Shareholder Protection and the Cost of Capital
Empirical Evidence from German and Italian Firms

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ABSTRACT. We investigate implications for the cost of capital in a model with agency conflicts between inside and outside shareholders, where the severity of agency costs depends on a parameter representing investor protection. Using firm-level data for Italy and Germany we find significant differences in shareholder protection and its implications for the firm's ownership structure and the cost of capital. Results indicate that concentrated inside ownership increases the cost of capital for Italian firms while having no significant impact on the cost of capital for German firms. Evidence also suggests bank influence in Germany may serve to reduce investor risk for outside shareholders. In contrast, the magnitude of capital stock distortions is found to be quite important in Italy. Overall, slow growth in continental Europe may be more closely linked to institutional differences in shareholder protection between countries rather than inside ownership of firms.

KEYWORDS: Shareholder protection, ownership structure, cost of capital, agency costs, underinvestment

JEL CODES: G31, G32, E22, D92, O16

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INTRODUCTION

There is mounting empirical evidence, including Pagano, Panetta and Zingales (1998) and Carpenter and Rondi (2006), that EU firms continued to exhibit slow rates of capital formation in the 1990s despite various policy initiatives to bolster equity markets and improve legal harmonization.[1] An alternative approach for explaining the differing growth rates between the US and Europe is to examine how the institutional differences between countries impact the firm's cost of capital. In this paper we set out to empirically investigate the impact of investor protection on the cost of capital in Europe, where investor protection can be characterized "those features of the legal, institutional, and regulatory environment – and characteristics of firms or projects - that facilitate financial contracting between inside owners (managers) and outside investors", Himmelberg, Hubbard, and Love (HHL) (2002). To date, research indicates the significance of these effects overall and the importance of examining differences between countries, but few empirical studies have emerged to link firm financial behavior to the institutional environment.

Several recent studies have pointed to the potential importance of differences in the financial contracting environment and the way legal systems protect investors to help explain differential growth rates between the US and Europe (see, for example, Demirguc-Kunt and Maksimovic, 1998, and Levine, 1999). La Porta, Lopez-de-Silanes, Shleifer, and Vishny ("LLSV", 1998, 2000), have shown that investor protection can be important in explaining why firms are owned and financed differently between countries. Cross-country evidence also shows that firms in countries with weak investor protection, such as many EU member states, have highly concentrated ownership (LLSV, 1999, Barca and Becht, 2001, and Morck, Wolfenzon and Yeung for a

recent survey). HHL (2002) expanded this work by deriving a structural econometric model in which the effects of the legal system are summarized to investigate the relationship among investor protection, inside ownership concentration, and the cost of capital using pooled data for 38 countries. They find that on the average, the higher the level of inside ownership, the higher is the marginal cost of capital – due to the higher risk premium. This model is important because it provides a framework to explain the role of weak governance in the efficient accumulation of capital, such as that experienced in the 1990s in Europe.

Our study extends the literature in two important ways: 1) by providing a micro examination of firm level behavior and agency related problems in the 1990s in Germany and Italy; and 2) allowing a more detailed comparison of two allegedly similar "poor shareholder protection" countries, which in fact have two very different legal, institutional, and regulatory environments.

The paper is organized as follows. Section 1 details the theoretical framework and predictions of our model. Section 2 briefly describes the institutional context in Germany and Italy, and the data. Section 3 describes the empirical strategy and results. We conclude in Section 4 by discussing implications for policy makers concerned with addressing firm growth and financing issues within the European context.

1. THE THEORETICAL FRAMEWORK

The theoretical foundation of this study is based on the agency theory of the firm as outlined in Alchian and Demsetz (1972) and Jensen and Meckling (1976), where agency problems between insiders and outsiders can arise because insiders can divert firm profits to themselves before paying out dividends. There is also a relevant treatment of these issues in the legal literature where different legal institutions reportedly have systematic influences on investor protection (LLSV, 2000, Shleifer and Wolfenzon, 2002). More recently, Himmelberg, Hubbard and Love

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[1] A large body of recent empirical literature has examined the impact of financing constraints on firms' fixed capital investment decision (see Hubbard, 1998, for a survey).

(2002) develop a model incorporating both the legal and financial strands of literature. The model introduces insider risk aversion as the offsetting cost of insider ownership. Specifically, poor investor protection (or more pointedly, poor protection of minority share-holders) favors insiders (controlling share-holders who control the decision-making of the firm) because it allows them to expro-priate outside (minority) shareholders. Con-centrated ownership is thus viewed as the response to, or the substitute for, the lack of legal protection, reducing agency problems and managerial slack (Jensen and Meckling, 1976; Shleifer and Vishny, 1986), or minority investors' expropriation - under the assum-ption that the dominant shareholder does not steal from oneself.[2]

Our focus is on the growth of the firms and underinvestment. We argue that the consequences of lack of investor protection for firm growth need to be spelled out. Weak (minority) investor protection and concentrated ownership may be detrimental not only to the insider but also to the firm in that by preventing the insider (as shareholder) from diversifying risk optimally they also prevent the insider (as shareholder-manager) from pursuing growth-oriented, risky capital projects, thus impeding optimal capital accumulation for the firm.

According to HHL (2002), under imperfect investor protection, the entrepreneur/manager must retain an equity stake in the firm large enough to reassure minority shareholders that he will neither pursue value-destroying projects nor carry out expropriation. The insider will thus be forced to bear high levels of idiosyncratic risk for having a large bulk of his wealth invested in (tied to) the firm. By reflection, the insider will raise external funds

(equity) in a proportion to the initial wealth invested in the firm that does not dilute his incentives, regardless of the actual amount of equity finance that would be needed to fund the firm's growth project.

Two consequences result from this agency problem. First there should be an additional premium in the cost of capital that reflects the additional idiosyncratic risk that the entrepreneur/manager is forced to bear, thus reducing in equilibrium the desired stock of capital. And second, a suboptimal quantity of capital is raised on the equity market (at the time of the IPO, and subsequently). While we do not attempt to test for the second result, we note that debt to equity ratios in Germany and Italy are broadly quoted as 1:1 vs. 1:4 for the US. The first consequence is one that we shall empirically examine in this study.

