Corporate Governance and the Determinants of Investment

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Abstract:

We use investment-cash flow regressions to show that both asymmetric-information and agency problems are more severe in Continental Europe than in the Anglo-Saxon countries leading to too little investment by firms with attractive investment opportunities and too much by those with poor investment opportunities. Legal systems, accounting standards, and ownership structure systematically affect the investment-cash flow sensitivity. Cash flow coefficients are largest for family-controlled firms in Europe.

Keywords: Investment, Cash Flow, Corporate Governance, Tobin's q , Marginal q , Asymmetric Information, Managerial Discretion

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A huge literature both theoretical and empirical now exists, which derives predictions about the determinants of investments and/or tests these predictions. Much of this literature can be said to be “institution free” in that the firm is placed in a neoclassical world where only the heights of its investment opportunities and cost of capital determine the level of its investment. When institutions have been introduced, they have (often implicitly) had what are generally regarded as the characteristics of Anglo-Saxon countries. Firms are joint-stock companies with widely dispersed shareholdings. Managers are isolated both from the owners of the firm, and from its sources of external capital. These institutional features of Anglo-Saxon countries have been shown to have important theoretical and empirical consequences for the determinants of investment.

In this paper we extend the institutional horizon by examining the implications of assuming an alternative institutional structure — namely that found in the Continental European countries. Here shareholdings are generally much more concentrated than is usually assumed to be the case in Anglo-Saxon countries, and banks are often assumed to play a more important role in supplying investment capital to companies and monitoring their managers. We demonstrate that these institutional differences produce differences in the predictions one makes about the determinants of investment in different countries, and present evidence that most of these differences exist.

The number of different theories of investment put forward over the last half century is in itself now quite large. To simplify matters and highlight important institutional differences across countries, our empirical work focuses on two theories — the *asymmetric-information* theory (hereafter the AIT) and the *managerial-discretion* theory (hereafter the MDT).¹ We do not test another popular theory in the investment literature — the *q*-theory, since *q* appears in both the AIT and MDT, although with different interpretations than under the traditional *q*-theory. Both the AIT and the MDT rest on different assumptions than does the *q*-theory, and the empirical support we obtain for each implicitly justifies these assumptions and rejects the pure form of the *q*-theory.

The AIT was first advanced as a theoretical proposition by Stiglitz and Weiss (1981) and Myers and Majluf (1984), and first tested empirically by Fazzari, Hubbard and Petersen (1988). The AIT, as its name implies, builds on the institutional feature of Anglo-Saxon systems that the distances between firms and their external sources of finance – banks, and equity and bond markets – are so great that an *asymmetric-information problem* may arise between a firm's managers and the external suppliers of capital. The managers may possess more information about their firm's investment opportunities than does the external capital market, and this can affect the level of its investment.

The MDT was first put forward and tested by Grabowski and Mueller (1972). It builds on the existence of a *separation of ownership and control* in Anglo-Saxon countries, which gives rise to a *principal-agent problem* between a firm's managers and its shareholders. The presence of a separation of ownership and control provides managers with the discretion to pursue their own goals, even when they conflict with those of the shareholders, and this can lead to differences in investment levels from those predicted under both the *q*- and asymmetric-information theories. This theory is not directly applicable in the institutional context of Continental Europe, since ownership is very concentrated and the separation of ownership and control therefore limited. However, concentrated ownership has its own agency costs and a conflict between large, controlling owners and small, minority shareholders arises. We argue that this has implications for the determinants of investment.

In the next section we discuss the two theories of investment, and models to test each. As a benchmark for comparison with other countries, in Section II we present estimates of the two models using data for the United States. Support for both models is found. The modifications to the models and their predictions needed to account for differences in corporate governance structures across countries are discussed in Section III. The data used to test these predictions and the empirical findings are presented in Section IV and Section V. The last section briefly draws the implications of our results.

I. Modeling the Determinants of Investment in an Anglo-Saxon World

A. The Asymmetric Information Theory of Investment

Under the q -theory the key explanatory variable is, of course, Tobin's q . When it exceeds one, a firm is presumed to have profitable investment opportunities, and it expands its capital stock. A large literature dating back almost 50 years (Meyer and Kuh, 1957) has, however, found a positive relationship between company cash flows and investment, a relationship not predicted by the q -theory. The AIT claims to be able to account for this relationship.

The AIT rests on several, rather extreme assumptions.² (1) A firm has insufficient cash flows to finance an attractive investment (one with a return greater than its cost of capital), and cannot finance this investment by either issuing debt (it is debt constrained), or cutting dividends (they already are zero). (2) The managers of the firm are aware of both the returns on this attractive investment, *and* that the existing assets of the firm are worth more than the market perceives. (3) Because of the latter assumption, the firm's shares are currently underpriced. If the firm issued shares to finance the investment, its current shareholders would be harmed because of the market's undervaluation of its shares. (4) The firm's managers maximize the wealth of only the current shareholders, and ignore those who would become shareholders if the firm issued equity to finance the investment, and who would in fact benefit greatly from such an action. Under these assumptions it is possible that a firm fails to undertake an investment with an expected return greater than its cost of capital. Given sufficient cash flows the firm can finance the investment without having to resort to the equity market. This benefits their existing shareholders who would be harmed by the sale of their undervalued shares. Hence arises the relationship between cash flows and investment. In a sample of firms with attractive investment opportunities, if the capital market is unaware of these opportunities, only firms with ample cash flows undertake the investments.

To test the AIT most studies have included both cash flows and q in the equation:

$$I_t = a + bq_{a,t-1} + cCF_{t-1} + \mu_t \quad (1)$$

Both right-hand-side variables are lagged to avoid endogeneity problems.

The logic for including $q_{a,t-1}$ in (1) is similar to that underlying the q -theory, namely that the variable captures investment opportunity differences across firms. The use of Tobin's q for this purpose is, however, a bit problematic. Tobin's q is the ratio of the market value of a firm to its assets. This can be shown to be equal to the ratio of its return on these assets, r_a , to its cost of capital.³ Since the total assets of a firm are involved in the measurement of Tobin's q , r_a is the *average* return over *all* of the firm's capital, and Tobin's q is a measure of average performance (hence the subscript a in (1)). A profit-maximizing firm invests to the point where the *marginal* return on investment equals the cost of capital, however, and thus an estimate of marginal q is needed to predict investment. Under certain, rather restrictive assumptions, average q is equal to marginal q , and thus to the return on *investment* relative to the cost of capital.⁴ The literature testing the q -theory assumes that these conditions hold, and regresses investment on lagged q_a . Our work improves upon the existing literature in part by employing a true estimate of *marginal* q .

All firms in an economy do not suffer from asymmetric-information problems, of course. Thus, an important aspect of testing the AIT is to identify which firms are *likely* to be subject to this problem. Here one confronts a logical difficulty. If a researcher can identify the firms suffering from asymmetric-information problems, then presumably so too can the market, and the problems disappear. The existing literature has essentially ignored this conundrum, and tried to identify the firms subject to AI problems using the assumptions underlying the AIT. Thus, samples of companies have been divided according to size, age and level of dividend payments under the assumption that small (young, low dividend) firms are more likely to fit the AIT.⁵ One of the contributions that we make to this literature is to offer what we believe to be a better criterion for identifying AI firms.

B. The Managerial Discretion Theory of Investment

Many studies of investment that have found a positive relationship between cash flows and investment, as for example the pioneering one of Meyer and Kuh, used samples made up of the largest companies in the economy. It is unlikely that most of these large, mature companies suffer from AI problems. Some alternative theory must explain this relationship for these companies. The most plausible theory, and the one most often put forward in Anglo-Saxon countries, to explain this relationship assumes the existence of managerial discretion or agency problems. Managers have their own goals, as for example increasing or maintaining the growth rate of the firm, and wish to pursue these even when they harm their shareholders. The discretion managers have to allocate their internal cash flows as they choose leads them to favor this source of finance over say bank borrowing or the issuance of debt and equity. Thus, variants on equation (1) could and have been used to test the MDT with $q_{a\ t-1}$ again capturing the investment opportunities of the firm, CF_{t-1} the cost (availability) of finance.⁶

C. Discriminating between the AIT and MDT

In this section we discuss the methodology that we use to discriminate between the AIT and MDT in a country with an Anglo-Saxon institutional structure. How the methodology must be changed to test the hypotheses in Continental European countries is taken up in section III.

