The Effect of Intangible Capital, Ultimate Control and Investors' protection on Corporate Value

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Abstract

This thesis investigates the factors that influence firms' value with empirical analyses of the UK and Western Europe. The aim is to measure the effects of intangible capital, ownership structure (managerial ownership and largest controllers) and country specific characteristics related with investors' protection on corporate value. The first original work of this thesis is with respect to Intangible capital. Specifically, the effect of previous and present R&D expenditures on Tobin's Q is explored. Although, this type of analysis has been previously carried out, this thesis aims to specify the model including financial variables as it is considered that they are fundamental to estimate the "true model" of corporate value. Under this specification, simultaneity of the financial variables might introduce endogeneity problems in the estimation. Therefore, an estimation method which aims to control for endogeneity of the variables is applied. A second objective of this thesis is to explore the relationship created by the ultimate control in the firm. In particular, it examines the effect of agency costs created by two type of relationships: a) managers and owners and b) largest controllers and minority shareholders. The firms' value might be affected depending of the number of shares that are on the hands of either the managers or/and largest controllers. Other issues are also questioned in this part of the thesis, such as, the effect on firms' value of both specific controllers (miscellaneous, family, state, etc) and ways in which control is delegated (pyramids, control-chains, dual shares). Finally, this thesis focuses on the legal differences for investors' protection among 12 Western European countries. This study combines the ownership structure variables at a firm level with variables at a country level. It is argued that corporate value is influenced by the investors' protection of a country. External investors would rather finance firms in countries where laws are more protective, as the risk of losing their investment would be reduced. Nevertheless, it is shown that firms from countries where laws are weak, have on exchange an ownership structure which seems to be more appealing for external investors.

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Declaration

This thesis is wholly the result of my own work.

The third chapter, Effects of Intangible Capital on Firm Performance was presented at the following conferences and seminars: University of York (March 2002), VIIIth Spring Meeting of Young Economists, (Leuven, Belgium, April 2003), Summer School of the European Economic Association, (London, UK, September 2003).

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Introduction

A positive corporate performance refers to the excess of market value of equity shares in relation to the replacement cost of the company assets. The discrepancy of these two values has been studied from both microeconomic effects and country specific corporate governance characteristics. To date, the interest of keeping a firm's value high is important as it represents high investment opportunities and consequently attracts external funding for future projects, via shareholders or bondholders.

This thesis investigates how market reactions to several characteristics of a company and the surrounding legal environment might influence firms' values. The aim is to measure the effect of three main concepts, which are not necessarily related; two of them are studied from a firm level perspective for the UK, i.e. Research and Development (R&D, as a measure for intangible capital) and ownership structure (specifically, it is examined the effect of both managerial ownership and the largest controllers with separation of cash flow rights and voting rights). The third concept incorporates law requirements via country specific characteristics for investors' protection in Western Europe, i.e. legal origin, creditors' rights, shareholders' rights and enforcement of law. A chapter dedicated to the relevant literature review with concern to these concepts follows this introduction.

The basic model of corporate value includes financial variables, such as, investment in productive capital, dividends paid, leverage and size. Although the

analyses of these variables are not the main objective of this thesis, they are considered as a fundamental element to constitute the "true" model. Nevertheless, in some cases, as it will be shown in the thesis, the inclusion of financial variables introduce some estimation problems. Chapter 2 focuses in introducing the financial variables to the thesis by discussing some of the previous findings of their relationship with corporate value. It also describes the statistical properties of the financial variables as this data is consistently used for the following chapters.

The original contribution of this thesis commences on Chapter 3 which aims to study the effect of R&D on the Tobin's Q ratio, where Tobin's Q is used as a proxy of firms' market value (this same measure is applied for the remainder of the chapters). Although this type of relationship has been previously studied[1], the originality of Chapter 3 can be numerated as follows. First, with the use of a panel dataset, it intends to assess the significant and positive influence of R&D activities on corporate value by using an econometric technique that controls for both endogeneity of the variables and fixed effects. Endogeneity might be created from external shocks caused by omitted variables in the model. These omitted effect might impact both the dependent and independent variables. The recognition of these characteristics of the data is important as popular econometric estimators become inconsistent under this case, i.e. OLS and Within estimator. A solution for this problem is the application of instrumental variables that are correlated with the explanatory variable but uncorrelated with the error term. In this study, instrumental variables are used by the Generalised Method of Moments (GMM), which can also eliminate the firm-fixed effects by a first-differences transformation.

Second, the construction of the basic model is based in previous literature,

[1] See for example: Hirschey (1982), Megna and Klock (1993), Chan et al (1999), Chen and Steiner (2000), Klock and Megna (2000), Toivanen et al (2002), Xu and Zhang (2004), among others. All these literature is further discussed in the Chapter of "literature review"

such as Fama and French (1998), Brennan (1970), Jensen and Meckling (1976), Miller and Scholes (1978, 1982), Brainard et al (1980), Masulis (1980), Eckbo (1986), Baker et al (2001, 2002), among others[2]. These studies highlight the importance of financial variables to explain the market value of the firm. As a difference with other studies, Chapter 3 considers both financial variables and R&D activities to determine corporate value.

Third, the impact of R&D activities is measured over time by the construction of a R&D stock to capture not only present but past effects in a static specification.

There are interesting results obtained from Chapter 3. The main findings can be summarized in two points. Firstly, it seems that the market positively reacts to new "news" about R&D activities of a corporation, Chan et al (1991), Toivanen et al (2002). Nevertheless, this effect seems to be lagged for one period to be recognized by the market. In addition, the effect of dividends paid was positive, although not very significant, probably due to the weakness of the instruments for this specific variable. Nevertheless, dividends paid seem to impact on the corporate value only when "special dividends" are paid, possibly because "special dividends" might be close related with restructures or reorganization of the firm.

To further explore the factors that affect corporate value, Chapter 4 aims to include additional attributes at the firm level. Specifically, those attributes related with managerial structure and ultimate controllers. Initially, it is assumed that managers without ownership would find a higher benefit in directing the free cash flow to situations that do not maximise the firms' wealth. Specifically, managers would pursue their own interests at expense of shareholders. Therefore,

[2]Note that these studies are mainly based in US data which might bring different results than for the UK or European countries. This difference is likely due to specific country characteristics, such as tax laws.

if managers possess a certain number of shares from the firm, this would align the objectives of both managers and corporations. Consequently, the number of shares owned by managers might be significant in determining firm's value.

In addition, the level of separation of corporate ownership (cash flow rights) and corporate control (voting rights) in the controlling stake is likely to create conflicts of interests among shareholders. This is an agency problem, which often arises because the decision made by the controlling shareholder might not be in the interest of minority shareholders, Becht and Mayer (2001).

Therefore, Chapter 4 has two main objectives. First, it aims to explain the impact of directors' shareholdings (also known as inside ownership) in corporate value. The first step is to explore which type of functional form is appropriate. Different studies from Morck et al (1988), McConnell & Servaes (1990), Short & Keasey (1999) and Cui & Mak (2002), among others, have drawn different conclusions about the functional form of managerial ownership, but all have agreed that it is non linear. There is no certainty as to which hypothesis is most acceptable. Findings in Chapter 4 suggest that there is not evidence of a relationship with managerial ownership and Tobin's Q. However, opposite results are obtained when financial variables are included in the model as controls. Specifically, a cubic relationship (where management is aligned at low and possibly high levels but is entrenched at intermediate ownership levels) was found significant. This finding suggests that as these types of variables are likely to be endogenous, the significant coefficients found for managerial ownership might be biased. This is in line with studies by Demsetz and Villalonga (2001) and Himmelberg et al (1999).

By contrast with the previous chapter, the analysis is based on cross sectional data. This is followed as managerial ownership might stay stable over time and the use of panel data might be inadequate (Zhou (2001), La Porta et al (2000)).

To this extent, the problem of endogeneity is considered from two perspectives. First, the "reverse" causality of managerial ownership and corporate value, as managers could be awarded with shares depending on the performance/value of the firm. Second, endogeneity is likely to arise as a result of omitted shocks that might be correlated with more than one of the variables included in the model. The model aims to correct for endogeneity following the methodology suggested by Rajan and Zingales (1995), where instruments of the explanatory variables are applied by averaging and lagging them for one period to reduce the noise and to account for slow adjustments.

The second aim of Chapter 4 is to measure if the divergence between corporate ownership and control could determine corporate value. In general, international evidence indicates that the accumulation of control rights in excess of cash flow rights reduces the observed market value of firms, which reflects their good performance (see Denis and McConnell (2003)). This might be explained by the limitation of monitoring activities of minority shareholders, as their supervision is restricted by the dominant shareholder (the one with the largest number of controlling shares).

Some of the questions that are addressed in this part of the chapter are: Is there an effect on firm performance when the largest controller possess different levels of voting rights than cash flow rights?; In the case of the presence of an ultimate controller: Is there a significant impact on firm's value depending on "who" is the ultimate controller? (such as family, widely held corporations, widely held financial institutions, state and miscellaneous (voting trusts, charities, pension funds, etc.)). How is corporate value affected with respect to the way that control is delegated? (such as, pyramids, control chains and cross-holdings).

Given the regulations that protect minority investors in the UK, the ultimate

largest controllers may not have enough legal power to extract resources from the firm. The protection to minority investors might bring as a consequence that the value of the firm is unaffected by the way that control is exerted, which in such a case would mean that legal rules are beneficial to prevent for any negative effect on firms' value. To this respect, evidence of a negative effect of high levels of separation of ownership and control (at least 2 votes per share) on firms' value was found. Nevertheless, for the UK, this effect might be limited as legal regulations protect minority shareholders.

Moreover, firms that are controlled by "Miscellaneous" were shown to have on average lower Tobin's Q ratios than firms with other ultimate controllers. A possible explanation for this finding is that the negative effect of "Miscellaneous" is partially caused because of the high levels of separation of ownership and control in these group of firms.

Based on the findings of Chapter 4 for the UK, Chapter 5 aims to extend the scope of the data by introducing information of 11 more countries from Western Europe. To this extent, Chapter 5 aims to examine the effect of country specific characteristics, which together with the previous findings, might determine an overall conclusion for the link between companies' value and corporate governance.

The data used in this Chapter contains information of both firm level data and country specific legal information. The unique database is a combination of three sources of information: Datastream, La Porta et al (1998) and Faccio and Lang (2002). The data utilized from La Porta (1998) refers to country specific characteristics divided in: a) legal origin, b) investors protection and c) law enforcement.

There are methodological aspects in estimations concerning this type of data.

First, it is likely that there are differences among countries, which are not included the model. Consequently, these omitted variables should be controlled. For instance, country dummies might be an alternative with the initial model. However, when country specific variables (which do not have within-country variation) are incorporated, the use of country dummies originates perfect collinearity with the country specific variables. The same problem is drawn from the fixed effects model. Moreover, a popular approach to control for these effects is the use of random effects, as La Porta et al (2002), Claessens et al (2002). There again, the Breusch and Pagan (1980) Lagrange multiplier test cannot reject the null hypothesis that errors are independent within countries, so it rejects the random effects model as an option. Therefore, an alternative to control for omitted country variables follows Nenova (2003), who controls for possible within-country correlation by using OLS firm-level regressions with clustered robust standard errors. Under this method each country is defined as a cluster, where weights are sums over each cluster. These approach aims to alleviate the effects of omitted country variables that could introduce biasness to the results. In addition, all the models are specified with and without financial variables to account for endogeneity issues as in previous chapters.

After selecting a suitable technique to estimate the models, Chapter 5 examines the effect of laws regarding investor's protection on corporate value. To this respect, countries' laws may be an important issue for corporations in obtaining external finance. External investors may prefer to finance firms in countries where laws are more protective. Therefore, if there are laws that protect shareholders, it is probable that firms which belong to those countries are valued higher. Moreover, firms in countries which have poor laws to protect investors might offer in exchange another type of incentives to overcome the risks originated from weak

investor protection. To this extent, the ownership structure of companies may be of relevance to external investors. For instance, minority investors might be aware of the agency costs created by the separation of ownership and control. Agency costs are created when the interests of the controllers are not aligned to those of minority shareholders, Jensen and Meckling (1976). Particularly, as pointed out by Dyck and Zingales (2004), controllers might get private benefits from the firm, such as perquisites or in some few cases outright theft. Thus, expropriation by larger shareholders is limited by the enforcement of protective laws.

Chapter 5 looks at three ways that laws and their origins might be relevant for firm valuation. Initially, legal origin is used as a proxy for investor's protection as it has been found that it matters for corporate value, Beck et al (2003), La Porta et al (2002).

Thereafter, indices of investor's protection are used and they are represented by the number of shareholder's rights and/or creditor rights in a country. Under this case, investors are of different types, shareholders and bondholders, respectively. To this respect, the impact that they might have on value is likely to be the opposite. Shareholder's rights might attract external investors to fund firms of a specific country. External investors might feel more confident about investing in a country were financial risks are lower. On the contrary, creditor's rights might have a different influence on value. For instance, Claessens and Kappler (2002) found that bankruptcies are higher in common law countries, where there are both stronger creditor rights and greater judicial efficiency. Rossi and Volpin (2004) found that attempted hostile takeovers are associated with better creditor's protection. This suggests that firms in countries with higher indices of creditors rights are more susceptible to hostile takeovers which in turn might negatively impact firm's value.

Finally, the last country specific characteristic, explored in Chapter 5, is with respect to the enforcement of law. Specifically, enforcement of law is represented with the index of efficiency in the judicial system, as in Kappler and Love (2004), La Porta et al (2000). The index for efficiency of the judicial system is constructed by investors' assessments of conditions in the country in question. It is likely that investors' have assessed the judicial system of the country based on other characteristics related with issues of law enforcement, such as, rule of law, corruption, risk of expropriation and risk of contract repudiation. The indices of investor's rights are also incorporated in this specification of the model as they do not present correlation with the efficiency of the judicial system. In other words, it might seem that the level of country protection to investors and the level to which law is enforced may be independently determined by countries' laws. For example, firms with the highest average investors protection are those from English origin countries. Contrary, firms from Scandinavian legal origin countries present the highest index of law enforcement.

The main findings in this chapter are as follows. First, as in Chapter 4 for the UK, the presence of a controller has a negative effect in firm's value. Moreover, as voting rights and cash flow rights become equal, corporate value is greater. However, the latter effect seems to disappear when country specific variables are integrated to the analysis. This finding suggests that firms in countries where the protection to investors and the law enforcement is low, might have stronger corporate governance mechanisms, such as, lower levels of separation between ownership and control, in order to attract external investors. For instance, firms from a French legal origin, where investors protection and law enforcement is the lowest, showed to have higher average Tobin's Q values than firms in countries from other origins. All the same, firms from French legal origin have the lowest

level of separation of ownership and control, situation that then might result on higher corporate values.

Generally, a firm which belongs to a country with poor investors' protection might set control mechanisms that favour external investors in order to make the firm more attractive to the external market. This analysis also gives insight to the preferences of investors to select a specific corporation for buying stock; with this knowledge, managers can follow actions to increase firm's value and as a consequence attract further external investment.

On the whole, this thesis offers some contributions with respect to the understanding of factors that might be of significance to determine firms' value. Interesting implications, such as the influence from differences among countries, are shown to be a fundamental aspect in corporate governance. This can be an exception when the nature of the experiment is a specific study of a single country as in Chapters 3 and 4, so particular conclusions could be drawn. Generally, the three factors under analysis: intangible capital, ultimate controllers and country specific characteristics, were shown significant in influencing firms' value.

Chapter 1

An Overview of the Literature

The behaviour of a firm has puzzled researchers about finding a rational explanation that can help to predict future returns and to choose the most adequate investment opportunities. As Dow and Gorton (1997) pointed out, the stock market indirectly guides investment by transferring two kinds of information: information about investment opportunities and information about managers' past decisions. A high stock price may signal to the manager that the market believes the firm has profitable investment opportunities. However, this does not mean that the manager will take the best decisions for the welfare of the firm. For this reason, managers must be given incentives to make good investment decisions. There are different characteristics of the company that might well influence the reactions of the market to value such stock. In this thesis three different elements that are likely to be important to influence corporate value are studied and the most relevant literature attach to them is discussed below.

1.1 Measuring corporate performance

Market value ratios show how highly the firm is valued by investors and are part of the tools for the analysis of firm's financial performance. A market value ratio which has been broadly applied in empirical work is Tobin's Q.

Tobin's Q is a ratio of the market value of the firm to its replacement cost. This ratio was originally developed by J. Tobin (1969), and represents a measure of profitable investment opportunities. The numerator must include the market value of both debt and equity and the denominator is the present value to replace the assets.

In Tobin's Q theory, the objective of a firm is to maintain this ratio as unity, which means that if the market value of the firm is greater than its replacement cost, the firm should invest in capital stock. Likewise, if the firm's market value is less than its replacement cost, the firm should disinvest in its capital stock.

Tobin's Q ratio has been compared with other performance ratios as in McFarland (1988). He compared Tobin's Q ratio with the rate of return using Monte Carlo experiments, to determine which of these ratios is superior. He pointed out that Q has several advantages over the rate of return. The measure for market value in the numerator of Tobin's Q, reflects a firm's expected future profits, while the accounting rate of return measures only past profits. Furthermore, a firm's market value is also influenced by the variance of expected profits, so Q includes an automatic adjustment for risk. Finally, Tobin's Q ratio should be less sensitive to the inflation rate than the accounting rate because the denominator of Tobin's Q is a firm's replacement value and not its book value. However, He also pointed out the limitations of calculating the replacement cost of firm's assets. This calculation often excludes any measure of the firm's intangible assets and includes a measure of depreciated tangible assets that is calculated using depreci-

ation schedules that do not adequately reflect true economic depreciation. Thus, the exclusion of intangibles from the firm's asset base and the use of inadequate depreciation schedules, which are the major objections to the accounting rate of return, also may cause errors in Tobin's Q. In his conclusion, McFarland argued that smaller average errors can be found in accounting estimates of Tobin's Q than in the rate of return, and that estimates of Tobin's Q have a much higher average correlation with the true measure than does the accounting rate of return.

Campbell and Shiller (1998) studied the conventional performance ratios: the dividend-price and price-earnings ratios. They argued that it is quite possible that the true relation between performance ratios and long-horizon returns is non-linear. However, even though these performance ratios are available for empirical research, they are limited in that they are not forecasting variables (ex post), but they are ex ante forecasting relations. For instance, as the authors stated, a criticism of the dividend-price ratio is that it can be affected by corporate financial policy. Companies can repurchase their stock, as a tax-favoured alternative to paying dividends. Repurchases transfer cash to the shareholders who sell their stock, and benefit ongoing shareholders because future dividend payments will be divided among fewer shares. This action reduces current dividends, but increases the long-term growth rate of dividends per share. This in turn can permanently lower the dividend-price ratio, driving it outside its normal historical range. This study gives insight to support the idea that the Tobin's Q ratio remains the best option for empirical studies to forecast future corporate performance, in spite of its limitations.

Due to the importance of the Tobin's Q ratio to represent corporate performance, its construction has been an issue for researchers, as in Lindenberg and Ross (1981). They pointed out that comparing accounting data and financial

valuation data offers the opportunity to examine performance, the difference between inputs, on the one hand, and output, on the other. The authors developed a cross-sectional value of Tobin's Q and analysed its implications for industrial organization. Their procedure for calculating Tobin's Q ratio has been widely used in different empirical research, and is the market value divided by the replacement cost. The firm's securities fall into three broad groups: a) common stock, b) preferred stock, and, c) debt. In the numerator, the complexity starts with the calculation of the market value of debt as the authors mentioned. They suggested to divide debt to: long term debt and short term debt, where the latter equals to its book value. Long-term debt, however, has a market value that depends, significantly, on the maturity distribution of the firm's bonds, its coupon rates, and the current yield to maturity. For the calculation of the replacement costs (denominator), they divided the assets in three broad categories: a) plant and equipment, b) inventories, and c) other assets. The latter is assumed to equal its book value as it contains mainly securities and liquid assets, such as cash. For the replacement cost of net plant and equipment, they considered four major effects: a) price level changes, b) technological change, c) real economic depreciation and d) investment in new plant and equipment. Finally, for the calculation of inventories, the authors made adjustments for the major methods of inventory valuation reported by individual firms.

Although there are different methods employed to estimate Tobin's Q ratio, none can reach theoretical precision. The problem arises from the lack of information available from firm level data which is required to estimate the marginal Tobin's Q ratio, as theory suggests. Marginal Tobin's Q is the ratio of the market value of an additional unit of capital to its replacement cost; however, the observable ratio is the average Tobin's Q, namely the ratio of the market value

of existing capital to its replacement cost. Researchers have assumed the average Tobin's Q as a proxy for the marginal Tobin's Q. The equivalence of marginal and average Tobin's Q was studied by Hayashi (1982). He stated that marginal and average Tobin's Q are essentially the same in the special, yet important, case where the firm is a price-taker and the production function and the installation function are homogeneous. He compared the performance of the average Tobin's Q with a modified ratio, which is equivalent to the marginal Tobin's Q. He found that the variation in the modified ratio is less pronounced than that in average ratio.

The measurement error obtained from the computation of the average Tobin's Q has also been recognized by other researchers, as in Perfect and Wiles (1994). They compared of five different ratios, and found that empirical results were sensitive to the method used to estimate Tobin's Q. They pointed out the advantages and disadvantages of the ratios under analysis. Lewellen and Badrinath (1997) also examined the methods commonly employed to estimate Tobin's Q ratios and in contrast, found them to be faulty in design and arbitrary in implementation. They proposed an alternative that they argued is simpler and more accurate. They suggested that the key to the procedure is an improved measure of fixed asset replacement costs.

Several empirical work have utilized the average Tobin's Q ratio to explain the excess of value of the firm in comparison with its replacement costs[1]. The excess in value of share prices has frequently been attributable to irrational behaviour such as "herding" or "market psychology", nevertheless recent work emphasizes that such sharp movements or "bubbles" may be consistent with the assump-

[1] Megna and Klock (1993), Klock and Megna (2000), Chen and Steiner (2000), Himmelberg et al (1999), Cui and Mak (2002), McConnell and Servaes (1990), Demsetz and Villalonga (2001), Hirschey 1982, La Porta et al (2002), Claessens et al (2002), among others.

tion of rational behaviour. In other words, "intrinsic" bubbles may depend on fundamentals such as dividends.

1.1.1 Intangible capital

Intangible capital is an alternative that has been applied to explain high corporate valuation. The intrinsic value of intangibles such as brand name, customer loyalty and human knowledge are factors that are not controlled in the historical records of the company's value. However, such factors are frequently worth higher than the tangible assets themselves, as they return a significant increase on corporate value, which reflects a good performance. To date, there does not exist a comprehensive system for measuring intangible assets and different empirical techniques have been studied to find a close relation that allow us to include these types of capital to value firms.

The basic analysis of intangibles relies on a firm level explanation, which argues that the excess value is caused mainly to characteristics and behaviour of the firm itself. Sveiby (1998) pointed out that it is useful to measure intangible assets and that it is possible for managers to create shareholder value, without relying primarily on traditional financial indicators. Previous research has explored this issue. For instance, Hirschey (1982) found that advertising and R&D expenditures have positive and significant market value effects. He also encouraged further investigations to be made on this aspect, considering variations over time and across industries; Megna and Klock (1993) studied the contribution of intangible capital in the semiconductor industry, to the variation in Tobin's Q with a model which represents a perfect equilibrium market. They found positive and significant estimators of intangible capital. They also studied the effect of rivals' stock on R&D, measured with patents, which appeared to contribute

negatively to the variation in corporate performance.

Several such studies have been performed, where intangible capital has been measured with R&D and advertisement expenditure. These types of empirical studies have been applied mostly to USA data, as information for advertisement is publicly available. The findings have been consistent for different sample periods, where intangible capital positively affects corporate value. See Hall (1993a and 1993b), Klock et al (1996), Chan et al (1999), Klock and Megna (2000). For the impact of intangible capital on productivity (profit rates) see Megna and Mueller (1991), Griliches (1994), Wakelin (2001).

Akbar and Stark (2003), used four different deflators to measure the effect R&D expenditure, among other variables, on corporate value in the UK. They found that the effect of R&D expenditure on corporate value remains positive and significant independently of the deflator used (similarly for dividends declared). Xu and Zhang (2004) argued that in Japan, the R&D effect on the stock market is different from that observed in the USA. They examined the R&D effect on stock returns in the Japanese market and found a positive and significant R&D effect during the period 1993-2000 (post-bubble period), but an insignificant effect for previous periods. They analysed the risk-reward patterns of stock returns in the subsequent period rather than instantaneous responses of the stock prices to the R&D announcements. Their results showed that overall, returns are positively related to the level of the R&D intensity, and to a lesser degree, the total risk of returns is positively related to the R&D intensity. They found an average cross-sectional impact of returns on R&D of $\beta = 4.9$ by creating a cumulative R&D intensity measure. A similar measure was constructed by Chan et al (2001) and Hall (1990), where current and past R&D expenditure were considered. Fama and French (1998) also found a positive coefficient for R&D expenditure; their

measure refers to the yearly expenditure in these activities. They also considered the future effects of its first difference. The R&D slopes for their regressions is about 4.5. Their study is for USA firms for 28 years (1965-1992).

Lev and Sougiannis (1996) documented a significant intertemporal association between firms' R&D capital and subsequent stock returns. They suggested that stock prices do not fully reflect R&D capital contemporaneously but in future periods. They acknowledged this effect to two likely causes. First, the underreaction of the market to R&D information, estimated at an annual rate of 4.57 percent. Second, the compensation in subsequent returns for extra-market risk factors associated with R&D.

An important factor to measure the effect of intangible capital on firms' performance is the specification of the most adequate regression model. The selection of the proper econometric techniques has to be based in the characteristics of the data. In accounting data there are problems of endogeneity, where econometric methods such as OLS and Within estimator for panel data become bias. The Generalized Method of Moments (GMM), however, has shown to tackle the problem of endogeneity. Some studies utilizing Monte Carlo simulation have been performed, such as Arellano and Bond (1991). They performed simulations for 100 units, seven time-periods and two parameters in a dynamic model, which by definition, have endogenous explanatory variables. They found that GMM performed better than the simpler Instrumental Variables estimator, as the finite sample bias and variances were insignificant. This technique was also applied to employment equations with UK data; although, the performance of the GMM was still better, a downward bias in the standard errors for the two-step estimator was observable in both the simulation and the application to real data.

The studies applying GMM have been mainly focused on dynamic investment

equations as in Bond and Meghir (1994), who investigated an empirical model of investment based on the Euler equation with UK company data. Investment models with the GMM estimator, which have used Tobin's Q as a measure of future investment opportunities, have compared the performance of GMM with OLS and the Within estimator. The performance of GMM has been demonstrated to be more appealing based on statistical tests, but, has been shown to be very sensitive to the specification of the instrumental variables. See Blundell et al (1992), Mairesse et al (1999), Bond et al (1997 and 1999), Mulkay et al (2000), Bond and Cummins (2000). Studies of corporate value have also used these techniques, for example, Blundell (1999) empirically studied the relationship between technological innovations, market share and stock market value.

Generally, previous literature agrees that there is a positive effect of intangible capital on market value. Nevertheless, the aim of Chapter 3 is to assess this relationship by considering financial variables in the model, subsequently, the endogeneity of these variables is aimed to be controlled with the use of GMM. To my knowledge this method has not being applied before in this particular setting.

1.1.2 Corporate Governance

Corporate Governance has been defined by Denis and McConnell (2003) as:

> "the set of mechanisms - both institutional and market-based - that induce the self-interested controllers of a company (those that make decisions regarding how the company will be operated) to make decisions that maximise the value of the company to its owners (the suppliers of capital)"

Another definition has been also given by Shleifer and Vishny (1997) who stated:

> "Corporate governance deals with the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment"

Based on a firm level explanation for a good firm's performance, corporate governance theory has become a popular argument to explicate the dissimilarity of company's market and book value. The separation of ownership and management is the main concern of corporate governance, as it can create conflicts between shareholders' and managers' objectives, which is an agency problem, Jensen and Meckling (1976). Agency costs are incurred when managers do not attempt to maximize firm value and shareholders incur costs to monitor them.

It has been argued that the structure of corporate ownership varies systematically in ways that are consistent with value maximisation (See Demsetz and Lehn (1985)). The inside composition of corporations gives an insight to explain firm's performance by its comparison with the outside environment, (e.g. stock market valuations).