1.1 Inside Ownership, Stealing, and the Cost of Capital

Our model directly follows that outlined in HHL (2002), which we employ as follows. The model describes a firm where managers are in full control of the decision-making, and have access to a growth project. We assume that the firm has a Cobb Douglas production function, described by $\Pi(K)$, where K is the capital stock that depreciates at the rate δ. The managers are risk averse and seek to diversify by selling a fraction $1-\alpha$, of the equity in the firm. Insiders can steal or divert a fraction s_{it+1} of firm profits to themselves before paying dividends, but stealing has a cost, as defined by an exogenous punishment technology, which is a positive function of a quantitative index of investor protection, ϕ_{it}[3]:

$$c(\phi_{it}, s_{it}) = \tfrac{1}{2}\ \phi_{it}s_{it}^{2} \qquad [1]$$

The manager's net return N_{it+1} in period $t+1$, after taking the firm public, is:

$$N_{it+1} = [\alpha_{it}(1 - s_{it+1}) + s_{it+1} - c(\phi_{it}, s_{it+1})]$$
$$\Pi(K_{it+1}, \theta_{it+1}) \qquad [2]$$

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[2] Interestingly, reliance on this "second-best" solution to agency frictions may be the reason why, in many industrialized countries, company by-laws still include relatively few rules aimed at protecting minority shareholders. Although some progress has been achieved within the EU, as part of the legal harmonization program, much is yet to be done. For example, recent financial scandals in Italy (e.g. Parmalat and Cirio) have been interpreted as a consequence of the delay in the harmonization (see The Economist, January 3rd, 2004).

[3] Higher values of the parameter ϕ_{it} indicate better protection.

Because of agency problems between insiders and outsiders, when managers raise external finance they have to convince outside investors that they will receive a fair market rate of return (i.e. that stealing will not occur).[4] With imperfect investor protection, the managers have to commit to lower levels of future stealing by retaining a higher fraction of equity than would be optimal for them to fully diversify the firm-specific risk. Consequently, they are forced to bear high levels of diversifiable idiosyncratic risk. The tradeoff between risk and insiders' incentive to invest in risky capital projects determines the inside ownership stake in equilibrium. The empirical implications derive from the first-order condition that characterizes the optimal capital choice:

$$E \ [\Pi'(k)] = r + \delta + \Gamma + \alpha(\gamma - \Gamma) \qquad [3]$$

$E \ [\Pi'(k)]$ is the marginal profit of capital and the right hand side represents the firm's user cost of capital, where r is the risk-free rate and δ is the depreciation rate on capital. Γ and $(\gamma - \Gamma)$ represent the risk discounts in the cost of capital for (non-diversifiable) systematic risk and (diversifiable) idiosyncratic risk, which depend in turn on the stochastic discount factors of the market and of the manager, respectively. What is of interest here is that the idiosyncratic compo-nent exists because a large fraction of the insider's income is derived from the profita-bility of the firm. With poor investor protec-tion, and $\alpha > 0$, there is an additional premium in the cost of capital, namely, $\alpha(\gamma - \Gamma) > 0$.

The economic intuition of the model is that insiders assign a lower value to risky projects (and profits) than outside investors. Assuming $(r + \delta + \Gamma)$ constant, one can estimate $(\gamma - \Gamma)$ by regressing $E \ [\Pi'(k)]$, or marginal profit of capital, on inside ownership.

1.2 Measuring the Marginal Profit of Capital

The marginal profit of capital can be measured as follows.[5] Suppose the firm has a Cobb-Douglas production function $Y_{it} = f(A_{it};K_{it};Z_{it}) = AK^{\alpha k}Z^{\alpha z}$, where A_{it} is a measure of total factor productivity, Y_{it} is output, K_{it} represents the stock fixed capital including the firm's property, plant and equipment, and Z_{it} is a vector of variable factor inputs (e.g., materials, energy, unskilled production workers). Now assuming that the firm faces an inverse demand curve $P(Y_{it})$, variable factor prices w_{it}, and fixed costs F, then the profit function is defined by

$$\Pi(K_{it};w_{it}) = max \ P(Y_{it})Y_{it} - w_{it} \ Z_{it} - F \qquad [4]$$
$$s.t. \ Y_{it} = AK^{\alpha k}Z^{\alpha z}$$

Then by the envelope theorem, the marginal profitability of fixed capital, denoted MPK, is:

$$MPK \equiv \partial \Pi_{it}/\partial K_{it} = \ (1 + \eta^{-1}) \ P_{it} \ (\partial f_{it}/\partial K_{it})$$
$$= (1 + \eta^{-1}) \ \alpha_k \ (S/K) = \theta \ (S/K) \qquad [5]$$

Where $\eta \equiv (\partial Y/\partial P)P/Y < -1$ is the firm-level price elasticity of demand , α_k is the capital share of output, $S = PY$ is the firm's sales, and $\theta = (1 + \eta^{-1})\alpha_k$ is a scale parameter that may vary across industries because price elasticity of demand as well as the capital share of sales are different across industries. Thus, up to an industry-specific scale parameter, the ratio of sales to capital may be used to measure the marginal profitability of fixed capital. Assuming that firms are on average at their equilibrium capital stocks, the marginal profitability of capital should roughly equal the cost of capital, $MPK_{it} = r_{it} + \delta_{it}$, where r_{it} is the risk-adjusted discount rate and δ_{it} is the depreciation rate.

1.3 Predictions

In countries where investor protection is said to be generally low, the model predicts

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[4] The level of stealing that maximizes the managers' net return $(\partial N_{it+1} / \partial s_{it+1})$ is characterized by the first-order condition $c_s(\phi_{it}, s_{it+1}) + \alpha_{it} = 1$. The optimal stealing is therefore: $s_{it+1} = (1 - \alpha_{it})/\phi_{it}$ which indicates that stealing is increasing in outside ownership, decreasing in investor protection, and also that inside ownership is inversely related to investor protection.