Although both the AIT and the MDT predict a positive relationship between cash flows and investment, in all other respects they make totally opposite predictions. Indeed, to a large extent each theory is a mirror image of the other. To see this, consider Figure 1. In Figure 1a the cost of capital, i , and marginal returns on investment curve, mrr_{IH} , are depicted for a firm with high investment opportunities relative to its internal cash flows, CF . The optimal level of investment for this firm, I_H , exceeds its cash flow, and to make this investment it has to raise capital externally. If it faces an AI problem, it may not be able to

do so at terms, which maximize the existing shareholders' wealth. If the firm then invests only the amount CF , its marginal return on investment *exceeds* its cost of capital.

Now consider the situation in Figure 1b. This firm has much lower investment opportunities relative to its cash flows. The investment that maximizes its shareholders' wealth, I_L , falls short of its cash flows, and it maximizes its shareholders' wealth by investing I_L and paying $CF - I_L$ in dividends. If, on the other hand, its managers and/or large shareholders pursue their own goals, and these include a more rapid growth rate than implied by I_L , then they will invest more than this level. As they do so, however, their share price falls from its maximum level, and the threat of takeover and replacement increases. Thus, growth-maximizing managers can be expected to choose a level of investment that equates their marginal gains from increased investment and growth to their marginal cost from an increase in the threat of takeover.⁷ This is likely to be an investment like I_{LM} , which exceeds the shareholders' optimal, I_L , but falls short of investing all of the firm's cash flows. That is to say, a growth-maximizing firm is likely to want to pay *some* dividends to keep its share price from falling so low that it is taken over.⁸

Both theories depicted in Figure 1 predict an increase in investment for the firm following an increase in its cash flows, and thus a positive relationship between cash flows and investment. The increase in investment for the firm in Figure 1a occurs, because the cash constraint is eased and it is able to move closer toward or reach its optimal investment, I_H . The increase occurs for the firm in Figure 1b, because a shift in CF to the right allows the firm to increase its level of investment *and* its dividends, thus allowing it to pursue more growth without a greater risk of takeover.

Although both the AIT and MDT predict a positive relationship between investment and cash flows, in every other way they are quite different. Under the AIT we expect marginal returns on investment to *exceed* the cost of capital, and dividends to be zero. Under the AIT managers would wish, if they could, to share the information that they have with the external capital market. Under the MDT we expect marginal returns on investment to be *lower* than the cost of capital, and dividends to be positive. Moreover, growth-maximizing

managers will, if anything, wish to *conceal* information about the returns on their investments from their shareholders.

As noted above, a *necessary* condition for an AI problem to arise is for the external capital market to *underestimate* not only the returns on a firm's investment, but also the returns on its existing assets. Tobin's q , what we call q_a , is a measure of the market's calculation of the value of a firm's existing capital stock. The higher q_a is, the higher the market's evaluation of its existing assets, and the *less* likely it is to face an AI problem and need to resort only to cash to finance its investments. This reasoning implies that the likelihood that a firm faces an AI problem, and thus the sensitivity of its investment levels to its cash flows decreases with q_a . We test this prediction by including q_a in eq. (1) and adding an interaction term between q_a and CF . Thus, although q_a appears in our model testing the AIT, as in others, its rationale is quite different. It is not assumed to measure the height of a firm's investment opportunities, but rather (inversely) the severity of its AI problem.

To measure a firm's investment opportunities we use the theoretically more appropriate marginal q . The second important modification we make to eq. (1), therefore, is to include as our measure of a firm's investment opportunities an estimate of marginal q , $q_{mt} = r_t / i_t$, where r_t is the firm's return on investment in t , and i_t is its cost of capital. (The methodology used to calculate q_{mt} is introduced by Mueller and Reardon (1993) and it is described in the appendix.) Adding these new variables to (1) and again lagging all right-hand-side variables to avoid endogeneity problems, we obtain the following equation as our basic model for testing the AIT.

$$I_t = a + b q_{a,t-1} + c CF_{t-1} + d q_{m,t-1} + e q_{a,t-1} CF_{t-1} + \mu_t \quad (2)$$

Following the arguments given above we expect $b > 0$, $c > 0$, $d > 0$, $e < 0$.

The same equation is also used to test the MDT, but the logic underlying some variables and one key prediction are different. Average q now measures the freedom of managers from the threat of takeover and thus, as under the AIT, is predicted to have a

positive coefficient. Marginal q again measures the attractiveness of investment opportunities, and again carries a positive predicted sign, as does cash flow, although as explained above, its rationale for being in the equation is quite different from that of the AIT. Large cash flows effectively increase managers' discretion to pursue their own goals by allowing them to finance investments without having to come under the scrutiny of external capital markets, and they allow managers to pay greater dividends to maintain their share price and thereby avoid takeovers. The major difference between the predictions for the AIT and MDT are with respect to the coefficient of the interaction term $q_{at-1}CF_{t-1}$. The MDT predicts $e > 0$. The higher a firm's average q is, the more discretion managers have to pursue their own goals, and the *greater* their use of cash flows will be in this pursuit.

A salient difference between the AIT and MDT is that firms under the former should have marginal returns on investment *above* their costs of capital, while firms under the MDT have marginal returns on investment *below* their costs of capital. This difference is used to select the samples for testing the two theories. Averages of annual marginal q s, which we call $\overline{q_m}$, are calculated for each firm. All firms with an average marginal q equal to or greater than 1.0 are placed in the sample used to test the AIT. Firms with an average marginal q less than 1.0 are used to test the MDT. Of course, all firms with a $\overline{q_m} \geq 1$ do not necessarily suffer from asymmetric-information problems, just as all firms with a $\overline{q_m} < 1$ do not necessarily conform to the MDT. Some firms may land in each group because their managers had mistakenly under- or overinvested during our time period. If the theories deserve to be taken seriously, however, the behavior of a substantial fraction of companies falling into each sample should conform to their respective predictions. In testing them, we assume that this is the case.

II. Empirical Results for the United States

A. Data

Data are taken from the 1997 version of the *Standard and Poors' Compustat* and from the 1996-2004 versions of the *Global Vantage*. These datasets contain balance sheet, income

statement, and stock market information. The sample period is from 1985 through 2002. We exclude all banks and financial companies (SICs 6000 through 6999) and some service industries (SICs above 8100) because the nature of capital and investment in these industries is not comparable to those in non-financial companies. The construction of all variables is detailed in the appendix.

Table 1 presents summary statistics and a correlation matrix on the main variables used for the full sample of firms as well as for the two sub-samples of firms with $\overline{q_m} \geq 1$ and $\overline{q_m} < 1$. Around three-fourth of firms are classified into the $\overline{q_m} < 1$ group. The average yearly marginal q is around 0.75, with the median slightly higher at 0.78. The correlation between q_{mt} and q_{at} is only 0.23.

B. Results

Table 2 presents the results for the United States. Industry and time dummies were included and were as a group statistically significant, but they are not reported to save space. Eq. 1 in the table presents the results from estimating eq. 2 above, for the full sample of companies. All four variables are statistically significant. Our main interest, however, is in eqs. 2 and 3 in the table.

Eq. 2 presents estimates for a sample of firms with mean q_m s greater than one. All coefficients are highly significant and of the predicted signs. In particular, cash flow, which can be accommodated only with great difficulty in a neoclassical world, is highly significant. Tobin's q , q_a , has a positive coefficient, but recall that the interpretation of this variable is different under the AIT than under the q -theory. Under the AIT, q_a measures the effect of easing the external capital market constraint on firms with attractive investment opportunities. The variable capturing the attractiveness of the investment opportunities, q_m , also has a statistically significant positive coefficient. Of particular interest is the coefficient on the q_a -CF interaction term. It is negative and significant as predicted under the AIT. As the q_a for a firm with good investment opportunities increases, its ability to raise funds on the equity market eases, and the sensitivity of its investment to its cash flows weakens.