In this context, an effect of directors' shareholdings on corporate value is frequently utilized. It has been suggested in theory a non-linear relationship between value and managerial ownership. However, there are some controversies in the empirical research to this extent, particularly with regards to the kind of relation (positive or negative correlation) and if so, in the inflection points that make these relationships behave non -linearly.

Morck et al (1988) found a non-linear relationship between firm's value -measured with Tobin's Q ratio- and ownership governance -measured with the number of shares possessed by the board of directors-. Their findings, with USA data, are based upon a piecewise linear relationship with these two variables, where Tobin's Q increased and then decreased with increases in managerial own-

ership. McConnell and Servaes (1990) further investigated the relation between Tobin's Q and the structure of equity ownership. They found a quadratic relationship with ownership and Tobin's Q. In this study, they recognized the existent causality between insider ownership and corporate value. It can be argued that managers are more inclined to retain a large fraction of successful firms. It may also be the case that the managers of successful firms are more likely to be rewarded with additional forms of stock ownership. Therefore, due to these implications, causality should be assumed.

By contrast, Short and Keasey (1999), found that management is aligned at low and possibly high levels but is entrenched at intermediate ownership levels. They confirmed from their empirical analysis that UK managements become entrenched at higher levels of ownership than their USA counterparts. They identified individual effects in the data, which are controlled with a Panel data estimation technique. Cui and Mak (2002) further investigate this relationship and found that Tobin's Q initially declines with managerial ownership, then increases, then declines again and finally increases once more. Their USA data reduce the noise from industry, using the industrial sectors which have the highest expenses on Research and Development (R&D). Their results are robust using 2SLS regression, and with the Hausman test, which did not indicate a problem of endogeneity.

Endogeneity issues between managerial ownership and firms' value have also caused controversy in empirical studies. Several studies have tackled this problem with the use of simultaneous equations. The results of Demsetz and Villalonga (2001) supported the idea that after controlling for endogeneity of ownership structure with a 2SLS model, there was no statistically significant relationship between ownership structure and firm performance. Cho (1998), found that any

possible effect of director's shareholdings on value disappears once endogeneity is controlled. He examined the relationship among ownership structure, investment and corporate value and found that corporate value affects ownership structure, but not vice versa. Likewise, Himmelberg et al (1999) who also controlled for endogeneity derived from observed firm characteristics and firm fixed effects, could not conclude that changes in managerial ownership affect firm performance. Himmelberg et al argued that all previous studies were spurious, as they did not control fixed effects with panel data analysis. However, this conclusions were criticized by Zhou (2001), who argued that in panel data estimations with firm fixed effects, it would be hard to find a meaningful relationship between ownership and performance, even if one existed. Zhou also analysed the variations in managerial ownership. He pointed out that, while there is a substantial difference in managerial ownership across firms, changes from year to year within a company are typically slow. In other words, Zhou's results support the idea that managerial ownership stays stable over time and, as a consequence, panel data estimation is inadequate, as it would eliminate the effects of managerial ownership on corporate value.

By contrast, significant results had been found eventhough endogeneity has been controlled. For instance, Chen and Steiner (2000) formulated an empirical model where both managerial ownership and Tobin's Q, as well as, analyst coverage were jointly determined. They found that managerial ownership enhance firms' value. Beiner et al (2004), also controlled for endogeneity by a simultaneous equation model. Instead of looking at a single control mechanism (managerial ownership), they used a broad corporate governance index for Swiss firms. Their findings support the hypothesis of a positive relationship between firm-level corporate governance and Tobin's Q. Schmid (2003) used a 3SLS model also in a

sample of Swiss firms, finding that managerial ownership has a positive effect on firms' value. Similarly, Chen et al (2003) concluded that after treating Tobin's Q and managerial ownership as endogenous, there is significant evidence that Tobin's Q increases monotonically with managerial ownership in a sample of Japanese firms.

Corporate governance has been studied beyond managerial ownership[2]. The separation of ownership and control has been considered as a determinant of corporate value. Stock market valuations can be used as reference points to assess whether corporate governance mechanisms, developed primarily to protect shareholder interests, have been constituted according to the firm's interests or mainly for the personal benefits of specific shareholders or managers. Financial policies are essential to achieve quality management, which consequently construct a credible good reputation for the firm to the outside world. Firm's behaviour can be manipulated by shareholders, but there are also several factors that could affect firm's market value, such as the separation of ownership and control and the largest ultimate controllers.

La Porta et al (1998) was the first study that investigated the issue of ultimate control, by tracing the chain of ownership to find who has the most voting rights. The authors present data on ownership structures of large corporations in 27 wealthy economies, to identify the ultimate controlling shareholders of these firms. Their analysis raise the question of how the agency conflict between the controlling and the minority shareholders can be reduced. They found that controlling shareholders typically have power over firms significantly in excess of their cash flow rights, primarily through the use of pyramids and participation in management.

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[2]See Becht (2002) for a review of the theoretical and empirical research of the main mechanisms of corporate control.

Similar corporate governance databases have also been constructed, such as by Claessens et al (2000), who improved and extend this analysis to East Asian countries. In their analysis, they found an extensive family control in more than half of East Asian corporations, and found that significant cross-country differences exist. For East Asian countries, corporate control is typically enhanced by pyramid structures and cross-holdings among firms. Finally, the separation of ownership and control was more pronounced among family-controlled firms and among small firms. Likewise, Faccio and Lang (2002), documented the ultimate ownership and control of 5,232 corporations in 13 Western European countries.

The type of datasets mentioned in the above paragraph, which are concerned with ownership and control, have been used for different types of studies, i.e. dividend policy, as in Short et al (2002) and firm performance, as in Suehiro (2001), Joh (2001), Palia et al (1999), among others.

The impact of the separation of cash flow and voting rights on corporate value has been analysed for different countries. Holderness (2002) concluded from a review of this type of studies, that the relation of blockholders and firms' value in the US is not conclusive. Sometimes has been found to be negative, sometimes positive and never very pronounced. Mehran (1995) found that the relationship of blockholders and firms' value was not significant. Similarly, he did not find support for a relationship of Tobin's Q and outside ownership of specific groups, such as, individual investors, institutional investors and corporations. Claessens and Djankov (1999) found that firm profitability is positively related to ownership concentration for Czech firms, the more concentrated the ownership the higher the firm profitability and labour productivity. They also found that certain type of owners, such as, foreign investors and non-bank funds are more strongly associated with improvements in performance.

Moreover, there are some legal rules in the UK that protect minority shareholders, as stated in Barca and Becht (2001). Once an investor owns 30% of equity shares, it has to make an offer of all the shares in the firm. The price of this offer has to be the highest price that the bidder paid for the target company's shares during the 12 months preceding the date when the stake reached 30%. This action benefit minority shareholders because of the presence of equal price rules in the case of takeovers. Moreover, minority shareholders can make a claim to court when majority shareholders intend to make a profit at their expense.

To this end, protection given to shareholders in each country might affect the general overlook of corporate value. For instance, Goergen and Renneboog (2001) suggested that the agency conflict caused by voting controls by shareholders in the UK differs from that found in Continental Europe. In the later, expropriation of minority shareholders might be the key agency problem related to ownership concentration. As there is extensive protection to minority investors in the UK, the agency problem originates from the lack of ownership concentration and control, which requires codes to prevent managers to benefit against shareholders.

There are different ways to obtain controlling power in a corporation. As Berle and Means (1932) pointed out, the control of a firm can be exerted by different devices, such as, pyramids, dual class shares (non-voting shares, limited voting shares) and cross-holdings. These devices cause differences in cash flow rights and voting rights in a company. The separation of ownership and control in the UK has been compared with other countries in Europe. For example, Franks et al (2004), pointed out that in the UK, family ownership is of limited significance and there are few dual class shares. Although, non-voting shares in the UK were outlawed since 1968, firms may issue "preference shares" which have a prior claim on dividends but limited or non-voting rights at general meetings.

Previous literature as described in this section has explored similar issues which are raised in Chapter 4. Nevertheless, conclusions in both managerial ownership and ownership structure have varied not only from differences among countries, but also from differences in the estimation methods. Therefore, Chapter 4 aims to empirically assess these issues for the UK.

1.1.3 Country specific characteristics

Corporate governance behaviour varies in different countries. This fact has focused research to investigate the differences among countries that could be the cause of the variation. Multi-country comparisons of investors' protection is a common approach to corporate governance as pointed out in a survey performed by Shleifer and Vishny (1997). Legal protection to minority shareholders is an important mechanism that emphasizes the attractiveness of investing in a specific country. Investors' protection refers to both shareholders and creditors, who have legal protection which varies among countries. The enforcement of creditor's rights may be beneficial for creditors themselves but not for shareholders, as this limits their power in the case of bankruptcy or liquidation. For instance, Claessens and Kappler (2002) found that bankruptcies are higher in common law countries, where there are both stronger creditor rights and greater judicial efficiency. This behaviour is also in accordance with a study by Rossi and Volpin (2004). They found that attempted hostile takeovers are associated with better investor protection. This suggests that firms in countries with higher indices of creditors rights are more susceptible to hostile takeovers which in turn might negatively impact corporate value.

Country specific characteristics have been studied from both macroeconomic and firm level perspectives. From a macroeconomic point of view, Beck et al

(2003) assessed two different theories with respect to the determinants of financial development. They found a robust link between stock market development and legal origin to determine financial development. For instance, countries from French legal origins have less develop stock markets than countries from English legal origins. Beck et al (2004) found that firms from a French legal origin find more obstacles in obtaining external finance than firms from other countries. This suggests that corporate value might be influenced by this type of limitations.

Rajan and Zingales (1998) found that financial development - typically measured by the size of the stock market and the level of credit - reduces, at least partially, firms' costs for external finance. Specifically, countries with greater financial development grow faster in economic terms.

Berkowitz et al (2003) analysed the determinants of efficiency in the legal system in a group of different countries around the world. They found that the way that the law is transplanted has a larger indirect effect on the effectiveness of legal institutions rather than the legal families. Therefore, countries which have some familiarity with the principles of the transplanted law have a more effective legal system. The transplanting effect have subsequently, an indirect effect in the economic development in those countries.

The relationship of external finance and investor's protection was performed by La Porta et al (1997). They presented evidence on the differences across countries with respect to legal rules protecting investors and their enforcement. They pointed out that these rules varied systematically by legal origin, i.e. French, English, Scandinavian, German. Their specific analysis is devoted to the countries capital markets; the main finding was that countries with poorer investor's protection have smaller and narrower capital markets.

La Porta et al (1998) concluded from a study of 49 countries that investors'

friendlier laws are a determinant of a more effective law enforcement. In their study, countries from French legal origin were found to have a lower law enforcement than English legal origin countries.

From a firm level perspective, the literature has made comparisons of firms' behaviour in different aspects, depending of the country to which firms belong. One of the aspects is the limits that firms have to set their ownership structure. For example, in Germany there is a legal restriction for non-voting (and limited voting) capital, where it may not exceed 50% of stock capital. Another example is in France, where there is a legal restriction for non-voting (and limited voting) capital, which may not exceed 25% of the stock capital, Faccio and Lang (2002). Furthermore, in the UK, once an investor owns 30% of equity shares, it has to make an offer of all the shares in the firm. The price of this offer has to be the highest price that the bidder paid for the target company's shares during the 12 months preceding the date when the stake reached 30%. This action benefit minority shareholders because of the presence of equal price rules in the case of takeovers, Barca and Becht (2001).

In addition, there is evidence in the literature, that the effect of separation of ownership and control varies depending on the country. For instance, Zingales (1994) found that in Italy, expropriation is large and consistent with voting power. By contrast, evidence for Sweden suggested that separation of ownership and control do not result in substantial expropriation by largest controllers, Bergstrom and Rydqvist (1990).

Cross-country comparisons with firm level data had been performed to assess the effect that different laws determine firms' behaviour. La Porta et al (1998, 1999) examined ownership concentration in the largest publicly traded companies and found a negative correlation between concentration of ownership and the

quality of legal protection of investors. They argued that strong investor protection is associated with effective corporate governance. Further research into this type of relationship has also been presented by Himmelberg et al (2002). who estimated the relationship among investor protection, inside ownership, and the marginal cost of capital using firm-level data from 38 countries. Their findings suggested that the weaker the investor protection, the higher the concentration of inside equity ownership, and the higher the cost of capital. Himmelberg et al's study is the first attempt of research focused to the relationship of ownership and marginal profit (measured by Tobin's Q).

Furthermore, a study of corporate governance and investor protection in emerging markets was developed by Klapper and Love (2004). They used recent data from 14 emerging markets and found that the average firm-level governance is lower in countries with weaker legal systems. Good corporate governance in their study, refers to a high index created from six different governance characteristics, such as, discipline, transparency, independence, accountability, responsibility and fairness[3]. They also include a measure of corporate valuation and found that firms in countries with poor investor protection can improve their corporate governance, which may in turn improve their performance and valuation.

Evidence of higher valuation of firms in countries with better protection to minority shareholders has also been found by La Porta et al (2001). This finding is based on a sample of the largest 20 firms by market capitalization for 27 wealthy countries around the world. Their results confirm that poor shareholder protection is penalized with lower valuation, and that higher cash flow ownership by the controlling shareholder improves valuation, especially in countries with poor investor protection.

[3]For a further description of the definitions for this elements see Kappler and Love (2003)

Claessens and Laeven (2003) investigated the role of property rights in the allocation of resources in a firm. They found that in countries where property rights are more secure against expropriation from powerful competitors, firms grow faster. To this respect, property rights were more important for intangible assets than tangible assets.

Similarly, Dermigüç-Kunt and Maksimovic (1998, 2002) found that differences in financial and legal systems has an impact on firms with respect to acquire external finance to promote growth. In their study, it was shown that firms attract more external finance, when they belong to a country with more efficient financial systems. Specifically, their results demonstrated that an active stock market and a well developed legal system are important in facilitating firm's growth.

Generally, previous literature had accounted for the importance of country differences with respect to the efficiency of the legal system and to the protection offered to external investors. Country specific characteristics, may then, be significant in determining of corporate value. This thesis contemplates in the analysis, for each of the chapters, previous findings that had been mentioned in this literature review.

Chapter 2

Accounting Variables and Data Description

2.1 Introduction

The aim of this chapter is to introduce the accounting data that is utilized throughout this thesis. This data is used for the construction of three hypotheses which are the aims of Chapters 3, 4 and 5. This chapter intends to facilitate the discussion of the financial elements that although are not the main issue to investigate in this thesis, are fundamental for the construction of the models under analysis. The selection of the financial variables described in this chapter follow the approach of Fama and French (1998), who focused in measuring how the tax effects of financing decisions impact on the corporate value. In this respect, debt, dividends, investment in productive capital, total assets (representing the size of the firm) and Research and Development were considered to affect the value of the company. Although they did not find a tax effect, they were able to demonstrate a strong influence of financial variables on value. The authors argued that dividends contain information about value that was not indicated

by other variables. Their cross-sectional regressions also showed that the level of leverage and longer-term changes in debt provide reliable information about value missed by the remainder of the variables. The same conclusion was implied about Investment.

Further studies have also considered financial variables to explain how they influence firms's value. These studies are cited in the corresponding sections in this chapter. For instance, see Brennan (1970), Jensen and Meckling (1976), Miller and Scholes (1978, 1982), Brainard et al (1980), Masulis (1980), Eckbo (1986), Baker et al (2001, 2002), among others.

The rest of the chapter is organised as follows. Section 2 explains the construction of the data set. Section 3 reviews the relevant theory of empirical research for each of the variables discussed in this chapter. Section 4 presents the descriptive statistics and correlation matrix for the data. Section 5 summarises.

2.2 Data Construction

The data discussed in this chapter is from the United Kingdom and is used for all subsequent chapters. This data is also further adjusted in instances where data limitations affect the construction of certain variables in the following chapters. This adjustments are discussed in the corresponding chapters. Variables were obtained from "Datastream" at the firm level. The sample period under analysis is from 1990 to 2000. The selection of this period was chosen as systematic disclosures of R&D expenditure (which is the main variable under analysis for the next chapter) are only available for UK firms since 1990 [1].

The panel data set was constructed with the following criteria: First, only

[1] This treatment of information related to R&D was also followed recently by Al-Horani et al (2003).

non-financial industrial sectors were included in the sample. Second, from these firms, only those with at least four continuous time series observations available were considered. This selection aims to have as much number of observations as possible and, simultaneously, enough time periods to comply with the econometric methods for panel data which are applied in Chapter 3. Third, as there is concern about the effect of influential observations, outliers in the data were controlled in both independent and dependent variables. The construction of the dependent variable (Tobin's Q) is very susceptible to measurement errors, probably for data errors that might create extreme and non-plausible values. To address this issue, approximately 2% of observations (1% in each tail) were deleted.

Furthermore, as explanatory variables are scaled by total assets, influential observations may result when assets are close to zero. There is also the possibility of outliers being created by errors in the data[2]. There was concern, as in the case of the dependent variable, that influential observations changed the results in the regressions. Generally, outliers might be the consequence of two different reasons. One is given by human mistakes made in the data. The second reason might be the possibility that one or some of the observations differ in any characteristic from the rest of the population. In any case, the effect of the outlier might change the results of the estimators.[3] Therefore, outliers for each of the explanatory variables were excluded in the same proportion as with the dependent variable (1% in each tail). Trimming was applied to individuals (firms) and not to observations due to the fact that the sample data is a panel. This means that all the time series of the corresponding firm that had an outlier in any time

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[2]See Fama and French (1998) for a similar discussion about the treatment of outliers in explanatory variables.

[3]There are some changes in the regressions with and without outliers. For instance, in Chapter 3, the coefficient for investment is negative when outliers are included and positive when they are excluded. There is also a general decrease on the impact of the coefficients of all the variables when outliers are excluded.

period, were excluded to avoid biasness in the selection of specific years in the sample. With these modifications, the final number of observations (firms times years) is 7,754. The number of firms per year differs in each of the years ranging from 10 to 512 firms.[4]

Endogeneity problems arising from the use of accounting variables are controlled by the application of GMM models as described in Chapter 3. Another methodology for cross sectional data is used in the remainder of the thesis[5]. Endogeneity is expected from the accounting variables as they are likely to be simultaneous, that is, that they might be jointly determined with the dependent variable. For instance, there has been empirical research related to the impact of Tobin's Q on the investment rate. Significant results have been found, suggesting that investment is endogenous as there is a simultaneous relationship with Tobin's Q[6]. Capital structure and the level of dividends paid are very likely to be influenced by Tobin's Q i.e. the performance of the firm. There is also the possibility that regressors and error terms may be correlated, e.g. shocks affecting Tobin's Q are also likely to affect some of the regressors such as leverage and dividends. All these estimation problems support the specification of the model under the assumption of endogenous variables, and consequently use instrumental variables via the GMM method.

2.3 Variables

The dependent variable used throughout this thesis is Tobin's Q ratio, which represents firm performance and value. As explanatory variables, the models in-

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[4]See Table 2.1 for the panel data structure.

[5]Refer to those chapters for a full discussion on this issue.

[6]See for example Mulkay et al (2000), Mairesse et al (1999), Bond et al (1999), Toivanen et al (1997), Blundell et al (1992), among others.

clude Dividends paid, Investment in productive capital, Leverage and size. These variables are discussed below individually.

2.3.1 Tobin's Q

Tobin's Q is a ratio of the market value of the firm to its replacement cost. This ratio was originally developed by J. Tobin in 1969, and represents a measure of profitable investment opportunities. The numerator must include the market value of both debt and equity and the denominator is the present value to replace the assets.

In Tobin's Q theory, the objective of a firm must be to maintain this ratio as unity, which means, on the one hand, that if the market value of the firm is greater than its replacement cost, the firm should invest in capital stock. On the other hand, if the firm's market value is less than its replacement cost, the firm should disinvest in its capital stock. Further, Tobin's Q ratio has been used in empirical research, for example in measuring the effect of intangible capital on the market value of a firm, as in Megna and Klock (1993), where R&D and patents were utilized as representatives of intangible capital to create a model in a perfect equilibrium market. The authors constructed their data obtained from 11 firms in the semiconductor industry for the period 1972 to 1990. Klock and Megna (2000) based their study on the wireless communications industry where further aspects of intangible capital were incorporated, such as advertising, radio spectrum licenses and measures of installed customer base.

The relationship of Tobin's Q with financial policy was also studied by Klock et al (1996), whereby Tobin's Q was the dependent variable representing firm performance. Other research has focused on the influence of ownership characteristics on firms' value, by also utilizing Tobin's Q as a measure of corporate

value. Such studies had been performed by Chen and Steiner (2000), Himmelberg et al (1999), Cui and Mak (2002), McConnell and Servaes (1990), Demsetz and Villalonga (2001), among others.

The ratio utilized herein is a proxy of Tobin's Q ratio which has been widely used in different studies. Among others, Hirschey (1982), and Hirsch and Seaks (1993) have used it to explain intangible capital aspects of advertising and R&D expenditures on Tobin's Q.

The general form of the ratio utilized in this research is as follows:

$$TQ = \frac{TA - ECR + MV}{TA} \tag{2.1}$$

where TA[7] is the book value of total assets, ECR is the Equity, Capital and Reserves of the firm and MV is Market value of the firm, which does not include preference capital, but only common stock. The book value of preference capital therefore, is implicit in the value of total assets.

This ratio does not include the market value of debt, so the book value of both current liabilities and long-term debt are taken as the total market value. The book value of total assets is assumed to represent replacement cost.

2.3.2 Dividends paid

The Miller and Modigliani (1961) proposition states that under perfect market conditions, dividends policy is irrelevant. However, market imperfections such as differential tax rates, information asymmetries between insiders and outsiders (signalling), conflicts of interest between managers and shareholders (agency problems), transaction costs, flotation costs and irrational investor behaviour might make the dividend decision relevant.

[7] See appendix 1 for the datastream codes of each variable

Financial decisions, such as the level of dividends paid, are related to value as they convey information about profitability. In the literature, emphasis has been placed on three key aspects of the impact of dividends on firms' value: tax rates. signalling and agency problems.

Tax rates hypothesis implies that dividends are taxed at a higher rate than capital gains, Brennan (1970). His prediction was that dividends had a negative effect on firms' value. By contrast, Miller and Scholes (1978) argued that taxes on dividends can be avoided by investing in stocks via retirement plans or by offsetting deductions of personal interest payments. They predicted that there is no significant effect on firms' value. Similarly, in Miller and Scholes (1982), firm value is unaffected by dividend policy because of symmetric taxation of dividends and capital gains. Note that these studies had been based in US data, where tax laws differ from those that apply to the UK and Europe (regions covered in this thesis).

More recently, in a study with US data, Fama and French (1998) predicted that the levels of expected future dividends affect firm value negatively; that is, the tax disadvantage of dividends depends on dollars of expected dividends. In this hypothesis, dividends are taxed at a higher rate than capital gains, so firms that pay dividends have the disadvantage of having a higher cost of equity. In spite of the tax hypothesis, they found that the estimated marginal relationship between firm value and dividends was positive. Since for their case, there is no reason to expect a positive tax effect in the pricing of dividends, they inferred that dividends convey information about profitability (expected cash flow) missed by a wide range of control variables. This information about profitability obscures any tax effects of financing decisions. The relationship between dividends and value of the firm observed was an unidentified mix of tax effects and factors that

affect profitability, as they stated.

It is important to note that each country has a different taxation rule which may impact on such a behaviour in different ways. In the UK, the way in which dividends are taxed differs from that in the US. Bell and Jenkinson (2002) examined the impact of a major change in dividend taxation introduced in the UK in 1997. Before 1997, the UK dividend taxation policy was, that dividends were tax preferred by certain investor classes. Subject to certain rules, Advance Corporation Tax (when applicable), could be offset against the Mainstream Corporation Tax liabilities of the company, and investors could use the tax credits to offset their personal tax liabilities and a cash refund could be obtained by tax-exempt investors. In 1997, the impact of the tax change was to increase the taxation of dividend income by £5bn per annum, and tax-exempt investors did not have the ability anymore to reclaim dividend tax credits. The overall result, as Bell and Jenkinson stated, was to make tax-exempt investors indifferent, between dividends and retained earnings. They found that dividend valuation decreased after the tax reform[8].

Fama and French (2001) deduced that firms that have never paid dividends are more profitable than former payers and also have strong growth opportunities. Dividend payers are, in turn, more profitable than firms that have never paid. But firms that have never paid invest at a higher rate, do more R&D, and have a higher Tobin's Q ratio than dividend payers. They found that, in general, firms have become less likely to pay dividends through time, whatever their characteristics[9].

Signalling is a second approach commonly used to explain the effect of div-

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[8]See the correlation matrix in section 3, After 1997 the correlation of dividends paid and Tobin's Q became low and even negative. This effect might be related with the tax reform on dividends.

[9]After summary statistics of the data for the UK used in this research, a general decrease of the firms that pay dividends is also observed. The proportion of payers decrease from 89% in 1990 to 74% in 2000.

idends on performance. For example, if firms use dividends to signal quality, dividend payments might be positively correlated with firm value. Dividend payments and changes in dividend policies are regarded as conveying information about permanent earnings (Brainard et al 1980). Dividend payments can provide the firm a certain element of stability which may be reflected in its value.

To explain further concepts of market imperfection, Baker et al (2002) examined theoretical and empirical research on dividends and share repurchases because they are the principal mechanisms by which corporations disburse cash to their shareholders. Probably an important part of this work is the review of surveys of firm managers. The most recent of which is that of Baker et al (2001), whose findings are consistent in many ways with earlier results. For instance, factors influencing dividend policy appear to be relatively stable over time and managers generally believe that dividend policy affects value. Respondents expressed a high level of agreement with the idea that signalling is a reason for the level of dividend payments.

An important characteristic related with dividends was detected with the descriptive analysis of the data. The way in which the variable "dividends paid" is constructed may produce different results. "Ordinary dividends", datastream code X(187), is defined as "the net amounts proposed on ordinary shares, including any variable amount paid on participating preference shares, saving shares and preferred shares". After inspection of annual reports of some of the companies, it was found that "ordinary dividends" from datastream coincides with the annual amount reported in dividends on ordinary shares.

By contrast, if the variable is constructed as: "dividends per share" times "number of shares", the total value does not include special dividends, and in fact it seems to correspond only to cash dividends. This variable gives a more

stable dividend behaviour over time.

To acknowledge the importance of this difference, the most relevant case in relation with the two measures is explained with the following example. Arcadia group present a decrease in ordinary dividends of more than five thousand percent from 1998 to 1999. In fact, after referring to the files obtained previously from datastream for all the periods under analysis, it was found that the dividend payment done in 1998 stands out. The amount registered in ordinary dividends was £851.1 million, against an average for the rest of the years of £34 million. This outstanding amount was related to the demerger of Debenhams in the 1998 financial year. Dividends in specie were paid for £830 million. Dividends in specie are non-cash dividends which will usually be declared in a given amount, to be satisfied by the transfer of assets. The dividend will be equal to that given amount[10].

An effect of this nature could be very influential for the regression results, given that a demerger is an important change in the structure of the company that is expected to affect somehow the value of shares in the stock market. This might show that the influence of the dividend payment is not because of the payment itself but because of special changes given in the company which are accounted as dividends.

Another effect of dividends paid on firms' value is related to the agency problems between corporate insiders and outside shareholders. According to this theory, dividends payments might be used as a disciplining device for managers. Profits could be diverted for personal benefits of insiders, unless that they are paid out to shareholders as dividends. As a consequence, shareholders might prefer dividends than retained earnings. (La Porta et al, 2000)

[10]See: http://www.inlandrevenue.gov.uk/manuals/ct123manual/ct1520.htmCT1520

In summary, the inclusion of the ratio "dividends paid to total assets" is expected to impact the Tobin's Q ratio in a positive way for the UK. In this sense, this thesis argues that managers use dividends as a means of transmitting information to shareholders about the performance of the company. The ratio of "dividends paid to total assets" can be, as stated by Fama and French (1998), a noisy proxy of dividend policy. Noisy in the sense that it can change in response to a change in profits on existing assets without implying a change in the target payout. Both measures of dividends with and without "special dividends" were included in the model described in Chapter 3 to examine their effect on firms' value.

2.3.3 Leverage

As for dividends, different empirical studies have been conducted to explain the effect of leverage on firms' value.

Jensen and Meckling (1976) argued that higher leverage allows a firm's manager to hold a larger fraction of its common stock. This reduces agency problems by aligning the manager's interests more closely with the interests of other stockholders. Jensen (1986) argued that leverage also enhances value by forcing the firm to pay out resources that managers might otherwise waste on poor investments. The model predicts that to control the agency costs created by free cash flow, firms with more profitable assets commit a larger fraction of their earnings to debt payments.