[5] See Gilchrist and Himmelberg (1998) for detailed derivation and empirical estimates for US firms.

endogenously high levels of insider ownership. Accordingly, the idiosyncratic risk premium applied to the cost of capital should be high, implying a steady-state level of capital below the first-best level. This allows us to measure the real effects of corporate governance, namely that of the effects on the accumulation of capital of the firm. Specifically, we estimate the determinants of the fraction of equity owned by insiders, testing as predicted, whether this fraction depends on measures of investor protection. We depart from previous studies in that our empirical approach emphasizes the *cross-firm* dimension of investor protection by adding firm-level proxies of investor protections. Thus, we test the prediction that investor protection has an important cross-firm and cross-cultural dimension by using data for Germany and Italy separately. We then investigate the correlation between inside equity ownership and the marginal return to capital, a relationship that follows directly from the first-order condition for capital, where the cost of capital includes a risk premium that reflects the insiders' exposure to idiosyncratic risk.

To estimate these relationships we use two separate data sets tracking the behavior of Italian and German firms listed on the *Borsa Italiana* and the *Frankfurt Exchange,* respectively. In addition to using the financial data from annual reports of these firms, our study also employs detailed information on each firm's corporate ownership structure, including that on the identity and concentration of ownership.

2. GERMAN AND ITALIAN INSTITUTIONAL FRAMEWORKS AND DATA

2.1 German and Italian Institutional Frameworks

In the economics literature Germany and Italy are often grouped together for analysis as countries where investors are weakly protected. We find this treatment is too generalized, particularly when one considers

the fact that although they share the Romano-Germanic civil law tradition, their respective institutional environments have developed rather differently. Germany derives its laws from the German Commercial Code written in 1897 after Bismarck's unification of Germany, while Italy's company laws originates from the French Commercial Code, written under Napoleon in 1807. LLSV (1998) which provides a comprehensive and detailed overview of many of the differences between legal, institutional, and regulatory frameworks across countries, concurs with our view by finding evidence of statistically significant differences between the institutions in countries following in the Germanic tradition (Germany) versus the French civil code tradition (Italy). We have summarized key findings below from a recent World Bank report appropriately named *Removing Obstacles to Growth.*

This World Bank data supports the well known stylized fact that both Germany and Italy have high ownership concentration levels compared to the US, as well as similar (lower) levels of informational disclosure requirements -however many other factors impacting investor protection in Italy are quite different than Germany.[6]

Specifically, German shareholders scored 8 out of 10 points for having laws relating to creditor/borrower rights in bankruptcy, and had an 8% of costs of insolvency –both scores very similar to the US. Whereas Italy's cost of insolvency is more than double Germany's, scoring a weak 3 for legal rights on borrower/lender protection. Further, costs of collateral are an order of magnitude higher in Italy than the US or Germany. Observations such as these are part of the reason that some legal scholars, including Theodore Baums (2004), feel that Germany is toughening up in terms of guidelines on governance and it is rapidly moving closer to a UK/US model.

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[6] Figure 1 includes data for the US for purposes of providing a comparative benchmark for European firm performance.

Figure 1. Summary Comparison of Investor Protection Characteristics

Country	Ownership Concentration	Information Disclosure	Legal Rights	Collateral Costs	Insolvency Costs
Italy	0.58	5	3	3.7	18
Germany	0.48	5	8	0.0	8
US	0.20	7	7	0.2	8
Disclosure index out of 10, based on investor protection laws and regulations requiring reporting (World Bank 2005)					
Legal rights index out of 10, based on laws protecting borrowers and lenders (World Bank 2005)					
Costs to create collateral as a % income per capita (World Bank 2005)					
Costs of insolvency as a % of estate (World Bank 2005)					

Summing up, while the German law may exhibit relatively poor shareholder's protection compared to the US or UK for example, it does have high protection of creditors' rights and law enforcement compared to Italy. Italy's law extends weak protection both to shareholders and creditors, as well as medium to low enforcement of law.

Prior to the European Monetary Union, several institutional features changed in Italy, such as: liberalization of the financial markets, privatization of many banks and public utilities, and introduction of a new corporate law that regulates take-over bids, enforces more informative accounting standards and disclosure requirements for listed companies. In 1997, the MSE – Milan Stock Exchange market was privatized, resulting in less restrictive and less costly listing requirements; in 1999, the *Nuovo Mercato*, the Italian counterpart of NASDAQ was launched for high tech firms –the same year as the *Neuer Markt*; and a Corporate Governance Code of Self-discipline was issued[7], but only enforced on a voluntary basis. Finally, in 2000, Borsa Italiana launched a new segment, the STAR (*Segmento Titoli con Alti Requisiti*) market, to enhance the visibility of small and medium old-economy enterprises committing to comply with higher liquidity requirements and more severe disclosure rules. In spite of institutional changes, investor protection remains comparatively weak in Italy, even according to CONSOB (*Commissione Nazionale per le Società e la Borsa*), the Authority that governs Italian equity markets since 1974.[8] For example, almost all listed companies had issued a corporate governance report and made it available on the Internet by 2004, but only a minority had adopted at least one of the provisions of the code.

In essence, the 1990s were an important period of institutional change in Germany and Italy, both countries seeking to improve their "poor shareholder protection" status to improve the investment climate. We argue that empirical studies are lacking to provide a clear understanding of the underlying relationships at work, and hope that this study will provide a benchmark for gauging future policy.

2.2 Data

Our empirical investigation uses two datasets, the first containing firms listed on the *Frankfurt Börse* and the second containing firms listed on the Italian exchange, *Borsa Italiana*.

The German financial data came from the Bonn Database, which contains a complete set of all firms listed on the Frankfurt exchange. We excluded firms that were involved in

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[7] Listed Companies Corporate Governance Committee of *Borsa Italiana*, "Report and Self-discipline Code", 1999, available at www.borsaitalia.it. Similarly to the US and UK, the Corporate Governance Code requires the nomination of independent, non-executive directors, appointment of the audit, nominating and compensation committees, and the appointment of an Investor Relations Officer.