Eq. 3 presents estimates for firms with mean q_m s less than one. All coefficients are again highly significant and of the predicted signs. The interpretation of the positive effect of q_a on investment is again different from that of both the AIT and q -theory. For firms which are overinvesting ($\overline{q_m} < 1$), a high q_a , implies less danger of hostile takeover and thus more freedom for managers to pursue growth. The attractiveness of investment opportunities is again captured by q_m , which is statistically significant with the predicted positive coefficient. Unlike for the sample of firms with mean q_m s greater than one, the coefficient on the q_a - CF interaction term now has a *positive* sign as predicted under the MDT. As the q_a for a firm that overinvests rises, the likelihood of a takeover falls, and its managers channel greater fractions of its cash flows into investment.

The nonlinear nature of the model makes it difficult to interpret the relative importance of q_a and CF as determinants of investment. To aid in this interpretation, the bottom two rows in Table 2 present the implied partial derivatives of investment with respect to each variable, when the other variable in the interaction term is evaluated at its mean. The marginal effect of an increase in cash flow on investment is slightly higher for firms fitting the AIT than for firms fitting the MDT. The marginal effect of increasing q_a , on the other hand, is almost twice as large for firms fitting the MDT as it is for those fitting the AIT. An increase in freedom from takeover has a greater influence on the investment of firms that are overinvesting than does a relaxation of the capital market constraint on firms that are cash constrained.

Before closing this section, it is perhaps useful to comment on the relative sizes of the coefficients on q_a and q_m . First of all, q_a and q_m represent quite different things in the two models. q_a represents either the severity of the constraint on a firm from using the equity market to finance attractive investments (AIT), or from using cash flows to finance unattractive investments, while q_m measures the height of investment opportunities. There is no a priori reason to expect the coefficients on these variables to have any particular relationship to one another. Second, the theoretically appropriate q_m to include in the model is the one that the managers *expect* in the year that they make an investment. We proxy this

unobservable with the lagged value of the q_m that was realized. The size of q_m $t-1$ depends on the change in market value of the firm and the size of its investment in $t-1$. Given the volatility of share prices, the proxy we use for expected q_m undoubtedly measures it with considerable error driving its coefficient toward zero.

III. Modifications of the Model Due to Differences in Corporate Governance

A. The Effects of Ownership Concentration

The stereotype of a company in an Anglo-Saxon country is that its managers own very small fractions of its shares, and that no outsider owns a large enough block to exercise effective control over the managers, while the Continental European stereotype is that such large blockholders exist either inside or outside the firm. Like most stereotypes each has an important element of truth to it, but is not totally accurate. Table 3 presents the mean (col. 3) and median (col. 5) shareholdings of the largest shareholder in each country for the firms in our sample for which these data are available (number of firms in col. 2). A look at the averages for each group, treating the United States as a group, supports the stereotypes. The median largest shareholding for the United States is 14.43 percent, for the remaining Anglo-Saxon countries it is 15.04 percent, while for the Continental European countries the figure is 40.74 percent. When one looks closer at the figures, however, one sees that not all countries in each group correspond to the stereotype, or perhaps better, some conform more closely than others. The median largest shareholding in South Africa, for example, is over 50 percent, and in New Zealand over 40 percent. The median largest shareholdings in Denmark, Finland, the Netherlands and Sweden, on the other hand, are all below 20 percent. Some of the figures are based on quite small samples of firms, but figures for larger samples of companies listed on the stock exchanges in each country are similar (Gugler, Mueller and Yurtoglu, 2004b, Table 2). (Note that the sample we use in all regressions that do not require ownership information contain many more firms than the numbers in Table 3, see Table 4). Thus, although the overall picture of ownership concentration painted in Table 3 fits the

stereotypes for Anglo-Saxon and Continental countries, there is some degree of heterogeneity within the two groups.

LaPorta, Lopez-de-Silanes, Shleifer and Vishny (1997, hereafter LLSV) have argued that differences in ownership concentration between Continental European and Anglo-Saxon countries are due to differences in their legal institutions. Anglo-Saxon legal systems offer shareholders with small stakes better protection from exploitation by managers than do the civil law systems found in Continental Europe. This weaker protection shifts both the demand and supply schedules for new equity issues to the left and results in both thinner equity markets and more concentrated ownership structures in civil law countries. Column 6 of Table 3 reproduces figures from LLSV showing that external capital markets are indeed thinner on average in the Continental countries than in the Anglo-Saxon ones.⁹ Mark Roe (2003) explains the differences in ownership concentration between the United States and Continental Europe to differences in their political ideologies.

These differences affect the predictions one makes under both the AIT and MDT. One way legal systems can protect shareholders is by forcing managers to reveal more information about themselves and their firm, as for example, their shareholdings and transactions, their compensation, research and development outlays, and the like. This information makes it easier for the capital market to evaluate the performance of companies and their investment opportunities, thus mitigating asymmetric-information problems. This characteristic of Anglo-Saxon systems helps explain why they have thicker external capital markets, and leads to the following hypothesis:

Hypothesis 1. Among the firms most likely to be subject to asymmetric-information problems, the relationship between investment and cash flows is stronger in Continental Europe than in Anglo-Saxon countries.

The MDT as formulated above must be reinterpreted and modified to take into account the different institutional environment prevailing in Continental European countries. First of all, the conflict over investment policies arises not between managers who own a small fraction of their company's shares and a large group of dispersed shareholders, but between a large controlling shareholder and the minority shareholders. As with managers in Anglo-Saxon countries, the large, dominant shareholder in Continental Europe can have incentives to pay out too little in dividends, and to invest a larger than optimal fraction of the firm's cash flows. One reason this might occur is because dividends are paid pro rata, implying that a large shareholder gets proportionally only the same amount as minority holders. Thus, one euro retained and invested could generate more pecuniary gains and utility to the large shareholder than if it is paid out.¹⁰ A second reason is that many large shareholders are themselves the founders of the firm or second or third generation offspring.¹¹ Their utility function may be dictated not solely by shareholder wealth maximization, but also by the goal of preserving the corporate empire that they control.

A second important difference between Anglo-Saxon and Continental European countries is that under the MDT the constraint on managers pursuing growth is the threat of displacement through a proxy contest or a hostile takeover should their company's share price fall too low. Where ownership concentration is highly concentrated, however, such proxy contests and hostile takeovers are rare, and managers have little to fear. Thus, managers and/or manager owners in civil-law-system countries should have more discretion to use company cash flows to pursue their own goals.

Hypothesis 2. Among the firms most likely to fit the MDT, the relationship between investment and cash flows is stronger in Continental Europe than in Anglo-Saxon countries.

The rationale for including q_a in the test of the MDT is that the threat of takeover falls as q_a rises. This rationale also underlies the prediction of a positive sign for the coefficient of the q_a -CF interaction term. The logic underlying these predictions collapses, however, in countries where ownership concentration is highly concentrated and hostile takeovers are rare. One might still justify leaving q_a in the equation, however, under the logic of the AIT. The higher a firm's share price, the cheaper it is to raise capital for investment by issuing shares, even in countries with thin equity markets. This reasoning might also be used to justify leaving the q_a -CF interaction term in the equation, even though one can no longer predict a positive sign for its coefficient. We are thus lead to

Hypothesis 3. Among the firms most likely to fit the MDT in Continental European countries, the relationship between q_a and investment is expected to be positive, while the coefficient on the q_a -CF interaction term might be either zero or negative.

B. The Effects of Owner Identities

A second dimension of corporate governance that might affect investment behavior is the identity of the dominant shareowner. We identify five ownership categories: (1) family controlled, (2) finance controlled, (3) firm controlled, (4) state controlled, and (5) widely dispersed. A firm in which the largest shareholder holds 20 percent or more of the outstanding shares is categorized as controlled by this shareholder.¹² All firms controlled by a bank or insurance company are categorized as finance controlled. When a firm that is not a bank or insurance company controls another firm, this firm is categorized as firm controlled. When no shareholder holds as much as 20 percent of the outstanding shares, it falls into the widely dispersed category. Columns 7 through 11 in Table 3 give the percentages of each country's sample falling into the five categories.

