year Observations**	**Percent**
Common Law	27,933	74.07%
French Civil Law	4370	11.59%
German Civil Law	4168	11.05%
Scandinavian Civil Law	1241	3.29%
Total	37,712	100%

Panel B: Summary Statistics for Main Variables

	N	Mean	Std	Q1	Median	Q3
R(average)	37,712	0.0684	0.0433	0.0395	0.0613	0.0881
R(peg)	37,712	0.0848	0.0524	0.0500	0.0744	0.1073
R(gls)	37,712	0.0321	0.0566	−0.0051	0.0276	0.0614
R(rct)	37,712	0.0647	0.0426	0.0387	0.0588	0.0827
R(oj)	37,712	0.0901	0.0503	0.0563	0.0810	0.1137
SC(Total)	37,712	239.19	255.58	62	156	318
SC(Educ)	37,712	30.28	32.62	5	20	45
SC(Empl)	37,712	178.08	215.03	34	103	231
SC(Other)	37,712	7.04	22.49	0	0	2
Liquidity	37,712	0.9191	0.0650	0.9077	0.9394	0.9692
Forecast Error	37,712	0.0174	0.0343	0.0022	0.0063	0.0173
Governance Index	12,575	0.5772	0.1309	0.4884	0.5814	0.6744
Beta	37,712	0.5653	0.6229	0.0919	0.4160	0.9576
BM	37,712	−0.8274	0.7248	−1.2384	−0.7608	−0.3365
Size	37,712	5.9093	15.2000	0.4512	1.3108	4.3049
Momentum	37,712	0.0189	0.0705	−0.0204	0.0140	0.0522
Leverage	37,712	0.1789	0.1590	0.0252	0.1580	0.2842
Growth	37,712	0.1523	0.1223	0.0850	0.1332	0.1933
Inflation	37,712	0.0254	0.0166	0.0164	0.0246	0.0323

view considers social capital to be an asset resident in a social network that can be accessed and mobilized through network membership. Economic agents derive benefits from knowing others with whom they form networks. This meaning of social capital, also referred to as social network capital, makes it measurable and explicitly grounded in network theory.

Consistent with prior research (Freeman, 1979; Burt, 1983), we use the size/degree centrality measure of social networks to empirically estimate social capital. We identify "financiers," the suppliers of capital, as those entities classified by BoardEx as "investment companies," "private equity," "specialty and other finance," or "bank". We define publicly traded corporations that demand capital as "finances," and exclude all financial and insurance firms because managers of those firms are more likely to have career overlap with financiers.

We argue that the social capital resident in managerial social networks with financiers has implications for the cost of financing for firms. We measure social capital by counting the number of social connections between corporate executives and directors with their counterparts in financier firms. As contained in BoadEx, two individuals are connected via employment if their careers overlap at the same employer in the past. Individuals are connected via education if they simultaneously attend the same university and obtain the same degree. Two individuals are connected via

other social activities if they both serve in the same professional association, non-profit associations, or leisure clubs. In addition, we estimate the aggregate measure of managerial social networks that includes all known sources of connection. Panel B of Table 1 provides descriptive statistics for our social capital measure. On average, corporate executives and directors have 30 ties with their counterparts in financier firms via education, 178 ties via employment, and 7 ties via other social connections.

3.3. Estimation of the cost of equity capital

We estimate the cost of equity capital using the *ex ante* cost of equity implied in current stock price and analysts' earnings forecast. The ex ante estimation is a better measure of the cost of equity capital than realized returns because it explicitly controls for cash flows and growth potential (Hail and Leuz, 2006; Pastor et al., 2008; Chen et al., 2011). We estimate the implied cost of equity with four different models introduced by Claus and Thomas (2001); Gebhardt, Lee and Swaminathan (2001); Easton (2004), and Ohlson and Juettner-Nauroth (2005). Following the prior literature (e.g., Hail and Leuz, 2006; Chen et al., 2009), we use the arithmetic average of the estimates from the four models. Our analysis utilizes the excess cost of equity estimated as the implied cost of equity minus the risk free rate. We measure the risk-free rate as the annualized yield on three-month government securities. We also use the cost of equity estimated from the four-factor model later in our robustness tests. A detailed description of the estimation of our cost of equity measures is provided in Appendix A.

Panel B of Table 1 presents descriptive statistics of the implied equity risk premium.[3] The Ohlson and Juettner-Nauroth (2005) method produces the highest average value for the implied excess cost of equity, with the mean (median) of 0.0901 (0.081). The Gebhardt, Lee and Swaminathan (2001) method yields the lowest average estimate, with the mean (median) of 0.0321 (0.0276). The mean (median) implied equity risk premium is 0.0684 (0.0613) when we use the arithmetic average of the four cost of equity estimates.

3.4. Other variables

The prior literature establishes that several risk-factors and firm characteristics affect the cost of equity financing. Researchers such as Fama and French (1992); Botosan and Plumlee (2005), and Chen et al.(2011) show that stock returns and the implied cost of equity capital is correlated with beta, firm size, and the book-to-market ratio. Therefore, we control for beta *(Beta)*, estimated by regressing the stock returns against the MSCI world market index returns. Firm size *(Size)* is estimated as the market value of equity at the end of the previous fiscal year, and the book-to-market ratio *(BM)* is measured at the end of the previous fiscal year. We expect a positive coefficient estimate for beta and the book-to-market ratio, and a negative coefficient estimate for firm size.

Guay et al. (2003) argue that it is necessary to control for recent stock returns to account for biases in the *ex ante* cost of equity estimates caused by analysts' "sluggishness" with respect to information in the past stock returns. Consequently, we include price momentum *(Momentum)* estimated as the compounding stock returns over the previous six months a s a control variable. Given that the cost of equity should increase with leverage (Modigliani and Miller, 1958), we also control for the leverage ratio *(Leverage)* estimated as the ratio of long-term debt to total assets. The expected sign for the leverage coefficient is positive.

Chen et al. (2011) argue that it is essential to control for long-term earnings growth to account for possible estimation biases in the four cost of capital calculation approaches. They show that long-term earnings growth positively affects the implied cost of equity capital. Subsequently, we control for the long-term earnings growth *(Growth)*, defined as the analysts' forecast of the long-term earnings growth rate.

We also control for annualized inflation *(Inflation)*, defined as the country's inflation rate. The predicted sign for the coefficient on inflation is positive. In addition, we include country, industry, and year fixed effects.

We measure the forecast error following Hail and Leuz (2006). That is, *Forecast Error* is defined as the absolute value of actual earnings minus the consensus earnings forecasts for the forthcoming fiscal year, divided by the stock price. Consistent with Lesmond (2005), we estimate *Liquidity* as the proportion of non-zero return days in the previous quarter. Finally, we follow Aggarwal et al. (2008) to estimate a firm-level corporate governance index *(Governance Index)*[4] . The index covers four subcategories: Board (board independence, composition of committees, size, and transparency), Audit (independence of the audit committee and the role of auditors), Anti-takeover (dual-class structure, role of shareholders, poison pill, and blank check preferred), and Compensation and ownership (executive ownership, options, and loans).

Panel B of Table 1 presents descriptive statistic for the major control variables used in our multivariate analysis. On average, our sample firms are large, and moderately levered. The mean leverage ratio is 0.18. The sample firms also possess important growth opportunities as implied by the mean log book-to-market ratio of −0.82. The mean forecast error for our sample firms is 0.0174. The mean proportion of non-zero trading days is 92%, which is comparable to that reported by Chen et al. (2009).

4. Empirical analysis and discussion of main results

4.1. Managerial social capital and the cost of equity financing

We first examine the relation between social capital and the excess cost of equity capital with a univariate analysis. We sort our sample firms into quartiles by the degree centrality measure of social connections between firm executives and their counterparts in financier firms. We then estimate the mean values of the implied equity risk premium for each quartile. The results, presented in Table 2, show that the excess cost of equity monotonically decreases across the social capital quartiles. When the average of the four estimates is used, the difference in the equity risk premium between high and low social capital quartiles is 0.013 and statistically significant at the one percent level. We obtain qualitatively similar results when separately using each of the four cost of capital estimates. These results provide strong preliminary evidence of an inverse relation between managerial social capital and the excess implied cost of equity capital.