[8] In its Annual Report for the year 2000, CONSOB recommends that the newly introduced reform of company law (Law n. 58/1998) will "pave the way to strengthened protection of shareholders".

mergers, bankruptcies, acquisitions, changes in legal status, double listing of consolidated and non-consolidated information for the same firm groups. This data was matched with detailed information on the ownership identity, concentration, and bank relationship for 80 of the firms for which the information was publicly available.[9]

One important contribution of our study comes from the fact that we collected our databases from original sources, allowing us to construct more precise and meaningful measures of firm-investor relationships than is normally possible with commercial data. Specifically we crafted variables measuring the degree of inside ownership/control as follows. For Germany, because banking relationships are key components of the institutional environment for the firm, and a special case of inside ownership we needed to construct a bank influence variable. This variable is a composite measure of bank influence on the firm relating to information we collected on the concentration of equity ownership in the firm, the use of proxy votes of the firm, and the degree of bank representation on the firms supervisory board (*Aufsichtsrat*). The construction of the variables indicating that the firm was controlled either by Insiders, Banks, or Institutions was done as follows. The *Inside* dummy variable takes on a value of 1 if either an individual or a family owns 25% of the firm or more, and no other owner owns more than 25%, in either 1991 or 1986. The *Bank* variable indicates that a financial institution (bank or insurance company) either: 1) owns more than 25% of the firm and no other owns more than 25% of the firm, or 2) a bank owns 50% of the firm (even if some other owns more than 25%), or 3) if the % of non-employee representatives that are bankers on the supervisory board is 25% and the total proxy votes of banks at annual shareholder meetings is more than 10% or 4) the % of non-employee representatives that are bankers on the supervisory board is 10% and the total number of proxy votes executed by banks at annual shareholders meetings is 25% or more.

This variable took the value of 0 otherwise, indicating minimal or no bank control over the firm activities. Note that under German corporate law, a 25% share of voting rights is sufficient to block any major proposal at the shareholders' meeting. The *Institute* variable indicates that either an institution (either a financial firm or a non-financial firm or both) owns 25% of the firm or more, and no other owner owns more than 25%. Note that many of these measures are not mutually exclusive but represent alternative measures of insider control, and as such will be entered into the estimations separately to avoid multicollinearity in estimates. In the Appendix, Tables A1 and A2, we summarize the main characteristics of the German firms in our dataset.

For Italy, we use annual firm-level data from the CERIS database that contains extensive information on 1850 Italian manufacturing firms over the period 1977-2002.[10] Our empirical investigation uses the sub-sample of 63 quoted firms that are still listed in the Milan Stock Exchange in 1995, when information about listed companies' ownership structure first became publicly available. The earliest entries in the data are therefore in 1995 and the latest entries are in 2000, in order to have at least 3 observations for firms going public in 2000. The panel comprises 334 firm-year observations for 63 firms, of which 43 going public after 1995. Firms going public in the 1980s and in the 1990s are recognized as different in many respects.[11] While the former are typically

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[9] For a complete description of these data see Chirinko and Elston (2006).

[10] The database, an unbalanced panel where firms have at least five consecutive observations, was constructed at CERIS-CNR using several sources. Balance-sheet and stock-exchange data are collected from two annual directories, *Le Principali Società*, and *Indici e Dati* published by Mediobanca, a large investment bank; information on corporate governance and ownership structure is derived from company reports, Borsa Italiana and CONSOB. Finally extensive information about the firms' age, ultimate ownership, group affiliation, location and business activity was obtained from DUN's Braadstreet and other directories. For a complete description of the dataset, see Benfratello et al., 2001.

[11] For differences in motivation to go public and post-IPO performance of these two groups of firms, see Carpenter and Rondi, 2006.

large, part of pyramidal groups where ownership and control are separated from ownership and less growth-oriented, the latter tend to be small or medium-sized, not affiliated to hierarchical groups (independent) and more motivated to growth around the IPO date. However, both kinds are ultimately family-owned, mature companies operating in manufacturing industries.

Inside ownership is a key variable in this study. Ideally inside owners are shareholders that control decision-making (i.e. sitting on the board of directors and/or in the managerial board).[12] For Italian firms, we could reconstruct year by year a continuous, time-varying variable for inside ownership based on information about boards' composition, "relevant" (i.e. > 2%) shareholdings and stockholders' identity (*Bollettino CONSOB*, Special Issue, various years). The detailed information on directors' board composition we collected for this paper confirms that controlling families participate in top management, consistently with the definition of insider in the HHL model (see also LLSV, 1999, and Bianchi, Bianco, Enriques, 2001). In Italy, the percentages of equity held by the controlling shareholder and by insiders are very close – 57.16 and 57.5%, on average in our sample – because the initial owner/ controlling shareholder (the entrepreneur manager who took the company public) usually sits on the board together with other members of the family. Most often, a «family», or an individual directly holds the controlling shareholding. Whenever it is held thorough a holding company, we could identify the ultimate owner in all but two cases. In the Appendix, Tables A3 and A4 summarize the main characteristics of the Italian firms in our dataset.

3. ESTIMATIONS AND RESULTS

A key feature of the model is that investor protection may vary not only across countries, but also across firms. "Investor protection is

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[12] HHL (2002) define it as the fraction of equity held by insiders, and use the "closely-held shares" variable from the Worldscope database for their cross-country analysis.

anything that exogenously increases the cost of stealing from outsiders" (p. 8), widening the scope of our search of firm-level determinants of investor protection. For example, tangible assets, such as factories, plants and equipment are difficult to steal and provide a "built-in" degree of protection to outside shareholders. Or, the identity of minority shareholders, such as institutional investors or financial institutions, may influence investor protection to the extent that they carry more (or less) political clout with law enforcement agencies. Further, in countries with poor investor protection, insiders may have a hard time selling equity and may wish to signal that they intend to respect their financial contracts. They may do so by voluntarily disclosing sensitive information, improving quality of accounting standards, or complying with a self-disciplining code of corporate governance, and so forth.

