Ownership structure and economic performance of European corporations

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Terms of reference

This report analyses the use of different share classes in Europe with a focus on the pharmaceutical industry and analyses the relationship between ownership structure and firms' economic performance.

The report is ordered and financed by Novo A/S.

The project has been supervised by a steering committee whose members are Morten Bennedsen and Kasper Meisner Nielsen. Besides, Joachim Sperling and Thorkil Kastberg Christensen have supervised the project on behalf of Novo A/S. The report has been completed over the period February 2007 to April 2007.

Executive summary

Firms in the European countries today have the possibility of choosing from a range of control enhancing mechanisms giving the controlling owners an amount of influence which is disproportional to their share of cash flow. The list of control enhancing mechanisms includes dual class shares, pyramidal ownership structures and several others.

The justification for these control enhancing mechanisms is currently the subject of much debate within the European Union. The opposing positions in the debate can be stated briefly as i) the control enhancing mechanisms are an impediment to takeovers and should therefore be removed to improve the market for corporate control. ii) Removing the control enhancing mechanisms reduces the contractual freedom to decide desirable ownership structures.

This report investigates whether ownership structures affect firm performance. To do so this study provides a description of the current ownership structures in European countries and the economic outcomes for firms using different ownership structures.

The results are presented in the tables below. SUMMARY TABLE 1 illustrates that the use of control enhancing mechanisms varies much across the European countries. In particular, the Scandinavian countries, UK, Italy and Belgium tend to use disproportional ownership structures more than the average European country. This difference is driven by the frequent use of dual class shares in Scandinavia.

SUMMARY TABLE 2 shows how the different types of ownership structures are used across Europe. Proportional ownership refers to the situation without control enhancing mechanisms are used, disproportional refers to all types of control enhancing mechanisms, and dual class share and pyramids are two specific forms of control enhancing mechanisms.
SUMMARY TABLE **2** shows that overall, firms with disproportional ownership structures tend to be more research and development intensive, measured by research and development expenditure relative to value added. For example, the R&D intensity of corporations with proportional ownership is 2.7 per cent in the third quartile, while it is 5.8 per cent for those with disproportional ownership.

SUMMARY TABLE 1 OWNERSHIP STRUCTURES IN DIFFERENT COUNTRIES

	All	Disproportional mechanism					
	Firms	All		Dual Class Shares		Pyramids	
	N	N	Share	N	Share	N	Share
Austria	82	34	0.41	18	0.22	19	0.23
Belgium	81	27	0.33	0	0.00	22	0.27
Denmark	152	71	0.47	45	0.30	27	0.18
Finland	94	52	0.55	42	0.45	7	0.07
France	456	76	0.17	10	0.02	67	0.15
Germany	548	215	0.39	101	0.18	130	0.24
Ireland	54	21	0.39	13	0.24	9	0.17
Italy	153	83	0.54	63	0.41	38	0.25
Norway	126	54	0.43	12	0.10	44	0.35
Portugal	69	8	0.12	0	0.00	8	0.12
Spain	136	27	0.20	0	0.00	24	0.18
Sweden	170	123	0.72	100	0.59	48	0.28
UK	1,486	623	0.42	376	0.25	318	0.21
All	3,607	1414	0.39	780	0.22	761	0.21

Source: Own calculations.

SUMMARY TABLE 2 R&D INTENSITY AND OWNERSHIP STRUCTURE

	Quartiles of R&D intensity		
	1th	2nd	3rd
Proportional	0.0017	0.0073	0.0265
Disproportional	0.0020	0.0079	0.0577
Dual class share	0.0015	0.0087	0.0578
Pyramids	0.0021	0.0075	0.0623

Source: Own calculations.

The main result is that the effects of disproportional ownership are mixed, as shown in SUMMARY TABLE 3. Firms which use disproportional mechanisms have a lower market value than comparable firms with proportional ownership. When performance is measured by the return on assets there is no significant effect of disproportional ownership. However, the growth of the market-to-book ratio is higher for disproportionally owned firms than for proportionally owned firms. Finally, the growth in sales and employment of disproportionally owned firms appears to be lower than that of comparable proportionally owned firms. An important caveat to the interpretation of these results is that ownership information is only available for 1996-1999 for this project, which means that the growth in market value and assets could be due to either improved operating performance or a change in ownership structure or both, and we cannot distinguish between the reasons on the basis of the available data.