Next, our theory predicts that social capital reduces the information asymmetry between the firm and its investors. It is this reduction in information asymmetry that then causes the cost of equity capital to decline. The reduction in information asymmetry can be manifested in more precise analysts' earnings forecasts or enhanced liquidity (Diamond and Verrecchia, 1991; Acharya and Pederson, 2005).

To quantify these effects, we apply a two-stage procedure. In the first stage we examine the effects of social capital on analysts' earnings forecasts and liquidity. In the second stage we investigate the relation between social ties and the cost of equity. More

[3] We winsorize all variables at 0.5% in each tale in our main tests to minimize the effects of potential outliers, and at 1% in robustness tests.

[4] We note that our governance data is available only from 2003.

Table 2
Univariate Analysis of Social Capital and the Cost of Equity
This table presents a univariate analysis of managerial social capital and the cost of equity financing. *SC(Total)* is the aggregate measure of social connections between executives of capital accessing firms and of financier firms by the number of total connections. For each *SC(Total)* quartile the average value of the excess cost of equity is reported. *R(peg), R(gls), R(rct),* and *R(oj)* are the estimates of the cost of equity based on Easton (2004); Gebhardt, Lee and Swaminathan (2001); Claus and Thomas (2001), and Ohlson and Juettner-Nauroth (2005) methodologies. *R(average)* is an average of the four measures of the cost of equity.

	N	R(average)	R(peg)	R(gls)	R(rct)	R(oj)
Low	9411	0.0751	0.0927	0.0375	0.07	0.0974
2	9430	0.0712	0.0882	0.0358	0.0657	0.0936
3	9433	0.0653	0.081	0.0308	0.0614	0.0868
High	9438	0.0618	0.0774	0.0244	0.0619	0.0827
Difference (High-Low)		−0.0133	−0.0153	−0.0131	−0.0081	−0.0147
P-value (High-Low)		(< 0.001)	(< 0.001)	(< 0.001)	(< 0.001	(< 0.001)

specifically, we fit the following two models:

$$\begin{aligned} Forecast\ Error(Liquidity)_{i,j,t} &= \beta_0 + \beta_1 Sc_{i,j,t} + \beta_2 Beta_{i,j,t} \\ &+ \beta_3 BM_{i,j,t-1} + \beta_4 Size_{i,j,t-1} + \beta_5 Momentum_{i,j,t} \\ &+ \beta_6 Leverage_{i,j,t-1} + \beta_7 Growth_{i,j,t} + \beta_8 Inflation_{j,t} \\ &+ Industry\ Dummies + Country\ Dummies \\ &+ Year\ Dummies + \varepsilon_{i,j,t} \end{aligned} \quad (1)$$

$$\begin{aligned} R_{i,j,t} - rf_{j,t} &= \beta_0 + \beta_1 Sc_{i,j,t} + \beta_2 Beta_{i,j,t} + \beta_3 BM_{i,j,t-1} \\ &+ \beta_4 Size_{i,j,t-1} + \beta_5 Momentum_{i,j,t} + \beta_6 Leverage_{i,j,t-1} \\ &+ \beta_7 Growth_{i,j,t} + \beta_8 Inflation_{j,t} + IndustryDummies \\ &+ CountryDummies + YearDummies + \varepsilon_{i,j,t} \end{aligned} \quad (2)$$

where the subscripts *i*, *j*, and *t* denote country, firm, and time, respectively.[5]

Table 3 reports our results. Social capital (*Sc*) is measured by the total number of social connections between corporate executives/directors and their counterparts in the financing firms. Panel A reports our results from estimating Eq. (1) using the main sample (Columns 1–4) and the U.S. sample (Columns 5–8). We find that social capital indeed enhances liquidity and reduces analysts' forecast error.

Panels B and C show the results of estimating Eq. (2) using the international sample and the U.S. sample, respectively. The cost of equity is estimated following Easton (2004) in Columns (3) and (4), Gebhardt, Lee and Swaminathan (2001) in Columns (5) and (6), Claus and Thomas (2001) in Columns (7) and (8), and Ohlson and Juettner-Nauroth (2005) in Columns (9) and (10). We use the average of those four measures of the cost of equity capital in Columns (1) and (2).[6]

Our findings show that social capital is negatively and significantly related to the cost of equity capital. The coefficient estimates for the control variables are broadly consistent with existing theory and prior empirical evidence. Social capital seems to reduce the cost of equity financing. Investors demand a lower "price" for the capital for firms with whom they are socially connected. These empirical findings establish a previously undocumented relation between the cost of equity capital and managerial social capital. They also provide strong support for our first hypothesis.

Our results also have economically significant implications for valuation. For example, a one standard deviation increase in social capital (Panel B, Column 2) leads to a reduction in the cost of equity, which under reasonable assumptions, implies an increase in firm value of about 3.5%.[7] Also, a one standard deviation increase in social capital causes a 13.7% (Panel B, Column 3) and 18.3% (Panel B, Column 4) reduction in forecast error relative to the cross-sectional mean, and a 1.02% (Panel B, Column 1) and 2% (Panel B, Column 2) increase in liquidity relative to the cross-sectional mean.[8]

In summary, the findings in this section are consistent with our hypothesis that social capital reduces the cost of equity financing through enhancing liquidity and analysts' forecast accuracy. These results are robust to alternative measures of the cost of equity and social capital.

4.2. The effect of financial constraints and investment opportunities

In this section we investigate whether the relation between managerial social capital and the cost of equity financing is affected by financial constraints and the investment opportunities of the firm. We argue that for financially unconstrained firms with access to cheap external financing, social capital with financiers is less important. For financially constrained firms that suffer higher costs of raising external capital, however, managerial social capital is significant for reducing the cost of financing. In addition, firms that lack good investment opportunities are more likely to use external capital for value-destroying projects and over-invest. If social capital improves efficiency and generates positive externalities, then it will have a more pronounced effect on the cost of equity when firms enjoy greater growth potential.

We test these predictions in Table 4. We first include the interaction term of managerial social capital with our proxies for financial constraints. Consistent with the previous researchers such as Hadlock (2010) and Li (2011), we use three measures of financial constraints: firm size, firm age (young and/or smaller firms are more financially constrained), and the WW index which is described in Appendix B. The prediction of Hypotheses H2A is that the coefficient estimates of the interaction terms of social capital and age, and social capital and size, should be positive while the interaction term of social capital and the WW index is expected to be negative. Table 4, columns (1) through (3) provide strong support for this hypothesis. We find that social capital

[5] Because we introduce interaction terms of continuous predictors later on, we standardize our variables, as recommended by the prior literature (e.g., Aiken and West, 1991).

[6] We also estimate the effects of the individual components of social capital on the cost of equity. We find that educational connections exert the strongest influence on forecast error, while employment connections have the greatest effect on liquidity. Overall, the effect of social ties via education have the strongest effect on the cost of equity. These unreported results are available upon request.

[7] We follow Chen et al. (2011) and estimate the valuation effect as follows: denote V_1 (R_1) and V_2 (R_2) as the value (the cost of equity) for firms with high and low social capital. From the relation of $V_1/V_2=(R_2-g)/(R_1-g)=1+(R_2-R_1)/(R_1-g)$, $V_1/V_2=1.035$, when $R_2-R_1=0.174$ and $R_1-g=5.0\%$. We estimate $R_2-R_1=\beta_1$(unstandardized)* standard deviation of SC(Total)=0.174%

[8] We estimate this effect for forecast errors in Column (3) as follows: β_1(unstandardized)* standard deviation of SC(Total)/average forecast errors= -0.0000125*255.58/0.0174=18.4%. Similarly, we estimate the effect in Column (4) as well as for Liquidity.