Hypotheses and Estimation Results

The empirical tests in this paper focus on two main hypotheses. First, we test if inside ownership depends on measures of investor protection by regressing inside ownership on variables that proxy the firm-specific, built-in degree of investor protection. Due to the different characteristics of the datasets, we adopt different estimation strategies to test this hypothesis. Second, we test the prediction of the model that the equilibrium level of inside ownership is positively related to the marginal return of capital, a relationship that reflects the additional idiosyncratic risk premium in the marginal cost of capital.

We first present the empirical results for the Italian firms, in Tables 1 and 2. Table 1 reports coefficient estimates of the determinants of inside ownership concentration for our sample of 63 Italian manufacturing firms in Column A. Columns B and C report results for the sub-samples of mature listed firms (B) and firms that floated in the Nineties to explore potential differences in the behaviour of insiders in old and newly public companies. The dependent variable is the logarithm of α, the equity holdings by

members of the firm's board of directors. Column A includes several variables of "built-in" investor protection: asset intangibility as measured by the sales to capital stock ratio (where the capital stock is reconstructed at replacement value based on a perpetual inventory method), a dummy variable returning if the firm is listed in the STAR (*Segmento Titoli con Alti Requisiti* – High Requirements Security Segment) branch of *Borsa Italiana* and a dummy variable which returns if the firm has a minority shareholding by an institutional investor (mutual or pension funds, or venture capital company). An additional dummy returns a one if the firm has complied with all norms by the Corporate Governance Self Discipline Code. In columns B and C, the specifications account for the separate effect of the main norms in the Code, - namely if firms have independent directors, an auditing committee and an investor relation officer.[13] Finally, we include a set of control variables, firm size (the log of real sales), a dummy returning if a group of the firm's shareholders signed an agreement such as a voting pact, and the firm's leverage. As highlighted by Bianchi, Bianco and Enriques (2001), in Italy, voting pacts and other agreements denoting a coalition of shareholders are viewed as devices to separate control from ownership as they allow insiders to control the firm with small equity stakes.[14] We include the leverage because if the firm's manager/insider is reluctant to raise external equity funds, then debt is the only alternative resource to finance growth projects. So we expect that leverage enters with a positive coefficient (see for example, Mueller, 2005).

In column (A) we find that the coefficient

on the sales to capital ratio is positive but insignificant. The Institutional Investor dummy enters with a negative and significant coefficient, as expected. This suggests that having an institutional minority shareholder acts as a substitute for investor protection, thus allowing the insider to retain a smaller equity share. The coefficient on the STAR dummy is negative and not far from significant, suggesting that featuring a record of transparency in the public equity market also has a role in lowering ownership concentration. Notably, only firms that IPO'ed in the Nineties list in the STAR segment. The Corporate Governance dummy is the variable that we expect to best capture the built-in degree of investor protection. We find that the estimated coefficient is negative and significant, consistently with the model predictions.

As for the control variables, both the dummy variable indicating "Shareholders' Agreement" and firm's size are not significant, whereas, the coefficient on firm's leverage is positively signed as expected, but again not significantly different from zero.

When we compare the results for old and newly public firms in columns B and C, we note several interesting differences. The first one is about the role of asset intangibility, as measured by the sales to capital ratio, which is included on the ground that intangibility of the assets (e.g. technological know-how, marketing capabilities, R&D activities) leads insiders to retain a larger fraction of the firm's equity. Conversely, asset tangibility, i.e. assets that are difficult to divert or steal, would provide stronger built-in protection to outside investors, thus making it easier for the insiders to reduce their share in the firm. Our results show that this interpretation holds for newly public firms – where the coefficient is positive and nearly significant, but not for mature listed firms where the presence of intangible assets apparently is not an obstacle for the insider to reduce his stake in the company. One possible explanation for the negative sales-to-capital coefficient is that firms that have been in the public market for longer enjoy a "reputation" effect that releases the insiders from having to rely on firm-specific

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[13] Construction of this variable required special attention for two reasons. First, companies are only recommended, not required complying with the code. Second, many companies provided only vague descriptions of their compliance to the code (e.g. not indicating the number or names of independent directors, or whether non-executive and independent directors in the required proportions were in the auditing committee). Only companies that applied all three norms literally were assigned a dummy value of 1.

[14] Listed firms have to notify shareholders' agreements, their content and duration to CONSOB.

investor protections. Given the structurally weak level of institutional protections this would reflect the underlying underdevelopment (lack of sophistication) of Italian equity markets. An alternative explanation is that insiders in long quoted firms do not require built-in protections because they may resort to alternative external sources to fund their projects. This interpretation is apparently supported by the empirical result on the coefficient for leverage that is positive and strongly significant for mature firms and negatively insignificant for newly public firms.

For this sub-sample only, firm size enters with a positive and nearly significant coefficient, indicating that inside ownership tend to be lower at smaller firms that went public in the Nineties. This is in contrast with HHL's finding of a negative coefficient, which they explain by arguing that large size may ensure better protection to outside investors because of economies to scale to monitoring. Our result, however, appears more consistent with the Italian institutional context, where small and medium firms may be motivated to adopt monitoring devices by their need to raise external finance in a weakly protected environment.

When we enter the corporate governance code's dummies separately, we find that both the presence of Independent Directors and the existence of the Audit Committee display the expected negative effect on inside equity ownership.

The second test we carry out focuses on the predicted positive relationship between the level of inside ownership (α) and the marginal return to capital (*MPK*). To implement equation [5] empirically, we construct industry-level estimates of θ by averaging over all firms *i* and years *t* in industry *j*, and by assuming $r + \delta = 0.18$ for all industries. Thus, for industry j, θ_j is given by:

$$\theta_j = [(1/NT)\Sigma_i\Sigma_t (P_{it}Y_{it}/K_{it})]^{-1} (r + \delta) \qquad [6]$$

And, for firm *i* at time *t*, $\Pi^k_{it} = \theta_j (P_{it}Y_{it}/K_{it})$ is the measure of marginal return to capital.