When a firm is controlled by another firm, a financial institution or the state, it can turn to these institutions for funds, if it has attractive investment opportunities, which it cannot finance itself. Outside of the United States, firms controlled by other firms are usually

parts of corporate pyramids, which, because of their size, usually have good access to external capital markets. In addition, those in control of a pyramid may be able to shift funds across it to finance attractive investment opportunities. Banks and other financial institutions have ample funds and companies controlled by these institutions should have little trouble in turning to them for funds for good investments. The same seems likely to be true for the state. Thus, we expect AI problems to be mitigated for firms that are controlled by financial institutions, other corporations or the state, and put forward

Hypothesis 4. Among the firms most likely to fit the AIT, the relationship between investment and cash flows is weaker, when the firms are controlled by another firm, a financial institution or the state than when they are family controlled or have dispersed ownership.¹³

It is more difficult to formulate hypotheses about the relationship between ownership identity and the extent of agency problems. For example, since everyone prefers more money to less, one can argue that other firms, financial institutions and the state will all want to see firms under their control maximizing profits and paying large dividends. On the other hand, both other firms and financial institutions may themselves be subject to agency problems and be managed by empire-builders who get psychic and perhaps financial benefits from seeing their own firms and those that they control grow. The state too may be interested in achieving growth (avoiding decline) in the firms it controls to save jobs and win votes.¹⁴ In a previous paper, we have examined the effects of ownership identities on the investment performance of firms as measured by q_m , and found the effects to be modest (Gugler, Mueller and Yurtoglu, 2004c). Thus, we formulate no hypotheses with respect to the effects of ownership identities on the results for firms with $\overline{q_m} < 1$.

C. The Effects of Accounting Standards

The scandals involving Enron and Parmalat have highlighted the importance of accounting conventions in protecting shareholders. In previous work we observed

significantly higher returns on investments out of cash flows and new equity in countries with strong accounting standards (Gugler, Mueller and Yurtoglu, 2003)¹⁵. Strong accounting standards provide capital markets with more and higher quality information and should, therefore, mitigate both managerial-discretion and asymmetric-information problems. We test, therefore,

Hypothesis 5. The relationship between investment and cash flows is stronger in countries with weak accounting standards than in countries with strong standards.

IV. Results for Anglo-Saxon and Continental European Countries

Table 4 presents summary statistics and a correlation matrix for the main variables for the full sample of Anglo-Saxon, non US firms and Continental European firms, and for the two sub-samples of firms with $\overline{q_m} \geq 1$ and $\overline{q_m} < 1$. Less than 10% of Continental European firms consistently earn their cost of capitals and exhibit a $\overline{q_m} \geq 1$. Yearly average marginal qs for Continental European firms are in line with those of US and other Anglo-Saxon countries (0.78), however, the distribution of q_{mt} s is skewed to the left with a median of only 0.64. This contrasts to the US case where the median was larger than the mean.

Table 5 presents the results for the tests of the five hypotheses. As for the US, industry and time dummies were included in each equation, but are omitted from the table. Hypothesis 1 predicts for firms fitting the AIT that the coefficient on cash flows is greater for Continental European than for Anglo-Saxon countries, because of the greater amounts of information generally available about companies in countries with strong corporate governance systems. This hypothesis is strongly confirmed. The coefficient on cash flow by itself is roughly four times larger in the Continental European than in the Anglo-Saxon countries, and the partial derivative of investment to cash flow presented at the bottom of the table is two and one half times larger in the Continental European countries. The $<$ signs separating the two sets of estimates indicate that the differences are both significant at the 5 percent level. Some of the other coefficients in the two equations are insignificant, and the

coefficient of q_m is of the wrong sign (although insignificant) for Continental Europe, but the coefficients involved in the test provide strong support for the hypothesis.

Hypothesis 2 makes the same prediction as hypothesis 1, but for firms with $\overline{q_m^s} < 1$. It too is strongly supported. Both the coefficient on cash flow by itself and the partial derivative of investment to cash flow are significantly larger for the Continental European than for the Anglo-Saxon countries.

Hypothesis 3 predicts that the coefficient on q_a is positive and that for the q_a -CF interaction term is not positive for Continental European countries unlike what was observed for the United States. Both predictions are confirmed. The coefficient of q_a is positive and significant, while that for the interaction term is negative and significant.

Hypothesis 4 predicts a smaller coefficient on cash flows for firms fitting the AIT and controlled by another company, financial institution or the state, than for firms that are family-controlled or with dispersed ownership, because the former are able to borrow more readily from the institution that controls them. This hypothesis is partially confirmed. The coefficient on cash flow and the partial derivative of investment to cash flow are both larger for family-controlled and dispersed-ownership firms as predicted, but only the partial derivatives are significantly different.

Hypothesis 5 claims that strong accounting standards protect shareholders better and thus constrain managers' discretion to pursue their own goals better than weak standards. Larger coefficients on cash flows are thus predicted for countries with weak accounting standards and this prediction is confirmed in Table 5. Both the coefficient on cash flow and the partial derivative of investment to cash flow are significantly larger for the Continental European than for the Anglo-Saxon countries.

Thus, all five hypotheses concerning the impact of corporative governance institutions on the determinants of investment have been largely confirmed. A look at some of the coefficients in Table 5 for variables that are not involved in the tests reveals some inconsistencies with the predictions and findings for the United States. Not all of these inconsistencies are detrimental to the AIT and MDT and the model used to test them,

however. For example, one should not be particularly surprised to find an insignificant coefficient on q_m for samples for which agency problems are expected. Managers of these firms are assumed to be pursuing their own goals and overinvesting. That their investment levels would not be positively related to q_m is not surprising. A comparison of the coefficients on q_m in the equations used to test hypotheses 2 and 5, reveals a positive and significant coefficient for both samples where corporate governance institutions are strong – Anglo-Saxon countries and countries with strong accounting standards – and negative coefficients (both insignificant at the 5% level) where corporate governance institutions are weak.

V. Further Tests

The results in section IV provide fairly strong support for both the AIT and MDT, and for the importance of corporate governance institutions in influencing investment decisions. In this section we test four variants of the hypotheses put forward in section III for subsamples of our original samples. These tests thus involve far fewer observations than for the previous tests, but we nevertheless feel that these additional results further strengthen the conclusions from the previous tests.

Hypothesis 1 predicts that asymmetric-information problems are more severe in Continental Europe, because the stronger corporate governance systems in Anglo-Saxon countries create thicker external capital markets, and make it easier for firms with attractive investment opportunities to raise money. Such AI problems are likely to be particularly acute for family-controlled firms as opposed, for example, to a firm controlled by a financial institution, which could approach this institution for a loan. We thus propose

Hypothesis 1'. The relationship between investment and cash flows is stronger in Continental Europe than in Anglo-Saxon countries for the family-controlled firms that are most likely to be subject to asymmetric-information problems. The difference in the importance of cash flows for investment should be stronger for family-controlled firms than for the full samples of firms used to test Hypothesis 1.

The first two sets of regression results in Table 6 test Hypothesis 1'. The coefficient on cash flow by itself is ten times larger in the Continental European than in the Anglo-Saxon countries, and the partial derivative of investment to cash flow is eleven times larger. Neither the coefficient on cash flow by itself nor the partial derivative of investment to cash flow is statistically significant for the Anglo-Saxon countries. Family-controlled firms with attractive investment opportunities appear to face significantly greater asymmetric-information problems in Continental Europe than in Anglo-Saxon countries. Hypothesis 1' is strongly confirmed.

Managers in civil-law-system countries should have more discretion to use company cash flows to pursue their own goals when they own a controlling interest in their firm than when another company or financial institution does. We thus retest Hypothesis 2 restricting our sample again to family-controlled firms (in the vast majority of cases a controlling family or individual is part of management).