Table 3
Social Capital and the Cost of Equity Capital

Panel A of this table reports the results of the following regressions: $Y_{i,j,t} = \beta_0 + \beta_1 Sc_{i,j,t} + \beta_2 Beta_{i,j,t} + \beta_3 BM_{i,j,t-1} + \beta_4 Size_{i,j,t-1} + \beta_5 Momentum_{i,j,t} + \beta_6 Leverage_{i,j,t-1} + \beta_8 Growth_{i,j,t} + \beta_{10} Inflation_{j,t} + IndustryDummies + CountryDummies + YearDummies + \varepsilon_{i,j,t}$, where Y in Columns (1)–(2), and (5)–(6) equals *Liquidity* estimated by Lesmond (2005) method (equals the proportion of non-zero return days in the previous quarter), and in Columns (3)–(4) and (7)–(8) *Forecast Error*– the absolute value of analysts' earnings forecast error for the fiscal year (equals the absolute value of actual earnings minus the earnings forecast scaled by the stock price). Columns (5)–(8) are estimated using only the US firms. Models (2), (4), (6), and (8) include industry, country, and year fixed effects. Panels B and C of this table reports results of the following regressions: $R_{i,j,t} - rf_{j,t} = \beta_0 + \beta_1 Sc_{i,j,t} + \beta_2 Beta_{i,j,t} + \beta_3 BM_{i,j,t-1} + \beta_4 Size_{i,j,t-1} + \beta_5 Momentum_{i,j,t} + \beta_6 Leverage_{i,j,t-1} + \beta_7 Growth_{i,j,t} + \beta_8 Inflation_{j,t} + IndustryDummies + CountryDummies + YearDummies + \varepsilon_{i,j,t}$. Social Capital (*Sc*) is SC(Total) - the measure of social connections between executives of capital accessing firms and of financier firms by the number of total connections. *R* is the cost of equity estimated in Columns (3)–(4) based on Easton (2004), in Columns (5)–(6) – Gebhardt, Lee and Swaminathan (2001), in Columns (7)–(8) – Claus and Thomas (2001), and in Columns (9)–(10) – Ohlson and Juettner-Nauroth (2005). In Columns (1)–(2) *R* is an average of these four measures of the cost of equity capital. *rf* is the risk-free rate measured as the yield on a three-month government bill. Control variables, Beta, *BM*, *Size*, *Leverage*, *Growth*, and *Inflation* are defined in Table 1. Models (2), (4), (6), (8), and (10) include industry, country, and year fixed effects. Regressions in Panel C are estimated using only U.S. firms. Robust standard errors, adjusted for heteroskedasticity and clustered at the firm level, are reported in brackets below the coefficients.

Panel A: Channels of Influence

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	International Sample				The U.S. Sample			
	Liquidity	Liquidity	ForecastError	ForecastError	Liquidity	Liquidity	Forecast Error	Forecast Error
SC(Total)	0.2786***	0.1443***	−0.0885***	−0.0389***	0.2002***	0.1207***	−0.1077***	−0.0660***
	(0.00829)	(0.00741)	(0.00648)	(0.00799)	(0.00977)	(0.00921)	(0.00826)	(0.01105)
Beta		0.0606***		0.0143*		0.0349***		0.0235*
		(0.00655)		(0.00850)		(0.00953)		(0.01346)
BM		−0.1363***		0.1725***		−0.1752***		0.1646***
		(0.00719)		(0.00773)		(0.00980)		(0.01178)
Size		−0.0008		−0.0334***		−0.0074		−0.0210***
		(0.00682)		(0.00618)		(0.00827)		(0.00810)
Momentum		0.0227***		−0.0183**		0.0240***		0.0155
		(0.00443)		(0.00746)		(0.00846)		(0.01198)
Leverage		0.0159**		0.0616***		−0.0275***		0.0777***
		(0.00688)		(0.00726)		(0.01008)		(0.01069)
Growth		0.0321***		0.0260***		0.0163*		0.0560***
		(0.00586)		(0.00855)		(0.00952)		(0.01149)
Inflation		0.0378***		0.0172		−0.6098***		−0.0520***
		(0.01069)		(0.01090)		(0.01934)		(0.01941)
Intercept	0.0000	−1.9292**	−0.0000	0.0491	−0.0000	−1.5295***	0.0000	−0.0583
	(0.01005)	(0.75576)	(0.00736)	(0.30586)	(0.01015)	(0.07689)	(0.01040)	(0.08395)
adj. R-sq	0.078	0.390	0.008	0.087	0.040	0.332	0.012	0.063
Obs	37,712	37,712	37,712	37,712	19,136	19,136	19,136	19,136

Panel B: International Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	R(average)	R(average)	R(peg)	R(peg)	R(gls)	R(gls)	R(rct)	R(rct)	R(oj)	R(oj)
SC(Total)	−0.0952***	−0.0402***	−0.0880***	−0.0332***	−0.0874***	−0.0369***	−0.0466***	−0.0335***	−0.0046***	−0.0019***
	(0.00914)	(0.00827)	(0.00910)	(0.00928)	(0.01051)	(0.00870)	(0.00756)	(0.00804)	(0.00045)	(0.00046)
Beta		0.0187**		0.0150*		0.0276***		−0.0042		0.0009**
		(0.00737)		(0.00782)		(0.00698)		(0.00760)		(0.00041)
BM		0.3403***		0.2206***		0.5062***		0.1669***		0.0112***
		(0.00749)		(0.00755)		(0.00814)		(0.00780)		(0.00038)
Size		−0.0237***		−0.0340***		−0.0207***		0.0124*		−0.0015***
		(0.00662)		(0.00720)		(0.00764)		(0.00669)		(0.00035)
Momentum		0.0034		0.0091		−0.0021		0.0032		0.0002
		(0.00532)		(0.00568)		(0.00455)		(0.00564)		(0.00030)
Leverage		0.0901***		0.0894***		0.0497***		0.1018***		0.0035***
		(0.00761)		(0.00794)		(0.00697)		(0.00808)		(0.00041)
Growth		0.1630***		0.1158***		0.0315***		0.2714***		0.0082***
		(0.00753)		(0.00740)		(0.00602)		(0.00981)		(0.00042)
Inflation		0.0869***		0.0562***		0.0803***		0.0924***		0.0027***
		(0.01190)		(0.01097)		(0.01146)		(0.01442)		(0.00058)
Intercept	0.0000	−0.3831	0.0000	−0.1745	−0.0000	−0.7126	−0.0000	−0.3193***	0.0903***	0.0868***
	(0.00976)	(0.45230)	(0.00952)	(0.52221)	(0.01125)	(0.52079)	(0.00873)	(0.09509)	(0.00047)	(0.02401)
adj. R-sq	0.009	0.377	0.008	0.278	0.008	0.468	0.002	0.296	0.008	0.246
Obs	37,712	37,712	37,712	37,712	37,712	37,712	37,712	37,712	37,712	37,712

Panel C: U.S. Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	R(average)	R(average)	R(peg)	R(peg)	R(gls)	R(gls)	R(rct)	R(rct)	R(oj)	R(oj)
SC(Total)	−0.1912***	−0.0644***	−0.1470***	−0.0500***	−0.2232***	−0.1047***	−0.1109***	−0.0161	−0.0069***	−0.0018***
	(0.01227)	(0.01178)	(0.01179)	(0.01285)	(0.01569)	(0.01217)	(0.01066)	(0.01228)	(0.00054)	(0.00059)
Beta		0.0684***		0.0536***		0.0627***		0.0430***		0.0032***
		(0.01148)		(0.01234)		(0.00822)		(0.01179)		(0.00058)
BM		0.3649***		0.2379***		0.5872***		0.1472***		0.0106***
		(0.01080)		(0.01113)		(0.01074)		(0.01132)		(0.00052)
Size		−0.0246**		−0.0282***		−0.0257**		0.0009		−0.0012**
		(0.00988)		(0.01023)		(0.01099)		(0.01233)		(0.00047)

(continued on next page)

Table 3 (continued)

Panel C: U.S. Sample

	(1) R(average)	(2) R(average)	(3) R(peg)	(4) R(peg)	(5) R(gls)	(6) R(gls)	(7) R(rct)	(8) R(rct)	(9) R(oj)	(10) R(oj)
Momentum		0.0136*		0.0108		0.0118*		0.0136		0.0003
		(0.00821)		(0.00880)		(0.00619)		(0.00883)		(0.00044)
Leverage		0.1392***		0.1206***		0.0904***		0.1648***		0.0041***
		(0.01117)		(0.01197)		(0.00891)		(0.01250)		(0.00055)
Growth		0.1718***		0.1323***		0.0252***		0.2287***		0.0084***
		(0.01109)		(0.01116)		(0.00834)		(0.01458)		(0.00053)
Inflation		−0.0764***		−0.0762***		−0.1318***		0.0063		−0.0012
		(0.01620)		(0.01760)		(0.01341)		(0.01734)		(0.00085)
Intercept	0.0000	−0.1734**	−0.0000	−0.2733***	0.0000	−0.0831	0.0000	0.1015	0.0834***	0.0740***
	(0.01351)	(0.08524)	(0.01293)	(0.09397)	(0.01576)	(0.07970)	(0.01265)	(0.07905)	(0.00060)	(0.00438)
adj. R-sq	0.037	0.372	0.022	0.239	0.050	0.531	0.012	0.279	0.021	0.222
Obs	19,136	19,136	19,136	19,136	19,136	19,136	19,136	19,136	19,136	19,136

*** indicate significance at the 1% level.
** indicate significance at the 5% level.
* indicate significance at the 10% level.