From the first-order condition for the capital stock in eq. [3], we obtain the following empirical model:

$$MPK_{it+1} = r + \delta + \Gamma + (\gamma - \Gamma)\alpha_{it} + u_{it} \qquad [7]$$

These regressions produce estimates of ($\gamma - \Gamma$), which reflects the average additional risk premium for bearing idiosyncratic risk, above the systematic risk premium (*Γ),* which is absorbed in the constant term.

In Table 2, we report the estimated coefficients from regressing the marginal profitability to capital on (lagged) inside ownership concentration for our sample of Italian firms. Both specifications account for firm specific effects and control for the endogeneity of inside ownership. The instrument set includes the once-lagged inside ownership and the variables we used when investigating the determinants of inside ownership in Table 1. Results in column A and B differ for the instrument sets as specified in the notes to the table.

The empirical results for Italian firms support the positive relationship between the equity fraction owned by insiders and the marginal return to capital predicted by the first order condition that characterizes the optimal capital choice. Columns A-B show that the coefficients on inside ownership are positive and significant, with estimated values of 0.1024 or of 0.096 depending on the instrument set, consistently with HHL's model prediction that, under poor investor protection, the higher is the concentration of inside ownership, the higher is the implied cost of capital.

Using the estimated coefficients in Table 2, we can calculate the quantitative importance of cost of capital distortions for the firm size, i.e. the extent to which weak governance is an obstacle to efficient accumulation of capital (see Table A5). These also depend on the elasticity of the capital stock to the marginal cost of capital.[15] Given our estimates of *($\gamma - \Gamma$)*

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[15] In the Appendix, Table A7 reports the solutions for the equilibrium values of marginal profit to capital and the associated capital stock assuming the estimated coefficients and sample values of inside ownership. We use the first-order condition as from eq. [7], assuming a Cobb-Douglas production function with constant returns to scale and a

= 0.1024 (0.096 in column B), which measures the cost of capital premium for idiosyncratic risk under weak investor protection, a firm where the insider typically holds 50.9% of the equity (the 25th percentile in our sample of Italian firms) is found to accumulate only about one third of the capital of a firm where the insider's stake is 10%. We can conclude that the magnitude of the underinvestment due to highly concentrated ownership and poor shareholders' protection in Italy is found to be quite important.

We now turn to our sample of German firms, where the empirical approach has to adjust to account for the presence of banks as major players in German capital and corporate control market. Instead of investigating the determinants of the insider's equity share, we therefore investigate what determines whether the insider is a family, a bank or an institution, with dichotomous dependent variables to represent the identity of the insider. Table 3 reports the results of the logit model in which the probability that the firm is dominated by banks (column A), an institution (B) or a controlling family or individual (C), or, is a linear and function of firm-specific investor protections. The set of explanatory variables includes firm size (the logarithm of total assets), R&D intensity measured as the ratio of intangible to tangible assets of the firm, leverage as measured by the ratio of total debt to the sum of debt and equity, and time and industry dummies.

Our results show that there is a positive relationship between firm size and *Bank* influence as indicated by positive and statistically significant coefficients in estimations A; a negative relationship between firm size and *Institutional* ownership, but no relationship between firm size and *Family* insiders. There are several possible explanations, but we interpret this as indicating that investors in larger firms may

downward sloping demand curve for output. So $(1-\eta)AK^{-\eta} = r + \delta + \Gamma + (\gamma - \Gamma)\alpha_{it}$ is the starting point. To derive the impact of changes in investor protection and ownership concentration numerically, we adopt the parameter values for η, δ, r, and Γ used by HHL (2002) which are, respectively, 0.2, 0.08, 0.10 and 0.0.

seek banks as an alternative insider (or in effect bank influence) as a solution to control the expropriation of firm assets –thus obtaining better protection. Conversely, the negative coefficient in column (B) seems to confirm that institutional ownership is perceived as a substitute for shareholders' protection particularly to investors in small firms. The lack of significance of the size variable in C is interesting, possibly indicating that for family-controlled firms there is neither better nor worse investor protection no matter what the firm size.

The coefficient on R&D (the ratio of intangible to tangible assets) is economically and statistically significant and positive for estimations A and B. If intangible assets (ideas vs. computers) are easier to "steal" or expropriate, then this help explain why R&D is such a strong and positive indicator of bank and institutional influence. If R&D is endogenous, which it surely is to some degree, another interpretation is that firms with bank influence have better investor protection and would then also have an easier time financing R&D, in which case like bank influence would be an endogenous proxy for good investor protection. The negative and significant sign on R&D for family insiders in column C is consistent with the notion that this variable captures idiosyncratic risk which is high in this case and is an endogenous indicator of weak investor protection. Leverage enters positively and significantly only for firms dominated by institutions, which indicates that these firms find it relatively easy to raise external funds alternative to equity to finance their projects. In contrast neither family-controlled nor bank-influenced firms appear to be able to do so. Even though this may appear counterintuitive for firms controlled by banks, our result is consistent with previous studies, such as Chirinko and Elston (2006) which find that bank influenced firms in Germany do not have greater debt levels nor lower cost of financing than independent firms.

In Table 4, we estimate the marginal product of capital as a proxy for the cost of capital as a function of *Bank*, *Institute* and *Family* inside ownership. We add firm size as

a control variable. The negative significant sign on size in all specifications indicates that, regardless of the insider's identity, larger firms have a smaller marginal cost of capital, which is to be expected due to better information sharing with creditors and better access to capital markets. When we turn to the relationship between MPK and type of ownership we find that being dominated by an *Institution* increases the cost of capital (column B), even when firm size is accounted for. A likely explanation for this result is that the relationship spuriously captures the leverage effects (see the results in Table 3), which are possible if the debt markets are not frictionless and insiders bear the consequences of a borrowing rate increasing in the debt to asset ratio. However the coefficient on *Family* (column C) is negative and significant while the one on *Bank* (column A) is insignificant. These findings generally do not support the prediction that family inside ownership (or bank influence) increases the cost of capital, nor are consistent with an institutional environment that is weak in shareholder protection, particularly when compared to the Italian data results.