Hypothesis 2'. The relationship between investment and cash flows is stronger in Continental Europe than in Anglo-Saxon countries for family-controlled firms that are most likely to fit the MDT. The difference in the importance of cash flows for investment should be stronger for family-controlled firms than for the full samples used to test Hypothesis 2.

The second two sets of regression results in Table 6 test Hypothesis 2'. The hypothesis again receives strong support with the coefficient on cash flow being somewhat larger in the Continental European countries, and the partial derivative of investment to cash flow being three times larger, although only the latter comparison is statistically significant. The second difference is greater than that reported for Hypothesis 2 in Table 5. Agency problems in the form of the large-small shareholder conflict are relatively more severe for family-controlled firms in Continental Europe than for similar firms in Anglo-Saxon countries.

Hypothesis 4 was tested for the combined sample of Anglo-Saxon and Continental European countries. Arguably, however, control by a financial institution or another

company means something different in Continental Europe than it does in an Anglo-Saxon country. This is certainly true for the United States. The category of financial institutions in the US consists mostly of mutual and pension funds, and the like. These institutions generally behave like individual shareholders, buying and selling as their expectations regarding future returns on individual shares change, and seldom hold positions on boards of directors where they could directly influence managers, or have long-run relationships with particular companies. Banks and insurance companies with controlling interests in firms in Continental Europe often hold such positions, on the other hand, and have such relationships. Similarly, when a company holds a controlling interest in another firm in the US, it generally also does so largely as an investment, and its stake in the other firm is likely to be transitory. We thus think it highly unlikely that US firms with attractive investment opportunities and limited cash flows would turn to a mutual fund or a firm with a large stake in it for funds. This explains why no test of Hypothesis 4 was conducted using the sample of US companies.

Some of the Anglo-Saxon countries, like the United Kingdom, are similar to the US in these respects. In others, like Canada, corporate ownership relations among a set of firms do sometimes resemble the corporate pyramids of Continental Europe, and a firm needing funds might turn to the company with a controlling interest in it, if such exists. Thus, the other Anglo-Saxon countries can be expected to fall somewhere between the US and Continental Europe with respect to Hypothesis 4. We thus retest Hypothesis 4 for just the Continental European countries.

Hypothesis 4'. Among the firms most likely to fit the AIT, the relationship between investment and cash flows is weaker, when the firms are controlled by another firm, a financial institution or the state than when they are family controlled or have dispersed ownership. This difference is greater for the Continental European countries than for a combined sample including Anglo-Saxon countries.

When the test is restricted to just the Continental European countries both differences in cash flows impact between the two ownership groups are much larger than when Anglo-

Saxon firms are included, and both differences are now statistically significant (see Table 6). In Table 5, where the Anglo-Saxon and Continental European countries are combined, an increase in cash flow is predicted to have a 58 percent larger impact on investment for firms in family control or with dispersed ownership, than for firms controlled by other firms, financial institutions, or the state. When the sample is restricted to companies in Continental Europe with $\overline{q_m s} \geq 1$, the predicted effect of an increase in cash flow on investment is more than three times larger for family-controlled or dispersed-ownership firms. These results support Hypothesis 4' and along with those for hypothesis 1' imply that asymmetric-information problems appear to be particularly severe for family-controlled firms in Continental Europe.

Strong accounting standards provide more information to the market and should mitigate both AI and MD problems. Thus, in testing Hypothesis 5 we used the full sample of companies ignoring mean marginal qs . Asymmetric-information problems should, however, be more ephemeral than agency problems. Time passes and the market learns what a firm's returns on total assets and capital are. Moreover, under the AIT managers of firms with attractive investment opportunities have an incentive to try to eliminate the AI problem. Managers who have the discretion to overinvest, and are doing so, have no incentive to eliminate their discretion to do so. If they are entrenched, such overinvestment may persist indefinitely. Thus, we expect agency problems to be more pervasive and serious among firms with $\overline{q_m s} < 1$, than AI problems are among firms with $\overline{q_m s} \geq 1$. Strong accounting standards are thus expected to have a greater effect on limiting managerial-discretion in the subsample of firms fitting the MDT.

Hypothesis 5'. The relationship between investment and cash flows is stronger in countries with weak accounting standards than in countries with strong standards, and stronger for firms with $\overline{q_m} < 1$, than for all firms.

The results in Table 6 confirm Hypothesis 5'. Although both Hypotheses 5 and 5' are supported, the absolute differences in the coefficients on cash flows and for the partial

derivatives of investment to cash flows are greater for firms with $\overline{q_m} < 1$, than for all firms in the Anglo-Saxon and Continental European countries.

VI. Discussion

The results in this article reconfirm the by now well-established proposition that “institutions matter,” and in particular that corporate governance institutions matter. We have found evidence suggesting asymmetric-information problems for firms with attractive investment opportunities and limited cash flows, and managerial-discretion problems. These problems have been found to be more severe in Continental Europe than in Anglo-Saxon countries, in countries with weak accounting standards, and in particular for family-controlled firms in Continental Europe.

These findings have important economic and policy implications. In a country without capital market imperfections and agency problems, one would expect to observe the following scenarios for firms over their life cycles.¹⁶ Firms are born through an innovation or by imitating an innovation. Although most die soon after birth, some grow to be quite large. In the early stages of a firm’s life cycle, its major difficulty is to raise enough capital to fund the investment opportunities that its founders foresaw, and that brought it into existence. It is at this stage in a firm’s life cycle that the asymmetric-information problem is likely to be most acute, and result in the firm’s foregoing attractive investments.

A firm that succeeds in growing large someday finds that its cash flows greatly exceed the amounts, which can be reinvested at rates of return equal to or above its cost of capital. If it were to maximize its shareholders’ wealth, it would make large dividend payments or purchases of its shares. As it matures it would be expected to return greater quantities of cash to its shareholders, and invest relatively less and less and grow ever more slowly. Thus, in a world without agency problems, capital would be “recycled” into the capital market from mature firms to be made available to young ones with attractive investment opportunities, and in a world without asymmetric-information problems, this capital would find its way to the young firms that needed it. The existence of AI and MD

problems interrupts this flow of capital from mature to young firms, and reduces the rate of growth of the economy. Too much gets invested by firms with low returns on investment, too little by firms with high returns.

Several studies have established the existence of a positive relationship between the growth rate of a country, and the size of its external capital market.¹⁷ LLSV (1997) have established a link between the strength of a country's corporate governance institutions and the size of its external capital market (see again column 6, in Table 3). The results of this article add further support to these findings. Both asymmetric-information and agency problems are more severe in Continental Europe than in the Anglo-Saxon countries leading to too little investment by firms with attractive investment opportunities and too much by those with poor investment opportunities.

At the summit meetings in Lisbon in 2000, the EU put forward the goal of increasing its international competitiveness to become the most powerful economic power in the world by the year 2010. Little progress toward this goal has been made to date. The results in this article imply that the set of policies adopted to reach this goal should include strengthening corporate governance and accounting standards within Europe.

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Appendix

A. The Calculation of Marginal q

The arguments for putting Tobin's q in an investment equation rest on the assumptions of perfect competition, constant-returns-to-scale and that firms are price takers, which imply that the marginal and average returns on capital are equal, and equal a firm's cost of capital. When firms are not price takers and markets are imperfectly competitive, however, marginal and average returns on capital do not coincide and equilibria may exist in which a firm's average return on capital differs from its marginal return. The same level of investment may be optimal for a monopolist as for a competitive firm even though the monopolist's profits on existing assets, and hence qa , are much larger than for the competitive firm. To predict the investments of these two companies more accurately, we need a measure of their *marginal* returns on capital relative to their costs of capital, which we now derive.