There are also other studies that relate the value of the company with the tax advantages of issuing debt. Masulis (1980) investigated whether tax benefits of debt increase firm value. His tax hypothesis suggests that the increase in leverage exchange offers will increase tax deductions and subsequently increase firm value.

He found evidence consistent with his predictions: leverage-increasing exchange offers increase equity value by 7.6%, and leverage decreasing transactions decrease value by 5.4%. So, according to Masulis' prediction, tax benefits of debt increase firm value. However, there has been evidence of non-tax factors affecting exchange offers market reactions giving other tax interpretations[11].

There is some evidence that the impact of leverage on stock reactions is not related with tax reduction. For instance, Mikkelson and Partch (1986) and Eckbo (1986) found that straight debt issuance (without equity retirement) does not produce a significant reaction in the stock price. Other studies suggest that exchange offers convey nontax information that affects security prices, perhaps due to asymmetric information problems or due to signalling, Leland and Pyle (1977).

Fama and French (1998) argued that a positive coefficient on interest is evidence of positive tax benefits of debt. However, in their regressions, the coefficient on interest is either insignificant or negative. They interpret those results as being inconsistent with debt tax benefits having a first-order effect on firm value. Instead they argued that interest provides information about earnings, which is not captured by their controls.

The finance literature has pointed out the benefits and costs of debt under the trade-off model, as Fama and French (2000) discussed. A positive impact of a leveraged firm is the reduction of cash flow problems and also the tax deductibility of interest. The costs of debt might cause agency conflicts between shareholders and bondholders and also potential bankruptcy costs. On the other hand, the pecking order model, Myers (1984), suggests that the cost of issuing new securities might overwhelm other costs and benefits of debt (and dividends). Such financial

[11] Myers (1984), Cornett and Travlos (1989), who did not find evidence that tax benefits increase value.

costs are, for example, transaction costs and asymmetric information costs. The model predicts that, holding investment fixed, leverage is lower for more profitable firms. So in this case, firms do not have leverage targets. Fama and French (2000) supported the profitability prediction of the pecking order and with reliable statistical evidence confirmed previous evidence that more profitable firms have less book leverage. However, they conclude that there is an issue where the pecking order model stumbles badly. After sorting leverage, it is observed that lower leveraged firms have higher spreads of investment over earnings (lower free cash flows), a situation that is consistent with the trade-off model. So in this respect, their results are inconclusive.

Leverage might be an important factor in corporate finance to control managers and to monitor them, as they could spend profits in perquisites or other sources that do not increase value to the company[12]. Leverage might be interpreted as a proxy of the ability of firms to issue debt, however, the excess of debt in a company can also cause financial distress and have a negative effect.

A measure of leverage is included herein to capture the impact of any of the factors discussed above. This measure is constructed with both short and long term debt divided by total assets.

2.3.4 Investment in productive capital and size

Investment in productive capital is performed by firms mainly with the objective of having a future benefit. If the firm invests on productive capital, such as machinery or merchandise, after a period of time it is sensible to forecast an increase in the companies' value when such investment -plus a premium- is recovered. In the opposite case, when the firm disinvests, a negative effect on value might be

[12]See Harris and Raviv (1991) for a review of theories of capital structure concerning agency costs of debt.

expected.

It is expected that a firm will invest when there are future prospects of profits. As in Hall (1999), an amount x of payout is expected depending on the investment in capital held for a productive use. The variable used for the investment measure is represented by the change in productive capital from one period to the next. The measure is constructed as follows:

$$I_t = P_t - P_{t-1} \tag{2.2}$$

where I_t is the investment for period t, P_t is the total productive capital in time t, and P_{t-1} is the total productive capital for the previous year. Productive capital includes both inventory and fixed assets:

$$\text{Productive capital}_t = S_t + (1+\delta)F_t \tag{2.3}$$

where S is the inventory of the firm (stocks + work in progress (WIP), datastream X(364)), δ is a rate of obsolescence which, for simplicity, could be equalized to an annual depreciation rate of 15% and F is the value of net fixed assets.

To control the variety of sizes in the sample under analysis, a measure is included with the natural logarithm of total assets in constant 1990 prices: $size = \ln(\text{total assets})$. As Fama and French (2000) pointed out, this measure of size may also be a proxy for other factors, such as age and ease of access to capital markets.

2.4 Descriptive Statistics

The distribution of the sample of 7,754 observations over the 11 years period 1990-2000 can be observed in Table 2.1. The highest number of observations was concentrated in firms with 11-years of information, which represents 59% of the

total number of firms. The distribution of the number of years per firm is also more concentrated in firms with 4 time-periods, which constitutes 12% of the total number of firms included in the sample.

Number of years	Number of firms	%	Number of observations	%
4	104	11.9	416	5.4
5	86	9.9	430	5.5
6	53	6.1	318	4.1
7	52	6.0	364	4.7
8	23	2.6	184	2.4
9	10	1.1	90	1.2
10	32	3.7	320	4.1
11	512	58.7	5,632	72.6
Total	872		7,754	

Table 2.1: Panel data structure

Table 4.6 presents descriptive statistics for the financial variables used in this thesis. From the table it can be observed that the mean value for Tobin's Q is 1.95, while its median is 1.38. The highest value of the dependent variable Tobin's Q is 35.7. This value is high in comparison with the mean value, even after controlling for outliers. In fact, 27% of the total number of observations (2,086 observations out of 7,754) have higher Tobin's Q ratio than its mean value. Moreover, 7% of the total number of observations have a Tobin's Q ratio greater than 4 (567 observations out of 7,754). This means that outliers cannot be further controlled, as these would represent a high biased choice against high values of Tobin's Q. Among observations with values greater than 4, 30% correspond to the "computer, electrical and electronic equipment" industrial sector. The first and third quartiles of Tobin's Q are 1.01 and 2.04, respectively. It can be observed that between the 25%-75% of the observations, there is less influence from extreme observations.

UK (872 firms)							
	Mean	25%	Median	75%	Std. Dev.	Min	Max
TQ	1.95	1.01	1.38	2.04	2.20	0.37	35.7
TL	0.18	0.05	0.15	0.25	0.15	0	1.55
I/TA	0.04	-0.01	0.03	0.09	0.19	-2.7	0.96
D/TA	0.03	0.01	0.02	0.04	0.03	0	0.53
D1/TA	0.02	0.004	0.02	0.034	0.04	0	1.94
size	10.8	9.48	10.6	12.12	2.02	4.3	18.4

TQ: Tobin's Q ratio, RD: Research & Development, TL: total leverage, I: change investment on productive capital, D: dividends paid, D1: dividends paid excluding special dividends, size: log(total assets). TA: Total assets

Table 2.2: Descriptive Statistics (average 1990-2000)

Total leverage has a mean value of 0.18, which means that on average, debt for firms in this sample constitutes 18% of their total assets. More than 1.5% of the firms have, at least in one of the time periods under analysis, a ratio for total leverage greater than 1. As with Tobin's Q, this is after controlling for outliers. This situation might be observed in firms which have negative equity.

Investment has a mean value of 0.04 and a lowest value of -2.7, which is not only due to negative equity, as with total leverage, but to firms that diminish their total assets considerably from one period to another. For some cases, a low investment ratio did not always mean a reduction in market value. The ratio of dividends to total assets has a mean value of 0.03, so firms in this sample pay an equivalent average of 3% of dividends in relation to the total assets of the company.

Year	No. obs.	R&D	I	D	D1	size	L
1990	536	0.128	0.039	0.291	0.048	-0.139	-0.067
1991	548	0.192	0.084	0.208	0.030	-0.072	-0.129
1992	556	0.202	0.055	0.325	0.042	-0.077	-0.145
1993	579	0.202	0.044	0.229	0.094	-0.184	-0.096
1994	633	0.205	0.109	0.345	0.180	-0.195	-0.178
1995	686	0.306	0.040	0.115	0.042	-0.201	-0.098
1996	776	0.262	0.076	0.228	0.140	-0.170	-0.152
1997	871	0.347	0.042	0.108	0.074	-0.210	-0.085
1998	871	0.325	-0.006	0.058	0.034	-0.120	0.019
1999	868	0.306	0.019	0.020	-0.054	-0.153	-0.075
2000	830	0.267	-0.053	0.019	-0.003	-0.115	-0.154
all	7,754	0.290**	0.027*	0.099**	0.025*	-0.143**	-0.083**

TQ: Tobin's Q ratio, RD: Research & Development, TL: total leverage, size: log(total assets), I: investment on productive capital, D: dividends paid, D1: Cash dividends paid. ** and * indicate coefficient is significant at the 1% and 5%, respectively (applied only to the last row).

Table 2.3: Annual Correlation matrix of Tobin's Q and the explanatory variables

Table 2.3 presents the correlation matrix of the explanatory variables with Tobin's Q for every year. One important aspect that can be observed is the behaviour of both of the variables constructed for dividends D and D1. The correlation of the former with Tobin's Q is much higher than when the special dividends are excluded. This issue is expected to have important effects in the regression results. Moreover, there is an important effect on both D and D1 after 1997. For the former, the correlation decreases dramatically from 0.10 in 1997 to 0.01 in 2000. Moreover, the correlation of D1 with Tobin's Q not only decreases but becomes negative from 1999. This behaviour might be explained with the 1997 UK tax reform. Before 1997, a feature that distinguished UK from other imputation tax systems was that the tax credit was fully refundable to tax-exempt shareholders.[13]

[13] Tax-exempt shareholders consist in pension funds, insurance companies, charitable bodies and individuals holding shares through Personal Equity Plans (PEPs). Partial refunds were also granted to non-resident investors. See Bell and Jenkinson (2002) for an analysis of the impact of this reform on the valuation of dividends on pension funds.

The correlation of Tobin's Q with R&D is consistently high, reaching up to 0.35 in 1995. Therefore it is expected that a significant relationship can be found between these two variables. The correlation between investment and Tobin's Q varies from year to year. Generally speaking, a systematic pattern cannot be deduced, probably because investment includes all productive capital and not only investment in fixed term assets. Moreover, investment represents the change of this type of capital from one year to the next, which may be the reason for the observed variation. Size and leverage generally have a negative correlation with Tobin's Q.

The next table contains the correlation matrix for pairs of explanatory variables. The null hypothesis is the no (linear) relationship between a pair of random variables. The only pair of variables that cannot reject the linear relationship is investment with size, which coefficient is 0.016. The coefficient for the remainder of the variables reject the null hypothesis at the 1% and 5% significance levels.

	R&D	I	D	size
I	-0.073**	1		
D	-0.058**	0.024*	1	
size	-0.083**	0.016	0.139**	1
TL	-0.072**	-0.052**	-0.185**	0.186**

RD: Research & Development, TL: total leverage, I: investment on productive capital, D: dividends paid, size: log(total assets). ** and * indicate coefficient is significant at the 1% and 5%, respectively.

Table 2.4: Correlation matrix of explanatory variables

2.5 Summary

This chapter introduced the variables that are part of the models used to study the factors that determine Tobin's Q ratio throughout the thesis. The construction of the general database has also been discussed in this Chapter, such as

the control of outliers, period under study and distribution of the panel data observations. The dataset described is then applied for the whole thesis with the required modifications to fit each of the Chapters' requisites. Three main aspects about financial variables have been discussed: First, a brief discussion of previous empirical literature for each of them. Second, the descriptive statistics which includes mean, quartiles, standard deviation, minimum and maximum points. Third, the correlation of each of this variables with respect to the Tobin's Q ratio and the correlation between explanatory variables which might suggest possible endogeneity issues to be considered in the following chapters.

Dividends paid, changes in productive capital, total leverage and size (natural logarithm of total assets) i.e. accounting variables, are expected to be important factors for the specification of the models. Although the study of their impact is not within the scope of this thesis, they are considered important elements which should not be ignored. These variables are expected to contain information about the performance and value of the firm which are not explained for other factors under study. The selection of these variables was based on previous empirical studies which aimed to explain value and performance of the firm. To date, however, their significance and impact have not been conclusive.

The inclusion of these variables is by the creation of their ratio to total assets[14]. They are included throughout the different chapters together with new characteristics that are the main topic of study of this research. Factors such as R&D, separation of ownership and control and investor protection characteristics are the main focus of investigation for the remainder of this thesis.

[14]Note that leverage is itself constructed as the ratio of total debt to total assets.

Chapter 3

Effects of R&D on Tobin's Q

3.1 Introduction

The importance of Research and Development (R&D) activities in the UK has become more significant as technological developments in some industrial sectors have increased, mainly in IT technology and pharmaceutical industries. Previous research has associated this type of investment with a positive impact on firms' value, with most studies originating from the USA and only a few from the UK. For the UK, Toivanen et al (2002) examined the reaction of the market to "new" news of R&D expenditure. In particular, they argued that information on innovation measured by R&D has a significant positive impact upon the market value of firms. For the US, Hirschey (1982) found that advertising and R&D expenditures have significant and positive market value effects for companies. He advocated further investigations on this aspect by considering variations over time and across industries (fixed effects). Studies by Megna and Klock (1993) and Klock and Megna (2000) have also found a positive and significant relationship of R&D and firms' value in two different industrial sectors: Semiconductor and Wireless communications. Similar conclusions for the US are also given in Hall

(1993), Hall (1999), Chen and Steiner (2000), among others.

Moreover, Akbar and Stark (2003), used four different deflators to measure the effect of dividends and R&D expenditure, among other variables, on corporate value in the UK. They found that the effect of R&D expenditure on corporate value remains positive and significant independently of the deflator used (similarly for dividends declared). Xu and Zhang (2004) argued that in Japan, the R&D effect on the stock market is different from that observed in the USA. They examined the R&D effect in explaining stock returns in the Japanese market and found a positive and significant R&D effect during the period 1993-2000 (post-bubble period), but an insignificant effect for previous periods. They analysed the risk-reward patterns of stock returns in the subsequent period rather than instantaneous responses of the stock prices to the R&D announcements. Their results showed that overall, returns are positively related to the level of the R&D intensity, and to a lesser degree, the total risk of returns is positively related to the R&D intensity.

This chapter aims to follow this line of research with the objective of studying the impact of R&D on Tobin's Q ratio in the United Kingdom. The focus of this research is to measure the benefit, from a firm's value perspective, given by investments in R&D (as a proxy of innovation). In this respect, Tobin's Q represents both market value and good performance of the firm. The information about R&D activities might be an important factor for investors as there is an implicit risk about the future outcome of these activities. Firms that pursue R&D activities might be compensated in terms of higher value. More specifically, R&D might not only increase the future value of the firm due to the success of the project in question, but it could affect the present corporate value as R&D activities contain information about a possible future success.

Although this type of relationship has been previously studied, this chapter intends to assess the evidence of a positive effect of R&D activities on firms' value by considering some aspects which differ from previous research. To this extent, the contribution of this chapter to the financial literature can be summarised in two points. First, the model includes financial variables following empirical work analogous to Fama and French (1998). Financial variables such as dividends paid, leverage, investment in productive capital and size have been found to have significant effects on firms' value. Previous findings concerning to these variables are discussed in Chapter 2 as they are included in the models for the remainder of the chapters. Although, financial variables are not the main scope of research in this Chapter, they are considered to be part of the true model following financial theory. Moreover, very interesting results have been found to this respect. For instance, dividends paid was shown to be a highly significant variable to determine market value, but only when "special dividends" are included, as it is fully discussed in the following sections.

Second, by considering the statistical characteristics of the data, this chapter intends to use an appropriate econometric technique to measure this relationship. Previous studies have already found positive effects of R&D on Tobin's Q for different countries, as those mentioned in the paragraphs above. Nevertheless, the main contribution of this chapter is to assess the evidence on that respect by using econometric methods which vary from those applied in previous research (typically, OLS for cross sectional and fixed effects for panel data). Specifically, endogeneity and firm effects are recognized.

The endogeneity problem of the data is controlled by the use of instrumental variables with the application of the General Method of Moments (GMM). Endogeneity of the explanatory variables is likely in accounting variables as they

may be simultaneous, that is, that they might be jointly determined with the dependent variable. Endogeneity can also be caused by the correlation of regressors and error terms e.g. shocks affecting Tobin's Q are also likely to affect some of the regressors such as leverage, dividends and R&D. There are other advantages in favour of the use of GMM in a panel database. These include the possibility to control firm-specific effects by obtaining the first-differences, and to control period effects which originate from macroeconomic shocks common to all firms by the inclusion of time dummies.

On the contrary, biasness of results is expected when simple regression specifications are implemented, such as the Ordinary Least Squares (OLS) for cross sectional analysis or the Within estimator for panel data. Although the within estimator eliminates the individual effects of the observations, the results can still be biased unless the explanatory variables are proven to be exogenous.

Studies applying GMM have been primarily focused on dynamic investment equations, as in Bond and Meghir (1994). Similar studies have compared the performance of GMM with OLS and the Within estimator. The performance of GMM has been demonstrated to be more appealing based on statistical tests, but has been shown to be very sensitive to the specification of the instrumental variables[1]. Furthermore, R&D has been studied by comparing it with tangible investment. From these studies, the simultaneous relationship of R&D and Tobin's Q with investment in tangible capital is suggested. Some of these studies have recognized the endogeneity problem and attempt to control it with the use of adequate econometric estimators. See, Mulkay et al (2000), Mairesse et al (1999), Bond et al (1999), Toivanen et al (1997)[2]. However, to date, there is not

[1] See Arellano and Bond (1991), Blundell et al (1992), Mairesse et al (1999), Bond et al (1997 and 1999), Mulkay et al (2000), Bond and Cummins (2000).

[2] Some other empirical work with intangible capital has investigated the productivity of the firm via the Cobb Douglas production function, as in, Goto and Suzuki (1989), Griliches (1994),

specific recognition (and treatment) of the endogeneity problem in such a model as the one presented in this Chapter.

An important aspect of the analysis in this chapter is that the measure used to explain R&D activities is in fact the R&D stock which accumulates and depreciates previous R&D expenditures. This intends not only to capture the contemporaneous reaction of the market to information about R&D activities but to evaluate the effect of past R&D expenditure on firms value.

In the following section, the construction of the empirical model is explained. Section three contains the data description of R&D activities. The econometric results are presented in section four and section five contains the summary and conclusions.

3.2 The empirical model of corporate value

To date, most of the empirical work related with intangible capital has focused on the US due to the numerous sources of information that are available. In the present analysis of UK, a similar kind of research has been more restricted due to the limitations to obtain information to represent intangible capital.

A model developed by Klock and Megna (1993) is used as a starting point, as it portraits the relationship that is aimed to examine in this chapter. The model assumes that firms operate in competitive markets and that capital stocks are at the optimal levels.

Tobin's Q ratio represents the value of the firm and can be defined as,

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Wakelin (2000).

Blundell et al (1999) examined the empirical relationship between technological innovations and stock market value. Although the GMM estimator is applied, their study did not include R&D activities as in this Chapter.

$$q = \frac{Mv}{K_1 + K_2} \tag{3.1}$$

where $K_1 + K_2$ are tangible and intangible assets, respectively. Mv is the market value of debt and equity.

The use of q for measuring intangible value is based on the assumption that a company's long-term equilibrium market value must be equal to the replacement value of its assets, giving a q value close to unity. Deviations from this relationship (where q is significantly greater than 1) are interpreted as an unmeasured source of value, generally attributed to a company's intangible value. Therefore, in this model, q is expected to be equal 1, where the market value of a firm is equal to the replacement cost of its assets, so the firm would represent its real value in the long term. However, the intangible capital is not observable, so the Q ratio which can be calculated with the observable capital is:

$$q' = \frac{Mv}{K_1} \tag{3.2}$$

As said before, in the long term, an equilibrium of $q = 1$ is expected, so under that condition market value can be expressed as $Mv = K_1 + K_2$. From equation (3.2), Mv is substituted to obtain the following relationship with the observable q':

$$q' = \frac{K_1 + K_2}{K_1} = 1 + \frac{K_2}{K_1} \tag{3.3}$$

K_2 represents all the j intangible characteristics for all the i available observations for each period t, as shown in equation 3.4;

$$K_2 = \sum_{j=1}^{n} K_{jit} \tag{3.4}$$

Equation 3.3 can be rearranged to represent a linear model for a panel data set as follows:

$$q_{it} = \alpha + \beta_1 \frac{K_{2it}}{K_{1it}} + \gamma_j X_{it} + \varepsilon_{it} \tag{3.5}$$

where α represents the intercept, K_{1it} is the value of the tangible capital represented by total assets per firm, K_{2it} is the value of R&D which represents intangible capital and X_{it} represents the control variables, such as capital structure characteristics. β_1 and γ_j give all the parameters of estimation for each of the variables included in the model.

Literature related with performance of the firm suggests the importance of control variables that might be an influence for the Tobin's Q ratio. The description of these variables is discussed in Chapter 2 as well as their stylised facts. These variables follow empirical research pursued by Fama and French (1998). The explanation of these variables is included in a separate chapter as they are utilized along the rest of the thesis, so the reader of each of the chapters may refer to them.

These variables are: Total leverage (TL), Dividends paid (D), Investment (I) and size (log of total assets).

Therefore, for estimation purposes, the following linear specification of the valuation function was adopted;

$$\begin{aligned} q_{it} \quad = \quad & \beta_1 \frac{R\&D_{it}}{TA_{it}} + \beta_2 TL + \beta_3 \frac{D_{it}}{TA_{it}} + \beta_4 \frac{I_{it}}{TA_{it}} \\ & + \beta_5 size_{it} + \alpha_i + \lambda_t + \upsilon_{it} \end{aligned} \tag{3.6}$$

where α_i represents the firm individual effects, λ_t represents the period effects

and υ_{it} is the error term. All regressions include time dummies as it is assumed that there are effects that vary through time but are fixed for all the firms in a given year, capturing mainly economic factors that are outside the firms' control. Similarly, the model considers individual effects, which are different for each firm but constant through time.

Fixed effects are control by a first-difference transformation because of the likely correlation of the explanatory variables with firm-specific elements, situation that would not provide efficient parameters estimates in a levels model. TA is total assets, which are also useful as a deflator, and helps to avoid some potential problems of multicollinearity and heteroskedasticity.

3.3 Data

The analysis was performed using UK data. The unbalanced sample contains approximately 872 firms. As systematic disclosures of R&D expenditure were not a legal requirement in the UK until 1990[3], reliable information may not be available for earlier periods. Therefore, the study period is from 1990 to 2000. Variables were obtained from "Datastream" and include all the non-financial industrial sectors. The final sample contains 7,754 observations. Descriptive statistics of the control variables are discussed in Chapter 2.

R&D is represented with the Datastream code X(119). This figure includes disclosed amounts of expenditure in the year which are not capitalized in the balance sheet. The stocks of R&D were constructed from this variable. R&D expenditure was accumulated for five years (starting from 1984 or the first year where information was available for a particular firm). Thereafter, a depreciation rate of 15% per year (δ) was applied. This methodology has been popularized

[3]See Al-Horani et al (2003).

by Hall (1990) and is based in a standard perpetual inventory equation with declining balance depreciation. The formula applied for the accumulation is as follows:

$$RDstock_{it} = (1 - \delta)RDstock_{it-1} + RD_{it}$$

where $RDstock_{it}$ is the end of period stock of R&D and RD_{it} is the expenditure during the year.

year	Expenditure on R&D performed in UK	Expenditure on R&D analysed in this Chapter	% of R&D included in this research
1990	8,054	4,662	58
1991	7,842	5,177	66
1992	8,166	5,359	66
1993	8,717	4,455	51
1994	8,842	4,042	46
1995	9,116	5,126	56
1996	9,297	6,464	70
1997	9,556	6,828	71
1998	10,133	7,149	71
1999	11,302	8,847	78
2000	11,510	9,267	81
grand total	109,951	67,377	61

Sources: Datastream and office for National Statistics, R&D of business enterprises.

Table 3.1: Percentage of research and development analysed over the total population for UK ('millions of pounds)

Table 3.1 presents the R&D expenditure of UK businesses, and is compared with the R&D expenditure analysed in this research. The data on UK-based R&D was obtained from the web-page of UK national statistics.[4]

[4]http://www.statistics.gov.uk/. This web page contains a wide selection of data produced by the Government Statistical Service (GSS) and other statistical bodies in the public sector. R&D related concepts follow internationally agreed standards defined by the Organization for Economic Cooperation and Development (OECD) and published in the Frascati manual. R&D is defined as creative work undertaken in a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of the stock of

Following this comparison in Table 3.1, the percentage of firms that report information on R&D expenditures in datastream is increasing every year, so for 2000, a high percentage of R&D is available for analysis. The firms included for analysis constitutes (for 2000) up to 81% of the total expenditure of R&D in UK, which is a good representative sample of R&D expenditure in UK.

Table 3.2 indicates the industrial sectors with the highest expenditure on R&D, numbers are deflated to 1990 prices.[5]

The pharmaceutical sector has the highest R&D expenditure with 27% of the total. It has shown a continuous increase from 1990. The rest of the industrial sectors show a general continuous annual increase, except for the chemical sector which decreased its R&D expenditure by 65% from 1990 to 2000.

knowledge to devise new applications. R&D performed by UK businesses excludes R&D funded by UK businesses that is performed overseas or in other sectors of the UK economy (such as higher education; government departments, agencies and non-departmental public bodies; local authorities; and private non-profit organizations).

[5]A clear inconsistency in IT hardware for UK can be observed from the Table 3.2. This three-year decrease from 1993-1995 was due to a specific firm named "Marconi" (datastream code: 900498). Marconi reported zero R&D for three years (1993-1995) after having reported £1,040 million in 1992 (current prices), which represents 98% of the total R&D for this sector and 1.5% of the total R&D expenditure in UK.

Year	Sector (£millions, deflated to 1990 prices)						
	Pharma-ceutic	Aero-space	IT hardware	Food prod.	Chemicals	Others	Total
1990	400	933	853	421	667	1,389	4,662
1991	450	878	992	415	753	1,402	4,890
1992	545	770	960	432	798	1,375	4,880
1993	1,109	620	20	490	449	1,307	3,994
1994	1,238	154	29	502	288	1,326	3,537
1995	1,519	581	36	527	288	1,386	4,337
1996	1,522	570	977	520	294	1,457	5,339
1997	1,543	643	929	466	299	1,587	5,468
1998	1,571	562	881	463	279	1,780	5,536
1999	2,509	798	863	506	238	1,830	6,746
2000	2,514	996	451	488	232	2,184	6,865
Total	8,491	7,506	6,991	5,229	4,584	17,025	56,255
%	27	13	12	9	8	30	100
Total no. of obs.	152	126	131	310	175	6,860	7,754
%	1.9	1.6	1.7	3.9	2.2	88.5	100
Obs. with R&D							2,489
%	6.1	5.1	5.2	12.5	7.0	67.1	100

Table 3.2: Distribution of the highest expenses on Research and Development per industrial sectors for UK

An important observation is that the concentration of firms in sectors with the highest R&D is small in relation with the whole sample of observations. The number of firms that are included in the top five sectors with the highest R&D expenditures constitute a small percentage of the total number of firms in the sample. The range is from 1.6% to 3.9% The last two rows of Table 3.2 show the proportion of the number of observations per industrial sector that have R&D expenditure. From the whole sample only 32% of the total number of observations had R&D activities. Among this, the highest number of observation was on Food producers with 12.5%.

3.4 Regression Analysis

The analysis in this section aims to explain the information contained within R&D activities to determine Tobin's Q ratio, which represents the performance and/or value of the firm. As mentioned in the introduction, previous literature has found evidence of a linear positive relationship between these two variables. Nevertheless, the analysis in this chapter includes financial variables in the model and applies a different econometric tecnique, which aims to control for endogeneity issues, to assess the evidence found in previous literature. The empirical model as in equation (3.6) is analysed with panel data. This allows to exploit the advantages of having information that varies within firms and time periods. However, there are estimation problems that arise in the presence of endogeneity of the variables and/or individual fixed effects. Both OLS and Within estimators are biased and/or inconsistent under these circumstances. Individual fixed effects are treated here as stochastic, therefore in a dynamic model, the lagged dependent variable will necessarily be correlated with this type of effects, situation that result in a biased OLS (similarly, this problem arises when variables are endogenous). The Within estimator can correct for individual fixed effects by transforming the equation to eliminate them. However, in the case of panels where the number of time periods available is small, this transformation induces correlation between the transformed lagged dependent variable and the transformed error term. Moreover, when the explanatory variables are considered endogenous (probably, because shocks that are not included in the model affect both the dependent and independent variables), the correlation of the error term and the explanatory variables is expected. This correlation makes the Within estimator inconsistent. A solution for this problem is the application of instrumental variables that are correlated with the explanatory variable but uncorrelated with

the error term. In this study, instrumental variables are used by the Generalised Method of Moments (GMM), which can also eliminate the firm-fixed effects by a first-differences transformation.