Table 4
Social Capital, Financial Constraints, and the Cost of Equity Capital
This table reports the results of the following regressions: $R(average)_{i,j,t} - rf_{j,t} = \beta_0 + \beta_1 Sc_{i,j,\ t} + \beta_2 Sc_{i,j,\ t} * Constr_{i,j,\ t} + \beta_3 Constr_{i,j,\ t} + \sum_{k=4}^{n} \beta_k Controls + IndustryDummies + CountryDummies + YearDummies$. *SocialCapital* (*Sc*) is *SC(Total)* - the measure of social connections between executives of capital accessing firms and of financier firms by the number of total connections. *R*(*average*) is the average of the four cost equity measures, estimated by Easton (2004); Gebhardt, Lee and Swaminathan (2001); Claus and Thomas (2001), and Ohlson and Juettner-Nauroth (2005) methodologies. *rf* is the risk-free rate measured as the yield on a three-month government bill. *Constr* equals *Age* - the natural logarithm of the number of years since incorporation in Models (1), (4), and (7), *Assets* – the natural logarithm of total assets in Columns (2), (4), and (8), and *WW Index* - Whited and Wu (2006) index of financial constraints in Columns (3), (6), and (9). Control variables are defined in Table 1. Each model includes industry, country, and year fixed effects. Robust standard errors, adjusted for heteroskedasticity and clustered at the firm level, are reported in brackets below the coefficients.

	(1) All Firms	(2)	(3)	(4) Low Q Firms	(5)	(6)	(7) High Q Firms	(8)	(9)
SC(Total)	−0.0214***	−0.0473***	−0.0216***	−0.0044	−0.0362***	−0.0092	−0.0570***	−0.0637***	−0.0508***
	(0.00817)	(0.00698)	(0.00740)	(0.01074)	(0.00905)	(0.00978)	(0.01042)	(0.00940)	(0.00941)
Age	−0.0415***			−0.0508***			−0.0230***		
	(0.00681)			(0.00908)			(0.00891)		
SC(Total)*Age	0.0216***			0.0181**			0.0234***		
	(0.00628)			(0.00807)			(0.00799)		
Assets		−0.0145			−0.0125			−0.0652***	
		(0.01114)			(0.01409)			(0.01131)	
SC(Total)*Assets		0.0212***			0.0190***			0.0324***	
		(0.00381)			(0.00428)			(0.00435)	
WW Index			0.0394***			0.0211***			0.0714***
			(0.00662)			(0.00787)			(0.00891)
SC(Total)*WW Index			−0.0133***			−0.0040			−0.0295***
			(0.00275)			(0.00350)			(0.00345)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adj. R-sq	0.455	0.455	0.455	0.462	0.460	0.460	0.464	0.466	0.466
Obs	37,712	37,712	37,452	18,795	18,795	18,589	18,917	18,917	18,863

*** indicate significance at the 1% level.
** indicate significance at the 5% level.
* indicate significance at the 10% level.

reduces the cost of equity, but this relation is stronger for young, small, and more constrained firms.

Next we use Tobin's Q as the measure of investment opportunities[9] and independently partition the whole sample into two subsamples based on the median value of Q. We predict that the coefficient estimate of the interaction and main effects coefficients of social capital should be higher for the subgroup with more investment opportunities. We estimate Eq. (2) for each subgroup. Columns (4) through (9) in Table 4 show the results. Consistent with our prediction, we find that social capital is a stronger predictor of the cost of equity for financially construed firms with more investment opportunities. In addition, the coefficient estimates of social capital (main effect) are insignificant in two (out of three) regressions for the low Q subsample. Overall, the results in Table 4 are consistent with our argument that social capital has a more pronounced effect on the cost of equity financing for financially constrained firms.

4.3. The effect of legal protection and financial development

In this section we focus on the interactive effect of country-level legal protections of investors, financial market development, and managerial social capital in reducing the cost of equity financing. Our third hypothesis predicts that social capital has a more pronounced effect on the cost of equity in markets characterized by the weak legal protection of investors

To test these predictions, we estimate Eq. (2) for high and low investor protection subsamples, as well as for high and low financial market development subsamples. Table 5 reports the results. Our partition of the sample is based on two measures of investor protection: revised Antidirector Rights Index from Spamann (2010) and Anti-self-dealing Index of Djankov et al. (2008).

[9] To mitigate the concern about endogenous investment opportunities, we use the industry median estimates.

Table 5
Social Capital, Investor Protection, and Financial Development
This table reports the results of the following regressions: $R(average)_{i,j,t} - rf_{j,t} = \beta_0 + \beta_1 Sc_{i,j,\ t} + \sum_{k=2}^{n} \beta_k Controls + IndustryDummies + CountryDummies + YearDummies + \varepsilon_{i,\ j,t}$. Social Capital (*Sc*) is *SC(Total)* - the measure of social connections between executives of capital accessing firms and of financier firms by the number of total connections. *R*(*average*) is the average of the four cost of equity measures, estimated by Easton (2004); Gebhardt, Lee and Swaminathan (2001); Claus and Thomas (2001), and Ohlson and Juettner-Nauroth (2005) methodologies. *rf* is the risk-free rate measured as the yield on a three-month government bill. Control variables are defined in Table 1. The sample is partitioned in Columns (1)–(2) based on Antidirector Rights Index from Spamann (2010), in Columns (3)–(4) – based on Antiselfdealing Index from Djankov et al. (2008), in Columns (5)–(6) – based on market capitalization as a percentage of GDP, and in Columns (7)–(8) – based on the overall financial development index from Khurana et al. (2006). Each model includes industry, country, and year fixed effects. Robust standard errors, adjusted for heteroskedasticity and clustered at the firm level, are reported in brackets below the coefficients.

	(1) ANTIDIRSP	(2)	(3) ANTISELF	(4)	(5) MCAPGDP	(6)	(7) FINDEV	(8)
	High	Low	High	Low	High	Low	High	Low
SC(Total)	−0.0113	−0.0189*	−0.0103	−0.0197*	−0.0162	−0.0223**	−0.0158	−0.0252***
	(0.01063)	(0.00975)	(0.00862)	(0.01189)	(0.01007)	(0.00902)	(0.01053)	(0.00877)
	(0.30152)	(0.15593)	(0.06223)	(0.32313)	(0.06810)	(0.36343)	(0.11217)	(0.31710)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adj. R-sq	0.523	0.504	0.448	0.599	0.490	0.478	0.483	0.485
Obs	16,975	19,479	27,029	10,641	19,527	18,185	18,439	19,273

*** indicate significance at the 1% level.
** indicate significance at the 5% level.
* indicate significance at the 10% level.

Spamann (2010) reexamines legal data and points out the flaws in the La Porta et al. (1998) measure of investor protection. The author argues that many of the empirical results established using uncorrected investor protection measure cannot be replicated. The corrections not only eliminate, but invert the differences between legal origins reported by La Porta et al. (1998). Spamann also contends that the claim of greater shareholder protection in common law countries is not supported by the corrected data.

Incorporating these critiques, Djankov et al. (2008) propose a new measure of legal protections. Their index is assembled with the help of Lex Mundi law firms, and is calculated for 72 countries focusing on disclosure, approval, and litigation, that govern a specific self-dealing transaction. The authors argue that the anti-self-dealing index is superior to other measures of investor protection. This is because self-dealing is the central problem of corporate governance, and the law's effectiveness in regulating this problem is the fundamental element of shareholder protection. Spamann (2010) argues that the corrected Anti-director index that he proposes offers a consistent and easily reproducible measure and that it is superior to all others. In light of this unresolved debate, we both the Corrected Anti-director index of Spamann and the Anti-self-dealing index of Djankov et al. to capture investor legal protections in our analysis.