The findings for firms in general do not extend to the pharmaceutical industry. For this industry, disproportional ownership is not associated with any statistically significant effect on the market-to-book ratio. On the other hand, disproportionally owned firms have a higher return on assets than comparable firms which have proportional ownership. There is no significant difference in the growth of the market-to-book ratio between disproportionally and proportionally owned firms. Finally, for the pharmaceutical industry there is no effect of disproportional ownership on the growth rate of sales and employment. One caveat to these results is that the number of pharmaceutical firms is modest.[1]

The results of the analyses in this report indicate that one cannot on the basis of existing data draw any general conclusions on whether disproportional ownership is good or bad for firms. On average firms with disproportional ownership have a lower market-to-book value than firms with proportional ownership. The result appears to be generated by firms in low and medium technology industries, as it does not extend to high tech industries. Similarly, the effect of disproportional ownership on operating performance depends on which measure of operating performance is used and which industries are considered. Finally, on average firms with disproportional ownership experience lower employment and sales growth than firms with proportional ownership, but only in low tech industries.

SUMMARY TABLE 3 EFFECT OF DISPROPORTIONAL OWNERSHIP ON DIFFERENT PERFORMANCE INDICATORS

	Market to Book ratio	Return on assets	Sales growth	Employment growth	Market value growth
Disproportional	-0.091	0.003	-0.026	-0.023	0.010
	(4.73)	(1.12)	(3.79)	(3.41)	(1.76)

Note: Numbers in parentheses are t-values. A t-value above approximately 1.97 indicates that a result is statistically significant – that is, the finding is so strong that is overcomes the statistical uncertainty associated with the analysis.
Source: Own calculations.

[1] Analyses have also been made of the effect of disproportional ownership for high-tech firms. For this range of industries no statistically significant relationship of disproportional ownership on any of the indicators of value, performance and growth could be found.

SUMMARY TABLE 4 EFFECT OF DISPROPORTIONAL OWNERSHIP ON DIFFERENT PERFORMANCE INDICATORS – THE PHARMACEUTICAL INDUSTRY

	Market to book ratio	Return on assets	Sales growth	Employment Growth	Market value growth
Dispropor-tional	0.199	0.101	-0.105	0.008	0.015
	(0.65)	(3.25)	(0.93)	(0.15)	(0.20)

Note: Numbers in parentheses are t-values. A t-value above approximately 1.97 indicates that a result is statistically significant – that is, the finding is so strong that is overcomes the statistical uncertainty associated with the analysis.
Source: Own calculations.

As such, the findings of this report raise some interesting points to consider in the European debate on the regulation of ownership structures and important topics for future research.

1 Introduction

A variety of control enhancing mechanisms are available to publicly traded corporations in Europe. These takes the form of chains of ownership (pyramidal structures), multiple voting rights, voting right ceilings, priority (or preference) shares, depositary receipts and non-voting shares, among others.

In its 2003 Action Plan, the European Commission considers that there is a medium to long-term case for doing away with, or at least discouraging, undesirable control arrangements. This has initiated a European debate on the pros and cons of control enhancing mechanisms. As an input to this debate this study aims at providing a picture of the current ownership structures in European countries and on the economic consequences of particular modes of organizing the ownership of firms.

The first part of the study provides a descriptive picture of the ownership of European firms. The aim is to provide a detailed overview of the use of mechanisms which firms use to separate control and income rights across European countries. Moreover, a central part of this analysis focuses on the main characteristics of disproportional ownership structures with a focus on Scandinavia.

The second part of the report investigates the economic consequences of having ownership structures that separates the distribution of control and income rights. The economic consequences of disproportional ownership structures are assessed using a range of indicators. Among these are firm value (market-to-book ratio), operating performance, sales and employment growth, and growth in firm value (market to book ratio). The analysis both provides a link between disproportional ownership and firm outcomes, as well as the effect on performance of the underlying mechanisms that creates the separation between income and cash flows rights. Finally, the analysis examines the effects of disproportional ownership structures on firms in research and development intensive industries and high tech industries.