Let I_t be a firm's investment in period t , C_{t+j} the cash flow this investment generates in $t+j$, and i_t the firm's cost of capital in t , then the present value of this investment is

$$(1) \quad PV_t \equiv \sum_{j=1}^{\infty} \frac{C_{t+j}}{(1+i_t)^j}$$

We shall assume capital market efficiency and, thus, that the capital market makes an unbiased estimate of the present value, PV_t , of any investment, I_t in t . We can then take the market's estimate of PV_t and the investment I_t that created it, and calculate the ratio of a pseudo-permanent return r_t on I_t to i_t .

$$(2) \quad PV_t = \frac{I_t r_t}{i_t} = q_{mt} I_t$$

If the firm had invested the same amount I_t in a project that produced a permanent return r_t , this project would have yielded the exact same present value as the one actually undertaken. The ratio of r_t to i_t is the key statistic in our analysis. If a firm maximizes shareholder wealth, then it undertakes no investments for which $q_{mt} < 1$. That q_m is a marginal q can easily be seen from (2) by contrasting it with q_a . Average q is the market value of a firm divided by its capital stock. *Marginal q* is the *change* in the market value of the firm, PV_t , divided by the change in its capital stock (I_t) that caused it.

The market value of the firm at the end of period t can be defined as,

$$(3) \quad M_t \equiv M_{t-1} + PV_t - \delta_t M_{t-1} + \mu_t$$

where δ_t is the depreciation rate for the firm's total capital, and μ_t the market's error in evaluating M_t . Substituting from (2) into (3) and rearranging yields

$$(4) \quad M_t - M_{t-1} = q_{mt} I_t - \delta_t M_{t-1} + \mu_t$$

The assumption of capital market efficiency implies that the expected value of μ_t is zero. Setting $\mu_t = 0$ and rearranging (4) yields

$$(5) \quad q_{mt} = \frac{M_t - (1 - \delta) M_{t-1}}{I_t}$$

Eqs. (4) and (5) illustrate the logic underlying our calculation of q_m . Assume, for example, that a firm's cost of capital, i_t , is 0.10, $\delta_t = 0$, and it invests 100 at a return $r_t = 0.12$. The predicted increase in its market value using (4) is then 120, and $q_{mt} = r_t / i_t = 1.2$. More generally, a firm's market value rises by more than the amount invested whenever $r_t > i_t$, and falls short of the value of I_t when $r_t < i_t$, abstracting from depreciation. Imagine now that $M_{t-1} = 1000$ and $\delta_t = 0.10$. Then the firm must invest 100 at an $r_t = i_t$ for its market value to remain unchanged.

It should be noted that because we calculate the *ratio* of r_t to i_t and not r_t alone, there is no need to calculate a firm's cost of capital to determine whether it is over- or underinvesting. Moreover, the methodology automatically allows for differences in risk across firms. If firm A 's investments involve greater risk than B 's, it has a higher cost of capital i_t than B . Any investment I_t by A must then produce a greater expected stream of profits (possess a higher r_t) than the equivalent investment by B to produce the same change in market value.

Eqs. (3), (4) and (5) incorporate the assumption that the market value of a firm at the end of year $t-1$ is the present discounted value of the expected profit stream from the assets in place at $t-1$. Changes in market value are due to changes in assets in place as a result of investment and depreciation. To calculate q_{mt} , one needs an estimate of the depreciation rate of a firm's total capital, δ_t , where the value of this capital is measured by the market value of the firm. The depreciation rate depends on the composition of tangible and intangible assets in total market value, and these will differ across industries. We assume that industry depreciation rates are constant over time, and use a variant of eq. (4) to estimate a separate δ_D for each industry D .

Eq. (5) defines q_m in year t . For the purpose of classifying firms into subsamples that fit each hypothesis, we shall calculate a weighted average q_m . Using (3) to replace the first right hand term in successive periods, and assuming again industry specific depreciation rates yields a generalized, multi-period version of (3),

$$(6) \quad M_{t+n} = M_{t-1} + \sum_{j=0}^n PV_{t+j} - \sum_{j=0}^n \delta_{D,t+j} M_{t+j-1} + \sum_{j=0}^n \mu_{t+j}$$

Using equation (2), we can calculate a weighted average q_m with each year's investment as weights

$$(7) \quad \overline{q_m} = \frac{\sum_{j=0}^n q_{m,t+j} I_{t+j}}{\sum_{j=0}^n I_{t+j}} = \frac{\sum_{j=0}^n PV_{t+j}}{\sum_{j=0}^n I_{t+j}}$$

Dividing (6) by $\sum_{j=0}^n I_{t+j}$, substituting from (7) and rearranging yields

$$(8) \quad \overline{q_m} = \frac{M_{t+n} - M_{t-1}}{\sum_{j=0}^n I_{t+j}} + \frac{\sum_{j=0}^n \delta_{D,t+j} M_{t+j-1}}{\sum_{j=0}^n I_{t+j}} - \frac{\sum_{j=0}^n \mu_{t+j}}{\sum_{j=0}^n I_{t+j}}$$

Stock market efficiency implies $E(\mu_{t+j})=0$ for all j , and thus that the last term on the right in (8) becomes small relative to the other two terms as n grows large. The market values and investments of the firm are observable. Therefore, $\overline{q_m}$ can be calculated to a close approximation using (8) for any assumed set of δ_D s when n is large. We make these calculations using our estimates of δ_D from eq. (4). This $\overline{q_m}$, the weighted average of the ratio of returns on investment to the cost of capital, is used to discriminate between the different hypotheses regarding investment behavior.

Before describing how we use estimates of $\overline{q_m}$ to test the different hypotheses about investment determinants, we must point out a possible bias in these estimates. We assume that the capital market at time t correctly values a firm's existing assets at that time and that the change in its market value between t and $t+1$ reflects the combined effects of the depreciation of its existing assets and the investments made in that period. It is also possible, however, that the market can anticipate future investments. If, for example, the market correctly anticipates at $t-1$ the stream of investments I_{t+j} , $j=1, \dots, n$ and the return r on these investments, then M_{t-1} will be higher (lower) than we assume in equation (8), if $r > i$ ($r < i$). Our calculated $\overline{q_m}$ s are thus biased toward 1.0 to the extent that the market can

predict returns on future investments. Nevertheless, as we shall see, we estimate substantial differences in $\overline{q_m}$ s across firms, and they seem to perform as our hypotheses predict.

A firm's market value at the end of year t , M_t , is defined as the market value of its outstanding shares at the end of t plus the value of its outstanding debt. Since this number reflects the market's evaluation of the firm's total assets, we wish to use an equally comprehensive measure of investment. Accordingly we define investment for the marginal q calculation as (investment in the investment-cash flow regressions is defined as capital expenditures)

$$I = \text{After tax profits} + \text{Depreciation} - \text{Dividends} + \Delta D + \Delta E + R \& D + ADV$$

ΔD and ΔE are funds raised using new debt and equity issues. Since $R \& D$ and advertising expenditures (ADV) are also forms of investment that can produce "intangible capital" which contributes to a company's market value, we add them to investment to obtain a measure of the firm's additions to its total capital.

B. Definitions of Strong and Weak Accounting Standards

The Center for International Financial Analysis and Research (Bavishi, 1993) examines the accounting practices in a large sample of countries and ranks them according to the number of desirable pieces of information each country's standards require to be published. The index is based on the examination of 1990 annual reports on the inclusion or omission of 90 items. These fall into seven categories: general information, income statements, balance sheets, funds flow statement, accounting standards, stock data, and special items.

The scale of this index for the countries in our study runs from a low of 36 for Portugal to a high of 83 for Sweden with a median of 64. We have classified any country with a score of 64 or more as having a strong set of accounting standards, with a score of 63 or less as having weak accounting standards.

C. Definition of Variables

Tobin's q is defined as the ratio of the market value of a firm to its total assets (COMPUSTAT item number 6, we use the corresponding variables from the Global Vantage

data base) where the market value of the firm equals the market value of common equity (items 199 (share price at the end of the fiscal year) times item 25 (common shares outstanding)) plus the book value of preferred stock (items 56, 10, 130) plus the book value of total debt (the sum of total short term debt (item 9) and total long term debt (item 34)). Cash flow is the sum of after tax profits (item 18) and depreciation (item 14) minus total dividends (item 21 plus item 19 if available). We adjust cash flow by adding the portion of *R&D* that is expensed for tax purposes. Capital stock is measured as net fixed assets (item 8). Capital expenditures are reported in the statement of cash flows (item 128). All variables are in real 1995 U.S. dollars.