We also partition our sample using two measures of financial development: financial market capitalization as the percentage of GDP, and the financial development index from Khurana et al. (2006). A firm is classified in the "low" or "high" sub-sample relative to the corresponding median.[10] The main variable of interest is our proxy for social capital, SC(Total). This is estimated as the total number of social connections between corporate executives and managers of financier firms. The dependent variable in all regressions is the average cost of equity capital estimate based on the four different models (Claus and Thomas, 2001; Gebhardt, Lee and Swaminathan, 2001; Easton, 2004; Ohlson and Juettner-Nauroth, 2005).

In each of the four "low" sub-samples, the coefficient for our social capital measure is significantly negative. In the "high" sub-samples, the coefficient on social capital is negative, but insignificant. We conclude that managerial social capital with financiers has a greater effect in weakly-developed financial markets or in markets with weak investor protections.

[10] Note that all indices are not available for all countries in our sample. Therefore, sample size varies based on data availability.

In summary, the results in this section are consistent with our third hypothesis. Specifically, the negative association between social capital and the cost of equity is stronger in financially underdeveloped markets or in markets with the weak legal protection of investors. Social capital, however, is less valuable in reducing the cost of equity in financially developed markets with strong investor protections.

5. Further analysis of the social capital and cost of equity capital connection

In this section we provide a further analysis of the relation between social capital and the cost of equity capital. Specifically, we first consider to what extent corporate governance might be an additional channel through which social capital can influence the cost of equity capital. We then offer a series of robustness tests using alternate measures for the cost of equity capital, financial constraints, investor protection, and financial development.

We first test whether corporate governance might be another channel through which executive/director social connections influences the cost of equity capital. It might be that managers enjoying a broad network of social connections and strong professional reputations have fewer incentives to behave as if entrenched or to resist the adoption of good governance practices. Chen et al., (2009, 2011) describe how strong corporate governance can reduce the cost of equity capital. Thus, corporate governance might serve as an additional channel through which social capital is able to effect the cost of equity. We present our findings in Panel A of Table 6. We observe that the coefficient of total social capital as well as those for its three components are significantly positive, suggesting that it improves corporate governance. This, then further implies that greater social capital operating through the governance channel can reduce the firm's cost of equity capital.

In Panel B we test whether the relation between social capital and the cost of equity capital continues to apply when we use the four factor model of Carhart (1997) to estimate equilibrium equity returns. A detailed description of the cost of equity estimation using Carhart's four-factor model is contained in Appendix A. In Panel B we find that the coefficients of social capital are consistently negative and significant. We conclude that our earlier finding of an inverse relation between social capital and the cost of equity is robust to this alternate model for estimating equity returns.

We next test whether the strong inverse association between social capital and the cost of equity capital that we observed in

Table 6
Further Analysis of Social Capital and the Cost of Equity Capital
Panel A reports the results of the following regressions: $Governance\ Index_{i,j,t} = \beta_0 + \beta_1 Sc_{i,j,t} + \beta_2 Beta_{i,j,t} + \beta_3 BM_{i,j,t-1} + \beta_4 Size_{i,j,t-1} + \beta_5 Momentum_{i,j,t} + \beta_6 Leverage_{i,j,t-1} + \beta_8 Growth_{i,j,t} + \beta_{10} Inflation_{j,t} + IndustryDummies + CountryDummies + YearDummies + \varepsilon_{i,j,t}$, where Governance Index is the corporate governance index from Aggarwal et al. (2008). Social Capital (Sc) is defined in Columns (1)–(4), (5)–(8), and (9)–(12) as *SC(Total), SC(Educ), SC(Empl)* and *SC(Other)* - the measure of social connections between executives of capital accessing firms and of financier firms by the number of total connections, education connections, employment connections, and other connections, respectively. Panel B of this table reports the results of the following regression: $R_{i,j,t} = \beta_0 + \beta_1 Sc_{i,j,t} + \beta_2 Beta_{i,j,t} + \beta_3 BM_{i,j,t-1} + \beta_4 Size_{i,j,t-1} + \beta_5 Momentum_{i,j,t} + \beta_6 Leverage_{i,j,t-1} + \beta_7 Growth_{i,j,t} + \beta_8 Inflation_{j,t} + IndustryDummies + CountryDummies + YearDummies + \varepsilon_{i,j,t}$. Social Capital (Sc) is defined in Columns (1)–(4) as *SC(Total), SC(Educ), SC(Empl)* and *SC(Other)* - the measure of social connections between executives of capital accessing firms and of financier firms by the number of total connections, education connections, employment connections, and other connections, respectively. Control variables for both panels, *Beta*, BM, Size, Leverage, Growth, and Inflation, are defined in Table 1. Each model in both panels includes industry, country, and year fixed effects. Robust standard errors, adjusted for heteroskedasticity and clustered at the firm level, are reported in brackets below the coefficients.

Panel A: Governance Index

	(1)	(2)	(3)	(4)
SC(Total)	0.1719***			
	(0.01164)			
SC(Educ)		0.1560***		
		(0.01152)		
SC(Empl)			0.0405**	
			(0.01876)	
SC(Other)				0.0417***
				(0.00856)
Beta	0.0288***	0.0322***	0.0370***	0.0371***
	(0.00868)	(0.00874)	(0.00884)	(0.00883)
BM	−0.0213**	−0.0191**	−0.0259***	−0.0241**
	(0.00918)	(0.00918)	(0.00944)	(0.00945)
Size	0.0337***	0.0631***	0.1228***	0.1277***
	(0.01054)	(0.01030)	(0.01067)	(0.00936)
Momentum	−0.0165***	−0.0170***	−0.0191***	−0.0192***
	(0.00568)	(0.00569)	(0.00579)	(0.00578)
Leverage	0.0399***	0.0408***	0.0513***	0.0540***
	(0.01012)	(0.01020)	(0.01048)	(0.01044)
Growth	−0.0713***	−0.0741***	−0.0865***	−0.0851***
	(0.00824)	(0.00831)	(0.00855)	(0.00852)
Inflation	0.1119***	0.1070***	0.1111***	0.1105***
	(0.01250)	(0.01246)	(0.01268)	(0.01263)
Intercept	−1.4973***	−1.3884***	−1.4904***	−1.4884***
	(0.09381)	(0.09573)	(0.09736)	(0.09674)
adj. R-sq	0.669	0.668	0.655	0.655
Obs	12,575	12,575	12,575	12,575

Panel B: Four-Factor Model

	(1)	(2)	(3)	(4)
SC(Total)	−0.0102**			
	(0.00450)			
SC(Educ)		−0.0112**		
		(0.00440)		
SC(Empl)			−0.0033**	
			(0.00145)	
SC(Other)				−0.0098***
				(0.00282)
Beta	0.7705***	0.7704***	0.7700***	0.7701***
	(0.00884)	(0.00881)	(0.00879)	(0.00879)
BM	−0.0006	−0.0009	−0.0004	−0.0007
	(0.00498)	(0.00498)	(0.00499)	(0.00498)
Size	−0.0075**	−0.0083**	−0.0125***	−0.0117***
	(0.00362)	(0.00333)	(0.00295)	(0.00297)
Momentum	0.0753***	0.0753***	0.0754***	0.0754***
	(0.00666)	(0.00666)	(0.00668)	(0.00668)
Leverage	0.0005	0.0006	−0.0002	−0.0004
	(0.00518)	(0.00517)	(0.00516)	(0.00514)
Growth	0.0110*	0.0110*	0.0119*	0.0113*
	(0.00608)	(0.00608)	(0.00611)	(0.00610)
Inflation	−0.0570***	−0.0567***	−0.0570***	−0.0570***
	(0.00898)	(0.00897)	(0.00898)	(0.00897)
Intercept	−0.3835***	−0.3913***	−0.3840***	−0.3854***
	(0.03272)	(0.03278)	(0.03267)	(0.03260)
adj. R-sq	0.820	0.820	0.820	0.820
Obs	12,575	12,575	12,575	12,575

*** indicate significance at the 1% level.
** indicate significance at the 5% level.
* indicate significance at the 10% level.