GMM in first differences is expected to be an adequate estimator, as it corrects for the presence of correlated firm-specific effects as well as the bias that originates from the endogeneity of explanatory variables with the error term. According to theory, the expected GMM estimator should be within the range suggested by OLS and the Within estimator, which are likely to be biased in opposite directions (see Bond 2002 for a complete discussion). The GMM estimator has been studied in empirical applications of the investment theory. Normally it is applied to dynamic models, since the correlation of the lag variable ($y_{i,t-1}$) with the error term is implicit. For this research GMM estimator of the type developed by Arellano and Bond (1991) is applied in a static specification.

An important feature of GMM is the application of an adequate matrix of instrumental variables[6], as they may be subject to large finite sample biases when the instruments available are weak.

The first step to follow in the analysis of the data was to test for the presence of any type of effect (fixed or random) with the Lagrangian multiplier test, with the null hypothesis of no within unit correlation. High values for this test favours a model with effects. Furthermore, the Hausman test is implemented, with the null hypothesis of consistency and efficiency of the random effects; in other words, if the Hausman statistic is rejected, one must use a model with fixed effects. Table 3.3 presents the results of these tests in the UK data. The Lagrangian multiplier test suggests the presence of firm effects in the model; the Hausman test suggests that such effects might not be random. These results are necessary for further

[6]See Wooldridge (2000) for a full description of intrumental variables. The discussion of the criteria to select the instruments is followed in the section "R&D and corporate value".

specification of the model with the GMM estimator, where the fixed effects can be eliminated via first differences.

	RE	FE
R-square	0.121	0.088
Lagrangian test	2,704	
	(.000)	
Hausman test	61.7	
	(.000)	

p-values in parenthesis; Null hypothesis for Lagrangian test is Ho: $sd(u_i) = 0$, no within unit correlation; Null hypothesis for Hausman test is Ho: difference in coefficients not systematic; All the regressions include time dummies. RE: random effects, FE: fixed effects.

Table 3.3: Tests for Fixed and Random effects for the UK

3.4.1 R&D and corporate value

In this model it is assumed that firms can instantaneously adjust towards the market value due to changes in firm-specific characteristics and /or random shocks. In other words, the information carried out by the different explanatory variables will affect contemporaneously the increase /decrease of the Tobin's Q ratio of the company.

The contemporaneous setting, as stated by Lev and Sougiannis (1996), indicates the extent of current recognition of information relevance by investors, while the dynamic analysis may suggest that the market reaction is slow, where investors fail to fully recognize the value-relevance of the information.

Although, there are no dynamic effects in the static model, R&D stock contains information about past shocks, as it has been yearly accumulated and depreciated. Managers' willingness to maintain R&D spending (so a more or less constant R&D stock), represents a vote of confidence that the firms' future opportunities might improve.

In this model, although there are no lags of the variables, the GMM model is used because of the recognition of the endogeneity problem. Table 4.6 presents results for the UK[7]. The results were estimated with Pcgive for the three estimators (OLS, Within and GMM).

Column (1) in Table 4.6 presents the results for the OLS estimator. AR(2) shows the presence of autocorrelation of the disturbance term. This reflects biases of the coefficients. Column (2) in Table 4.6 presents the within estimator, which controls for fixed effects. The parameters of these two estimators are expected to define the range for a more efficient estimator with the GMM, or at least an estimator that is not very distant from either the OLS or within parameters.

The methodology used to choose the instruments for GMM in columns (3) to (6) follows Blundell et al (1992). If ν_{it} in equation (3.6) is $MA(1)$ ($x_t = \Phi\ \nu_{i,t-1} + \nu_{it}$), rather than serially uncorrelated, then only the values of untransformed regressors dated $t-2$ are valid instruments in the transformed equation for period t. If we treat the endogenous variables as predetermined, it would allow the use of $t-1$ as an additional instrument, as x_{it} and ν_{it} are still uncorrelated, but x_{it} may still be correlated with ν_{t-1}. Column (3) presents the results under the first assumption where endogeneity of the explanatory variables ($X's$) is considered as well as the $MA(1)$ of the disturbances (υ_{it}). Therefore the instruments available for the endogenous explanatory variables are from $t-2$ and further lags. In practice very remote lags are unlikely to be informative instruments and in addition can result in overfitting bias. Some studies have shown that the loss of relevant information caused by omitting the more distant lags as instruments will often be very modest [see Bond (2002)]. To avoid the overfitting bias, the lags of the instruments considered in all the regressions are up to $t-6$ (as general overfiting

[7] See Appendix 1 for comparison with Univariate results.

bias was developed after including more lags).

In column (3) the Sargan test is rejected, with the null hypothesis being the validity of the instruments. One likely reason for this result is that the endogenous explanatory variables are predetermined with respect to the disturbance (υ_{it}). Thereafter, the lags $t-1$ of the endogenous variables are included as instruments. In this case there is the possibility of biases due to correlation of the lag $t-1$ and the first differentiated error-term $\triangle\upsilon_{it.}$ If the estimate of β for each of the endogenous variables decreases, a downward bias of the coefficient is implied.

The possibility of bias was investigated in two different ways. Each of the endogenous variables were instrumented independently with $t-1$, while the remainder were instrumented with $t-2$. The coefficients obtained behave with the same tendency to increase or decrease for each of the variables as when all the endogenous variables were instrumented with $t-1$ at once. The results of the second approach are presented in column (4).

The results show a downward bias in the coefficients for dividends, R&D and size. In the presence of measurement error neither $t-2$ nor $t-1$ are available instruments. Therefore, Column (5) present the results with the exclusion of $t-1$ and $t-2$ as instruments for the specific variables where the measurement error was detected. These variables were instrumented by $t-3$ and further lags and those variables which did not register a downward bias kept instrumented by $t-2$ and further lags.

The Sargan test although improves, is still rejected at the 95% confidence level as in column (5). This finding may be a result of different factors. The misspecification of the model is a likely cause for three reasons; first, the difficulty in judging for the endogeneity of the explanatory variables; second, the omission of an important variable in the empirical model; third, instruments available for

the equations in first differences are likely to be weak when the individual series have near unit root properties. To this respect, instrumental variable estimators can be subject to serious finite sample biases when the instruments used are weak. The econometric literature has produced a variety of tests for unit roots in panel data when N is large an T is small (see Hall and Mairesse 2001), however, these types of tests are still being implemented and developed with comparisons of Monte Carlo experiments and real data. For this reason, they were not exploited for this research.

A final check as to the validity of instruments was completed with the exclusion of all the lags $t-2$, so considering as valid instruments $t-3$ and further lags (column (6)). The validity of a particular assumption is tested using the Sargan test of overidentifying restrictions. Difference Sargan is useful in this context, where the set of moment conditions specified under the weaker assumption (e.g. contemporaneous correlation) is a strict subset of the set of moment conditions specified under a stronger assumption (e.g. no contemporaneous correlation, series are predetermined), Bond (2002).

Letting S denote the Sargan statistic obtained under the stronger assumption and $S\prime$ denote the Sargan statistic obtained under the weaker assumption, the difference $DS = S - S\prime$ is asymptotically X^2, and tests the validity of the additional moment conditions used in the former case (Arellano and Bond (1991)). The degrees of freedom of the difference Sargan test equals the degrees of freedom of S minus the degrees of freedom of $S\prime$.

Regression with both sets of instruments were tested (from $t-2$ and from $t-3$ and further lags). The difference Sargan test rejects the validity of additional moment conditions[8]. Given this result the set of instruments chosen are from $t-3$

[8] For regressions where instruments are from $t-2$ the Sargan test (degrees of freedom) = 231.8 (170)

and further lags. For this case the Sargan estimator cannot be rejected at the 95% confidence level.

The interpretation of the results is based in the model which fulfils statistical requirements i.e. Sargan test and AR(2) as that in column (6).

Not all the estimators obtained with GMM were between the OLS and Within estimators, which were expected to be the interval for an unbias and more precise estimator. The interpretation of the results should be taken with caution due to the sensitivity of the estimators and standard errors when GMM is applied.

First of all, there is no intercept presented in the tables for the GMM estimation. As the models are in first differences in all the GMM regressions, the real effect of the constant is not the average Tobin's Q, but the change of Tobin's Q from one year to the other (given by the inclusion of time dummies)[9]. This means that a direct comparison with the intercept of the OLS estimation, which effectively represents the average Tobin's Q for the sample, cannot be made. For this reason, the intercept has been omitted from the tables in columns (2) to (6).

For publicly traded companies, the cost and benefit of R&D activities must

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For regressions where instruments are from $t-3$ the Sargan test (degrees of freedom) = 151.2 (125)

Difference Sargan 231.8(170) − 151.2(125) = 80.6(45)

p-value (.000)

[9]From 11 time periods only 10 time dummies are considered, the one excluded is that which represents the constant term. So in this case, the constant represents the change in Tobin's Q from 1990 to 1991.

For example: Assuming a 2 year dataset, the equation including period effects (as dummy variables (D1 and D2)) would be as follows:

$Y_{it} = \beta_0 + \delta_0 D2_t + \beta_1 x_{it} + \alpha_i + \upsilon_{it}$

To be able to differentiate, each of the equations can be written as follows:

$(t = 2)\ y_{i2} = (\beta_0 + \delta_0) + \beta_1 x_{i2} + \alpha_i + \upsilon_{i2}$

$(t = 1)\ y_{i1} = \beta_0 + \beta_1 x_{i1} + \alpha_i + \upsilon_{i1}$

where, β_0 is the intercept, δ_0 is the period effect for year 2 and α_i is the fixed effect to eliminate. If we subtract the second equation from the first.

$(y_{i2} - y_{i1}) = \delta_0 + \beta_1(x_{i2} - x_{i1}) + (\upsilon_{i2} - \upsilon_{i1})$

The unobserved effect, α_i, does not appear anymore, it has been "differenced away". Also, the intercept δ_0 is actually the change in the intercept from $t = 1$ to $t = 2$. (See Wooldridge, pp. 440)

be reflected not only contemporaneously, but in future values of Tobin's Q ratio. The past behaviour of this variable is taken into account from its construction as it has accumulated previous R&D expenses to create a R&D stock. It is expected that R&D activities result in new technologies, products or production processes that would return successful increases in performance and value. On the other hand, R&D activities may not be successful, but as in the opposite case, this result may take a long time to show its effect. R&D investment, therefore carries a higher risk than investment in productive capital. Chan et al (1990) conducted an event study on the stock market reaction to the announcements of R&D expenditures, the results showed a positive significance of this announcement. This demonstrates that investors are keen to deal with uncertainty in future outcomes, so, an instantaneous response might also be expected.

From column (6) in Table 4.6, it can be observed that the coefficient of R&D has a highly positive and significant influence at the 95% confidence level. This estimation, besides being of high impact on Tobin's Q ($\beta = 4.75$), relies on the expected range created by the OLS and Within estimators. This supports the expectation of achieving an estimator that measures the influence of R&D activities to increase value. This means that firms are compensated in terms of higher value when R&D activities are pursued. These results are similar to past research where R&D has been found to be positively related to value of the firm. Xu and Zhang (2004) found an average cross-sectional impact of returns on R&D of $\beta = 4.9$ in an study of Japanese firms from 1985-2000. They also considered the past impact of R&D by creating a cumulative R&D intensity measure, where an average weight is given to the R&D expense carried out in three consecutive time periods. A similar measure was constructed by Chan et al (2001), where current and past R&D expenditure were considered. They suggested that their measure

of R&D stock was equivalent to that from Hall (1990), which was applied in the present study. Fama and French (1998) also found a positive coefficient for R&D expenditure; their measure refers to the yearly expenditure in these activities. They also considered the future effects of its first difference. The R&D slopes for their regressions are about 4.5. Their study was for USA firms for 28 years (1965-1992).

The positive estimator of R&D is also consistent with previous hypotheses where R&D activities contribute substantially to the information asymmetry between managers and investors. Under this perspective, managers exploit the opportunity to obtain gains from insider trade (Aboody and Lev, 2000). In this sense, independently of the likely benefit from innovations given by successful R&D activities, firms might obtain an extra benefit from the reaction of the market to the disclosure of such information. These results also agree with an study by Toivanen et al (2002). They argue that the "news" of new activities of R&D have a positive effect on the market value of UK firms.

Total leverage, Investment and size were not significant to determine value. The insignificant result of leverage is in line with Cornett and Travlos (1989) who found no evidence of the benefits of debt on value. In contrast, this result does not support that of Fama and French (1998), who concluded that the level of leverage and longer-term changes in debt have reliable information about value missed by other control variables, such as investment and dividends. The positive correlation that exists between leverage and size may be the explanation for the high standard errors for both when included together. To investigate this further, the regressions were run without the measure for size. Leverage was found to be positively significant at the 90% confidence level. The remainder of the variables were consistent with or without the inclusion of size. In general, is difficult to

make a conclusion of how the level of debt of a company affects value. From these results, it is considered that the impact of debt on value can easily be affected by the way in which leverage is measured, as well as, by its jointly inclusion with other explanatory variables in the model. Fama and French (1998) also suggested that these factors may introduce different slopes and significance levels to the estimated coefficients for leverage.

Dividends were shown to have a positive and significant influence on companies' value. However the confidence level decreases in the last column of Table 4.6. The reason for such a low confidence level might be the disappointing feature of GMM when the selection of instruments causes large differences in the standard errors in comparison with other estimators.

The estimators for dividends in each specification show unexpected behaviour. From Table 4.6 it is observed that the range constructed by Within and OLS estimators is between 5.33 to 9.77, respectively. However the estimators calculated with GMM have a much higher estimated coefficient, except when the instruments are from $t-1$, where the estimated coefficient lies between the range ($\beta = 7.37$). The reason for these variations is likely to be due to the weakness of the instruments. Moreover, it also can be a cause of the first-difference transformation due to the high increases (decreases) of the variables from one year to the next. As explained in Chapter 2, the construction of dividends paid includes all the "special dividends", which cause a noticeable change of the conventional amount of dividends paid in some companies.[10] The effect of "special dividends" is expected to be significant for value as a structural change in the company of such high monetary impact may logically affect the value of its shares in the stock market. Due to the special dividends, dividends paid had extreme changes after

[10]See Chapter 2, section: "dividends paid" for a complete explanation of "special dividends"

the first-difference transformation which might cause a disproportionate effect on the results.[11].

A further analysis with respect to this variable was followed using a different way to construct dividends paid: "dividends per share" times "number of shares". This variable reflects the value of cash dividend excluding all forms of "special dividends". The effect of the regressions with this new variable gave the following results:[12] First, the impact of dividends paid is much lower and ranges from 2.19 to 2.40 with the Within and OLS estimators, respectively, but in neither case the estimators were significant. Second, after following the GMM estimation with the selection of different set of instruments, the coefficients changed and were higher than the range given above. Third, although the significance of dividends improves when calculated with GMM, the Sargan test for the validity of the instruments is rejected for all of the sets of instruments chosen. This fact might corroborate the weakness of the instrument set for dividends given that the instruments and the residuals of the equation to be estimated might be not independent.

The lack of effect of cash dividends could be related with the signalling explanation for dividend payments. Dividend signalling theories hold that dividend decisions are an important way for managers to signal to shareholders about the future firm profitability and good performance[13]. However, the results presented herein suggest that the expected effect of ordinary dividends is not related to the typical and stable policy of paying cash dividends, but to special irregular payments. Moreover, the contemporary effect of dividends as observed in Table

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[11]Some studies such as Virolainen (1998) opted for deleting observations with this extreme values, allowing for an specific limit of change. The study in this Chapter rather analyses the whole set of observations to avoid biasness in the selection process.

[12]Tables with results are not included.

[13]See Allen and Michaely's (1995) survey of the dividend literature, where they state that the empirical evidence on dividend signalling is far from conclusive.

4.6 might be the result of the announcement of the payment itself. A study conducted to explain why NYSE firms have largely abandoned the practice of paying special dividends, by DeAngelo et al (2000), supports this finding by suggesting that dividends are a useful signalling mechanism only when they send clear messages to stockholders. They found that the stock market reacts favourably when a special dividend is declared (holding the regular dividend constant), but that the stock price has a positive reaction even when firms pay a lower special dividend and leave regular dividends unchanged. Their results indicate that investors respond favourably to the news of a special dividend payment, even when this special dividend is lower than in previous years. Similarly, they found that when firms increase the regular dividend but omit payment of a special, the average stock return does not differ significantly from zero, suggesting that the regular dividend increase compensates shareholders somehow for the news that the firm will not pay a special.

So probably, the payment of a dividend is not what causes the increase in Tobin's Q, but the payment of a "special dividend" which is a substantial increase in these payments from those of previous years. In the study by DeAngelo et al it is mentioned that the Wall Street Journal reports indicate that 81% of the "special dividends" announced in the 1990's were due to the presence of takeover/restructuring pressures. The presence of these pressures suggests that managers of these firms felt it was important to distribute large amounts of cash to provide a credible indication of their faith in the planned restructuring. Therefore, the evidence found in this chapter suggests that the increase on the ratio of dividends paid/ Total assets in 1 unit, due to the announcement of a special dividend, might increase firms value in 13.9 units.

The inclusion of firms' size in the model is meant to control for the hetero-

geneity of firms with respect to their total assets. This negative effect might be explained by the likely agency cost that raise in larger firms because of the difficulties to monitor the activities of managers. Also, it might suggest that smaller firms have better growth prospects as in Claessens et al (2002).

Overall, the results in Table 4.6 can be summarised as follows. First, the choice of the preferred model (column (6)) was based on the validity of instruments (from $t-3$ and further lags for all the explanatory variables). Based on these results, R&D is positively associated with Tobin's Q. An increase in the proportion of R&D stock to total assets by one percent would be associated with an increase in the Tobin's Q ratio of 4.75 percent. As the R&D stock measure was accumulated over the years, the positive relationship reflects the impact of both current and past expenses of R&D. The result for dividends showed that they are significant only when the "special dividend" is included, therefore only high increases in the dividend payments from one year to another might be influential on Tobin's Q ratio. However, caution should be exercised in the interpretation due to the likely weakness of the instruments in this specific variable.

	UK (872 firms, 7,754 observations)					
	OLS	Within	GMM (first differences)			
	(1)	(2)	(3)	(4)	(5)	(6)
constant	2.59***	–	–	–	–	–
	(.274)					
RD_t/TA_t	5.01***	2.45*	3.69**	2.37	4.81**	4.75**
	(.873)	(1.30)	(1.81)	(1.76)	(2.19)	(2.16)
I_t/TA_t	0.53***	0.36***	0.34	0.37***	0.36	0.30
	(.171)	(.123)	(.294)	(.092)	(.362)	(.369)
D_t/TA_t	9.77***	5.33***	16.1**	7.37***	15.4**	13.9*
	(1.71)	(1.33)	(6.84)	(2.42)	(7.53)	(7.81)
TL_t	-0.21	0.23	0.16	0.48	0.27	0.60
	(.293)	(.345)	(.586)	(.522)	(.616)	(.881)
Size	-0.14***	-0.34***	-0.37	-0.46**	-0.40	-0.41
	(.024)	(.082)	(.272)	(.209)	(.265)	(.314)
R^2	0.139	0.062				
Wald joint	142	48.52	36.87	43.23	29.64	22.69
(p-value)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Sargan			231.8	312.2	183.8	151.2
(p-value)			(.001)	(.000)	(.012)	(.055)
AR(2)	6.73	-2.86	-1.78	-1.819	-1.66	-1.66
(p-value)	(.000)	(.004)	(.074)	(.069)	(.096)	(.097)
instruments in levels from	t - 2	t - 1	t - 2: I/TA, TL t -3: D/TA, RD/TA, Size		t - 3	

Robust standard errors in parenthesis; Sargan test for overidentifying instrumental variables;
All the models include time dummies; results for GMM are from the 2-step estimation;
Wald test for joint sig. of all the explanatory variables except for dummies; Sargan test for the validity of instruments; AR(2) tests for the autocorrelation of second order;
Robust standard errors. TQ: Tobin's Q ratio, RD: R & D stock, TL: total leverage,
I: investment on productive capital, D: dividends paid, TA: Total assets.
Instruments to t - 6; ***, ** and * indicate coefficient is significant at 1%, 5% or 10%

Table 3.4: Estimators in OLS, Within and GMM for UK. Static model.

3.5 Summary and Conclusions

In this chapter an empirical model of the effect of R&D activities on market valuation with firm level data was developed. The contribution to the financial

literature was defined by two points. Firstly, the model controls for accounting variables, which have been used for empirical studies in previous research, such as leverage, dividends and investment in productive capital. The aim is to highlight the importance of R&D activities as an information carrier of good performance and high value companies together with the inclusion of the control variables that have previously been shown to be important in determining corporate value. Secondly, the analysis applied the GMM estimation in first-differences after the recognition of the presence of firm-fixed effects and endogeneity of the explanatory variables.

The results suggest that information about R&D activities plays an important role to determine the corporate value of UK companies. This finding revealed that the value of R&D activities is recognized by the market in both present and past R&D expenditures.

Interesting results were found with respect to dividends paid, which was shown to impact significantly on firms' value (although the significance was only at 90%). The positive impact of dividends suggests that investors react to irregular information of dividend payments. This effect may also be explained with the managers' choice of using dividends to send credible profitability signals to the market. It is likely that, in the case of a specific change inside the company, such as a restructure, managers would send information about the credibility for the future impact of such a change in the firm. This information is sent to investors by the payment of "special dividends". There is no evidence that leverage influences firm value. This result is in line with previous studies where the response of stock prices to changes in debt has been shown to be small and statistically unreliable.

Generally, although the results found with the GMM estimator were statistical significant for some of the explanatory variables, they should be treated

cautiously, as instruments were shown to be sensitive to small variations in their selection. Nevertheless, the findings related to R&D activities remain consistent, significant and positive under the specified models. The results are in accordance with those that have been previously found in different countries using different estimation methods.

Chapter 4

Corporate Value, Inside Ownership and Ultimate Control in the UK

4.1 Introduction

In a publicly traded corporation, conflicts of interests among investors may originate when cash flow ownership is different from controlling power, Jensen and Meckling (1976). The excess of controlling power to cash flow ownership obtained by either managers or largest controllers might facilitate the extraction of resources from a company in detriment of non-executive shareholders and minority investors, respectively. As a result, firms' value might be negatively influenced. For example, managers could pursue their own interests such as high salaries, expensive business trips, etc., thereby obtaining a private benefit instead of maximising the firms' value. Particularly, as pointed out by Dyck and Zingales (2004), controllers might get private benefits from the firm, such as perquisites

or in some few cases outright theft.

Empirical research has suggested that if managers are awarded with shares, the agency problem between managers and owners may be reduced. To this extent, a non-linear relationship between firms' value and managerial ownership has been proposed [Morck et al (1988), McConnell and Servaes (1990), Short and Keasey (1999), Cui and Mak (2002), Kim et al. (2004), among others]. However, there are some controversies in the empirical research to this respect, particularly in the form of relationship (positive or negative) and, in the inflection points that make this relationship behave non -linearly.

Endogeneity issues between managerial ownership and firms' value have also caused controversy in empirical studies. Endogeneity of the variables is a problem to be expected in the econometric methods. The positive alignment between Tobin's Q and directors' shareholdings could be due to the fact that a highly profitable firm would award their directors with shares. So the real effect would be the opposite, i.e. performance of the firm would influence the number of shares that directors hold. Several studies have tackled this problem with the use of simultaneous equations. For example, Chen and Steiner (2000) formulated an empirical model where both managerial ownership and Tobin's Q, as well as, analyst coverage were jointly determined. They found that managerial ownership enhance firms' value. Beiner et al (2004), also controlled for endogeneity by a simultaneous equation model. Instead of looking at a single control mechanism (managerial ownership), they used a broad corporate governance index for Swiss firms. Their findings support the hypothesis of a positive relationship between firm-level corporate governance and Tobin's Q. Schmid (2003), who used a 3SLS model, also in a sample of Swiss firms, found that managerial ownership has a positive effect on firms' value. Similarly, Chen et al (2003) concluded that after

treating Tobin's Q and managerial ownership as endogenous, there is significant evidence that Tobin's Q increases monotonically with managerial ownership in a sample of Japanese firms.

By contrast, Cho (1998), found that any possible effect of director's shareholdings on value disappears once endogeneity is controlled. He examined the relationship among ownership structure, investment and corporate value, and found that corporate value affects ownership structure, but not vice versa. Himmelberg et al (1999), also recognized the endogeneity of the variables, but from a different perspective. They accounted for endogeneity induced by time-invariant unobserved heterogeneity. Once they controlled both firm effects and observed firm characteristics, with panel data, they could not conclude that changes in firm managerial ownership affect performance. Zhou (2001) suggested that the use of panel data might not be adequate for studies related with managerial ownership as the fixed effects may absorb the impact, if any, of the managerial ownership considering that it is stable over time. Demsetz and Villalonga (2001) investigated the relationship between ownership structure and performance, treating ownership as an endogenous variable with simultaneous equations, and concluded that coefficients of single equation models of the effect of ownership structure on performance may be biased, as they did not find any evidence of a relationship between these variables.

Using a sample of UK firms, this chapter examines whether ultimate ownership is a determinant of corporate value (represented by the Tobin's Q ratio). Specifically, whether shareholders may influence firms' value depending on their ownership stake, controlling power and/or executive participation inside the firm (managerial ownership). In this context, two particular relationships of ownership structure and firms' value are analysed.

First, the internal ownership, represented by directors' shareholdings, which aims to measure the way in which firms' value is affected when managers are also shareholders of the company. The empirical model includes a measure for firms' size and research and development stock (R&D), as well as, specifications with and without financial variables. In this respect, two types of endogeneity are recognized. One which is caused by the use of financial variables and another which is caused by "reverse" causality of managerial ownership and Tobin's Q. A methodology which follows Rajan and Zingales (1995) is followed to alleviate the endogeneity problem by the use of lagged explanatory variables as instruments. Similarly, Toivanen et al (2002) tackle endogenous variables in a model of corporate value by instrumenting them with their lagged values.

Thereafter, the impact of ultimate controllers on corporate value is examined. In particular, three different perspectives related to controlling power are considered. Initially, the effect of largest controllers who have different levels of ownership and control is analysed. In this sense, lower levels of cash flow rights with respect to voting rights are expected to be more prejudicial for firms' value. This may be caused by the abuse of power when control is concentrated in few hands. Subsequently, the level of separation of controllers' shares is substituted with data of the specific type of controller. A family that is the ultimate controller might have different objectives with respect to firms' activities than if the state is the ultimate controller. For example, Claessens et al (2002) found that family control might be more sensitive to divert benefits to themselves than other ultimate controllers, which in turn reduces firms' value. Finally, the devices through which control is exerted are analysed. In this context, pyramids, control chains and dual shares may affect firms' value. For instance, pyramidal structures give control rights through chains that are not evident to minority shareholders.

Few studies have focused on this side of the ownership structure (i.e. ultimate controllers) and firms' value in the UK. Probably, because of the lack of available data. However, some other studies have been conducted for different countries. Holderness (2002) concluded from a review of these types of studies, that the relation of blockholders (largest controllers) and firms' value in the US is not conclusive. Sometimes the relationship was found to be negative, other times positive and never very pronounced. Mehran (1995) found that the relationship of blockholders and firms' value was not significant. Similarly, he did not find support for a relationship between Tobin's Q and outside ownership for specific groups, such as, individual investors, institutional investors and corporations. By contrast, Claessens and Djankov (1999) found that firm profitability is positively related to ownership concentration for Czech firms; the more concentrated the ownership, the higher the firm profitability and labour productivity. They also found that certain types of owners, such as, foreign investors and non-bank funds are more strongly associated with improvements in performance. In addition, Claessens et al (2002) found, in a sample of East Asian corporations, that firm value falls when the control rights of the largest shareholder exceed its cash-flow ownership.

The remainder of the chapter is structured as follows. Section two discusses the relationship between inside ownership and firm's value. Section three focuses in the discussion of the relationship between ultimate controller and firms' value. Section four describes the data used for this study and the construction of the variables, as well as, descriptive statistics of the data. Section five examines the results by empirical analyses of two relationships of ownership structure with firms' value, named, inside ownership and ultimate largest controllers. Finally, section six concludes.

4.2 Inside ownership and firms' value

The relationship of Ownership and corporate value is empirically studied in this part of the chapter. Specifically, inside ownership refers to that fraction of equity held by managers, also known as inside equity.