Figure 1
Investments with high (a) and low (b) investment opportunities
(a)

Table 1: Summary Statistics and Correlation Matrix for the USA

Panel A. Summary Statistics

<i>Variables:</i>	All			$\overline{q_m} \geq 1$			$\overline{q_m} < 1$		
	Mean	S.D.	Med	Mean	S.D.	Med	Mean	S.D.	Med
<i>Total assets (Mn. \$)</i>	2464.7	10080.2	294.1	2396.4	6188.6	444.3	2487.2	11063.5	249.5
I_t/K_{t-1}	0.255	0.274	0.182	0.265	0.281	0.187	0.251	0.271	0.180
CF_t/K_t	0.342	0.797	0.259	0.399	0.861	0.309	0.323	0.773	0.245
q_{at-1}	1.368	1.106	1.026	1.682	1.257	1.292	1.265	1.032	0.967
q_{mt-1}	0.746	3.006	0.776	1.237	3.024	1.210	0.585	2.915	0.653
<i>Number of Firms</i>	1,872			466			1,406		
<i>Number of Obs.</i>	24,455			6,031			18,424		

Panel B. Matrix of Correlation Coefficients: All firms

	<i>TA</i>	I_t/K_{t-1}	CF_t/K_t	q_{at-1}	q_{mt-1}
<i>TA</i>	1.000				
I_t/K_{t-1}	-0.046	1.000			
CF_t/K_t	-0.005	0.230	1.000		
q_{at-1}	-0.027	0.294	0.049	1.000	
q_{mt-1}	0.010	0.114	0.062	0.230	1.000

Note: $\overline{q_m}$ is the weighted average marginal q over the sample period (see appendix).

Total assets are average total annual assets

I_t/K_{t-1} is capital expenditures divided by the beginning of period book value of capital stock

q_{at-1} is Tobin's q calculated as the market value of equity plus the value of debt divided by total assets

q_{mt-1} is the yearly measure of marginal q.

CF_t/K_{t-1} is cash flow (income before extraordinary items plus depreciation minus dividends plus (1 - tax rate) times R&D expenditures) divided by the beginning of period book value of capital stock.

Table 2**Regression results for the USA**

Sample	All		$\overline{q_m} \geq 1$			$\overline{q_m} < 1$	
	Coef	t-val	Coef	t-val		Coef	t-val
CF_{t-1}/K_{t-1}	0.0675	39.70	0.0973	26.01	>	0.0561	29.57
$q_{m\ t-1}$	0.0021	7.09	0.0024	4.23	>	0.0018	5.32
$q_{a\ t-1}$	0.0432	54.09	0.038	26.40	<	0.0479	48.93
$q_a \bullet CF$	-0.0049	-9.43	-0.015	-15.97	<	0.0015	2.35
Firms	1,872		466			1,406	
No. Obs.	24,455		6,031			18,424	
$\overline{R}^2$	0.234		0.240			0.244	
$\delta I / \delta CF$	0.061		0.072		>	0.058	
t-value	47.85		27.57			39.93	
$\delta I / \delta q_a$	0.042		0.033		<	0.048	
t-value	51.83		22.69			48.54	

Note: $\delta I / \delta CF$ and $\delta I / \delta q_a$ are the first derivatives with the interaction term $q_a \bullet CF$ evaluated at the mean value of the respectively other variable.

Table 3: Ownership Concentration and Identities (Cut off: 20%)

Country	No. firms	Mean largest holder	St.dev. Largest holder	Median largest holder	External Capital/GDP	Family holdings	Financial holdings	Non-financial holdings	State holdings	Dispersed holdings
United States	1,760	19.85	14.80	14.43	0.58	0.292	0.089	0.113	0.001	0.505
Australia	61	20.14	16.23	13.48	0.49	0.066	0.115	0.131	0.000	0.689
Canada	207	40.85	26.34	35.75	0.39	0.206	0.081	0.407	0.005	0.301
Great Britain	439	16.23	13.85	11.99	1.00	0.086	0.082	0.109	0.000	0.723
Ireland	19	18.07	14.06	13.20	0.27	0.250	0.000	0.100	0.000	0.650
New Zealand	4	42.19	8.91	42.78	0.28	0.000	0.250	0.750	0.000	0.000
South Africa	8	50.04	11.45	51.86	1.45	0.125	0.125	0.750	0.000	0.000
Anglo Saxon (excl. USA)	738	24.01	21.51	15.04	0.65	0.123	0.084	0.205	0.001	0.588
Austria	24	58.87	21.24	55.10	0.06	0.083	0.125	0.583	0.167	0.042
Belgium	26	43.34	18.98	43.35	0.17	0.077	0.308	0.577	0.000	0.038
Switzerland	43	45.55	27.66	47.80	0.62	0.302	0.070	0.395	0.047	0.186
Germany	180	51.97	23.26	50.98	0.13	0.256	0.250	0.422	0.039	0.033
Denmark	26	20.60	18.15	13.00	0.21	0.154	0.000	0.231	0.000	0.615
Spain	42	40.66	28.70	33.37	0.17	0.024	0.095	0.548	0.048	0.286
Finland	20	21.10	14.29	15.64	0.25	0.048	0.048	0.190	0.190	0.524
France	102	46.69	24.87	49.14	0.23	0.176	0.108	0.559	0.010	0.147
Italy	24	42.45	18.22	44.29	0.08	0.042	0.375	0.500	0.000	0.083
Luxembourg	2	36.90	10.19	36.90	---	0.000	0.000	0.500	0.500	0.000
Netherlands	52	20.66	19.41	11.31	0.52	0.019	0.058	0.231	0.019	0.673
Norway	27	30.88	18.93	26.11	0.22	0.071	0.143	0.357	0.036	0.393
Portugal	3	49.85	2.68	50.71	0.08	0.000	0.250	0.500	0.000	0.250
Sweden	23	23.72	17.45	16.60	0.51	0.000	0.261	0.217	0.000	0.522
Continental Europe	594	42.05	25.41	40.74	0.25	0.152	0.164	0.425	0.039	0.219
All	3,092	25.11	20.74	16.83	0.38	0.225	0.102	0.195	0.008	0.470

Sources: The sample of firms consists of *Global Vantage* and *Compustat* firms, which are listed on a stock exchange. The sources of ownership data include *Compact Disclosure* for USA, *Amadeus* for European countries, various issues of *Wer gehört zu wem?* for Germany, various issues of *PricewaterhouseCoopers Corporate Register* for the UK, various issues of *Survey of Industrials and Survey of Mines and Energy Resources* for Canada, We use several other country level publications for the remaining countries and check their consistency with ownership data from *Worldscope*. The details are available from the authors upon request.

Table 4: Summary Statistics and Correlation Matrix for Anglo-Saxon (non US) and Continental European Countries

Panel A. Summary Statistics for Anglo-Saxon non US Sample

	All			$\overline{q_m} \geq 1$			$\overline{q_m} < 1$		
<i>Variables:</i>	Mean	S.D.	Med	Mean	S.D.	Med	Mean	S.D.	Med
<i>Total assets (Mn. \$)</i>	1563.4	5192.1	286.9	2328.9	9157.9	526.3	1401.6	3845.3	259.8
I_t/K_{t-1}	0.228	0.210	0.173	0.247	0.233	0.182	0.224	0.205	0.172
CF_t/K_t	0.260	0.544	0.214	0.296	0.632	0.231	0.252	0.524	0.212
q_{at-1}	1.219	0.786	0.997	1.484	0.925	1.215	1.164	0.741	0.959
q_{mt-1}	0.854	4.866	0.771	1.620	5.189	1.277	0.692	4.782	0.687
<i>Number of Firms</i>	1,166			206			960		
<i>Number of Obs.</i>	12,822			2,243			10,579		