Table 7
Robustness of Social Capital, Investor Protection and Financial Development
This table reports the results of the following regressions: $R_{i,j,t} = \beta_0 + \beta_1 Sc_{i,j,t} + \sum_{k=2}^{n} \beta_k Controls + IndustryDummies + CountryDummies + YearDummies + \varepsilon_{i,j,t}$. Social Capital (Sc) is *SC(Total)* - the measure of social connections between executives of capital accessing firms and of financier firms by the number of total connections. R is the cost of equity estimated by using the CAPM. The sample is partitioned in Columns (1) and (2) based on the legal origin, and in Columns (3) and (4) based on domestic credit to private sector as a percentage of GDP. Each model includes industry, country, and year fixed effects. Control variables are defined in Table 1. Robust standard errors, adjusted for heteroskedasticity and clustered at the firm level, are reported in brackets below the coefficients.

	(1) Legal Origin	(2)	(3) CREDITPRIVGDP	(4)
	Common	Civil	High	Low
SC(Total)	−0.0024	−0.0096*	0.0003	−0.0094*
	(0.00289)	(0.00582)	(0.00294)	(0.00538)
Controls	Yes	Yes	Yes	Yes
adj. R-sq	0.957	0.969	0.957	0.964
Obs	10,405	2170	9511	3064

***indicate significance at the 1% level.
**indicate significance at the 5% level.
* indicate significance at the 10% level.

poorly developed markets or those with the weak legal protections is robust to alternative measures of investor protection and market development. In Table 7 we use the common-civil law legal regime of LaPorta et al (1997) as an alternate measure for investor protection. In columns (1) and (2) we find that social capital is significantly and inversely related to the cost of equity capital for firms located in civil law countries. These countries are widely reported to offer a lower level of shareholder protection (e.g., La Porta et al., 1997, 1998). These findings are consistent with those reported in Table 5 using the Spamann (2010) and Djankov et al (2008) measures of investor protection. In columns (3) and (4), we use domestic credit extended to the private sector as a percent of GDP as an alternative measure of financial development. Again, we find that in less developed markets social capital is significant in reducing the firm's cost of equity capital.

Our last robustness test involves the use of the Kaplan and Zingales (1997) index as an alternative measure of firm financial constraints. We provide details regarding the estimation of this index in Appendix B. Our results, not tabulated for brevity, are available upon request. We find managerial social capital is significant for reducing the cost equity financing. Our findings are consistent with that reported in Table 4 using three other measures for financial constraints.

6. Adjustments for possible endogeneity

The relation between social capital and the cost of equity financing might be endogenous. We argue that the endogeneity concern arising from reverse causality is inapplicable to this study because it requires feedback between the cost of equity capital and social capital. The research design of this study makes this feedback extremely unlikely. Formation of social connections predates the measurement of the cost of equity capital and the cash flow sensitivities for years and sometimes even decades as is the case for educational connections.

Endogeneity due to omitted variables is a possibility, so we undertake a series of tests to alleviate any concern that our results might be driven by omitted variables. First, if omitted variables related to the social capital with financiers are also related to the social capital with non-financier firms, and if these omitted variables are driving our results, then we would again obtain significant results in our regressions using connections to non-financier firms. To test this possibility, we conduct a placebo test

by estimating social connections of capital accessing firms with utility firms. Results are shown in Table 8. Replications of our analysis using the connections with utility firms are never associated with significantly negative coefficients for social capital.[11]

Second, in our major regressions we include firm fixed effects to control for unobservable firm-specific characteristics that could impact the cost of equity. In addition, managerial skill could be an alternative explanation for the firm's access to cheap external financing. For example, highly skilled managers are more likely to better manage their firms and could easily obtain low-cost external financing. To control for this possibility, we include managerial fixed effects in our major regressions. Our empirical results contained in Table 9 show that our conclusions are unaffected by the addition of firm and managerial fixed effects.[12]

Finally, we use an instrumental variable approach to account for the endogeneity of social connections in our baseline regressions. We incorporate two different instruments. First, based on Fracassi and Tate (2010), death of network ties (in this case death of financier executives to whom financee managers are connected) provides an ideal exogenous shock to the managerial social networks of financee firms. Consequently, we count the number of socially connected executives of financier firms connected to financee firm managers who have died up to the previous fiscal year[13] and use it as an instrument for social capital. Second, we instrument for managerial social capital by the average network size of executives of other companies in the same geographic area.[14] Social networks of other executives in the same geographic area are likely to influence managerial social network size of financee firms (e.g., social connections via club memberships).

Table 10 reports the results of the first and the second stage regressions. Our instruments are relevant and do not suffer from weak instruments concerns, because the F-statistics of excluded instruments in all specifications are greater than the cutoff value of 10. In addition, the Dubin Wu-Hausman test shows that our social capital measures are indeed endogenous. Overall, we confirm our major results regarding the causal role social capital plays in reducing the cost of equity capital.

7. Summary and discussion

Our study investigates the effects of managerial social capital with financiers on the firm's implied cost of equity capital. Financial market frictions, such as asymmetric information and agency problems, limit a firm's ability to access external financing (Stein, 2003; Rajan and Zingales, 1998; Myers and Majluf, 1984). We argue that social capital can help to alleviate these frictions.

We propose several arguments why social capital could negatively affect the cost of equity. Social capital can reduce a firm's cost of equity capital by reducing information asymmetry between the firm and its investors. It can also lower the costs and the need for external monitoring. Through its information-sharing channel, social capital reduces potential inefficiencies in the financial markets due to imperfect information (e.g., Granovetter 1975, 1995; Fafchamps and Minten, 1999; Rauch and Casella, 2001; Hochberg et al., 2007, Cohen et al., 2008). Furthermore, by the threat of reputational loss, social capital reduces managerial incentives to expropriate. This can correspondingly reduce agency problems within the firm.

Using a large panel of companies from 52 countries over the period 1999–2012, we document that social capital negatively affects the cost of equity. We also find that the inverse association

Table 8
Placebo Test for Social Capital and the Cost of Equity Capital
This table reports the results of the following regressions: $R(average)_{i,j,t} - rf_{j,t} = \beta_0 + \beta_1 Sc_{i,j,\ t} + \sum_{k=2}^{n} \beta_k Controls + IndustryDummies + CountryDummies + YearDummies + \varepsilon_{i,\ j,t}$. Social Capital (Sc) is measured by $SC(Total)_{utility}$, $SC(Educ)_{utility}$, $SC(Empl)_{utility}$ and $SC(Other)_{utility}$ - social connections between executives of capital accessing firms and of utility firms by the number of total connections, education connections, employment connections, and other connections, respectively. R(average) is the average of the four cost of equity measures, estimated by Easton (2004); Gebhardt, Lee and Swaminathan (2001); Claus and Thomas (2001), and Ohlson and Juettner-Nauroth (2005) methodologies. rf is the risk-free rate measured as the yield on a three-month government bill. Control variables are defined in Table 1. Each model includes industry, country, and year fixed effects. Robust standard errors, adjusted for heteroskedasticity and clustered at the firm level, are reported in brackets below the coefficients.

	(1)	(3)	(5)	(7)
$SC(Total)_{utility}$	−0.0051			
	(0.00713)			
$SC(Educ)_{utility}$		0.0056		
		(0.00625)		
$SC(Empl)_{utility}$			−0.0077	
			(0.00706)	
$SC(Other)_{utility}$				0.0063
				(0.00560)
Controls	Yes	Yes	Yes	Yes
adj. R-sq	0.376	0.376	0.376	0.376
Obs	37,712	37,712	37,712	37,712

***indicate significance at the 1% level.
**indicate significance at the 5% level.
*indicate significance at the 10% leve.

Table 9
Social Capital and the Cost of Equity with Managerial/Firm Fixed Effects
This table reports the results of the following regressions: $R_{i,j,t} = \beta_0 + \beta_1 Sc_{i,j,\ t} + \sum_{k=2}^{n} \beta_k Controls + YearDummies + \varepsilon_{i,\ j,t}$. Social Capital (*Sc*) is defined as *SC(Total)* - the measure of social connections between executives of capital accessing firms and of financier firms by the number of total connections. In Columns (1) and (2) *SC(Total)* is estimated for each manager and additional controls for *Age* – the natural logarithm of executive age, and *Tenure* – the natural logarithm of executive tenure, are included. R is the cost of equity estimated by the four-factor model. Control variables are defined in Table 1. Models (1) and (2) include manager fixed effects and Models (3) and (4) firm fixed effects and firm and industry-year fixed effects, respectively. Each model also includes year fixed effects. Robust standard errors, adjusted for heteroskedasticity and clustered at the firm level, are reported in brackets below the coefficients.