The third part of the report focuses on the pharmaceutical industry. The pharmaceutical industry is interesting for at least three reasons: First, it is one of the most important sectors in Scandinavia as well as

in the rest of Europe. Second, the industry is characterised by having a high research and development intensity. Third, the industry has witnessed significant growth rates over the last decades. This part of the report compares the ownership structure of pharmaceutical firms to firms outside the pharmaceutical industry, and analyzes the differences in performance and growth for pharmaceutical firms as well as non-pharmaceutical firms with and without disproportional ownership structures.

The broad picture that we develop in this report is that there is a significant variation in the way that European firms are organized. Thus, the report provides valuable insights to the ongoing discussion of the desirability of only allowing one specific ownership structure – that is, proportional ownership - within the European Union. Moreover, to facilitate the discussion the appendix provides the interested party with a list of the 100 largest European firms with disproportional ownership structures as well as list of pharmaceutical companies included in the analysis.

2 Data

Analysing the link between ownership structures, firms' economic situation and R&D requires highly specialised data. This chapter is intended to inform the interested reader on how the data is collected and constructed.

2.1 Sources

Ownership data are drawn from Bennedsen and Nielsen (2006), which is an updated file of Faccio and Lang (2002). These data are collected on 14 countries[2] and cover almost all listed firms (see Faccio and Lang (2002) for coverage rates). The sample consists of information on ultimate ownership for the period 1996 to 1999.

Financial information is drawn from Worldscope, which is available from Thomson Financial in electronic form. The Worldscope database contains accounting information on public firms, which is comparable across countries, for more than 50 countries in the world. Financial information is drawn for 1995-2004.

The matched sample of ownership and financial information consists of 3,607 firms with approximately 22,000 firm-year observations from 13 countries.[3] On average each firm's financial information is available for 6.1 years. From this sample small firms are removed. The following observations were excluded: firms with current or lagged total assets less than one million dollars or missing (lagged) total assets. The main reason for this omission is that most of the variables in the empirical model are ratios of either current or lagged total assets and small values of total assets increase the number of outliers.

[2] Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

[3] Matching is achieved by company name. The initial match in Bennedsen and Nielsen (2006) between ownership and financial information for 1996-1998 from Worldscope contains 4.410 firms. Two main reasons can be given for the fewer firms in the current sample. First, a match for Switzerland was impossible. Second, the focus on the period 1995-2004 reduces the number of firms due to bankruptcy, delistings, and merger and acquisition activity.

The final piece of information is research and development (R&D) intensity on industry and country level. Data are drawn from the OECD data base, STAN, which groups R&D for 11 of the countries in the sample for the period 1995 to 2003. The R&D data was merged in the sample by industry, country and year.

2.2 Ownership variables

Disproportional ownership structures allow the controlling owners to separate control (votes) from income rights. To measure the degree of disproportional ownership attention is given to firms where the largest ultimate owner possesses at least 10 per cent of the votes (except for firms with dual class shares, cf. below). This threshold follows the literature and reflects the idea that influential control can be achieved with less than complete control (i.e. more than 50 per cent of the votes). [4] Three types of disproportional mechanisms are distinguished.

First, all firms with dual class shares (DCS) are classified as having disproportional ownership. Since all firms with DCS are classified as a disproportional ownership irrespective of the largest owner's stake of votes, it is the only group where the largest controlling owner can possess less than 10 per cent control. Variation in restrictions on DCS is given in Chapter 3.[5]

Second, firms have a pyramidal structure when the ultimate owner controls the firm through another firm.[6] Again it is assumed that 10 per cent of the votes are necessary to control the firm. For example, if family X owns 20 percent of stocks in firm A, which again owns 40 per cent of stocks in firm B. Firm B is classified as a firm with pyramidal ownership. The largest owner, family X, possesses 20 per cent of the

[4] In Bennedsen and Nielsen (2006) results are provided with attention on the group of large shareholders (defined as the sum of individual owners with more than 10 per cent of the votes) without significant changes in results.

[5] In this report we analyze among other things the value of dual class share firms. This is difficult, because not all superior voting shares are valued in the market. To take the value of superior voting shares for these firms into account, we assume that the price of a superior voting share equals the price of limited voting shares.

[6] The ultimate owner is e.g. a family, fund or government.

votes (weakest link in control chain is 20 per cent) of firm B and 8 per cent of the income right (0.2 multiplied by 0.4)[7].