Panel B. Summary Statistics for Continental European Sample

	All			$\overline{q_m} \geq 1$			$\overline{q_m} < 1$		
<i>Variables:</i>	Mean	S.D.	Med	Mean	S.D.	Med	Mean	S.D.	Med
<i>Total assets (Mn. \$)</i>	3459.9	9512.1	695.7	5703.2	8759.7	2399.6	3288.7	9546.0	644.2
I_t/K_{t-1}	0.245	0.199	0.200	0.242	0.171	0.205	0.245	0.201	0.199
CF_t/K_t	0.345	0.406	0.283	0.363	0.487	0.274	0.344	0.400	0.283
q_{at-1}	0.949	0.631	0.782	1.297	0.894	1.042	0.923	0.598	0.768
q_{mt-1}	0.778	3.630	0.638	1.674	4.169	1.224	0.709	3.575	0.599
<i>Number of Firms</i>	679			47			632		
<i>Number of Obs.</i>	7,655			546			7,109		

Panel C. Matrix of Correlation Coefficients: All firms

	<i>TA</i>	I_t/K_{t-1}	CF_t/K_t	q_{at-1}	q_{mt-1}
<i>TA</i>	1.000				
I_t/K_{t-1}	-0.037	1.000			
CF_t/K_t	-0.009	0.244	1.000		
q_{at-1}	-0.031	0.301	0.180	1.000	
q_{mt-1}	0.010	0.074	0.030	0.187	1.000

Table 5: Tests of Hypotheses Regarding Corporate Governance and Investment

Country/Ownership Group	H1		H2		H3		H4		H5				
	$\overline{q_m} \geq 1$		$\overline{q_m} < 1$		$\overline{q_m} < 1$		$\overline{q_m} \geq 1$		All firms				
	AS	CE	AS	CE	CE	CE	Ownership CFS	Identity FamDis	Accounting Standards Strong	Weak			
CF	0.057	<	0.200	0.092	<	0.127	0.127	0.049	$\approx$	0.084	0.084	<	0.105
t-value	4.38		6.12	15.33		13.10	13.10	2.51		4.23	19.77		13.78
q_a	0.062	$\approx$	0.07504	0.0741	>	0.0343	0.0343	0.0438	$\approx$	0.0501	0.075	>	0.044
t-value	10.45		6.26	25.50		6.13	6.13	5.49		6.75	37.07		10.63
q_m	0.0024	<	-0.0008	0.0011	>	-0.0003	-0.0003	0.0008	$\approx$	0.001	0.0011	>	-0.0011
t-value	2.64		-0.33	2.83		-0.55	-0.55	0.92		1.21	3.92		-1.84
$q_a \bullet CF$	-0.002	<	-0.058	-0.020	$\approx$	-0.0118	-0.0118	-0.013	$\approx$	-0.011	-0.0125	$\approx$	-0.018
t-value	-0.51		-4.67	-7.34		-2.06	-2.06	-1.81		-1.47	-6.77		-4.23
Nobs	2,232		543	10,561		7,117	7,117	1,164		1,306	23,005		8,369
R ²	0.225		0.316	0.157		0.125	0.125	0.152		0.178	0.140		0.105
$\delta I / \delta CF$	0.054	<	0.126	0.069	<	0.116	0.116	0.039	<	0.071	0.068	<	0.088
t-value	6.45		6.33	17.16		17.95	17.95	4.11		7.15	24.91		17.38
$\delta I / \delta q_a$	0.061	$\approx$	0.054	0.069	>	0.030	0.030	0.040	$\approx$	0.046	0.072	>	0.039
t-value	10.62		5.57	25.07		6.66	6.66	5.37		6.89	37.10		10.96

Note: AS ... Anglo-Saxon countries (excluding the US)
CE ... Continental European countries
CFS ... Company/Financial/State controlled
FamDis ... Family/Dispersed controlled

Table 6: Tests of Further Hypotheses Regarding Corporate Governance and Investment

Country/ Ownership Group	H1'			H2'			H4'			H5'		
	Family controlled			Family controlled			CE			$\overline{q_m} < 1$		
	$\overline{q_m} \geq 1$			$\overline{q_m} < 1$			$\overline{q_m} \geq 1$			Accounting Standards		
	Ownership Identity											
	AS		CE	AS		CE	CFS		FamDis	Strong		Weak
CF	0.0462	<	0.4736	0.0951	≈	0.1238	0.1877	≈	0.3464	0.1057	<	0.1611
t-value	0.90		4.75	4.57		5.09	5.21		2.69	18.31		13.77
q_a	0.0871	>	0.0249	0.0784	>	0.0172	0.0548	≈	0.0104	0.0688	>	0.0398
t-value	3.60		1.34	7.84		1.18	3.72		0.40	25.35		6.13
q_m	0.0058	≈	0.0004	0.0024	>	-0.0016	0.0006	≈	0.0004	0.001	>	-0.0012
t-value	2.08		0.26	1.68		-1.15	0.30		0.18	2.51		-1.82
$q_a \bullet CF$	-0.0043	≈	-0.0204	-0.0339	<	0.0294	-0.0593	≈	0.023	-0.0222	≈	-0.0179
t-value	-0.19		-0.54	-3.27		1.91	-4.34		0.42	-8.42		-2.01
Nobs	200		78	971		1,142	340		162	14,055		5,375
R ²	0.328		0.672	0.202		0.252	0.383		0.442	0.130		0.132
$\delta I / \delta CF$	0.040	<	0.444	0.057	<	0.151	0.110	<	0.378	0.076	<	0.135
t-value	1.44		4.95	4.07		9.56	5.18		3.59	21.79		17.36
$\delta I / \delta q_a$	0.086	>	0.019	0.068	>	0.028	0.031	≈	0.018	0.063	>	0.031
t-value	3.99		1.49	7.34		2.58	2.57		1.00	24.83		5.81

Notes

¹ See Gugler, Mueller and Yurtoglu (2004a) for tests of these theories for US data only.

² We list only the most important ones, for the full list and discussion see, Myers and Majluf (1984).

³ Let the firm have a capital stock of K , which earns a permanent return on these assets of r_a . Thus, the profits of the firm are $\Pi = r_a K$. With a discount rate of i the market value of the firm becomes $M = \Pi/i$. By definition, $q = M/K$, and by substitution $q = (\Pi/i)/K = (r_a K/i)/K = r_a/i$.

⁴ See, Hayashi (1982).

⁵ See Fazzari, Hubbard and Petersen (1988), Hoshi, Kashyap and Scharfstein (1991), Oliner and Rudebusch (1992), Carpenter (1995), Carpenter, Fazzari, and Petersen (1994, 1998). For a critique of the application of this methodology by Fazzari, Hubbard and Petersen, see Kaplan and Zingales (1997, 2000).

⁶ A popular alternative to q as a proxy for investment opportunities has been changes in sales. See, Grabowski and Mueller (1972), Vogt (1994), Kathuria and Mueller (1995), or Lamont (1996).

⁷ Both these marginal gains and marginal costs can be expressed as marginal utilities of the managers. For a rigorous derivation, see Kathuria and Mueller (1995).

⁸ Indeed, if the firm never paid a dividend, the value of its shares as a flow of income would be zero, and a hostile takeover would be almost ensured.

⁹ For theoretical arguments and evidence linking shareholder protection to equity market size, see Modigliani and Perotti (1997).

¹⁰ See Gugler and Yurtoglu (2003) for evidence that more concentrated ownership firms pay out less in dividends than less concentrated firms.

¹¹ Examples include the Siemens family and the Quandt family (BMW) in Germany or the Wallenberg family in Sweden.

¹² All studies, which identify controlling shareholders use either a 10 or 20 percent criterion. The results we obtain for the test of hypothesis 4 are very similar for both cut-offs.

¹³ Evidence in support of this hypothesis for Japan was presented by Hoshi et al. (1991).

¹⁴ This is an important part of Roe's (2003) thesis.

¹⁵ The criterion for distinguishing between strong and weak accounting standards is discussed in the appendix.

¹⁶ See, Mueller (1972).

¹⁷ See e.g. King and Levine (1993), Rajan and Zingales (1998), Levine and Zervos (1998), and Demirgüç-Kunt and Levine (2001).