	(1)	(2)	(3)	(4)
SC(Total)	−0.0104*	−0.0103*	−0.0445*	−0.0385*
	(0.00569)	(0.00572)	(0.02488)	(0.02302)
Age		−0.6004***		
		(0.15110)		
Tenure		−0.0014		
		(0.00219)		
Controls	Yes	Yes	Yes	Yes
adj. R-sq	0.820	0.821	0.922	0.931
Obs	350,441	350,441	12,575	12,575

**indicate significance at the 5% level.
*** indicate significance at the 1% level.
* indicate significance at the 10% level.

[11] We also perform a more comprehensive analysis using social connections with the Fama-French 49 industries in Appendix C. We find significantly negative results for social ties with 6 industries. However, the magnitude of the coefficient estimates is approximately half of that reported in Panel B of Table 3. The difference is statistically significant in all cases as shown in the last two rows of Appendix C. Please note that we exclude financial services and regulated firms because they are separately examined in the main tables.

[12] We note that we redesigned panels with respect to managers in columns (1) and (2). The median one-year change in SC(Total) is 1. Our relatively weak results (significance is at 10%) are not surprising since fixed-effects models rely exclusively on within-subject variations to identify the effects of explanatory variables, and our social capital measure do not vary annually very much in our sample.

[13] To better reflect the strength of a shock from a lost executive/director on the network, we weight this variable by the change in the number of connections, since the loss of one director does not necessarily mean the loss of one connection.

[14] We require at least 5 firms in each geographic area. Consequently, the sample size shrinks.

Table 10
Instrumental Variables Analysis of Social Capital and the Cost of Equity
This table report the results of the 2-SLS IV regressions. Columns (1), (3), and (5) report the results of the following first-stage regressions: $Sc_{it} = \beta_0 + \beta_1 Instrument_{i,j,\ t} + \sum_{k=2}^{n} \beta_k Controls + IndustryDummies + CountryDummies + YearDummies + \varepsilon_{i,\ j,t}$. In Column (1) *ExecConGeog,* median network size of executives of other companies in the same geographic area, excluding the firm in question, is used as the instrument. In Column (2) *DecDir* - the number of deceased directors and executives of financier firms connected to managers of capital accessing firms who have died up to previous fiscal year is used as the instrument. In Column (5) both instruments are used. Dependent variable *SC* is *SC (Total)*, the measure of social connections between executives of capital accessing firms and of financier firms by the number of total connections. Columns (2), (4), and (6) report the results of the second stage IV regression: $R(average)_{i,j,t} - rf_{j,t} = \beta_0 + \beta_1 \widehat{Sc}_{i,j,\ t} + \sum_{k=2}^{n} \beta_k Controls + IndustryDummies + CountryDummies + YearDummies + \varepsilon_{i,\ j,t}$. R(average) is the average of the four cost of equity measures, estimated by Easton (2004); Gebhardt, Lee and Swaminathan (2001); Claus and Thomas (2001), and Ohlson and Juettner-Nauroth (2005) methodologies. rf is a risk-free rate measured as the yield on the three-month government bill. Control variables are defined in Table 1. Panel A is estimated using the robustness sample, similar to Table 6. Each model includes industry, country, and year fixed effects. Robust standard errors, adjusted for heteroskedasticity and clustered at the firm level, are reported in brackets below the coefficients.

Panel A: Model Specifications with Robustness Sample

	(1) SC(Total)	(2) R(average)	(3) SC(Total)	(4) R(average)	(5) SC(Total)	(6) R(average)
ExecConGeog	0.169***				0.163***	
	(0.020)				(0.019)	
DecDir			−0.090***		−0.087***	
			(0.013)		(0.013)	
SC(Total)		−0.125**		−0.201***		−0.151***
		(0.061)		(0.054)		(0.047)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
F-test of Excl. Instrument	70.55		46.99		60.34	
	(< 0.001)		(< 0.001)		(< 0.001)	
Test of Exogeneity	3.317		13.022		15.277	
	(0.0685)		(0.0003)		(0.0003)	
Hansen J statistics						0.822
						(0.3645)
adj. R-sq	0.534	0.580	0.537	0.569	0.553	0.576
Obs	10,034	10,034	10,034	10,034	10,034	10,034

Panel B: Model Specifications with Main Sample

	(1) SC(Total)	(2) R(average)	(3) SC(Total)	(4) R(average)	(5) SC(Total)	(6) R(average)
ExecConGeog	0.1495***				0.1504***	
	(0.01657)				(0.01571)	
DecDir			−0.1139***		−0.1119***	
			(0.00784)		(0.00754)	
SC(Total)		−0.1581***		−0.0594*		−0.1075***
		(0.05658)		(0.03596)		(0.03296)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
F-test of Excl. Instrument	81.40		210.91		143.09	
	(< 0.001)		(< 0.001)		(< 0.001)	
Test of Exogeneity	8.178		2.817		9.648	
	(0.0042)		(0.0933)		(0.0019)	
Hansen J statistics						2.155
						(0.1421)
adj. R-sq	0.477	0.466	0.499	0.477	0.512	0.473
Obs	23,959	23,959	23,959	23,959	23,959	23,959

*** indicate significance at the 1% level.
** indicate significance at the 5% level.
* indicate significance at the 10% level.

between social capital and the cost of equity is stronger in underdeveloped financial markets and in markets characterized by the weak legal protection of investors. These results provide support to the conjecture that social capital generates positive externalities and facilitates investment in countries where the formal contract enforcement system is weak and financial market mechanisms underdeveloped. We further document that social capital has a stronger effect on the cost of equity financing for constrained firms. These results are robust to alternative model specifications, variable measurement, and extensive tests for endogeneity, including placebo testing and an instrumental variable approach.

Our results have a number of important implications. First, our results suggest that the social capital of senior management can be a mechanism for reducing agency problems within a firm. Second, social capital allows investors to successfully identify firms that are financially constrained buy yet possess potential for profitability. In the absence of the communication channels due to social capital, these firms would be masked to investors due to information asymmetry and the costs of monitoring. In addition, social capital creates positive externalities by assisting legal and market institutions in the development of financial contracting. This is especially true in underdeveloped countries. This new evidence regarding social capital contributes to the debate over its value in both the academic finance literature and in global development agencies such as the World Bank and the International Monetary Fund.

Appendix A. Estimating the cost of equity

Implied Cost of Equity

Following Dhaliwal et al. (2006) and Chen et al. (2009), the implied cost of equity is estimated by implementing four variations of the residual income valuation model.

Variable definitions

Pt	price per share of common stock in June of year *t* as reported by I/B/E/S
Bt	book value at the beginning of the year divided by the number of common share outstanding in June of year *t*
DPS0	dividends per share paid during year *t-1*
EPS0	actual earnings per share reported by I/B/E/S for year *t-1*
LTG	consensus long-term growth forecast reported in June of year *t*
$FEPS_{t+i}$	consensus forecasted EPS from I/B/E/S for the next i-th year at time t. $FEPS_1$ and $FEPS_2$ are equal to the one and two-year-ahead consensus EPS forecasts reported in I/B/E/S in June of year *t*.
k	expected dividend payout ratio, calculated as DPS_0/EPS_0. If the firm-specific payout ratio is missing, then we substitute it with a country/industry median dividend payout ratio.
rf	country risk-free rate, estimated as a return on three annualized yield on 3-month government securities. For currencies where no liquid treasury bill market exists, LIBOR rates are used.
glt	Expected long-term or perpetual future earnings growth rate, calculated as the long-term median realized annual inflation rate for each country.[15]

Model 1: Gebhardt, Lee, and Swaminathan (2001)

$$P_t = B_t + \sum_{i=1}^{11} \frac{FROE_{t+i} - r_{gls}}{\left(1 + r_{gls}\right)^i} B_{t+i-1} + \frac{FROE_{t+12} - r_{gls}}{r_{gls} \times \left(1 + r_{gls}\right)^{11}} B_{t+11}$$

$FROE_{t+i}$: forecasted return on equity. For the first three periods, *FROE* is equal to $FEPS_{t+i}/B_{t+\ i-1}$. Subsequent *FROE* forecasts are a linear interpolation to industry median *ROE*, with industries defined using the 48 classifications in Fama and French (1997).