Jensen (1986), divided stockholders in two groups: i) inside equity (held by managers), and; ii) outside equity (held by anyone outside the firm). The effect of managerial control may be observed in two ways. First, managers could use the control for their own interests i.e. perquisites or high salaries, instead of maximising the firms' wealth. This is also known as the entrechment hypothesis, which predicts a negative relation between managerial ownership and the firms' performance. Second, managers may assume ownership as an incentive. In this context, firms and managers objectives would be aligned, i.e. the wealth maximisation of the firm. This is the alignment-of-interest hypothesis, which predicts a positive relationship between managerial ownership and firms' performance. This suggests that managers may choose the way of exerting their control, and this may depend on the number of shares that they own. In other words, this would imply a non-linear relationship between inside ownership and firms' value.

The relationship between managerial ownership and firm's value has been studied in previous literature such as, Morck et al (1988), who found in a cross-sectional analysis a non-linear relationship between firm value -measured with Tobin's Q ratio- and ownership governance -measured with the number of shares possessed by the board of directors. Their findings for USA data were studied using a piecewise linear relationship with these two variables, where Tobin's Q increases and then decreases with increases in managerial ownership. They anticipated specific inflexion points for this relationship at 5% and 25%. McConnell and Servaes (1990) found a quadratic relationship with ownership and Tobin's Q,

where the relationship was found to have a U-shape. Short and Keasey (1999) found that management is aligned at low and possibly high levels but is entrenched at intermediate ownership levels. They confirmed from their empirical analysis that UK managements become entrenched at higher levels of ownership than their USA counterparts. The inflexion points located by Short and Keasey (1999) were at 16% and 42%. Cui and Mak (2002) further investigated this relationship and found that Tobin's Q initially declines with managerial ownership, then increases, then declines again and finally increases once more -a W-shaped relationship. Their USA data reduced the noise from industry, using only the seven industrial sectors which have the highest expenses on Research and Development (R&D). More recently, Kim et al (2004) examined a sample of Thai firms, which findings were consistent with the relationship between firm performance and managerial ownership found by Morck et al (1988) and Short and Keasey (1999). They found a cubic relationship which inflexion points were located at much higher levels (31% and 71%). They suggested that the higher levels of inflexion given by the sample of Thai firms was because the study was based in IPO firms and an emerging market instead of a developed market.

In this context, this chapter aims to test the hypothesis that managers without ownership would find a higher benefit in directing the free cash flow to situations that do not maximise the firms' value. Specifically, managers would pursue their own interests at expense of shareholders. Moreover, this situation may improve in favour of the firm if shares are awarded to managers to ensure that they would have incentives to make efficient investment decisions (Jensen (1986)). In line with Short and Keasey (1999), it is hypothesised that at low levels of ownership, market discipline will force managers to adhere to value maximisation, Demsetz and Lehn (1985) and Fama and Jensen (1983). However, after a certain level of

equity owned by managers, they could increase their consumption of perquisites. and probably differ from the objectives of the firm. This effect is in line with Morck et al (1988), where medium levels of managerial ownership could cause a decrease in firms' value, as managers have sufficient control to fulfil their own interests. Moreover, after some level of inside ownership, managers might find higher benefits when their interests are aligned to those of the firm. Accordingly, the hypothesis followed in this Chapter is that inside ownership is likely to have a cubic relationship, where managers align their objectives to the firm at low and high levels of inside ownership, but at intermediate levels this effect might be the opposite. In trial regressions, the linear and the quadratic specifications of managerial ownership and firms' performance are also included. However, the results did not show evidence of any significant relationship to this respect.

Firm's market value is represented by the Tobin's Q ratio as a measure of firm's performance. The measure for insider equity i.e. managerial control, is represented with director's shareholdings. Therefore, the relationship to be found in this part of the Chapter is between these two elements: Tobin's Q and director's shareholdings. The approach to follow is based in the likely non-linearity of this effect. R&D and size are used as control variables to specify the empirical model in this Chapter. The hypothesised relationship of Tobin's Q and inside ownership is as follows;

$$TQ_i = \alpha_i + \beta_1 Own_i + \beta_2 Own_i^2 + \beta_3 Own_i^3 + \gamma_k control_i + \mu_i$$

where Own is the ratio of director's shareholdings to total number of shares and control represents the control variables that conform the basic model under analysis. Nevertheless, a linear and a quadratic relationship between managerial ownership and firms' value are also examined.

4.3 Ultimate control and firms' value

The separation of corporate ownership (cash flow rights) and corporate control (voting rights) is likely to create conflicts of interests among shareholders. This is an agency problem, which often arises because the decision made by the controlling shareholder might not be in the interest of minority shareholders, Becht and Mayer (2001).

However, there are some legal rules in the UK that protect minority shareholders. Once an investor owns 30% of voting rights in a company, it has to make an offer of all the voting shares in the firm. The price of this offer has to be the highest price that the bidder paid for the target company's shares during the 12 months preceding the date when the stake reached 30%. This action benefit minority shareholders because of the presence of equal price rules in the case of takeovers. Moreover, minority shareholders can make a claim to court when majority shareholders intend to make a profit at their expense, Barca and Becht (2001).

Goergen and Renneboog (2001) suggested that the agency conflict caused by voting controls of shareholders in the UK differs from that found in Continental Europe. In the later, expropriation of minority shareholders might be the key agency problem related to ownership concentration. As there is extensive protection to minority investors in the UK, the agency problem originates from the lack of ownership concentration and control, which requires codes to prevent managers from benefiting from shareholders.

In this part of the chapter, an empirical analysis of the effect of separation of ownership and control on corporate value in the UK is pursued. In general, international evidence indicates that the accumulation of control rights in excess of cash flow rights reduces the observed market value of firms, Denis and Mc-

Connell (2003). This situation is given because of the creation of conflicts of interest among investors, mainly when the largest controller abuses its power. Specifically, this research questions whether largest controllers have any benefit. opposed to increasing firms' value, depending on their level of separation of voting and cash flow rights (i.e. no-separation, low, medium or high).

Furthermore, the presence of an ultimate controller is expected to be negatively associated with value. In addition, the specific type of owner [i.e. family, state, bank, firm, miscellaneous (charities, foreigners, etc.)] might have an impact on Tobin's Q in different proportions. For example, Suehiro (2001) suggested that *family* type business in Thailand does not always demonstrate poor performance in comparison with other types of ultimate owners. Therefore, it is expected that corporate value might be influenced to different degrees, depending on who is the ultimate controller.

Finally, the devices from which control is exerted are examined. Berle and Means (1932) pointed out that the control of a firm can be exerted by different devices, such as, pyramids, dual class shares (non-voting shares, limited voting shares) and cross-holdings. Like common stock, preference shares represent partial ownership in a company. Preferred stock shareholders do not enjoy any of the voting rights of common stockholders. Further analysis in this respect is pursued, specifically, the question of whether the way of controlling a firm has any effect on its value. For instance, pyramids can create an agency problem call "self-dealing", which gives the possibility for the firm to manipulate their operations by trading with companies owned by the firm itself.

These devices cause differences in cash flow rights and voting rights in a company. Franks et al. (2004) suggested that there are few dual class shares in the UK. However, although, non-voting shares in the UK have been outlawed since

1968, firms may issue "preference shares" which have a prior claim on dividends but limited or non-voting rights at general meetings, Faccio and Lang (2002). This is a way in which owners may acquire controlling power to the detritment of minority shareholders. For instance, pyramidal structures might be created through publicly traded companies, which give an indirect shareholding.[1]. In this respect, preferred stock shareholders may not enjoy any of the voting rights of common stockholders.

4.4 Data and descriptive statistics

In this section, the characteristics of the datasets used for the analysis are discussed. The original database is that one described in Chapter 2. Some adjustments were done to allow the matching of the new information used for this Chapter. Data related with both managerial ownership and control is not available in a panel structure. For this reason, this Chapter follows a cross sectional analysis.

The control variables, such as R&D and size, as well as financial variables (for some of the regressions) were averaged over four years (1997-2000). The main reason is to mitigate problems of seasonal effects and to account for slow reactions of the market (Rajan and Zingales, 1995). This sample of firms was matched with data on director's shareholdings (managerial ownership), which was obtained from Datastream for the year 2000. Furthermore, the observations which contain information of all the previous variables were matched with data on ultimate control which corresponds to the year 1996. This data was obtained from a previous research by Faccio and Lang (2002). They collected data on ownership and control for 5,232 corporations in 13 Western European countries.

[1] An example of a pyramidal structure in a British company is given in Appendix 1.

The dependent variable for this research is Tobin's Q which represent firms' value and performance. This variable was constructed with data for the year 2001. In Chapter 3, the endogeneity problem was controlled by the application of GMM. However, the use of GMM is not possible in this chapter given that data related to managerial ownership and ultimate control is only available for a single year. Moreover, there is evidence that data on ownership and control stays stable over time, thus, the use of panel data might be not adequate, as controlling for fixed effects in the model could eliminated the managerial ownership effect (Zhou, 200; La Porta et al, 2000). Therefore, the lagged explanatory variables aim to reduce the problem of endogeneity. The use of past values reduces the likelihood of observed relationships of Tobin's Q on firm-specific factors[2].

[2]Rajan and Zingales (1995) followed a similar methodology. They averaged the explanatory variables one period to reduce the noise and to account for slow adjustments. They also lagged the explanatory variables to reduce the problem of endogeneity.

Variables	Description
Tobin's Q (Dependent variable)	Ratio that represents firm performance, constructed as: (Total assets - Equity, capital and reserves + Market value)/ Total assets
R&D stock (base year 1984)	Ratio of research and development (R&D) stock to total assets, R&D stock was constructed using the methodology popularized by Hall (1990) based on a standard perpetual inventory equation with declining balance depreciation
lnassets	Natural logarithm of total assets as a measure of size
Own	Percentage of shares held by directors
CO/C	Ratio of Corporate ownership (cash flow rights) to control (voting rights) for firms with a controller with at least 10% of total shares.
No separation	Dummy variable equal to one when there is a controller who has equal cash flow and voting rights
Low separation	Dummy variable equal to one when there is a controller whose control and cash flow rights differ in a low level. $0.75<CO/C<0.99$
Medium separation	Dummy variable equal to one when there is a controller whose control and cash flow rights differ in a medium level. $0.50<CO/C<0.75$
High separation	Dummy variable equal to one when there is a controller whose control and cash flow rights differ in a high level. $0 \leq CO/C \leq 0.50$.
pyramids	Dummy variable equal to one when there is a pyramidal structure at the 10% cutoff.
control chains	Dummy variable equal to one when there is a control chain structure at the 10% cutoff.
dual shares	Dummy variable equal to one when the company have two types of shares: ordinary and preference.

Table 4.1: Description of Variables

The final sample for analysis consist of 632 observations for the UK. The definitions of the variables used for this research are described in Table 4.1.

The ratio corporate ownership/control (CO/C) represents the separation of cash flow and voting rights for controllers with at least 10% of the stake. Control refers to the percentage of shares held by the owner of the majority voting rights or the owner who holds enough voting rights to have de facto control. It is specifically

the percentage of the largest shareholder's ultimate control stake. Corporate ownership refers to the percentage of the largest shareholder's ultimate cash flow stake. These two variables -control and corporate ownership- can diverge due to the fact that corporations issue different classes of shares that provide different voting rights for given cash flow rights (preference shares), and also due to the existence of pyramids and holdings through multiple control chains. When the ratio of corporate ownership to control is equal to one, the delegation of control is not manipulated inside the firm. By contrast, the way of controlling could have a negative effect on value. The data for this ratio (CO/C) is only available for firms where there is a shareholder with ultimate control of at least 10%. However, no data is available for some observations, as some firms are widely held at the 10% threshold. This is the reason for creating dummy variables with different levels of separation (low, medium, high and no-separation, see the table above) instead of accounting for the ratio itself. In this way the maximum number of observations available is exploited aiming to avoid selection biasness.

Table 4.2 shows the concentration of firms within different ranges of directors' ownership. It can be observed that for 54.9% of firms in the sample, the concentration of shares owned by directors is between 0-5%. In this range, the average Tobin's Q is 1.47. The maximum average for Tobin's Q was reached by the only three firms in ths sample that have managerial shareholdings higher than 70%.

Own	No. of firms	% of concentration	TQ	Std. Dev.
0-5%	347	54.9	1.47	0.93
5-10%	70	11.0	1.54	0.99
10-15%	49	7.7	1.45	1.84
15-20%	35	5.5	1.21	0.50
20-25%	30	4.7	1.75	2.87
25-30%	14	2.2	1.30	0.60
30-35%	21	3.3	1.45	0.81
35-40%	12	1.9	1.44	0.75
40-45%	10	1.6	1.11	0.69
45-50%	5	0.8	1.28	0.76
50-55%	9	1.4	1.56	0.94
55-60%	10	1.6	1.17	0.44
60-65%	10	1.6	1.36	1.11
65-70%	7	1.1	0.86	0.26
70-75%	2	0.3	2.81	1.10
75-80%	1	0.1	2.35	NA
Total	632	100	1.46	1.15

Source: the original information was obtained from Datastream and was grouped to construct the averaged measures.

Table 4.2: Concentration of directors shareholdings

Table 4.3 shows the descriptive statistics for the main variables used for the empirical analysis. It reveals that the maximum concentration of shares owned by directors is 75.8%, while the mean is 11.6%. This description is very similar to that from Short and Keasey (1999), where the reported mean for the UK in 1992 was 11.47% and the reported maximum was 75.2%.

A relevant characteristic for the analysis can be observed in "control stake" and "cash flow stake". Data is only available for information where control stake is at least 10%, the rest of the observations have empty cells (26% of the total number of observations). Therefore, the presented statistics are values excluding the missing observations. This implies that if it is assummed that the 26% of the missing observations have a controlling stake of 5% (average value between zero and ten), the mean value in the total sample under study would be lower than

20%. In other words, the majority of the firms would be widely held at the 20% cutoff. This statistic is close to the mean reported by Goergen and Renneboog (2001) of 15.2% for the largest control stake (voting block) in 1992. Similarly, the median for control stake if > 10% is still below the 20% cutoff (17.9%). Consequently, a better appreciation of the largest shareholders can be observed at the 10% cutoff, where a largest shareholder is observed for more than 50% of the companies.

Variables	UK 632 obs.					
	Mean	Min	25%	Median	75%	Max
Panel A						
Tobin's Q	1.46	0.24	0.92	1.17	1.56	16.6
% managerial own	11.6	0	0.39	3.5	16.2	75.8
Control stake if >10%	25.2	10	13.9	17.9	30.1	89.9
Cash flow stake if>10%	22.8	0.02	11.8	16.1	29.9	84.5
Panel B (Control variables)						
R&D stock/Total assets	0.05	0	0	0	0.03	1.14
size	11.5	6.7	10.3	11.3	12.7	17.8
Investment/Total assets	0.03	-0.63	-0.01	0.03	0.08	0.52
Leverage	0.18	0	0.07	0.17	0.25	1.08
Dividends paid/Total assets	0.03	0	0.01	0.02	0.04	0.18

Notes: This table shows the mean, median and quartiles of the variables that are analysed in this research. Panel A presents the descriptive statistics of the main characteristics of the data under analysis. Panel B presents the descriptive statistics of the control variables, including financial variables (investment, total debt and dividends paid) which are considered for some of the model specifications in the empirical analysis. The sample consists in 632 firms for the UK.

Table 4.3: Descriptive Statistics for UK

Table 4.4 shows the ultimate largest controllers at both the 10% and 20% thresholds. *Family* as the ultimate largest controller refers to an individual or a firm which is not listed on any stock exchange. Unlisted firms are considered as *family* as it was justified, with statistical support, by Faccio and Lang (2002)[3].

[3]In the UK, there is a 3% disclosure rule for unlisted firms. However, Faccio and Lang were still unable to find ownership data for all unlisted firms. Any failed attempt to identify owners

Widely held financial are those companies controlled by a financial company, which does not have a controller at an specific cutoff. *Widely held corporation* refers to those companies controlled by a non-financial company which is also widely held. *Widely held* companies refer to those which do not have any owners with significant control rights at those particular stakes (10% and 20%). *Miscellaneous* refers to charities, voting trusts, employees, cooperatives, or minority foreign investors. *State* is when a national government (domestic or foreign), local authority or government agency, are the ultimate shareholders at any specific cutoff.

At the 10% threshold, the highest proportion corresponds to firms controlled by families as ultimate owners. This is followed by companies which are *widely held* (26.1%) and *widely held financial* (17.4%). At the 20% cutoff, it can be observed that a very high percentage is for firms that are *widely held* (68.4%). This statistic is consistent with Faccio and Lang (2002), where from a sample of 1,953 firms for the UK, 63.1% were *widely held* at the 20% threshold. This means that the majority of firms in the UK have a disperse ownership structure where the largest controlling stakes are probably less than 20%.

	10 % cutoff	%	20 % cutoff	%
sample size	632	100	632	100
Family	304	48.1	150	23.7
Widely held financial	110	17.4	28	4.4
Widely held corporation	4	0.6	3	0.4
Widely held	165	26.1	432	68.4
Miscellaneous	47	7.4	18	2.8
State	2	0.3	1	0.1

Notes: This table shows, by control stakes, the number of firms which are controlled by different categories of owners for the UK sample of 632 observations.
Source: Faccio and Lang (2002)

Table 4.4: Ultimate controllers at the 10 and 20 percent cutoff

for unlisted firms was classified as family. They also offer statistical support for it.

Table 4.5 shows the characteristics of both the ultimate owner and the means to exert control, as well as some other characteristics of the data. Controller accounts for the observations with the presence of an ultimate controller; this is all the firms except for the *widely held* companies. In the UK, 73.8% of firms have an ultimate shareholder with at least 10% of the control stake and only 31.6% with at least 20% of the control stake.

In addition, 23.3% of the shareholders, with at least 10% of the control stake, have different levels of voting rights and cash flow rights. For shareholders with at least 20% of the control stake, the statistic is much lower (6.6%).

	10 % cutoff	%	20 % cutoff	%
Controller	467	73.8	200	31.6
Separation	147	23.3	42	6.6
No Separation	320	50.6	158	25.0
Low separation	74	11.7	26	4.1
Medium separation	26	4.1	8	1.3
High separation	47	7.4	8	1.3
Pyramids	147	23.3	36	5.7
Control chains	36	5.6	22	3.5
dual shares[1]	88	13.9	33	5.2

[1]Non voting shares were outlawed from UK since 1968, so for this context it refers to firms that have both ordinary and preference shares.
Source: Faccion and Lang (2002).

Table 4.5: Characteristics of ultimate structure and ultimate owner at the 10 percent cutoff

Pyramids and control chains refer to the ultimate structure of the firm. Pyramids represent the controlling shareholder who exercises control through at least one publicly-traded company. Firm Y is said to be controlled through a multiple control chain if it has an ultimate owner who controls it via a multitude of chains. In table 4.5, it can be observed that the proportion of firms with a pyramidical structure is 23.3% at the 10% threshold and only 5.7% at the 20% threshold. Dual shares refer to firms which have both preference and ordinary

shares, as preference shares have limited voting rights. The number of firms with dual shares at the 10% threshold is 13.9% and for the 20% threshold is 5.2%.

Table 4.6 presents a more detailed description of separation of voting and cash flow rights. In the sample for analysis there are 147 firms that have separation of control and ownership at the 10% cutoff. It is possible to identify ultimate controllers for this firms. For instance, the highest percentage is for firms controlled by *Family* (22.1% and 7.7%, at 10% and 20% cutoff points, respectively) and for *Widely held financial* (15.7% and 3.8%, at 10% and 20% cutoff points, respectively).

	10 % cutoff	%	20 % cutoff	%
Family	69	22.1	24	7.7
Widely held financial	49	15.7	12	3.8
Widely held corporation	3	0.9	2	0.6
Miscellaneous	25	8.0	3	0.9
State	1	0.3	1	0.3

Notes: This table shows the number of sample companies, by specific type of owner, in companies where controllers have different cash flow and voting rights at the 10% and 20% thresholds. The sample consists of 632 firms in the UK.
Source: Faccio and Lang (2002).

Table 4.6: Number of firms with separation of voting and cash flow rights per type of controller

4.5 Empirical results

The empirical analysis followed in this section have two main hypothesis. First, it investigates whether insider ownership is significant in determining corporate value and if this relationship is non-linear, and; second, it examines whether the ultimate controller of the firm at the 10% threshold has an impact on firms' value. The reason for choosing 10% as the cutoff point is related to the controlling structure of firms, as in the UK, firms tend to be widely held at higher cutoff

points. The data available for this purpose contains information of two different thresholds (10% and 20%). Therefore, the choice of 10% gives more opportunity to analyse the impact of largest shareholders, as at the 20% cutoff, the majority of firms (68.4%) do not have a controller. Moreover, the 10% cutoff has being previously used by other studies, such as Claessens et al (2002) and La Porta et al (2002). They have suggested that control can be exerted with, as low as 10% of the voting rights. Also, La Porta (1999) presented evidence using a 20% cutoff. They found the same but statistically weaker results than for La Porta et al (2002), where the cutoff was at 10%. However, they pointed out that the difference was likely cause by the size of the sample, and not by the control cut-off.

An initial problem in the data is the presence of endogenous variables. To correct for endogeneity, the explanatory variables have been lagged for one period, therefore, using the lagged explanatory variables as instruments. However, it is difficult to assure that with this procedure endogeneity has completely disappeared. Testing for endogeneity might be useful in this context. The endogeneity test is based on estimating the reduced form of managerial ownership, which is assumed to be endogenous. A further assumption for this test is to consider that the rest of the variables are exogenous (i.e. size and R&D stock). This leaves as options the measure of size to determine managerial ownership (in the reduced equation)[4], and R&D as the exogenous variable to determine Tobin's Q. Therefore, under these assumptions the test for endogeneity is carried out. The residual of the reduced form is then included in the original equation as an additional regressor, and its significance is tested with a t statistic. If we reject the t statistic, it would be concluded that managerial ownership is endogenous because ν and μ

[4]Size was insignificant to determine Tobin's Q in this particular case, probably because the sample size is smaller than that of Chapter 3. Therefore, it could be used as an exogenous variable to determine managerial ownership. Similarly, Demsetz and Villalonga (2001) specified the reduced form for managerial ownership with the measure of firm size.

are correlated.

From Table 4.7, it can be observed that when Tobin's Q for 2001 is used, the p-value for the estimated parameter of ν cannot reject that ν is equal zero. In other words, managerial ownership might not be endogenous for this particular sample because ν and μ are not correlated. By contrast, when Tobin's Q for the year 2000 is used for the test, it is observed that managerial ownership is endogenous (Given that managerial ownership is also for the year 2000). Consequently, to control for endogeneity by lagging the explanatory variables for one period seemed useful in this particular case.

	Tobin's Q 2001	Tobin's Q 2000
p-value for ν	(.977)	(.029)

Notes: This table presents the p-values from the endogeneity test.
For the test puposes, the full equation is:
$Tobin\prime sQ = \alpha + \beta_1 R\&D + \beta_2 own + \mu$
The reduced equation for managerial ownership is:
$Own = \alpha + \beta_1 R\&D + \beta_2 size + \nu$
Because the first equation can be estimated with OLS, the reduce residual $\widehat{\nu}$ can be obtained. The second equation is then estimated with $\widehat{\nu}$ as an additional regressor by OLS.
If the t statistic for $\widehat{\nu}$ is rejected: managerial ownership might be endogenous because ν and μ are correlated.

Table 4.7: Test for Endogeneity

4.5.1 Inside ownership

The initial aim of this section examines whether insider ownership is significant in determining firms' value and if this relationship, if any, is non-linear. Table 4.8 shows the parameters for five different estimations. Column (1) is the linear relationship, Column(2) adds the square of managerial ownership assuming a quadratic relationship as McConnell and Servaes (1990), Column (3) assumes a cubic relationship of inside ownership and performance following Morck et al

(1988), Short and Keasey (1999) and Kim et al (2004). Column (4) is the same as Column (3) but with the exclusion of the measure of size as it is highly correlated with managerial ownership and is not correlated with Tobin's Q. Kole (1995) suggested that the different findings of Morck et al (1988) (piecewise linear relationship) and McConnell and Servaes (1990) are attributable to differences in the size of the firms analysed. Column (5) is the same as Column (4), but with the inclusion of industry effects.

From the results in Table 4.8, there is no evidence of a relationship between managerial ownership and Tobin's Q. The results are consistent with the inclusion of industrial dummies for Column (5). In general the results are not in line of those from Morck et al (1988), Short and Keasey (1999), Kim et al (2004). To investigate this issue further, financial variables, such as investment, leverage and dividends paid, were included in the model as in Column (6). The empirical results confirm that UK management becomes entrenched at low and possibly high levels of ownership and aligned at medium levels of ownership. The inflexion points for Column (6) are located at 17.4% and 54.5%. This suggests that managers who own up to 17.4% would align their interests to those of the firm, named value maximisation. In the case when managers own more than 54.5%, the benefits obtained from the value-maximisation of the firm are possibly higher than those that could be obtained for personal benefits. By contrast, when managers own between 17.4% to 54.5% there is a negative effect on value of -0.001. This means that an increase of one unit in shares between this range (17.4-54.5%) reduces value by 0.001 units.

It can be observed that although there is a significant effect of the estimators for managerial ownership in Column (6), the impact is low in comparison with the control variables. Given the likely endogeneity of financial variables, the

positive results of Column (6) suggest that the significance of the coefficients for managerial ownership might be biased. This is in line with studies by Demsetz and Villalonga (2001) and Himmelberg et al (1999). However, the interesting matter in this research is that not only the likely reverse causality of managerial ownership and Tobin's Q could bias the estimators, but also the endogeneity of control variables that are included in the specification (such as financial variables). Therefore, both considerations should be made to achieve consistent results and the interpretation of significant evidence of managerial ownership on Tobin's Q in the presence of financial variables should be cautiously interpreted.

In the previous chapter of this thesis, it was shown that the market value of the firm (Tobin's Q) is determined by R&D, dividends paid, investment and size. These are control variables to specify the empirical model in this Chapter. In addition, leverage is also included, although it was previously insignificant in determining firms' value. However, to be consistent with previous research, such as Fama and French (1998), leverage is also included as a control variable. The specification of the model is important as an underfitted model could bring biased as well as inconsistent estimators. In addition, the disturbance variance will be incorrectly estimated. In consequence, it is likely that the statistical significance of the estimated parameters may be misleaded[5]. For these reasons, the control variables mentioned above are included in Column (6).

[5] Gujarati (1995)

	UK sample size = 632 obs.					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A (managerial ownership)						
Constant	1.30***	1.27***	1.15***	1.27***	1.06***	1.07***
	(.313)	(.333)	(.346)	(.067)	(.376)	(.388)
Own	-0.0007	0.0014	0.019	0.017	0.019	0.03**
	(.002)	(.008)	(.016)	(.015)	(.015)	(.015)
Own^2		-3.8e-05	-0.0009	-0.0008	-0.0007	-0.001**
		(.0001)	(.0007)	(.0007)	(.0006)	(.0006)
Own^3			9.8e-06	9.3e-06	7.6e-06	1.3e-05*
			(7.6e-06)	(7.6e-06)	(7.5e-06)	(7.3e-06)
Panel B (control variables)						
R&D	3.09***	3.09***	3.13***	3.11***	3.47***	3.53***
stock	(.329)	(.331)	(.331)	(.325)	(.366)	(.360)
size	0.0007	0.002	0.009			
	(.025)	(.026)	(.026)			
Leverage						0.04
						(.316)
Invest.						-1.5***
						(.417)
Divid.						9.0***
						(1.66)
Ind. dum.	No	No	No	No	Yes	Yes
R-square	0.126	0.126	0.128	0.128	0.176	0.23
Inflection						17.4%
points						54.5%

Notes: This table presents the results of six models estimated by OLS for the sample of 632 companies in the UK. The dependent variable is the Tobin's Q ratio (firms' value) for the year 2001. Panel A presents the independent variables with respect to managerial ownership. Own, Own^2 and Own^3 are the percentage of directors shareholding for the year 2000. Panel B presents the control variables which are: R&D/TA (ratio of R&D stock to total assets), size (log of total assets), leverage (ratio of total debt to total assets), I/TA (ratio of the change of productive capital to total assets, D/TA (ratio of dividends paid to total assets). Independent variables in Panel B have been averaged for 4 consecutive years (1997-2000). Standard errors in parenthesis.
***, ** and * indicate coefficient is significant at 1%, 5% or 10%

Table 4.8: OLS estimator for managerial ownership

Robustness of Results

High R&D firms are more likely to have problems of agency costs and asymmetric information. Moreover, there is evidence of greater institutional ownership in high R&D firms (Bushee (1998); and Wahal and McConnell (2000)).