Third, a group labelled other disproportional ownership structures (ODP) is derived. This group consists of firms with cross ownership, which is when a firm A is controlled by another firm B that is controlled by A. Again the control chain requires at least 10 per cent control. The group also consists of all firms where the largest owner has more control than income rights, but where the separation of control and income rights was achieved with other mechanism, e.g. golden shares and voting caps. The data do not allow a distinction between these other mechanisms.

2.3 Industry affiliation

The final issue in this chapter is industry affiliation. This is important because Chapter 5 focuses on pharmaceutical firms and R&D intensity is at the country and industry level. The industry affiliation of firms is based on net sales and relates to October 2005. Firms are allocated to 4 digit Standard Industrial Classification (SIC) codes in Worldscope.

For this reason and the reason that the pharmaceutical sector is quite small, we adopt a slightly broader definition of pharmaceutical industry from the Nordic Stock Exchange, where the group 'Health Care' is used to identify SIC codes where firms have health as primary activity. Chapter 5 contains a complete list of SIC codes.

R&D intensity (R&D expenditures divided by gross value added) data from OECD are available by country, industry and year. These are available for all countries except Austria and Portugal. Finally, R&D intensity is available on ISIC revision 3.1, which is the United Nation industry classification. By use of a correspondence table between SIC and ISIC codes, R&D intensity were merged into the ownership and financial database by industry, year, and country. [8]

[7] Note 100 percent control of the votes in a control chain is a subsidiary and not a pyramid.

[8] This mapping between classifications can lead to misclassifications of firms. But as long R&D intensity is approximately of the same order, the problem of misclassification is relatively small. Moreover in the empirical model with R&D intensity as explanatory variable the analysis is restricted to manufacturing, where the classification bias is smaller.

3 Ownership structures in Europe

This chapter discusses ownership structures in Europe or more precisely for the 13 countries in the sample. First, the distribution of dual class share and pyramidal firms across countries is discussed. Second, the combined effect of disproportional ownership and distribution of control and income rights is accessed. Third, other disproportional mechanisms, which are less common, are investigated. Fourth, focusing on origin of company law, the characteristics of Scandinavia is investigated. Finally, a discussion of why firms are using disproportional mechanisms ends this chapter.

Ownership structures will be classified by type of disproportional mechanisms. Dual class shares (DCS) and pyramids (PYR) are the main disproportional mechanisms firms apply to separate control and income rights. Other mechanisms are grouped under other disproportionality mechanisms (ODP). TABLE 3.1 provides evidence of the differences in disproportional ownership across countries. On average 39 per cent of the firms have one or more forms of disproportional ownership.

3.1 Dual class shares and pyramids in Europe

TABLE 3.1 shows that nearly half of the firms in the sample are located in the UK. Instead of focusing on the number of firms, which to some extent reflects the size of countries, the share of firms with disproportional ownership structure relative to the total number of firms will be the centre of attention.

TABLE 3.1 shows that the share of listed firms with dual class shares is 0.22 and the share with pyramidal ownership of all firms is 0.21. Overall the share of disproportionally owned firms is 0.39 including other disproportional mechanism, which indicates a small overlap in firms having dual class shares, pyramids or other mechanisms. The variation in the fraction of firms with disproportional ownership is quite high across countries. In Sweden 72 per cent of all firms have disproportional ownership compared to only 12 per cent in Portugal.

TABLE 3.1 NUMBER AND SHARES OF ALL FIRMS WITH MECHANISMS SEPARATING CONTROL AND INCOME RIGHTS ACROSS EUROPE

	All	Disproportional mechanism					
	Firms	All		Dual Class Shares		Pyramids	
	N	N	Share	N	Share	N	Share
Austria	82	34	0.41	18	0.22	19	0.23
Belgium	81	27	0.33	0	0.00	22	0.27
Denmark	152	71	0.47	45	0.30	27	0.18
Finland	94	52	0.55	42	0.45	7	0.07
France	456	76	0.17	10	0.02	67	0.15
Germany	548	215	0.39	101	0.18	130	0.24
Ireland	54	21	0.39	13	0.24	9	0.17
Italy	153	83	0.54	63	0.41	38	0.25
Norway	126	54	0.43	12	0.10	44	0.35
Portugal	69	8	0.12	0	0.00	8	0.12
Spain	136	27	0.20	0	0.00	24	0.18
Sweden	170	123	0.72	100	0.59	48	0.28
UK	1,486	623	0.42	376	0.25	318	0.21
All	3,607	1414	0.39	780	0.22	761	0.21

Source: Own calculation.