B_{t+i}: $B_{t+\ i-1}+FEPS_{t+i}\ (1+k)$. Forecasts of *B* are based on the clean surplus relation, I/B/E/S earnings forecasts, and the year t dividend payout rate.

Model 2: Claus and Thomas (2001)

$$P_t = B_t + \sum_{i=1}^{5} \frac{FEPS_{t+i} - r_{ct} \times B_{t+i-1}}{(1 + r_{ct})^i} + \frac{(FEPS_{t+5} - r_{ct} \times B_{t+4}) \times (1 + glt)}{(r_{ct} - glt)(1 + r_{ct})^5}$$

$FEPS_{t+i}$: I/B/E/S consensus for the first two years, for years three, four, five, consensus forecasts if available, otherwise, $FEPS_{t+i} = FEPS_{t+\ i-1}(1 + \mathrm{LTG})$.

B_{t+i}: $B_{t+\ i-1}+FEPS_{t+i}\ (1+k)$. Forecasts of *B* are based on the clean surplus relation, I/B/E/S earnings forecasts, and the year t dividend payout rate.

glt=: growth in abnormal earnings.

Model 3: Ohlson and Jüettner-Narouth (2005) model, implemented by Gode and Mohanram (2003)

$$r_{oj} = A + \sqrt{A^2 + \frac{FEPS_{t+1}}{P_t}\left(\frac{FEPS_{t+2} - FEPS_{t+1}}{FEPS_{t+1}} - glt\right)}$$

where

$$A = \frac{1}{2}\left(glt + \frac{k \times FEPS_{t+1}}{P_t}\right)$$

$FEPS_{t+2} > 0$ *and* $FEP_{t+1} > 0$

Model 4: Easton's (2004) implementation of Ohlson and Jüettner-Narouth (2005)

$$P_t = \frac{FEPS_{t+2} + r_{peg} \times DPS_0 - FEP_{t+1}}{r_{peg}^2},$$

where

$FEPS_{t+2} \geq FEP_{t+1} \geq 0$

[15] Results are qualitatively similar if rf-0.03 is used as an estimate for *glt*.

Estimating the Cost of Equity by Using the Four-Factor Model[16]

Variable definitions[17]:

$r_{i,t}$	the return on stock i in period t.
$r_{f,t}$	the risk-free rate in period t.
$r_{m,t}$	the return on the market portfolio in period t.
$\pi_{s,\,t}$	excess returns for size factor for time t.
$\pi_{mb,\,t}$	excess returns for market-to-book factor for time t.
$\pi_{mom,\,t}$	excess returns for momentum factor for time t.
$\varepsilon_{i,\,t}$	a random error term.
$\beta_{m,i,t}$	beta coefficient for firm i for time t for market risk.
$\beta_{s,i,t}$	beta coefficient for firm i for "size" factor for time t.
$\beta_{mb,i,t}$	beta coefficient for firm i for market-to-book factor for time t.
$\beta_{mom,i,t}$	beta coefficient for firm i for momentum for time t.
$E(r_{i,t})$	cost of capital for firm i for time t.

• The first-stage regression

$$r_{i,t} - r_{f,t} = \alpha_i + \beta_{m,i,t}\left(r_{m,t} - r_{f,t}\right) + \beta_{s,i,t}\pi_{s,t} + \beta_{mb,i,t}\pi_{mb,t} + \beta_{mom,i,t}\pi_{mom,t} + \varepsilon_{i,t}$$

The regression produces estimates for the second stage. The regression sample periods consist of 60 months of data prior to t. Firms with less than 60 months of data are included in the analysis as long as they have at least 24 months of prior data.

• The second-stage

In the second stage long-term averages (period: 1991–2012) are used to compute

$$E(r_{m,t}),\ E(\pi_{s,t}),\ E\left(\pi_{mb,t}\right),\ E(\pi_{mom,t}).$$

$$E(r_{i,t}) = r_{f,t} + \hat{\beta}_{m,i,t}\left(E(r_{m,t}) - r_{f,t}\right) + \hat{\beta}_{s,i,t}E(\pi_{s,t}) + \hat{\beta}_{mb,i,t}E\left(\pi_{mb,t}\right) + \hat{\beta}_{mom,i,t}E(\pi_{mom,t})$$

Appendix B. Financial Constraints Indices

(1) WW Index is estimated following Whited and Wu (2006) with the following formula:

WW Index= −0.091**CF*-0.062**DIVPOS*+ 0.021**TLDT*-0.044**LNTA*+ 0.102**ISG*-0.035**SG* where

CF	cash flow/total assets
DIVPOS	indicator that takes the value of one if the firm pays cash dividends
TLTD	long-term debt/total assets
LNTA	Ln(total assets)
ISG	the firm's three-digit industry sales growth
SG	firm sales growth.

(2) The KZ Index is estimated following Lamont et al (2001) and Kapaln and Zingales (1997):

KZ = −1.001909**CashFlow*/*K* + 0.2826389**Tobin's Q* + 3.139193* *Debt*/*TotalCapital* − 39.3678**Dividends*/*K* − 1.314759**Cash*/*K*

CashFlow/K	(income before extraordinary items + depreciation and amortization)/ property, plant, and equipment lagged
Tobin's	(total liabilities and stockholders' equity + Market Equity – Book Value of total common equity - deferred taxes)/ total liabilities and stockholders' equity
Debt/TotalCapital	(long-term debt + debt in current liabilities)/((long-term debt + debt in current liabilities + stockholders' equity)
Dividends/K	(common dividends + preferred dividends)/ property, plant, and equipment lagged
Cash/K	cash and short-term investments/ property, plant, and equipment lagged

Appendix C. Placebo test for social capital and cost of equity with fama-French 49 industries

This table reports the results of the following regressions: $R(average)_{i,j,t} - rf_{j,t} = \beta_0 + \beta_1 Sc_{i,j,\,t} + \sum_{k=2}^{n}\beta_k Controls + IndustryDummies + CountryDummies + YearDummies + \varepsilon_{i,\,j,t}$. Social Capital (*Sc*) is measured by SC(Total) - social connections between executives of capital accessing firms and of Fama-French 49 industry firms by number of total connections. *R*(*average*) is the average of the four equity cost measures, estimated with Easton (2004); Gebhardt, Lee and Swaminathan (2001); Claus and Thomas (2001), and Ohlson and Juettner-Nauroth (2005) methodologies. *rf* is the risk-free rate measured as the yield on the three month government bill. In Columns(2), (4), (6), and (8), *Liquidity* estimated by Lesmond (2005) method (equals the proportion of non-zero return days in the previous quarter), and *Forecast Error* – the absolute value of analysts' earnings forecast error for the fiscal year (equals the absolute value of actual earnings minus the earnings forecast scaled by the stock price) are added to the main model. Control variables are defined in Table 1. Each model includes industry, country, and year fixed effects. Difference is the difference between coefficient estimate of SC(Total) in this table and in the main table (Table 3). Robust standard errors, adjusted for heteroskedasticity and clustered at the firm level, are reported in brackets below the coefficients. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

[16] For CAPM we use only market factor.

[17] Data for systematic market risk, size, market-to-book ratio, and momentum factors as well as the risk-free rate are obtained from Kenneth French's website (international research factors).

Variable	FF49 Industry number and Definition	(1)	(2)	(3)	(4)	(5)	(6)
SC(Total)	11 Healthcare	−0.0207***					
		(0.00791)					
SC(Total)	16 Textiles		−0.0166**				
			(0.00647)				
SC(Total)	20 Fabricated Products			−0.0105*			
				(0.00545)			
SC(Total)	33 Personal Services				−0.0243***		
					(0.00717)		
SC(Total)	40 Shipping Containers					−0.0128**	
						(0.00599)	
SC(Total)	44 Restaurants, Hotels, Motels						−0.0229***
							(0.00650)
Controls		Yes	Yes	Yes	Yes	Yes	Yes
adj. R-sq		0.377	0.377	0.376	0.377	0.376	0.377
Obs		37,712	37,712	37,712	37,712	37,712	37,712
Difference		0.0195	0.0236	0.0297	0.0159	0.0274	0.0173
P-value		[0.0446]	[0.0122]	[0.0013]	[0.0735]	[0.0037]	[0.0495]

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