The previous section in this chapter used data, which included all the non-financial industrial sectors available and both high and low R&D firms. To test for the robustness of results the methodology of Cui and Mak (2002) to select firms with high R&D was followed.

The database is ranked with the ratio of R&D expenditure to total assets. Table 4.9 shows the concentration of the top 10% UK industries with the highest R&D expenditure. From a total of 15 industrial sectors, only 8 are present in the top 10% of R&D expenses. The second column in Table 4.9 shows the proportion of firms which are within the top 10% to the total number of firms in the sample in a particular industrial sector. The two industrial sectors with the top number of firms with high R&D are "Chemicals, healthcare and pharmaceuticals" and "computer, electrical & electronic equipment". The selection of the top eight industries decreases the sample for the year 2000 by 26%, from 632 to 467.

As can be seen from Table 4.10, the results for a cubic relationship between managerial ownership and Tobin's Q remain consistent with the previous section. Columns (1) and (2), but not Column (3) include financial variables. The significance of managerial ownership, as in Column (1) and (2), is likely to be biased due to the endogeneity of financial variables. AAlthough these variables have also been lagged for one period, it seems that the method is not sufficient to control for endogeneity.

	Industry	No. firms within the top 10% of R&D/TA	Max. ratio of R&D/TA	No. firms in the sector considering the whole sample	% of Firms within the top 10% to total no. of firms in the sector
1.	Automotive, aviation and transportation	2	0.41	46	4.3
2.	Chemicals, health care and Pharmaceuticals	15	0.43	51	29.4
3.	Computer, electrical & Electronic equipment	39	0.24	82	47.6
4.	Engineering, mining, and oil-gas exploration	1	0.05	83	1.2
5.	Leisure, hotels, pubs and restaurants	3	0.19	50	6.0
6.	Paper, forestry and photography[1]	1	0.08	55	1.8
7.	Services	1	0.06	52	1.9
8.	Textile, leather and clothing & footwear[3]	1	0.06	48	2.1
	Grand total	63		467	

[1]includes Packaging and Printing & Publishing; [2]includes metallurgy; [3]includes furniture

Table 4.9: Distribution of high Research and Development industries

In summary, the results for managerial ownership have been obtained after accounting for the endogeneity of the variables. However, it cannot be stated that the problem has fully disappeared, as the exclusion of financial variables increase the standard errors of managerial ownership. The results are robust to the the selection of industrial sectors with high R&D expenditures. Results from previous literature that have accounted for endogeneity through systems of simultaneous equations have found different results for the relationship of ownership with firms' value. For instance, Chen and Steiner (2000) found a quadratic relationship where as ownership increases in one unit, value increases in 0.08 units and then decreases. However, they included financial variables in all the specifications

without accounting for their potential endogeneity. Similarly, results in Chen et al. (2003), who found a linear relationship with managerial ownership and Tobin's Q, might be biased, as again, they controlled the endogeneity from "reverse" causality but ignored the endogeneity from financial variables.

	UK sample size = 467 obs.		
	(1)	(2)	(3)
Panel A (ownership variables)			
Constant	0.85***	0.89***	1.31***
	(.156)	(.219)	(.143)
Own	0.04**	0.05***	0.028
	(.020)	(.020)	(.020)
Own^2	-0.0017*	-0.002**	-0.0012
	(.0009)	(.0009)	(.0009)
Own^3	1.6-05	1.7e-05*	1.2e-05
	(1e-05)	(1e-05)	(1.04e-05)
Panel B (control variables)			
R&D/TA	3.29***	3.6***	3.49***
	(.374)	(.408)	(.420)
Leverage	0.45	0.07	
	(.418)	(.420)	
I/TA	-1.34***	-2.1***	
	(.518)	(.549)	
D/TA	9.4***	9.1***	
	(2.21)	(2.18)	
Industry dummies	No	Yes	Yes
R-square	0.17	0.23	0.145
Inflection points	16.8%	18.6%	
	53.5%	55.6%	

Notes: This table presents the results of three models estimated by OLS for the sample of 467 companies, from the industrial sectors with the highest R&D stock, in the UK. The dependent variable is the Tobin's Q ratio (firms' value) for the year 2001. Panel A presents the independent variables with respect to managerial ownership. Own, Own^2 and Own^3 are the percentage of directors shareholding for the year 2000. Panel B presents the control variables which are: R&D/TA (ratio of R&D stock to total assets), size (log of total assets), leverage (ratio of total debt to total assets), I/TA (ratio of the change of productive capital to total assets, D/TA (ratio of dividends paid to total assets). Independent variables in Panel B have been averaged for 4 consecutive years (1997-2000). Standard errors in parentesis. ***, ** and * indicate coefficient is significant at 1%, 5% or 10%

Table 4.10: Managerial ownership in High R and D industries

4.5.2 Ultimate controller

In this part of the empirical analysis of the impact of the ultimate controllers on firms' value is studied from three different perspectives: i) level of voting rights to cash flow rights, ii) largest ultimate controller (family, bank, state, etc.), and. iii) devices to exert control (pyramids, control chains and/or different voting shares). The UK has laws that favour minority investors as rights to approve transactions between subsidiary and parent firms and equal price rules in takeovers. The protection to minority investors might bring as a consequence that the value of the firm is unaffected by the way that control is exerted, which in such a case, it could be implied that legal rules are beneficial to prevent for any negative effect on firms' value.

Separation of voting rights and cash flow rights is measured with dummy variables in two ways. First, when the ratio of corporate ownership to control rights (CO/C) is different from one. In other words, this represents both the presence of a controller, and that such control is obtained due to an excess of voting rights with respect to cash flow rights. Second, Bebchuk et al (2000) argued that a controller who has separation of control and cash flow rights can create higher agency costs than a controller with no separation. In light of this argument, in this Chapter, ultimate control is classified in five different categories: a) firms with a controller without separation of ownership and control (ratio CO/C = 1), b) firms with a controller with low level of separation ($0.75 \leq CO/C \leq 1$), c) firms with a controller with medium level of separation ($0.50 \leq CO/C \leq 0.75$), d) firms with a controller with high level of separation ($0 \leq CO/C \leq 0.50$), e) firms which do not have a controller (widely held).

Table 4.11 shows the initial set of results. Column (1) presents the results when there is a controller and simultaneously there is separation of control and

ownership at the 10% cutoff. There is a significant effect on value for this variable, but with a very low significance level (10%). The low significance might be as a result of the high impact of UK regulations on firms' behaviour. Specifically, takeover rules have discouraged the accumulation of share blocks in excess of 30%. This rule protects minority shareholders from actions made by dominant controllers, such as, influencing the decisions of the board of directors. As Becht and Mayer (2001) pointed out, the composition of the board of directors must be such that significant decisions with respect to the management of the firm are taken independently from the largest controller.

Furthermore, the effect of separation of control and ownership is expected to be significantly negative for countries with low investors' protection, La Porta et al (2002), Kappler and Love (2004), Claessens et al (2002), among others. Therefore, the low significance of this variable for the UK, suggests that legal regulations have had a positive influence not only to protect minority investors, but to avoid a negative impact on firms' value. Nevertheless, it can be appreciated in Column (2) and (3) that when there is a controller whose control is exerted with a high level of separation (of at least twice as much voting power than cash flow ownership), the negative impact on firms' value is significant at the 95% confidence level. Only 7.4% of the observations have a controller with high level of separation. For this group of observations, separation is given mainly by pyramids (87%), and the ultimate controller is dominated by miscellaneous and widely held financial firms (45% and 40%, respectively). This evidence suggests that although the number of controllers with separation of ownership and control, for the UK, are very low, when there is such a characteristic, the influence is negatively associated with value. For instance, potential conflicts of interest between owners and controllers can be created, such as the use of control to extract corporate resources. Firms'

value might also be affected when controllers have incentives to spend resources to monitor and influence the activities of managers, Denis and McConnell (2003). In summary, the significant effect of a controller with high levels of separation may be interpreted as a decrease in the mean level of Tobin's Q by 0.36 units for firms with a controller who has twice as much voting rights than cash flow rights with respect to firms that do not have a controller (widely held firms).

Although, the boundaries chosen to establish the low, medium or high levels of separation were chosen arbitrarily, the results showed evidence that having twice as much voting rights than cash flow rights is significant for firm's value. To check for the robustness of these boundaries, a different distribution was selected for firms with controllers that have different voting rights and cash flow rights. For this check, the dummies to represent high, medium and low levels of separation were set equal to one when $0<CO/C<0.33$, $0.33<CO/C<0.64$ and $0.64<CO/C<1$, respectively; and zero otherwise. The results in this case showed that high separation was significant (at least three voting rights per one share)[6]. There was no evidence that low and medium levels impact on firms' value under this distribution. This suggests that the previous effect of controllers with at least twice as much control than cash flow rights might be lost when averaged together with lower levels of separation (as in $0.33<CO/C<0.64$). Therefore, the boundary created for the dummy that represents at least twice as much control than ownership seems adequate to capture the corresponding effect.

Column (4) is the same as Column (3) but with the inclusion of financial variables. Financial variables were not considered before because of the potential problems in obtaining consistent results due to endogeneity problems, as shown in the empirical analysis of inside ownership. In this section, financial variables

[6]Significant at the 95% confidence level. This significance level is reduced when industry dummies were included in the model.

are lagged for one period with respect to the dependent variable, as was done for the remainder of the variables. After including financial variables, the coefficients of the ultimate ownership variables remain similar to those found before. However, standard errors increase to the point that the confidence interval previously found for high levels of separation in Column (3) decreases from 95% to 90%. It can be observed that financial variables have a highly significant impact on firms' value (except for leverage, that was shown to be not significant). Nevertheless, although the endogeneity problems may have been alleviated with the instrumental variables method, there is some evidence that it may still bias the results (given the increased standard errors for the remainder of the variables). Therefore, the results in Column (3) without financial variables is the preferred specification of the model.

The percentages of managerial ownership have been excluded in this part of the analysis and only the measures for the controller with separation of ownership and control were considered. To investigate further the effect of managerial ownership as in the previous section, an attempt of combining both directors' shareholdings and controllers with separation of ownership and control was followed (results are not presented in the table). In particular, there was no evidence of an effect of managerial ownership on corporate value. This evidence is consistent to the functional form of directors' shareholdings such as linear, quadratic or cubic, and to robust standard errors. Also, consistent with the previous section this effect became significant when financial variables were included. In addition, the results remained consistent demonstrating that only controllers with a high separation of cash flow rights and voting rights are of significance to determine corporate value.

	UK 632 obs			
	(1)	(2)	(3)	(4)
Panel A (separation of ownership and control)				
Constant	1.35***	1.41***	1.17***	1.16***
	(.052)	(.085)	(.383)	(.396)
Separation	-0.19*			
	(.101)			
No separation		-0.09	-0.08	-0.03
		(.103)	(.102)	(.100)
Low separation		-0.19	-0.14	-0.04
		(.151)	(.149)	(.147)
Medium separation		-0.17	-0.13	-0.04
		(.228)	(.226)	(.222)
High separation		-0.42**	-0.36**	-0.32*
		(.178)	(.178)	(.173)
Panel B (control variables)				
R&D	3.04***	3.06***	3.42***	3.44***
	(.325)	(.325)	(.365)	(.360)
Investment				-1.39***
				(.413)
Dividends				8.37***
				(1.67)
Leverage				-0.03
				(.316)
R-square	0.131	0.134	0.179	0.23
Industry dummies	No	No	Yes	Yes

Notes: This table presents the results of four models estimated by OLS for the sample of 632 companies in the UK. The dependent variable is the Tobin's Q ratio (firms' value) for the year 2001. Panel A presents the independent variables with respect to the separation of ownership and control with data from 1996. Separation is a dummy variable that equals one if the firm has a controller who has different cash flow and voting rights, and zero otherwise; No separation is a dummy variable equal to one if the firm has a controller who has the same cash flow and voting rights, and zero otherwise; Low separation is a dummy variable equal to one if the firm has a controller who has more voting than cash flow rights in the range $0.75<CO/C<0.99$, and zero otherwise; Medium separation is a dummy variable equal to one if the firm has a controller who has more voting than cash flow rights in the range $0.50<CO/C<0.75$; High separation is a dummy variable equal to one if the firm has a controller who has more voting than cash flow rights in the range $CO/C<0.5$. Panel B presents the control variables, which have been averaged for 4 years (1997-2000). Standard errors in parenthesis. ***, ** and * indicate coefficient is significant at 1%, 5% or 10%.

Table 4.11: Separation of ownership and control

Another effect from the level of separation can be analysed from a different perspective. Table 4.12 presents results for the influence of the specific ultimate controllers at the 10% threshold. Firms' value could be affected in different levels depending on the type of ultimate controller (family, state, widely held financial, widely held corporation and miscellaneous). Previous literature has shown that in contrast with Continental Europe, where firms are mainly controlled by families, the UK has dispersed ownership (widely held), Barca and Becht (2001). The data available for this study allows an analysis to be made at the 10% threshold, where there is an ultimate largest controller for the 74% of the firms.

The effect of an ultimate controller on firms' value could be given for different reasons than the voting power. For instance, firms controlled by families could nominate executive directors that are also family members. So the decisions of the directors could be influenced by the largest controller to pursue activities that would benefit the family and not the minority shareholders. Consequently, this is likely to reduce the firms' value. Nevertheless, a family could pursue activities that increases firms' value, as in Suehiro (2001), who analysed data of Thai firms, and concluded that *family* type business does not always demonstrate poor performance in comparison with other types of ultimate owners.Moreover, if different members of the family have controlling power, they could establish coalitions to have the facto control over the firm. However, this type of actions are not exclusive to family controlled firms, but they can be followed by any other type of controller.

In Table 4.12, ultimate controllers were included in the regressions to see their effect on value. In this analysis, managerial ownership is not considered as previous results showed that it was not significant, so the analysis concentrates only on ultimate controllers and ultimate devices to obtain control. From all the

ultimate controllers in Table 4.12, Column (1), only miscellaneous showed to be significant at the 95% confidence level. Probably, this result is given because 45% of the total firms that have miscellaneous as an ultimate controller coincide to have a high level of separation, which was shown to be negatively significant in Table 4.11. The same model with the inclusion of financial variables is followed in Column (3). As before, results remain consistent but the significance level decreases from 95% to only 90%. Again this might be as a result of the endogenous financial variables. The significant effect found in Miscellaneous as an ultimate controller is different to that found in Claessens et al (2002) who found that for East Asian countries, the ultimate controllers that might have a decreasing effect on value are family and state. They explained that these types of controllers could have more reasons to divert benefits to themselves compared with other types of controllers.

The third and last perspective to analyse is related with the devices to which control can be exerted. For instance, *Widely held* firms at the 10% cutoff, do not have any ultimate device to exert control. Hence, to study the effect of the ultimate structure on firms value, the dummy variables for controllers with different levels of "separation" are replaced by the mechanisms to exert control, as by definition, if there is a mechanism to control, there must be a controller (so both types of variables are collinear). Ultimate owners might use pyramidal structures to have an excess of control rights with respect to ownership rights. In this way they would be able to impose initiatives at the expense of minority shareholders.

	UK 632 observations				
	(1)	(2)	(3)	(4)	(5)
Panel A (ultimate controllers and devices to exert control)					
Constant	1.41***	1.15***	1.17***	1.16***	1.18***
	(.085)	(.382)	(.396)	(.377)	(.390)
Miscellaneous	-0.40**	-0.36**	-0.30*		
	(.178)	(.177)	(.173)		
State	-0.51	-0.45	-0.47		
	(.768)	(.765)	(.746)		
Family	-0.09	-0.08	-0.02		
	(.104)	(.103)	(.101)		
Widely held fin.	-0.19	-0.13	-0.07		
	(.132)	(.132)	(.129)		
Widely held corp.	-0.33	-0.18	-0.24		
	(.546)	(.542)	(.528)		
Dual shares				-0.19	-0.13
				(.124)	(.122)
Pyramids				-0.13	-0.13
				(.102)	(.100)
Control chains				-0.14	-0.13
				(.186)	(.182)
Panel B (control variables)					
R&D	3.08***	3.44***	3.45***	3.40***	3.42***
	(.324)	(.364)	(.360)	(.364)	(.359)
investment			-1.41***		-1.43***
			(.413)		(.412)
dividends paid			8.27***		8.14***
			(1.66)		(1.66)
leverage			-0.06		0.003
			(.314)		(.316)
R-square	0.135	0.18	0.23	0.18	0.23
Industry dummies	No	Yes	Yes	Yes	Yes

Notes: This table presents the results of five models estimated by OLS for the sample of 632 companies in the UK. The dependent variable is the Tobin's Q ratio (firms' value) for the year 2001. Panel A presents the independent variables with respect to the specific ultimate controllers and controlling devices (data for 1996). Miscellaneous, State, Family, widely held corporation, widely held financial are represented with a dummy equal to one if the firm is controlled by the corresponding category, zero otherwise; Panel B presents the control variables: R&D/TA (ratio of R&D stock to total assets), size (log of total assets), leverage (ratio of total debt to total assets), I/TA (ratio of the change of productive capital to total assets, D/TA (ratio of dividends paid to total assets). Independent variables in Panel B have been averaged for 4 consecutive years (97-2000) Standard errors in parenthesis. ***, ** and * indicate coefficient is significant at 1%, 5% or 10%

Table 4.12: Ultimate Controllers and Controlling Devices

Column (4) in Table 4.12 shows this relationship. There is no significant evidence to support that the type of mechanism to exert control is a determinant of firms' value. This result is consistent with Claessens et al (2002) who, in a study for East Asian countries, did not find strong evidence on which mechanism separating ownership and control is associated with the value discounts. For Column (5), when financial variables are considered, results are still not significant, so the way that control is delegated do not seem to be a determinant of firms' value.

4.6 Conclusions

The results in this Chapter can be summarized in two parts. First, managerial ownership was shown to be insignificant to determine value after endogenous financial variables are excluded from the specification. The level of shares owned by managers may not determine the market value of the company. This result is consistent with and without the inclusion of industrial dummies. The robustness of the results was tested with the analysis of a subsample of the observations that included the top eight industrial sectors with the highest R&D expenditure.

Second, with respect to the separation of ownership and control, there is significant evidence that companies that have a controller with high levels of separation (at least 2 votes per share) impact firms' value negatively. However, this situation has been limited in the UK due to legal regulations that protect minority shareholders. Therefore, it is suggested that controlling power with separation of control and ownership at high levels is a negative influence for firms' value, while at lower levels seems insignificant. The devices through which control is exerted (pyramids, control chains and dual shares) were not relevant in determining firms' value.

Firms that are controlled by "Miscellaneous" were shown to have on average

lower Tobin's Q ratios than widely held firms. Moreover, it was found that firms with controllers with the highest level of separation are controlled mainly by miscellaneous and financial institutions and that the average control stake in those firms is only 15.5%. This suggests that it is likely that the negative effect of "Miscellaneous" is partially caused because of the high levels of separation of ownership and control in these types of firms.

Generally, the results suggest that given the dispersion of shareholdings in UK companies, the separation of ownership and control may have limited potential for expropriation to minority shareholders. In addition, the regulations that protect minority investors in the UK might be have as a result that largest controllers have limited legal power to extract resources from the firm. Similar remarks are also sustained by Goergen and Renneboog (2001), who characterized the UK for having strong managers and passive institutional investors.

The results of this research may vary according to country specific legal characteristics. Legal regulations to protect investors may be determinants of firms' value as they control for agency problems among shareholders.

Chapter 5

Corporate Performance, Controlling Power and Law Protection for Investors in Western Europe.

5.1 Introduction

Previous research has suggested a relationship between the law and traditions of a country and the value of corporations that belong to that country, La Porta et al (1998, 2002). Countries' laws regarding investors' protection may be relevant for corporations in order to facilitate the access for external finance, Beck el al (2004). In this respect, external investors are likely to be concerned about the risks involved in buying stock from a firm which is in a country with weak financial laws. By contrast, investors may prefer to finance firms in countries where laws are more protective to them. Therefore, firms which belong to countries with

strong shareholder protection are likely to be valued higher than those firms in countries with weaker laws.

Nevertheless, firms in countries which have poor laws to protect investors might offer in exchange other types of incentives to overcome the risks that originate from weak investor protection. It has been found that good corporate governance practices are more important in countries with weaker laws, Kappler and Love (2004), Durnev and Kim (2002).

To this extent, the ownership structure of companies may be of relevance to external investors. For instance, minority investors might be aware of the agency costs created by the separation of ownership and control. Agency costs arise when the interests of the controllers are not aligned with those of minority shareholders, Jensen and Meckling (1976). Particularly, as pointed out by Dyck and Zingales (2004), controllers might get private benefits from the firm, such as perquisites or in some few cases outright theft.

Previous literature has reported the impact of investors' protection as a determinant of countries economic growth and financial development. Demirgüç-Kunt and Maksimovic (1998, 2002) found that the legal system is important to ease firms' growth. It has also been suggested that legal origin matters for financial development because legal traditions differ in their ability to adapt efficiently to evolving economic conditions (see for example, Beck et al (2003), La Porta et al (1997) and Berkowitz et al (2003), among others). Moreover, there is a connection between growth at a firm level and financial development. For instance, Rajan and Zingales (1998) found that financial development reduces, at least partially, firms' costs for external finance.

More related to this chapter is the evidence of higher valuation of firms in countries with better protection to minority shareholders. For instance, La Porta

et al (2002) found evidence that poor shareholder protection is penalized with lower valuation, and that higher cash flow ownership by the controlling shareholder improves valuation, especially in countries with poor investor protection. Similarly, Kappler and Love (2004) found that the relationship of governance ranking and corporate value is stronger in countries with weaker legal systems. They suggested that adopting good governance practices might be of more importance to firms in countries with poor legal systems.

This chapter aims to empirically examine if countries' financial laws and traditions contribute to determine corporate value in Western Europe. Specifically, the extent to which investors' protection is valuable for firms in contrast with the ultimate controlling power. Some of the questions to be addressed are: Is corporate value higher in countries where protection to investors is strong? If external investors prefer to finance firms in countries with strong shareholders' protection, what would be an alternative for firms from a countries' weak legal system to attract external finance? In particular, it is examined if the effect of low levels of separation of cash flow rights and voting rights in the largest controlling stake might be a substitute or complement for poor investors' protection.

To explore these relationships, two sets of information are relevant. First, country level financial regulations which are consistent for all the firms that belong to a specific country, such as investors' rights, legal origin and law enforcement. Second, firm level variables that represent the controlling structure. Particularly, the separation of cash flow rights and voting rights in a controlling stake and the presence of a largest ultimate controller in the firm. Therefore, this chapter combines information at both country and firm levels.

The initial model specified in this chapter assesses if the separation of cash flow rights and voting rights at a firm level is significant in determining firms'

value in Western Europe. The separation of ownership and control creates discrepancies between minority shareholders and controllers as their objectives inside the firm may diverge. For instance, large controllers might divert cash payments to minority shareholders and set high dividend payments to themselves (Shleifer and Vishny, 1997). Therefore, the excess of control rights of the largest shareholder with respect to cash flow ownership might have a decreasing effect on firms' value (Claessens et al, 2002). As they pointed out, the largest shareholder is frequently able to control the firm with a relatively small direct stake in its cash flow rights. Consequently, a controller with high levels of cash flow rights might be more concern with the firms' performance, which in turn would protect minority investors.

Evidence found on expropriation of minority shareholders by controllers varies among countries. For example, Zingales (1994) found that in Italy, expropriation is large and consistent with voting power. By contrast, evidence from Sweden suggests that separation of ownership and control do not result in substantial expropriation by largest controllers, Bergstrom and Rydqvist (1990).

In this context, this chapter aims to measure the effect of the largest shareholding stake with separation of ownership and control on corporate value by controlling country effects using both country dummies and clustered robust standard errors. The latter follows Nenova (2003), who uses such method as a substitution for country dummies or fixed/random effects. This method might be applied when variables without within-country variation are introduced in the model.

Thereafter, country specific characteristics are incorporated to the model to assess the effect of both law and controlling power on corporate value. Initially, legal origin is included as a proxy of shareholders' protection. Previous research

has found that countries from a common law origin (English origin) have more investor-friendly laws than countries from a civil legal origin (French, German and Scandinavian origin) [La Porta et al (2002), Berkowitz et al (2003)]. Moreover, Beck et al (2004) found that firms from a French legal origin find more obstacles in obtaining external finance than firms from other origins. This suggests that corporate value might be influenced by these types of limitations.

Legal origin is then substituted by another measure of shareholders' protection, which is the index for antidirectors' rights obtained from La Porta et al (1998). A second index that measures creditors' rights is also used. These indices represent protection to different sources of finance in a firm, equity holders and bondholders, respectively. Therefore, the effect that they may have on firms' value is expected to differ accordingly. First, protection to shareholders rights has been found to be correlated with value in a positive way, La Porta et al (2002). By contrast, the effect of creditors protection might be different. Firms in countries with higher indices of creditors rights are more susceptible to hostile takeovers and bankruptcies which in turn might negatively impact value, Claessens and Kappler (2002), Rossi and Volpin (2004).

Finally, another way to protect investors is by the enforcement of law. This is measured by the efficiency of judicial system as in Kappler and Love (2004), La Porta et al (2002). The level to which law is enforced may be independent from the level of investor's protection Therefore, both characteristics are examined together.

The main findings in this chapter suggest that the presence of an ultimate controller is negatively significant in determining value. Moreover, firms whose shareholders have equal number of voting rights and cash flow rights were shown to have higher value than when there is separation of ownership and control.

The findings related to investors protection showed that shareholders protection do have a significant effect on corporate value which disappears after controlling for ownership variables. The negative effect found in creditors protection is explained as an indirect influence of the limitations given to shareholders. Therefore, the benefits of a protective law for creditors might be in detriment of shareholders, especially as these may apply in cases of bankruptcy or liquidation.

Furthermore, firms that come from a French legal origin showed to have, on average, a higher value than those from any other legal origins. This result may be explained from two points of view that characterise firms from French legal origin. First, they have the lowest level of law protection for creditors, which may benefit shareholders. Second, they have the lowest levels of separation of ownership and control, a situation that was shown to be significant in determining firms' value.

Enforcement of law, represented by the efficiency of the judicial system, was shown to have a negative effect on firms' value. This is probably because law is enforced in cases of financial distress, as in bankruptcy. Therefore, the benefit would be for creditors in detriment of shareholders, which in turn reduces corporate value.

The next section explains the relationship of corporate value, ownership and country specific characteristics for this study. Section three describes the data. Section four presents the results for the model with the inclusion of legal origin, shareholder rights, creditor rights and enforcement of law. Section five presents the conclusions.

5.2 Ownership and country specific characteristics

The separation of ownership (cash flow rights) and control (voting rights) might create an agency problem between controllers and minority shareholders, Jensen and Meckling (1976). The agency problem arises as controllers (largest shareholders who have an excess of voting rights with respect to cash flow rights) may abuse their power for personal benefits instead of firms' wealth. Subsequently, the value of the firm might be decreased in situations where voting rights exceed cash flow rights.

In some instances, the abuse of controlling power might be moderated by financial laws and other characteristics of the country where the firm belongs. In this respect, there are legal rules that set boundaries to the level of separation of voting and cash flow rights. For example, in Germany there is a legal restriction on non-voting (and limited voting) capital, where it may not exceed 50% of stock capital. Another example is in France, where there is a legal restriction for non-voting (and limited voting) capital, which may not exceed 25% of the stock capital, Faccio and Lang (2002). Moreover, Goergen and Renneboog (2001) suggested that the agency conflict caused by voting controls by shareholders in the UK differs from that found in Continental Europe. In the latter, expropriation of minority shareholders might be the key agency problem related to ownership concentration. As there is extensive protection to minority investors in the UK, the agency problem originates from the lack of ownership concentration and control, which requires codes to prevent managers from benefiting against shareholders.

In addition to the legal rules to establish the limits of controlling power, external investors could be protected by country laws. In particular, these laws

aim to protect investors and to enforce the application of the law itself. For this chapter, country specific characteristics refer to different factors that rule or impact on a country overall. In particular, the main interest is in the differences with respect to legal origin, investors' protection and law enforcement. These factors might influence the financial behaviour of firms, and more specifically their value. For instance, firms' opportunities for external finance can be limited depending on the legal protection given to investors and the effectiveness of law regulations. Investors' might prefer to direct their resources to firms in those countries where the risk of expropriation by the largest shareholders is low.