CONCLUSIONS

In this paper, we empirically investigate the impact of investor protection on the cost of capital in Europe, where investor protection can be characterized according to HHL (2002) as "those features of the legal, institutional, and regulatory environment – and characteristics of firms or projects – that facilitate financial contracting between inside owners (managers) and outside investors". To date, research indicates the significance of these effects overall and the importance of examining differences between countries, but very few empirical studies have emerged to link micro-firm financial behaviour to the institutional environment.

Our findings suggest that for Italy, voluntary compliance with corporate governance norms as well as tighter liquidity and disclosure rules have a negative impact on the concentration of inside ownership of the firm. The presence of institutional minority investment is also a negative determinant of inside ownership, suggesting that the presence of institutional investors may serve as a signal of better protection. We interpret these variables as proxies of firm specific "built-in" investor protections. Our results confirm that investor protection has an important *cross-firm* dimension in addition to the more familiar *cross-country* dimension, as suggested by HHL's approach. Furthermore, for Italian firms, we find that the *cross-firm* dimension of investor protection changes with length of the period on the stock market. Specifically, asset intangibility is a positive determinant of the insider's stake for newly public firms; but it is not for companies that have been quoted on the exchange for longer periods of time. Mature firms apparently compensate for the lack of outside equity by increasing debt, but firms that went public in the 1990s do not.

In Germany, we find an environment with both higher investor protection and lower concentrated ownership than Italy, but no evidence of an external financing premium. Our results suggest that investors in large firms may seek inside bank influence as a means of increasing outside minority shareholder protection. Allowing for endogeneity in our interpretation of bank influence, these results also suggest that bank influence may to some degree, also serve as a signal of better protection to investors. In Germany, a firm's R&D intensity has a strongly positive impact on the probability that the firm would have bank influence, but not on its propensity to have concentrated insider ownership otherwise, also indicative that firms with bank influence may provide better investor protection and/or have an easier time financing R&D projects.

In both countries, asset intangibility is a positive determinant of concentrated inside ownership. We interpret this as an indication that R&D intensive firms (which have higher percentages of intangible assets) have a harder time obtaining equity capital (thus diluting capital structure) because of the inherent asymmetrical information problems

associated with high technology firms.

Finally, our results for German firms suggest that bank influence has little impact the firm's marginal cost of capital, consistent with earlier findings on the relatively weak influence of banks on firm capital structure. In contrast, our evidence for Italy shows that the higher the concentration of inside ownership, the higher is the implied cost of capital, thus confirming the link between investor protection, ownership structure and the cost of capital. This suggests that the magnitude of the distortions from the first-best level of capital stock may be large in countries with poor investor protection like Italy, concurring to explain underinvestment and slow growth.

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TABLE 1
DETERMINANTS OF INSIDE OWNERSHIP CONCENTRATION
ITALIAN FIRMS
Dependent Variable: Log α

Firm-Level Characteristics	(A)	(B) Mature Listed Firms	(C) Firms IPOing in the 90s
Sales / Capital	0.003	-0.061*	0.005
	(0.840)	(-1.742)	(1.491)
STAR Segment	- 0.306	-	0.011
	(-1.211)	-	(0.322)
Institutional Investors	-0.060**	-0.087***	-0.003
	(-1.985)	(-2.689)	(-0.139)
Corporate Governance Code	-0.091**	-	-
	(-2.279)	-	-
Independent Directors	-	-0.181***	-0.075*
	-	(-2.879)	(-1.654)
Audit Committee	-	-0.078	-0.282***
	-	(-1.208)	(-3.135)
Investor Relation Officer	-	0.034	0.171*
	-	(1.029)	(1.763)
Shareholders' Agreement	0.131	0.045	0.039
	(1.239)	(0.744)	(0.762)
Leverage	0.164	0.387**	-0.030
	(1.054)	(2.077)	(-0226)
Log (Sales)	0.026	0.003	0.116
	(0.501)	(0.006)	(1.575)
Adj-R2	0.723	0.830	0.688
N. Obs.	334	147	187
N. Firms	63	20	43

Notes: LSDV estimates. Standard errors corrected for heteroskedasticity. t-statistics in parentheses.

***   Coefficient significantly different from 0 at the 1 percent level or less.

**   Coefficient significantly different from 0 at the 5 percent level.

*   Coefficient significantly different from 0 at the 10 percent.

TABLE 2
ESTIMATES OF THE FIRST-ORDER CONDITION FOR THE CAPITAL STOCK
ITALIAN FIRMS
Dependent Variable: MPK

	(A) I. V.	(B) I. V.
Inside Ownership$_t$	0.1024** (2.357)	0.096*** (3.009)
Firm Dummies	Yes	Yes
N. obs.	271	271
N. Firms	63	63
Sample period	1996-2002	1996-2002

Notes: 2SLS estimation performed using Limdep. t-statistics in parentheses. Standard errors corrected for heteroskedasticity.

***   Coefficient significantly different from 0 at the 1 percent level or less.
**   Coefficient significantly different from 0 at the 5 percent level.
*   Coefficient significantly different from 0 at the 10 percent.

Instruments in Col. (A): Insider (-1), Sales/Capital, Inst. Investors, CorpGov. Code
Instruments in Col. (B): Insider (-1), Log (Sales), Sales/Capital, Inst. Investors, CorpGov. Code.

TABLE 3
LOGIT ANALYSIS OF THE PROBABILITY OF BANK / INSTITUTION / FAMILY OWNERSHIP
GERMAN FIRMS

Dependent Variable	*Bank*	*Institute*	*Family*
	(A)	*(B)*	*(C)*
Log (Total Assets)	1.093***	-0.829***	-0.178
	(4.729)	*(-3.163)*	*(-1.187)*
R&D [1]	9.325***	34.763***	-14.424***
	(2.546)	*(3.003)*	*(-2.905)*
Leverage	-1.226	4.784***	-1.298
	(-1.186)	*(3.164)*	*(-1.518)*
Industry Dummies	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes
χ^2	239.1 [20]	312.0 [20]	77.1 [20]
p-value	*0.00*	*0.00*	*0.00*
PCP	83.5%	90.2%	80.7%
N. Firms	43	43	43
N. Obs.	357 [2]	357	357

Notes: t-statistics in parentheses

Bank influence uses data on bank equity ownership, proxy votes used by bank, and supervisory board representation. *Family* ownership is the concentration of family or individual ownership. *Institute* indicates ownership by financial or non-financial institutions.