Sweden is followed by Finland (55 per cent), Italy (54 per cent) and Denmark (47 per cent). At the bottom of the scale, France (17 per cent) and Spain (20 per cent) are close to Portugal, which has the lowest level of disproportional mechanisms in the sample. Although some of the variation can be expected to arise from the sample selection, evidence in Faccio and Lang (2002) for all listed firms and Bennedsen and Nielsen (2006) point in the same direction.

The choice of mechanism to separate control from income rights varies much across countries as well. However, the dispersion seems to originate mainly from differences in the share of firms with dual class shares. On the one hand Sweden, Finland, Denmark, and Italy have the largest share of firms with dual class shares and these countries also have the overall highest proportion of firms with disproportional ownership structures. On the other hand, pyramids are distributed somewhat more equally across countries. No clear pattern emerges from comparing pyramidal ownership and dual class shares across countries, a simple correlation coefficient across proportions reveals a very weak negative correlation.

Country specific restrictions on the use of dual class shares can be expected to explain some of the cross country differences. Countries like Belgium and Norway have implemented the one-share one-vote

rule, which can be directly observed in the data. In Belgium there are no firms with dual class shares, whereas in Norway a small number exists, as the government can approve deviations from the general one-share one-vote rule. In France, Germany, Italy, Portugal, and Spain the non-voting (or limited voting) shares cannot exceed 50 percent (25 percent for France) of the nominal share capital. Denmark, Finland, and Sweden have implemented a maximum voting ratio of 10 to 1 between superior and limited voting shares. Non-voting shares have been outlawed in the UK since 1968. Finally, the corporate law in Austria and Ireland do not impose any restrictions on the use of dual class shares. Notice that the legal restrictions discussed above are current restrictions, due to 'grandfathering' clauses the actual variation across countries can be somewhat higher.

In Chapter 4, the effect of disproportional ownership on firms' economic outcomes is assessed. It is important to underline that dis-proportional ownership structures are relatively stable over time (Faccio and Lang (2002) p. 368) and therefore can be used to explain performance of firms over a long period. Moreover, the analysis is extended to cover each mechanism's effect on performance.

In addition to the cross-country variation, firm characteristics such as firm size or R&D intensity, might explain differences in which firms have implemented disproportional ownership structures.

TABLE 3.2 shows the share of firms with disproportional ownership structures for small and large firms, when we split the sample into two according to the median firm size. Firm size is measured by number of employees and the median is computed by country and industry. When we condition on size, it appears that the fraction of firms with disproportional ownership is higher among the larger firms. Overall 45 per cent of firms with size above the median have disproportional ownership structures compared to only 34 per cent for firms below the firm size median. However, across countries some variation occurs. For Belgium and Denmark small firms are more likely to have disproportional ownership structures. The use of mechanisms to separate control and income rights also varies across size. First, firms with dual class shares are more likely to be large and this pattern is consistent across countries. Firms with pyramidal ownership structures are also larger than the median with the exception of firms in Belgium and Denmark.

TABLE 3.2 SHARE OF FIRMS WITH DISPROPORTIONAL OWNERSHIP STRUCTURES CONDITIONAL ON FIRM SIZE

	Disproprotional ownership		Dual class shares		Pyramids	
	Small	Large	Small	Large	Small	Large
Austria	0.34	0.50	0.21	0.26	0.16	0.30
Belgium	0.34	0.23	0.00	0.00	0.27	0.21
Denmark	0.54	0.43	0.29	0.34	0.27	0.08
Finland	0.53	0.58	0.47	0.48	0.08	0.02
France	0.13	0.20	0.01	0.05	0.12	0.16
Germany	0.29	0.50	0.11	0.30	0.20	0.23
Ireland	0.35	0.46	0.22	0.31	0.16	0.21
Italy	0.44	0.66	0.28	0.57	0.20	0.26
Norway	0.33	0.59	0.03	0.21	0.31	0.41
Portugal	0.09	0.12	0.00	0.00	0.09	0.12
Spain	0.17	0.17	0.00	0.00	0.14	0.16
Sweden	0.75	0.73	0.60	0.62	0.26	0.27
UK	0.34	0.48	0.19	0.31	0.19	0.24

Note: Small firms are firms with number of employees below the median number of employees on industry and country level, whereas large firms have number of employees above the median.
Source: Own calculations.