Previous studies that have investigated the impact of country specific characteristics from a macroeconomic perspective, suggest that financial development is related to legal framework. For instance, Beck et al (2003) suggested that legal origin matters possibly because legal traditions differ in their ability to adjust efficiently to evolving socioeconomic conditions. For example, countries from a French legal origin tend to have lower levels of financial development. Beck et al (2003) defined financial development based on indicators of financial intermediary, stock market development and property rights protection.

Berkowitz et al (2003) found that the way that the law is transplanted has a larger indirect effect on the effectiveness of legal institutions rather than the legal families. Subsequently, this contributes to the economic development of those countries. La Porta et al (1998) concluded, from a study of 49 countries, that investors' friendlier laws are a determinant of a more effective law enforcement. In their study, countries from French legal origin were found to have a lower law enforcement than English legal origin countries.

Some other studies have focused on a firm level perspective. For instance, Claessens and Laeven (2003) investigated the role of property rights in the allo-

cation of resources in a firm. They found that firms grow faster, in countries where property rights are more secure against expropriation from powerful competitors. In this respect, property rights were more important for intangible assets than tangible assets.

La Porta et al (2002), suggested that financial markets are more valuable where laws are protective to outsider investors. They explained that when laws are better enforced and a country has a high level of investors' protection, the financial assets are more valuable as external investors are willing to pay more. In this sense, investors' protection would limit controllers to expropriate external investors. By contrast, the traditional "law and economics" perspective of financial contracting, may replace most regulations of financial markets, as contracts take place, La Porta et al (2000).

Beck et al (2004) showed that firms in countries with French legal origin face higher obstacles to obtain external finance than those firms in common law countries (English legal origin). In general, they concluded that the legal system adaptability is important for corporate finance.

Nevertheless, firms that belong to common law countries, face other type of obstacles in financial terms. For example, securing creditors' rights might not have the same effect as securing shareholders' rights. Investors might be concerned about the future of a particular firm, which may have a good performance in the short run but which could also have a high risk of future liquidation due to either reorganization or bankruptcy. In the presence of these types of speculations, shareholders' might prefer a firm where creditors' do not have as much protection, as rights may favour creditors instead of the shareholders themselves. For instance, Claessens and Kappler (2002), found that bankruptcies are higher in common-law countries and in market-oriented financial systems. As they pointed

out, this may be a consequence of stronger creditor rights, which are generally associated with higher use of bankruptcy.

5.3 Data

There are two sets of data used for this chapter. Each of them is applied to two main model specifications with respect to two different variables of ultimate ownership, named ultimate controller and separation of cash flow rights and voting rights in the largest controlling stake. The number of observations available for each of the datasets are 1557 and 1319 observations, respectively. The countries included in the study are from Western Europe: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Norway, Spain, Sweden, Switzerland and the UK.

This data was obtained from three main sources. The accounting data to construct the Tobin's Q ratio has been obtained from Datastream and calculated for the year 2001. Tobin's Q is a ratio that represents investment opportunities and is constructed as: (Total assets - Equity, Capital and reserves + Market Value)/ Total assets. Moreover, a four-year average (1997-2000) of the natural logarithm of total assets is included to control for firms' size. Similarly, financial variables which are included in some of the model specifications follow the same construction. The four-year average is aimed to eliminate seasonal effects from extreme changes in the assets of the company.

This set of observations was then matched with ultimate ownership information from Faccio and Lang's 2002 database (Appendix 5.4 contains the description of the variables). This data is normally for the year 1997, but for some countries is for 1996[1]. Finally the country specific characteristics were added to this dataset

[1] As in Zhou (2001), La Porta et al (2002), it is assummed that ownership remains stable

relying on data presented in La Porta et al (1998). More specific information about this data can be found in Appendices 5.1, 5.2 and 5.3.

Table 5.1 shows the total number of observations from Faccio and Lang (2002) that matched with the observations from Datastream. The sample for this study includes 38% of Faccio and Lang's (2002) total sample of non-financial firms. The country with the lowest number of matched companies is Spain, which has only 8% of the companies that Faccio and Lang included, with Austria being the highest with 77% of firms included. The matching of information intends to get as more observations as possible and is not limited to specific groups of firms. For instance, La Porta et al (2002), chose only, for a similar study, the largest companies by market capitalization. There are 15 non-financial industrial sectors in the data, which are controlled by the inclusion of industrial dummy variables for all the model specifications.

Country	No. of non-fin. ind.*	No. obs. matched with datastream	% included
Austria	69	53	77
Belgium	79	15	19
Finland	116	80	69
France	460	157	34
Germany	554	288	52
Ireland	58	22	38
Italy	151	56	37
Norway	130	40	31
Spain	516	41	8
Sweden	203	90	44
Switzerland	161	83	52
UK	1555	632	41
Grand total	4052	1557	38

*(Faccio & Lang (2002)); Notes: This table includes the distribution, by country, of the number of observations in both the sample examined in this paper and the sample from where data on ownership was obtained.

Table 5.1: Number of observations included in the sample

over time.

Table 5.2 presents the average values for some of the variables, as well as the number of non-financial firms included per country. Countries are also separated depending on their legal origin such as: French, German, Scandinavian or English. Shareholders' rights represent the number of benefits for equity investors out of six different characteristics, which are: 1) Proxy by e-mail allowed, 2) shares not blocked before meeting, 3) cumulative voting or proportional representation, 4) oppressed minorities mechanism, 5) pre-emptive rights and, 6) percentage of share capital to call an extraordinary shareholders' meeting. All these variables are described in Appendix 5.1. Creditors' rights represent the number of benefits for bondholders out of four different characteristics, which are: 1) no automatic stay on assets, 2) secured creditors first paid, 3) restrictions for going into reorganization, and 4) management does not stay in reorganization. Creditors' rights variables are described in Appendix 5.2.

It can be observed that countries from a French legal origin have on average the smallest index of creditor rights. By contrast, countries from a German legal origin have the highest index of creditor rights. However, with respect to shareholder rights countries from a German legal origin have the lower index, while the highest index is for countries from a English legal origin.

Moreover, it is shown that a low index of shareholder rights, not necessarily implies a low index of creditor rights, as these two variables may be independently determined by the country laws. The country with the highest average Tobin's Q value is Spain and the lowest ratio belongs to Austria. Although firms from both countries are mainly controlled by families, the principal difference between them is that in Austria, 17 % of the firms have miscellaneous (Charities, voting trusts, employees, cooperatives, or minority foreign investors) as an ultimate owner. Spanish firms have instead widely held financial (12%) and widely held

(17%) as ultimate controllers. This is shown in Table 5.3, where the rest of the countries are also described with their ultimate controllers at the 10% cutoff. Family as an ultimate controller has the highest percentage of observations per country, except for companies in Ireland that are mainly controlled by widely held financial institutions.

Country	No. obs.	TQ	size*	Shareholder$^{\top}$ rights	Creditor$^{\top}$ rights
French legal origin					
Belgium	15	1.48	13.5	0	2
France	157	1.46	13.0	3	0
Italy	56	1.24	13.9	1	2
Spain	41	1.53	12.9	4	2
Average	269	1.43	13.3	2	1.5
German legal origin					
Austria	53	1.00	11.9	2	3
Germany	288	1.34	11.7	1	3
Switzerland	83	1.43	12.6	2	1
Average	424	1.26	12.1	1.6	2.3
Scandinavian legal origin					
Finland	80	1.38	11.5	3	1
Norway	40	1.06	11.9	4	2
Sweden	90	1.42	11.7	3	2
Average	235	1.30	11.7	3.3	1.6
English legal origin					
Ireland	22	1.31	12.7	4	1
UK	632	1.46	11.5	5	4
Average	654	1.38	12.1	4.5	2.5
Grand total	1557	1.41	12.3	2.8	1.9

*The measure for size (log total assets) was calculated with the equivalent of British pounds for all the countries. $^{\top}$Source: La Porta et al. (1998)
Notes: This table presents the summary statistics (means) of the sample. Countries are categorized by legal origin.

Table 5.2: Descriptive statistics

Country	Widely held financial	Family	Widely held corporation	Miscella-neous	State	Widely held
French legal origin						
Belgium	13	67	0	7	7	7
France	5	83	2	1	3	6
Italy	5	75	0	2	16	2
Spain	12	59	2	0	10	17
German legal origin						
Austria	2	62	0	17	15	4
Germany	6	83	0	2	3	4
Switzerland	7	67	0	6	2	17
Scandinavian legal origin						
Finland	1	64	0	5	13	18
Norway	8	52	2	5	20	11
Sweden	8	66	0	14	2	10
English legal origin						
Ireland	41	27	5	14	0	14
UK	17	48	1	7	0	26
Grand total	11	62	1	6	4	15

Notes: This table presents the number of companies, categorized by country, that have an major shareholders with at least 10% of the control stake. Numbers are percentages with respect to the total number of observations per country.

Table 5.3: Relative percentage of observations per ultimate controller at the 10 percent cutoff

Table 5.4 presents the data with respect to ultimate control. It can be observed that observations that come from a French legal origin have, on relative terms, less firms with controllers who have separation of ownership (cash flow rights) and control (voting rights), with only 23.4% observations belonging to this classification. The exception is Italy, which in contrast to the other countries from a French legal origin, has 60.7% of the firms with separation. This is due to the high percentage of Italian firms with pyramidal structures which are normally headed by families, coalitions or the State, Bianchi et al (2001).

This percentage is even higher than the rest of the countries, where the highest proportion is 48.2% in Switzerland. With respect to the presence of an ultimate controller, which possess at least 10% of the control stake[2], firms which come from an English legal origin have the lowest level. This means that at that level stake there are more firms widely held in comparison to the other legal origins. However, there is still a high number of firms with an ultimate controller (80%).

Country	No. obs	Separation†	%	Controller†	%
French legal origin					
Belgium	15	5	33.3	14	93.3
France	157	19	12.1	148	94.3
Italy	56	34	60.7	55	98.2
Spain	41	5	12.2	34	82.9
	269	63	23.4	251	93.3
German legal origin					
Austria	53	17	32.1	51	96.2
Germany	288	97	33.6	277	96.2
Switzerland	83	40	48.2	69	83.1
	424	154	37.9	397	91.8
Scandinavian legal origin					
Finland	80	30	37.5	66	82.5
Norway	40	18	45.0	38	95.0
Sweden	90	41	45.5	81	90.0
	235	89	42.7	185	89.2
English legal origin					
Ireland	22	9	40.9	19	86.4
UK	632	147	23.2	467	73.9
	654	156	32.1	486	80.1
Grand total	1557	462	34.0	1319	88.6

†Source: Faccio and Lang (2002).

Notes: This table presents the proportion of firms, by country, that have "separation" or/and a "controller". Separation refers to those companies with a controller who has different levels of voting rights with respect to cash flow rights. Controller refers to those companies which have a largest shareholder with at least 10% of the voting rights. Percentages are calculated with respect to the total number of observations per country.

Table 5.4: Ultimate control

Table 5.5 contains the country specific characteristics that describe law en-

[2]The reason for choosing the 10% threshold is given in the section "Empirical results".

forcement for each of the countries. These variables are fully described in Appendix 5.3. Variables are indices per country from zero to ten, where the higher the index, the better the country enforces the law. Countries that come from a French legal origin have the lowest indices for law enforcement in comparison with the other legal origins.

Country	Efficiency judicial system	Rule of law	Corruption	Risk of exprop.	Risk of contract repudiat.
French legal origin					
Belgium	9.5	10	8.82	9.63	9.48
France	8	8.98	9.05	9.65	9.19
Italy	6.75	8.33	6.13	9.35	9.17
Spain	6.25	7.8	7.38	9.52	8.40
	7.63	8.78	7.85	9.54	9.06
German legal origin					
Austria	9.5	10	8.57	9.69	9.6
Germany	9	9.23	8.93	9.90	9.77
Switzerland	10	10	10	9.98	9.98
	9.5	9.74	9.17	9.86	9.78
Scandinavian legal origin					
Finland	10	10	10	9.67	9.15
Norway	10	10	10	9.88	9.71
Sweden	10	10	10	9.40	9.58
	10	10	10	9.65	9.48
English legal origin					
Ireland	8.75	7.8	8.52	9.67	8.96
UK	10	8.57	9.1	9.71	9.63
	9.37	8.18	8.81	9.69	9.29

Source: La Porta et al (1998)

Notes: This table presents the indices of each of the characteristics related to law enforcement. Indices are scaled from 1 to 10. The higher the index is, the better the law enforcement of a particular country.

Table 5.5: Law enforcement characteristics

Table 5.6 presents the correlation matrix of the country specific variables used in this research. The coefficients were calculated at a country level. It can be observed that there are high levels of correlation among variables related to

enforcement of law. For instance, rule of law, corruption and efficiency of judicial system are all highly positive correlated. This may imply that countries with traditions of law and order have less levels of corruption, and consequently more efficient judicial systems. Generally, efficiency of judicial system is positively correlated with all the characteristics of law enforcement. This might suggest that the higher the indices of each of the variables, the greater the efficiency of the judicial system. Efficiency of judicial system represents investors' assessments of conditions of the country, probably related to corruption, rule of law, risk of expropriation and risk of contract repudiation, among other factors.

	Credit. rights	Shareholder rights	Effic. judicial system	Rule of law	Corrupt.	Risk of exp.
Shareholder rights	0.037					
Efficiency judicial sys.	0.173	0.065				
Rule of law	-0.015	-0.368	0.744***			
Corruption	-0.146	0.230	0.865***	0.696**		
Risk of exp.	0.026	0.036	0.052*	0.350	0.571*	
Risk of cont. repudiation	0.300	-0.285	0.761***	0.703**	0.569*	0.577**

Notes: This table presents the correlation matrix of country specific variables. Correlation indices were obtained using the country level indices. Total sample: 12 countries.
*, **, ***, significance levels at the 10%, 5% and 1%, respectively.

Table 5.6: Correlation matrix

5.4 Empirical Results

In previous chapters, conclusions were made on ultimate owners, ultimate structure and the effect of financial structure on firms' performance in the UK. The analysis in this Chapter considers the preceding results in order to study both the impact of a controller with separation of "voting rights and cash flow rights"

and country specific effects of investors' protection for Western Europe.

It is assumed that there is an ultimate largest controller when it possesses at least 10% of the voting rights. The threshold of 10% is chosen for two main reasons. First, in the previous chapter, it was found that for the UK (which constitute a third of the full sample), the ultimate control stake is limited because of law regulations. As a consequence, the majority of controllers possess, on average, less than 20% of the control stake. Second, Claessens et al (2002) and La Porta et al (2002) also establish a threshold of at least 10% as information of lower stakes is not available because of disclosure rules. Moreover, La Porta (1999) presented evidence using a 20% cutoff, and found the same but statistically weaker results than for La Porta et al (2002), where the cutoff was at 10%. However, they pointed out that the difference was likely to be due to the size of the sample, and not to the control cutoff.

All the model specifications include industry dummies and the natural logarithm of total assets to control for firms' size. In addition, all the models are specified with and without financial variables. This aims to show whether endogeneity of the financial variables might create biased estimators. Nevertheless, the endogeneity of financial variables is alleviated by instrumenting with the one period lagged explanatory variables, following Rajan and Zingales (1995). However, there is no certainty that the endogeneity problem can be fully controlled with this procedure.

There are two characteristics related to the ownership structure of firms. First, the ratio of cash flow rights to voting rights (corporate ownership to control, herein CO/C) intends to measure the level of separation of cash flow rights and voting rights in the controlling stake. It is expected that as CO/C tends to one, corporate value would increase. The model specifications that include CO/C as

a variable, have a reduction in the sample size because of the exclusion of firms that are widely held.

Second, a measure to capture the presence of a controller - independently if there is separation of ownership and control - is included. The presence of a controller is represented with a dummy variable which is equal to one when there is an ultimate controller. The specific ultimate controllers are also included in the analysis as in Column (7) in Table 5.7. It is referred as an ultimate controller to the largest shareholders, such as, Family, State, Widely held corporations, Widely held financial institutions and Miscellaneous (charities, voting trusts, employees, cooperatives or minority foreign investors)[3]. The model specifications that include ultimate controller as a variable, uses the whole sample, including those firms with widely held ultimate control.

The initial model is a linear relationship with the ultimate ownership variables. To consider specific differences among countries there are different options to follow. The inclusion of country dummies is a way to capture the country specific effects. This is a possibility when particular country characteristics are not included. Once the specific characteristics are in the model, country dummies cannot be used due to perfect collinearity with the specific country variables.

Another way to control for specific country effects is by using panel data with fixed or random effects. As La Porta et al (2002) pointed out, the natural alternative to eliminate the country effects is with fixed effects. However, as they mentioned, fixed effects are not feasible given that there is no within-country variation in the legal variables. Therefore, the same problem as with country dummies would arise. The random effects model could also be applied to eliminate effects of omitted country-specific variables [as La Porta et al (2002), Claessens

[3]See appendix 5.4 for the full definitions of each of these variables.

et al (2002)]. In this context, models with random effects use both within and between country variation in the firm-level variables to estimate firms' value, but do not treat firms in a given country as independent observations. Instead, standard errors are adjusted to reflect the cross-correlation between observations due to common country components. However, in this chapter, the Breusch and Pagan (1980) Lagrange multiplier test cannot reject the null hypothesis that errors are independent within countries, suggesting that a Random Effects model might not be an adequate specification.

Given the problems associated with the aforementioned methods, the methodology to control for omitted country variables follows Nenova (2003). In her study of the value of control-block votes, possible within-country correlation was controlled by the use of OLS firm-level regressions with clustered robust standard errors. Under this method each country is defined as a cluster, where weights are sums over each cluster. To this extent, observations may be correlated within countries, but would be independent between countries. The estimated standard errors take into account that firms within countries are not independent. Since country-level values should be independent (supported by the Breusch and Pagan (1980) Lagrange multiplier test), standard errors are computed based on aggregated firm's values for each of the countries. This method corrects the standard errors, but fails to correct the coefficients. An useful check to observe how coefficients might be affected, is to compare in a model without specific country characteristics both regressions with country dummies and regressions with clustered standard errors.

The results of this initial model are presented in Table 5.7. These results follow the same specification of that in Chapter 4, but now using 12 different countries. As at this point specific country effects have yet not been included, regressions

with country dummies to control for specific fixed effects can be applied. Column (1) and (2) present the model with country dummies and clusters standard errors, respectively. To this point, country dummies are acceptable as all variables have within-country variation. It can be observed that the coefficients behave very similarly in both columns, and the real variation is only observable in the standard errors as this method presupposes.

The results suggest that the presence of a controller in a firm is highly significant, implying that firms that have a controller have, on average, a Tobin's Q ratio 0.21 units lower than those firms that are widely held.

In Column (7) the ultimate controllers were specified in more detail. It is shown that the highest influence for Tobin's Q is given by "Miscellaneous", suggesting that firms whose ultimate controller is in this classification have a market value 0.29 units lower than those firms that do not have a controller with at least 10% of the voting power. Generally, the evidence suggests that having any controller in a firm is a negative influence for corporate value against firms which are widely held.

The effect of size is negative but not very significant. This might suggest that the greater the firm, the lower the market value. Similarly, Claessens et al (2002) explained that the negative effect of size on firms' value might suggest that smaller firms have better growth prospects. Another possible suggestion to explain this effect might be that larger firms have greater agency problems, as it is more difficult to monitor the activities of managers.

Column (4) and (5) specify a different model using the ratio CO/C. The omitted country effects are controlled in different ways as indicated in Column (4) and (5), by country dummies and clusters, respectively. It can be observed that the closer that this ratio is to unity, the higher that the impact on firms'

value would be. This implies that when voting power is greater than cash flow ownership, the corporate value would be negatively affected. In other words, the smaller the difference of control and ownership, the higher the Tobin's Q ratio. Therefore, as the ratio CO/C increases by one unit (towards one), the Tobin's Q of the firm would increase by 0.17 units. This result is in line with that of Volpin (2002), who found that the larger the fraction of cash-flow rights owned by the controlling shareholder, the more sensitive turnover is to performance. This finding was based on a 12 year period sample of 205 Italian firms, and was also confirmed by the analysis of the firms' Q ratio, which increased with the fraction of cash flow rights owned by the controlling shareholder.

It can also be observed in Column (4) that by the inclusion of country dummies CO/C reduces its significance level to 10%. This may be a result of some correlation between country specific characteristics and the separation of ownership and control. This effect can be better appreciated in the following sections.

In Chapter 3, it was observed that financial variables contribute to determine the value of the firm. The nature of the dataset in Chapter 3 allowed the application of GMM to control for endogeneity problems that arise from either simultaneity among variables or omitted variables that might be correlated with more than one of the explanatory variables. Chapter 4 illustrated the problems of endogeneity when it is not fully controlled. There was an attempt in Chapter 4 to alleviate this problem by lagging the explanatory variables for one period, so using the lagged variables as instruments to determine the firms' value. However, the results of director's shareholdings were shown to be inconsistent when financial variables were taken into account. This situation is important to consider as results might be biased when financial variables are included and endogeneity is not fully controlled.

Dependent variable Tobin's Q 2001							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A							
Constant	2.1***	2.2***	2.1***	1.6***	1.6***	1.6***	2.2***
	(.378)	(.347)	(.411)	(.333)	(.271)	(.346)	(.370)
CO/C				0.14*	0.19**	0.18***	
				(.088)	(.063)	(.049)	
Controller	-0.21**	-0.21***	-0.18**				
	(.094)	(.059)	(.077)				
Family							-0.20**
							(.085)
State							-0.20*
							(.103)
Widely held							-0.26***
financial							(.068)
Widely held							-0.26***
corporation							(.052)
Miscellan.							-0.29***
							(.068)
Panel B (control variables)							
size	-0.04**	-0.04*	-0.02	-0.04*	-0.03	-0.02	-0.04*
	(.022)	(.019)	(.021)	(.022)	(.018)	(.023)	(.019)
Investment/TA			-0.57			0.12	
			(.432)			(.248)	
Dividends/TA			3.48			3.04*	
			(1.99)			(1.63)	
Leverage			-0.63***			-0.82***	
			(.194)			(.129)	
Country dummies	Yes	No	No	Yes	No	No	No
No. of obs.	1557	1557	1557	1319	1319	1319	1557
R-square	0.070	0.063	0.094	0.081	0.073	0.106	0.064
F-test	6.13	44.4	31.23	6.1	31.9	24.1	46.3
p-value	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)

Models estimated by OLS with clustered standard errors (where each country is a cluster) or by OLS with robust standard errors using country dummies. CO/C is the ratio of corporate ownership stake to control stake; Controller is a dummy variable that equals one if the firm has a shareholder with at least 10% of the control stake, zero otherwise; Family, State, Miscellaneous, Widely held corporation and Widely held financial are dummy variables that equal one if the firm is controlled by the corresponding category, zero otherwise. TA:Total assets. Industry dummies in all the models; Standard errors in parenthesis. *, **, *** significant levels at 10%, 5% and 1%.

Table 5.7: Initial specification. Ultimate ownership

Therefore, in this Chapter results are presented with and without financial variables in order to distinguish the effects they might have on the results. It can be observed that although the significance of the "controller" and "CO/C" remains, the coefficient is slightly lower. Moreover, the significance of size disappears when financial variables are considered. With respect to the financial variables themselves, the results seem different to those obtained in Chapter 3. The estimated coefficient for dividends is lower and less significant; Leverage became a significant variable, whereas it was not in Chapter 3; and, investment does not significantly determine Tobin's Q[4]. These differences might be the result of the scope of the data, as previous chapters were based only on UK data.

5.4.1 Legal origin

Given that a first insight of country specific influence on value was mostly significant, a broader classification is followed, by grouping the countries according to their legal origin. Legal origin is used as a proxy for shareholders' protection in a country, as previously suggested in La Porta et al (2002), Berkowitz et al (2003), Beck et al (2004).

Countries are classified in 4 broad families: French, German, English and Scandinavian. The results with the inclusion of dummies for different legal origins are showed in Table 5.8. The initial specification presents results with the inclusion of dummies for three legal origins: Scandinavian, German and French. This were included together as they originated from civil law, which is different from the English origin, which originated from common law.

Results in columns (1) and (3) showed that companies which come from a French legal origin have a higher market value than those firms from English

[4]Note that R&D is not included in this chapter at all, as data to that extent was only available for the UK and partially available for the other countries.

legal origin. Moreover, if French legal origin is replaced in the model by English legal origin, as in column (5) and (6), results suggest that there is a significant difference on the average Tobin's Q in firms from French legal origin and the others. Specifically, it confirms that firms from a French legal origin have on average a higher Tobin's Q than any other legal origin. By contrast, there is not significant difference in the average corporate value among firms from English and German legal origins. Therefore, the question is what is the difference between French legal origin from the others that causes a higher average corporate value?.

The results in Table 5.8 contradict previous findings by La Porta et al (2002). Their results for the coefficient for common law origin (English legal origin) was positive and significant, which implied that countries with better shareholder protection (as those from English legal origin) are associated with higher valuation of corporate assets. A possible explanation that could be given for the opposite results in Table 5.8 is that the sample used in this chapter concentrates only in Western Europe as opposed to that in La Porta et al (2002) where there are countries from all over the world. Additionally, in Western Europe, firms from a French legal origin have a lower proportion of separation of ownership and control (CO/C = 1) than those from other legal origins, therefore this effect might be more important than the legal origin itself. One way to explain this behaviour is that firms in countries with poorer laws would have in exchange better firm-level governance (reflected somehow in the average similarity of voting rights and cash flow rights) to signal their intentions to external investors, as suggested by Kappler and Love (2004). They found in a study of 14 emerging countries that good governance practices are more important in countries with weaker laws. Similarly, Durnev and Kim (2003) found that the quality of the governance mechanisms in a firm is positively associated with ownership concentration, need

of external finance and growth opportunities. Thus, as a consequence, firms seem to adjust to weak legal environments by creating more efficient governance practices. In addition, firms with better corporate governance were shown to have higher corporate values. In this Chapter corporate governance is represented with only one characteristic that is normally used to compute a corporate governance index. This characteristic is the protection to minority shareholders by limiting the controlling power of largest shareholders. In other words, when one share is equivalent to one vote, control is equivalent to cash flow ownership which might stop largest shareholders from pursuing activities for personal benefits instead of firm's wealth.

Furthermore, an important effect may be observed in the ultimate ownership variables. The ratio of corporate ownership to control was positive and significant in the previous section of this chapter. However, once legal origin is included, it becomes insignificant in determining corporate value. This is probably because French legal origin firms are characterised by a high average ratio of CO/C, which means similar number of voting rights and cash flow rights. For instance, as shown in Faccio and Lang (2002), in countries from a French legal origin there are restrictions to issue non voting and limited voting shares. In Spain and Italy, non voting and limited voting shares may not exceed 50% of stock capital. This percentage is even lower in France where the limit is 25%; Belgium has the restriction of one-share-one-vote.

A relationship of legal origin and ownership concentration has been previously suggested. For instance, Carlin and Mayer (2003) used the variable English legal origin as a instrument for ownership concentration. They found that there is a negative and significant correlation between these two variables. Likewise, large equity markets and dispersed ownership structure have been found to be

complements and joint outcomes of strong investor's protection, Leuz et al (2003). Moreover, Shleifer and Wolfenzon (2002) pointed out that ownership structure may vary systematically across countries, depending on their legal systems. This might suggest that the origin of law may determine the level of ownership in a firm of a specific country. Furthermore, Francis et al (2001) suggested as a result of strong investor protection (common law countries), agency problems are more likely to exist, as a consequence of greater external financing, higher level of separation between ownership and management, and more diverse ownership structures.

In summary, firms from a French legal origin have an average value 0.13 units higher than those from other origins. The reason is likely due to the low level of separation of ownership and control that exists in firms from this origin, which is a positive factor for value. Cash flow ownership may be seen as a financial incentive to moderate the expropriation of minority shareholders as expropriation is costly, Burkart et al (1998). Therefore higher cash ownership should lead to lower expropriation, as La Porta et al (2002) pointed out.

Column (2) and (4) present the results with the inclusion of financial variables. The main differences encountered are as those from the previous section. With respect to legal origin, countries from a French legal origin still seem to have higher market values than the rest of the countries, but now the coefficient is higher and the significance level is greater.