(1)   R&D= (Intangible Assets / Tangible Assets)
(2)   Excluding Intangible / Tangible > 1 and observations for which debt was not available

   ***   Coefficient significantly different from 0 at the 1 percent level or less.
   **   Coefficient significantly different from 0 at the 5 percent level.
   *   Coefficient significantly different from 0 at the 10 percent.

TABLE 4
ESTIMATES OF THE FIRST-ORDER CONDITION FOR THE CAPITAL STOCK
GERMAN FIRMS

Dependent Variable	MPK		
	(A)	*(B)*	*(C)*
Bank Influence	-0.010 *(-0.347)*	- -	- -
Institution Inside Ownership	- -	0.095*** *(3.978)*	- -
Family Inside Ownership	- -	- -	-0.049** *(-2.276)*
Log (Total Assets)	-0.058*** *(-4.351)*	-0.050*** *(-4.044)*	-0.057*** *(-4.644)*
Industry Dummies	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes
Adj-R2	0.20	0.22	0.21
N. Firms	45	45	45
N. Obs.	312[1]	312	312

Notes: Standard errors corrected for heteroskedasticity. t-statistics in parentheses.
Bank influence uses data on bank equity ownership, proxy votes used by bank, and supervisory board representation. *Family* ownership is the concentration of family or individual ownership. *Institute* indicates ownership by financial or non-financial institutions.

(1) Excluding MPK < 0.03 and MPK > 2

*** Coefficient significantly different from 0 at the 1 percent level or less.
** Coefficient significantly different from 0 at the 5 percent level.
* Coefficient significantly different from 0 at the 10 percent.

APPENDIX

TABLE A1 – *GERMAN* SAMPLE: FIRM CHARACTERISTICS BY INDUSTRY UPON ENTRY
(Means)

	Industries	N. Firms	Inside-Controlled Firms	Firms with Bank Shareholding	Others
1	Mineral Products, Paper, Oil, Forestry	5	1	0	4
2	Chemical and Rubber	3	0	3	0
3	Iron, Steel, Machinery & Equipment	18	6	11	1
4	Electronics, Optics, Computers	6	1	1	4
5	Transport Equipment	3	1	1	1
6	Food, Drink, & Tobacco	4	1	0	3
7	Textiles, Leather	0	-	-	-
8	Utilities and Power	6	0	3	3

TABLE A2 – *GERMAN* SAMPLE: DEFINITIONS AND SUMMARY STATISTICS
FOR FIRM-LEVEL VARIABLES
(Means and percentiles, 1986-1991)

	Variable	Mean	Stdev.	25th Perc.	50th Perc.	75th Perc.
1	Bank inside ownership	0.39	0.489	0.00	0.00	1.00
2	Institute inside ownership	0.39	0.489	0.00	0.00	1.00
3	Family inside ownership	0.22	0.415	0.00	0.00	0.00
4	Log (Assets)	21.84	1.10	21.01	22.03	22.58
5	R&D (asset intangibility)	0.04	0.08	0.003	0.012	0.039
6	MPK	0.21	1.20	0.10	0.16	0.27
7	Book leverage	0.51	0.18	0.36	0.52	0.64

TABLE A3 – *ITALIAN* SAMPLE: FIRM CHARACTERISTICS BY INDUSTRY UPON ENTRY
(*Means*)

	Industries	N. Firms	Inside equity ownership	STAR segment	Institutional Investor	Shareholders' Agreement	Corporate Governance	Lev
1	Non metallic mineral products	5	60.07	0.00	0.80	0.20	0.00	43.84
2	Chemical rubber and plastics	8	62.40	0.38	0.50	0.38	0.38	23.00
3	Machinery and Equipment	10	52.54	0.30	0.80	0.50	0.20	38.13
4	Electrical machinery. TLC and electronics	17	60.67	0.41	0.35	0.29	0.29	29.33
5	Transport Equipment	5	53.12	0.40	0.80	0.20	0.80	41.02
6	Food and Drinks	4	52.68	0.75	0.25	0.25	0.50	41.08
7	Textile and Clothing	12	58.75	0.17	0.25	0.17	0.33	35.85
8	Print Publishing	2	59.78	0.50	0.00	0.00	1.00	43.28

TABLE A4 – *ITALIAN* SAMPLE: DEFINITIONS AND SUMMARY STATISTICS FOR FIRM-LEVEL VARIABLES
(*Group means and percentiles, 1995-2002*)

	Variable	Mean	Stdev.	25th Perc.	50th Perc.	75th Perc.
1	Inside Equity Ownership	0.575	0.118	0.509	0.590	0.662
2	Log (Sales)	11.8691	1.0629	11.076	11.726	12.541
3	Sales/Capital	3.135	5.281	1.494	1.920	3.200
4	MPK	0.175	0.430	0.081	0.112	0.156
5	Book leverage	0.366	0.215	0.180	0.351	0.518
6	Corporate Govern. Code	0.142	0.252	0.000	0.000	0.250
7	Star Segment	0.339	0.473	0.000	0.000	1.000
8	Institutional Investors	0.469	0.409	0.000	0.429	1.000

TABLE A5 – QUANTITATIVE IMPORTANCE OF CAPITAL STOCK DISTORTIONS FOR ITALY

α	$\gamma - \Gamma$	
	Π^k	K
0.000	0.180	100
0.100	0.190	75.83
0.300	0.211	45.48
0.509	0.232	28.05
0.575	0.239	24.29
0.662	0.248	20.23

Notes: Calculations based on observed equity ownership of Italian insiders and estimated values of the idiosyncratic risk premium, $\gamma - \Gamma$.

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