	Dependent variable Tobin's Q 2001					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A						
Constant	2.35***	2.24***	1.81***	1.78***	2.46***	1.93***
	(.331)	(.373)	(.247)	(.309)	(.346)	(.264)
CO/C			0.15	0.14*		0.15
			(.086)	(.080)		(.086)
Controller	-0.21***	-0.19**			-0.22***	
	(.056)	(.065)			(.056)	
English legal origin					-0.12**	-0.12**
					(.043)	(.039)
French legal origin	0.12**	0.17***	0.12**	0.15***		
	(.043)	(.041)	(.039)	(.038)		
German legal origin	-0.02	-0.05	-0.02	-0.03	-0.14**	-0.14**
	(.044)	(.042)	(.042)	(.050)	(.048)	(.048)
Scandinavian legal origin	-0.08**	-0.01	-0.09*	-0.04	-0.20***	-0.21***
	(.038)	(.038)	(.047)	(.040)	(.058)	(.065)
Panel B (Control Variables)						
size	-0.05**	-0.03**	-0.04**	-0.03	-0.05**	-0.04**
	(.017)	(.017)	(.016)	(.020)	(.017)	(.016)
Investment/TA		-0.60		0.13		
		(.453)		(.266)		
Dividends/TA		3.85*		3.33*		
		(2.05)		(1.72)		
Leverage		-0.61**		-0.79***		
		(.195)		(.136)		
No. observations	1557	1557	1319	1319	1557	1319
R-square	0.066	0.099	0.076	0.111	0.066	0.076
F-test	225	68.5	10	15.1	18.7	10.5
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)

Results estimated by OLS with clustered standard errors, where each country is a cluster. CO/C is the ratio of corporate ownership to control; Controller is a dummy variable that equals one if the firm has a shareholder with at least 10% of the control stake, zero otherwise; French legal origin, German legal origin, Scandinavian legal origin and English legal origin are dummy variables that equal one if the firm belongs to a country from such origin, zero otherwise. TA:Total assets. Industry dummies in all the models; Standard errors in parenthesis.
*, **, *** significant levels at 10%, 5% and 1%, respectively.

Table 5.8: Impact of legal origin and ultimate controller when there is separation of cash flow and voting rights

Furthermore, the presence of a controller is still negatively significant, as in the previous section. The conjecture of this result is that having a controller might have negative impact on corporate value, as monitoring activities from minority shareholders may be limited. Moreover, when monitoring is limited, controllers may abuse their power at the expense of the firms' wealth. As corporate governance refers to the ways that investors recover their money directed to the company, large investors might possibly expropriate resources from the firm rather than distribute them around minority investors. Furthermore, they may not be sufficiently prepared to deal with the managerial activities of the company, which is another type of expropriation against minority investors. This characteristics affect the corporate performance of businesses. Fundamentally, large investors represent their own interests, which may differ from those of the firm itself, so large investors have the power of expropriation in the firm, Shleifer and Vishny (1997).

5.4.2 Investors' protection

There are mainly two types of investors in a company: shareholders and bondholders (creditors). Law may be protective of any of them in different levels. The protection given by law to both types of investors might be independent, which means that if in a particular country there is a high level of shareholders' protection, that does not necessarily imply that creditors would be highly protected.

Shareholders' rights are represented by the index for antidirector rights. It is the index representing an aggregate of six characteristics of shareholders' rights, the higher the index, the greater the rights that shareholders have. Creditor's rights is an index that aggregates four different characteristics that protect bond-

holders.

From Table 5.9, Columns (1) and (4), it can be observed that there is not a significant effect of shareholders' rights on firms' value. The insignificant estimator for shareholder rights is not in line to previous findings by La Porta et al (2002), where the effect of shareholder rights was positive and significant. This difference may be caused by the nature of the sample. In La Porta et al (2002), the sample covers 27 countries over the world, while in the sample in this research is exclusively for 12 countries in Western Europe. Therefore, the effect in specific regions of the world may vary with respect of the effect of Western European countries. Moreover, La Porta et al (2002) chose the largest 20 firms by market capitalization for each country, while herein there is not such a selection, so the number of firms in each country vary independently of its size.

To further investigate, a regression with only the shareholder rights was followed as in Column (3), the results show that shareholder rights have a positive and significant effect on value. This time being consistent with La Porta et al (2002) as opposed with the results, in Columns (1) and (4). The implication of this finding might be similar to that from legal origin. Firms with low indices of shareholder rights tend to have low levels of separation of cash flow ownership and control. Therefore, the significance level of these variables when included together is altered due to high correlation. The separation of ownership and control then absorbs the positive effect that might be found by the protection to shareholders. This finding is important as it suggests that it is likely that firms with low protective laws tend to take measures to overcome risks that might decrease corporate value. This result is in line with Shleifer and Vishny (1997) who observed that countries with low investor's protection are more exposed to agency problems arising from the separation of ownership and control, therefore

firms in such countries might consider a good practice to limit shareholdings with excess voting rights to cash flow rights. This is also consistent with Doidge et al (2004), who showed that a greater proportion of equity financing that comes from abroad is for countries with poor investor's protection. They implied that financial globalization reduces the importance of country characteristics and increases the incentives for good governance in order to attract external financing. Similarly, Durnev and Kim (2003), suggested that firms rely on ownership concentration to resolve agency conflicts between controllers and other shareholders in response to weak investor's protection.

In Column (4) creditor rights have a significant and negative impact on firms' value, but at a very low level. This result is different when financial variables are included, where the significance level is much higher, as in columns (2) and (5). A possible explanation for the effect of creditor rights on firms' value is that benefits for creditors are disadvantages for shareholders, especially in the case of bankruptcy or reorganization. Creditors' legal rights are enforced in a costly and inefficient way, such as bankruptcy. Therefore, it could be argued that creditors' rights influence value indirectly, not from the benefit that creditors' received but from the limitations given to shareholders. The result implies that firms in countries with higher protection to creditors would have on average lower Tobin's Q levels in approximately 0.05 units. This result is in line with Claessens and Kappler (2002), who found that bankruptcies are higher in common law countries, where there are both stronger creditor rights and greater judicial efficiency. It is also in accordance with Rossi and Volpin (2004), who found that attempted hostile takeovers are associated with better investor protection. This suggests that firms in countries with higher indices of creditors rights are more susceptible to hostile takeovers which in turn might negatively impact their value.

To investigate further whether the negative effect of high levels of creditor rights on firms' value could be originated from higher number of bankruptcies in the corresponding country, an interaction term is included in the regression as in Column (6). The interaction term is constructed as leverage*creditor rights. It implies that creditor rights could be more prejudicial for firms' value in cases of higher leverage, which subsequently have higher risks for bankruptcy. The interaction term was shown to be positive and significant. This suggests that creditor rights are more important for firms with overall higher leverage. In other words, the negative impact of creditor rights on corporate value increases when leverage is higher.

Once again, the effect of size fully disappears when financial variables are included. The impact of the presence of a controller and the ratio CO/C are fairly consistent with and without financial variables. An important difference can be observed with respect to shareholder rights. Previously, it was found that it was significant only when included by itself (always accounting for differences in industrial sectors), similarly it is when included together with financial variables. This suggests that there may be some bias originated from the endogeneity of financial variables, which could generate inconsistent results.

Generally, it can be implied that indices for investors' protection are sensitive to the inclusion of financial variables. For instance, the impact of shareholder rights may be a consequence of omitted effects which are correlated with the financial variables.

	Dependent variable Tobin's Q 2001					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A						
Constant	2.3***	1.5***	2.3***	1.7***	1.8***	1.97***
	(.340)	(.204)	(.366)	(.276)	(.328)	(.363)
CO/C				0.18**	0.17**	0.16**
				(.078)	(.075)	(.074)
Controller	-0.21***		-0.18**			
	(.059)		(.067)			
Shareholder	0.009	0.017**	0.03**	0.009	0.02*	0.03**
rights	(.012)	(.007)	(.012)	(.010)	(.012)	(.011)
Creditor	-0.02		-0.06***	-0.03*	-0.05***	-0.12***
rights	(.014)		(.012)	(.013)	(.011)	(.020)
Cred. rights						0.30***
*leverage						(.068)
Panel B (Control Variables)						
Size	-0.04**		-0.03	-0.03*	-0.02	-0.02
	(.018)		(.018)	(0.017)	(.020)	(.020)
Invest./TA			-0.68		0.02	0.05
			(.426)		(.243)	(.237)
Leverage			-0.65***		-0.84***	-1.64***
			(.194)		(.133)	(.267)
Divid./TA			3.9*		3.4*	3.3*
			(2.1)		(1.7)	(1.7)
No. of obs.	1557	1557	1557	1319	1319	1319
R-square	0.064	0.055	0.099	0.073	0.111	0.115
F-test	45.4	70.4	102.9	30.8	38.3	45.8
p-value	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)

Models estimated by OLS with clustered standard errors, where each country is a cluster. CO/C is the ratio of corporate ownership to control; Controller is a dummy variable that equals one if the firm has a shareholder with at least 10% of the control stake, zero otherwise; Shareholder rights is an aggregate of six characteristics of shareholders' rights; Creditor's rights is an index that aggregates four different characteristics that protect bondholders. Both indices were obtained from La Porta et al. (1998). The higher the index the greater the rights. TA:Total assets; Creditor rights*leverage is the interaction term between these two variables ndustry dummies are included in all the models; Standard errors in parenthesis. *, **, *** significant levels at 10%, 5% and 1%, respectively.

Table 5.9: Investors' protection and firms' value

5.4.3 Enforcement of law

Enforcement of law for this research is measured with the index of efficiency of judicial system. There are other indices that might also represent law enforcement, such as, rule of law, corruption, risk of expropriation and risk of contract repudiation. These are fully explained in Appendix 3. In the correlation matrix presented above, it was shown that the available variables to measure enforcement of law are highly correlated. Under this case, the standard errors may be biased when all the characteristics are included together, this situation might lead to inconsistent results.

Efficiency of judicial system is shown to be highly correlated with each of the other variables. Therefore, it could well represent the general quality of law enforcement of a country. This variable is constructed by investors' assessments of conditions in the country in question. It is likely that investors' have assessed the judicial system of the country based on any of the other characteristics, such as rule of law, corruption, risk of expropriation and risk of contract repudiation. Moreover, efficiency of judicial system has also been chosen as a representative of law enforcement in previous literature. For example, Kappler and Love (2004), use judicial efficiency to represent legal efficiency to explain Tobin's Q. Similarly, La Porta et al (2000) used judicial efficiency to represent enforcement of law in a study of Investor's protection and corporate governance.

As the indices for investor's protection (named creditor's rights and shareholder's rights) used in the previous section of this chapter do not show any correlation with the enforcement of law variables, it is assumed that both types of variables may be independent. This means that countries with high level of protection to investors do not necessarily fully enforce law. Therefore, in this section both indices of investor's protection (for shareholders and creditors) and

efficiency of judicial system are included together.

The level to which law is enforced may be an influential factor for corporate value. Investors' may prefer countries that enforce law, as the risk of losing their investment might be diminished. Therefore an effective implementation (efficiency of judicial system) of both shareholders' rights and creditors' rights is expected to impact on firms' value. As in the previous section, the effect might vary depending on the level of benefits provided to either shareholder's or bondholders. For instace, creditors are given more priority in the distribution of the proceeds that result from the disposition of the assets of a bankrupt firm.

In Columns (1) and (3) from Table 5.10, it can be observed that efficiency of the judicial system is negative and significant for determining corporate value. The negative sign of law enforcement may be originated as countries which have higher levels of law enforcement might give to creditors the ability of enforcing their rights. This in turn might increase the use of bankruptcy, which consequently impacts negatively on firms' value. This result is in line with Claessens and Klapper (2002), who suggested that the use of bankruptcies is significantly less in countries with less efficient judicial systems (such as French legal origin countries). They found that creditors are more likely to use formal and costly bankruptcy proceedings in the case of default when the speed and success of collecting in the court is more efficient.

Furthermore, French legal origin countries have the highest market values and the lowest indices for efficiency of judicial system, but they also have higher levels of ownership concentration as pointed out by La Porta et al (1998). They suggested that quality of law helps to determine ownership concentration, as the lack of protection might be substituted by better corporate governance. Therefore, heavily concentrated ownership with respect to control may be a result of

weak investors' protection and law enforcement. Burkart and Panunzi (2004) suggested that ownership concentration and legal shareholder protection can be both substitutes (when legal protection is of intermediate quality) and complements (when legal protection is weak). For this reason, as mentioned by Bukart and Panunzi (2004), a more efficient legal protection may exacerbate rather than alleviate the conflict of interests between large and small shareholders. In particular strengthening creditors legal protection might have an adverse effect on the incentives to increase firms value.

As in the previous section the inclusion of financial variables decreases the standard errors of the coefficients. This situation suggests that it is likely that endogeneity may be introduced by the financial variables. However, the efficiency of the judicial system remains significant in both models, with and without financial variables.

Dependent variable Tobin's Q 2001				
	(1)	(2)	(3)	(4)
Panel A				
Constant	2.77***	2.69***	2.24***	2.17***
	(.412)	(.425)	(.324)	(.363)
Controller	-0.22***	0.19**		
	(.060)	(.067)		
CO/C			0.16*	0.15*
			(.082)	(.078)
shareholders rights	0.02	0.03***	0.02*	0.03**
	(.010)	(.011)	(.009)	(.011)
creditors rights	-0.01	-0.05***	-0.02	-0.04***
	(.011)	(.010)	(.012)	(.012)
efficiency. judicial system	-0.05**	-0.04***	-0.05**	-0.04**
	(.018)	(.012)	(.019)	(.016)
Panel B (control variables)				
size	-0.04**	-0.03*	-0.04**	-0.03
	(.018)	(.017)	(.016)	(.019)
Investment/TA		0.67		0.03
		(.423)		(.237)
Dividends/TA		3.9*		3.4*
		(2.1)		(1.7)
Leverage		-0.63***		-0.82***
		(.194)		(.135)
No. of observations	1557	1557	1319	1319
R-square	0.065	0.101	0.074	0.111
F-test	315	38	31	34
p-value	(.000)	(.000)	(.000)	(.000)

Models estimated by OLS with clustered standard errors, where each country is a cluster. CO/C is the ratio of corporate ownership to control; Controller is a dummy variable that equals one if the firm has a shareholder with at least 10% of the control stake, zero otherwise; Shareholder rights is an aggregate of six characteristics of shareholders' rights; Creditor's rights is an index that aggregates four different characteristics that protect bondholders. Both indices were obtained from La Porta et al. (1998); The higher the index, the greater the rights; Efficiency of the judicial system is a dummy variable that equals one if the firm belongs to a country which enforces law, zero otherwise. Industry dummies are included in all the models; Standard errors in parenthesis.

*, **, *** significant levels at 10%, 5% and 1%, respectively.

Table 5.10: Law enforcement and firms' value

5.5 Summary and Conclusions

An empirical analysis of the effects of country specific characteristics with samples of 1557 and 1319 observations from 12 countries of Western Europe was pursued. The results, with the inclusion of country dummy variables to a model that controlled for ultimate ownership effects, showed that country specific characteristics are important aspects in determining corporate performance. The specification of the model with country dummies was limited to the inclusion of specific country characteristics as there was not within-country variation in these variables. Due to this aspect, firm-level OLS with clustered robust standard errors, where each country was a cluster, was applied. This method aimed to control for specification problems that might arise due to omitted country variables.

Ultimate ownership characteristics were shown to affect corporate value, in both the presence of a controller with a negative effect and the "less" separation of control and cash flow rights (CO/C) with a positive effect. However, the ratio CO/C was shown to be more sensitive to the specification of the model, probably due to the correlation with country specific characteristics. Firms from a French legal origin were shown to have the lowest indices for both investors' protection and law enforcement. However, firms from this legal origin had on average higher Tobin's Q ratios than firms from other origins. Firms from French legal origin also have the lowest level of separation of ownership and control, this situation might result in higher corporate values. Although countries from a French legal origin have the lowest investors' protection and law enforcement, the corporate governance practices might offer what investors need in a weak system in order to protect their investments. Consequently, this might have a positive and significant effect on firms' value. In other words, the lack of investors' protection and law enforcement seems to be compensated with a corporate governance practice where

cash flow rights and control rights are not separated. This result is confirmed with the significant effect of the index for shareholders' protection when included by itself. Once the size of the firms and the ratio CO/C are added to the model, the effect of shareholder rights becomes not significant. Firms with high indices of shareholder rights tend to have low level of separation of cash flow ownership and control. The separation of ownership and control then absorbs the positive effect that might be found by the protection to shareholders. By contrast, a negative and significant effect of creditors' protection was found, this effect is more significant when financial variables are included. This shows that it is likely that financial variables (eventhough they were instrumented by their lags) introduce some endogeneity to the model. Nevertheless, the significant effect of creditor rights (such as, secure payment in cases of bankruptcy or restructuring) might be enforced by an efficient judicial system, in detriment of shareholders. In addition, it was found to be more important in firms with high leverage. Therefore, corporate value may be decreased under this circumstances.

Generally, it is likely that firms tend to adjust their corporate governance practices to overcome the value decreasing risks associated with low protective country laws for minority investors and in that way be more attractive for external investors.

Chapter 6

Conclusions

The aim of this thesis has been to explain the excess market value of the firm, in relation to its book value, with the objective of understanding how the market reacts to certain characteristics or information about the firm. For this purpose, the measure utilized to model coporate value was Tobin's Q ratio. This decision was based on empirical research conducted by McFarland (1988) and Campbell and Shiller (1998), who argued that Tobin's Q ratio is the only measure of corporate value which is useful for forecasting, as other measures such as the rate of return and the dividends-price ratio, have more limitations.

The examination of the divergence between market value and book value of a firm was initiated in Chapter 3. The goal of this chapter was to measure the effect of intangible aspects on market value, specifically R&D activities at a firm level. To accomplish that, the characteristics of the data were taken into account. For instance, endogeneity developed from simultaneous variables and fixed effects was considered. The data under analysis was an unbalanced panel of UK firms, which aimed to make full use of the available information.

Results presented interesting features. First, after controlling for the endogeneity problem and the fixed effects by the use of GMM, R&D activities were

shown to be an important component in determining firm's value; this finding is consistent with other empirical work in this area. This result was found by the construction of a R&D stock where expenditures were accumulated and depreciated over time to recognize present and past effects on corporate value.

A very interesting feature was found in the results with respect to dividends paid. Results demonstrated that probably dividend payments are relevant to determine value only when there are "special dividends". This means that the market reacts positively to "news" of a special dividend being paid, rather than to frequent or stable cash dividends. The interpretation of this result could be related to the reestructuring or reorganization of a company, as generally under this circumstances is when a special dividend is paid. Nevertheless, the significance of this result was low, probably due to the weakness of the instruments for this specific variable.

Size of the firm and investment in productive capital were also found significant elements to determine firm's value. They contain information about value and /or performance of the firm, which is not captured by the other explanatory variables in the model. It was found that an increase in investment in productive capital has a positive impact upon market value. This result, together with the positive influence of R&D, suggests that the introduction, as well as the generation, of new technology is valued by the market.

The next step of this thesis was to relate corporate value with the characteristics of equity ownership in the UK. For this instance, two types of ownership were studied. First, the managerial ownership, represented by director's shareholdings. Second, the separation of owneship and control and the structures given by this aspect, such as, level of separation, ultimate controlers and ways to delegate control.

The main difference from the preceding chapter is that the analysis was performed with a cross-sectional study, instead of a panel data technique. Therefore, the use of GMM to control for endogeneity problems was not feasible. However, endogeneity was alleviated by using lagged explanatory variables as instruments.

The following results were found. First, the level of shares owned by managers may not determine the performance of the company. By contrast, when financial variables are included in the model, a cubic relationship of the managerial ownership on corporate value was found, where management is aligned to the firms' objectives at low and possibly high levels but is entrenched at intermediate ownership levels. As this result was sensitive to the inclusion of financial variables, it may seem that there is some biasness in the results, probably because endogeneity was not fully corrected (mainly in the financial variables themselves). The behaviour of financial variables was also consistent with the previous chapter. R&D, dividends paid and investment were significant to determine corporate value.

Second, it was found that the level of separation (high, medium, low or none) between ownership and control might be an influece to the companies' market values. Specifically, for the UK case, it was found that when a firm has a controller, only high levels of separation of ownership and control affect negatively corporate value (at least two votes per share). This situation may be explained by the UK's laws which protect minority shareholders, as they might stop largest shareholders of expropriating resources from the firm. However, in such cases where voting rights are twice as much than cash flow rights, laws are not probably enough to stop largest controllers from abusing their power. Consequently, the value of the firm seem to be lower in these cases than for those firms which have controllers and where separation of ownership and control is lesser or non-existent. Some examples of the abuse of power by largest controllers can be perquisites or personal

benefits, such as high salaries or expensive business trips; designation of inappropriate managers for the company based on personal preferences; self-dealing activities for the benefit of companies other than that under discussion; etc.

The ownership structure was also analysed from a different perspective. The addressed question to this respect was: is there any difference in firms' market values depending on who is the ultimate controller?. The findings showed that only firms where the largest ultimate controller is "miscellaneous" have lower market values than firms which are widely held. Likewise, it was found that firms that have miscellaneous as an ultimate controller coincide with the characteristic of having high levels of separation between ownership and control. Therefore, this might be the reason for the negative effect of miscellaneous as an ultimate controller.

Finally, the means to which control is delegated were also analysed. The findings showed that there is not evidence that corporate value is affected by the way to which largest shareholders obtain controlling power.

The last chapter of this thesis, increased the scope of the data by including 11 countries more from Western Europe. To this extent new effects were incorporated to the analysis. Specifically, country specific characteristics, such as legal origin, investor's protection and law enforcement.

The novelty of this chapter was the construction and analysis of a unique dataset which combines firm level characteristics with macroecomic variables. This database was constructed with three different sources of information: i) datastream for financial variables, ii) Faccio and Lang (2002) for information related with ownership and control, and, iii) La Porta et al (1998) for information at a country level.

The findings in Chapter 5 were as follows. Consistent with the previous chap-

ter, the presence of a controller was negatively associated with firms' value. The separation of ownership and control was positive and significant for determining corporate value. However, to this extent, the significance deacreases or dissapears when country specific characteristics were included in the model specification.

Firms from countries that come from a French legal origin were shown to have higher market values than countries from any other legal origin. Although, this finding contradicts previous literature, it can be explained by the characteristics of the data. Particulary, firms from a French legal origin coincide to have the lower levels of separation of ownership and control, situation that might be positive for corporate value. Specifically, firms from a French legal origin have the lowest indices of both investor's protection and law enforcement. This situation seems to be compensated somehow with an ownership structure where cash flow rights and control rights are similar.

Furthermore, shareholder rights were shown to be positively associated with market value, but insignificant when the specification of the model includes the separation of ownership and control. This might be explained as firms with high indices of shareholder rights tend to have low level of separation of cash flow rights and voting rights. Therefore, when both variables are considered together in the model, it seems that the separation of ownership and control absorbs the positive effect that might be found by the protection to shareholders.

By contrast, a negative and significant effect of creditors' protection was found, but only very significant when financial variables are included. This shows that it is likely that financial variables (eventhough they were instrumented by their lags) introduce some endogeneity to the model. The negative effect of creditor rights on firms' value could be explained by the association of bankruptcy and high levels of creditor protection that has been pointed out in previous literature. Thefore, as

creditors get more benefits, shareholders might be more limited, specifically in the case of bankruptcy or liquidation. So, investment which comes from shareholders is more valuable in terms of adding value.

On the whole, this thesis has offered some contributions to study the behaviour of firms with the objective to increase corporate value. Interesting implications, such as the influence from differences among countries, were shown to be a fundamental aspect in corporate governance. This can be an exception when the nature of the experiment is a specific study of a single country. Generally, the three factors under analysis: intangible capital, corporate governance and country specific characteristics, have an influence in determining the market value of a firm.

Appendix 2.1. Datastream codes

Datastream code	Variable
X(305)	Equity, Capital and Reserves
X(392)	Total assets
X(136)	Depreciation
X(MV)	Market Value
X(339)	Net Fixed assets
X(321)	Total loan capital
X(309)	Borrowing < 1 year
X(330)	Total fixed assets
X(338)	Total depreciation of fixed assets
X(306)	Preference capital
X(389)	Current liabilities
X(263)	1-2 years liabilities
X(264)	2-5 years liabilities
X(319)	more than 5 years liabilities
X(267)	leasing
X(397)	Revaluation Reserve
X(1099)	Surplus or deficit for revaluation
X(197)	Additional depreciation (provision for permanent diminution)

Appendix 3.1 Univariate Analysis

Table 6.1 contains the regression results from the univariate analysis of each of the variables on Tobin's Q. Considering the endogeneity problem, the methodology for the analysis follows the comparison of OLS and Within with GMM. The expectation is that GMM is the most adequate estimator as it controls for endogeneity and fixed effects by the first differentiation. However, it is important to consider that the specification of the model is also an influential factor for the calculation of correct estimators. In this case, each variable is included independently so there is the risk that the model is misspecified.

All the variables except for Investment were significant at the 95% confidence level using the OLS estimator. After controlling for fixed effects, leverage became insignificant. This might suggest that the level of debt of a company might depend on its individual characteristics, for instance the industrial sector to which they belong.

An important feature of the univariate analysis is the test for the validity of instruments. Leverage and size are the only two variables that do not pass the Sargan test at the 95% of confidence level, however they are valid at the 90% level. They are also insignificant with the GMM specification. In fact, the only significant coefficients calculated with GMM are R&D and Dividends; this result is the same as in the full regressions in Section 4. The AR(2) is rejected by Dividends at the 95% of confidence. This means that even though it passes the Sargan test, it is likely that the instruments for this variable are weak due to a persistent behaviour (unit root).

	UK (872 firms, 7,754 observations)				
	OLS	Within	GMM	Sargan	AR(2)
	(1)	(2)	(3)	test	
R&D stock	5.03***	2.88**	7.45***	(.188)	(.194)
	(.885)	(1.30)	(2.17)		
Dividends	7.35***	5.69***	37.5***	(.233)	(.023)
	(1.92)	(1.32)	(13.55)		
Leverage	-1.24***	-0.01	-0.57	(.010)	(.068)
	(.318)	(.364)	(1.01)		
Investment	0.30*	0.16	0.18	(.228)	(.058)
	(.163)	(.121)	(.421)		
Size	-0.15***	-0.40***	-0.24	(.022)	(.069)
	(.027)	(.080)	(.269)		

Robust standard errors in parenthesis; p-values for Sargan test and AC(2); All models include time dummies; AR(2) tests for the autocorrelation of second order; Sargan test for the validity of the instruments; Dependent variable: Tobin's Q; Ratios (all variables divided by Total Assets) except for size (natural logarithm of total assets)

Table 6.1: Univariate Analysis in OLS, Within and GMM for UK.

Appendix 4.1 Example of separation of control and cash flow rights by a pyramidal structure

Figure 6.1 shows the largest shareholders for Royal Doulton. The ultimate largest controller can be found through the largest control stakes: Waterford Wedgwood with 21.16% of shares, then Stoneworth Investment Limited with 16.6%. The last shareholders in the chain own the same proportion of shares (49%), but Sir Anthony O'Reilly has another direct stake of 2.86%. Therefore, Sir Anthony O'Reilly is the largest shareholder with 4.58% of cash flow rights (0.2116*0.166*0.49+0.0286) and 19.46% of control rights (the weakest link along the control chain, 16.6%, plus the direct control of 2.86%). The control is separated from ownership by a pyramidal structure as there is at least one publicly traded firm in the chain (Waterford Wedgwood). Moreover, in this example it would be said that at the 20% threshold, Royal Doulton is a Widely held company, but at the 10% threshold the largest controller would be classified as Miscellaneous (Charities, voting trusts, employees, cooperatives, or minority foreign investors), given that Sir Anthony O'Reilly is a foreign investor (Irish).

Figure 6.1: Royal Doulton

Appendix 5.1 Shareholders' rights

Appendix 5.2 Creditors' rights

Appendix 5.3 Law Enforcement

Appendix 5.4 Description of Ultimate Controller variables

Variables	Description
Ratio CO/C	Ratio of corporate ownership to control
Controller	Dummy variable equal to one when there is an ultimate controller at the 10% cutoff.
Family	Individual or firm that is unlisted in any stock exchange. A discussion to include the later as family can be found in Faccio and Lang (2002)
Widely held financial	Companies controlled by a financial institution which is also widely held
Widely held corporation	Companies controlled by a corporation which is also widely held.
Miscella-neous	Charities, voting trusts, employees, cooperatives, or minority foreign investors.
State	National government (domestic or foreign), local authority or government agency

Source: Faccio and Lang (2002)

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