To examine whether innovative firms are more or less likely to have disproportional ownership we attempt to measure the level of innovation in a firm by the research and development (R&D) intensity on industry level. As discussed in Chapter 2, R&D intensity is drawn from OECD's STAN database. The R&D variable measures the total expenditure firms use on R&D related investments by industry, year and country. R&D intensity is measured by dividing the actual R&D expenditure with gross value added by industry, year and country. Using this measure Finland, Sweden, France and Denmark are ranked as the most R&D intensive countries in the sample.

Using the industry level of R&D intensity as a proxy for individual firm R&D intensity, TABLE 3.3 shows the R&D intensity across ownership structure and mechanism to separate control and income rights. The n^{th} quartile divides the firms into two specific parts: Firms with values larger than the n^{th} quartile and firms with values smaller than the n^{th} quartile. The 1^{st} quartile is the R&D intensity where 25 per cent of the firms have lower R&D intensity and 75 per cent have larger. Likewise for the 3^{rd} quartile, 75 per cent of the firms have lower R&D intensity and 25 per cent have higher.

TABLE 3.3 R&D INTENSITY AND DISPROPORTIONAL OWNERSHIP STRUCTURES

	quartiles of R&D intensity		
	1st	2nd	3rd
Proportional	0.0017	0.0073	0.0265
Disproportional	0.0020	0.0079	0.0577
Dual class share	0.0015	0.0087	0.0578
Pyramids	0.0021	0.0075	0.0623

Source: Own calculations.

The 2nd quartile is the median. TABLE 3.3 shows that ownership structure does not appear to affect the R&D intensity of firms with low R&D: For all the listed categories of ownership structure, the 1st quartile of R&D intensity is more or less the same. For the median R&D intensity (2nd quartile) there are also very small differences. The median value of R&D intensity for a proportionally owned firm is 0.73 per cent and this is 0.79 percent for a firm with disproportional ownership structure. However, at the 3rd quartile firms with disproportional ownership structure spend 5.77 per cent of gross value added on R&D and proportionally owned firms only spend 2.65 per cent. Hence, firms with disproportional ownership structures tend to have higher R&D intensity. For firms with dual class shares the comparable number is 5.78 per cent and for firms with pyramidal ownership it is 6.23 per cent. Finally, notice that the variation in R&D intensity is not across firms but across industry. Any within industry differences are not accounted for by these measures.

3.2 Separation of control and income rights

Since disproportional ownership separates control and income rights and therefore violates the principle of proportionality, it is of interest to analyse the degree of disproportional ownership. This section investigates the extent to which control is separated from income rights by focusing on the largest owner.

The analysis of the difference between control and income rights starts by describing the distribution of control rights across Europe and continues to explore the extent to which control rights are separated from income rights conditional on having dual class shares and pyramidal ownership.

TABLE 3.4 LARGEST OWNER'S SHARE OF VOTES

	Median votes			
	All	Disproportional ownership	Dual class shares	Pyramids
Austria	0.55	0.54	0.70	0.36
Belgium	0.31	0.20	-	0.16
Denmark	0.31	0.45	0.47	0.43
Finland	0.31	0.28	0.26	0.26
France	0.50	0.40	0.42	0.40
Germany	0.50	0.38	0.45	0.30
Ireland	0.19	0.14	0.12	0.14
Italy	0.49	0.46	0.46	0.39
Norway	0.27	0.29	0.24	0.29
Portugal	0.46	0.41	-	0.41
Spain	0.34	0.37	-	0.40
Sweden	0.32	0.38	0.43	0.36
UK	0.15	0.16	0.15	0.16
All	0.27	0.25	0.25	0.25

Note: Belgium. Spain and Portugal have missing values because of no DCS exist in the data.
Source: Own calculations.

TABLE 3.4 provides evidence of median share of votes for the largest owner for each of the 13 countries in the sample. The largest owner's median share of votes is reported for all firms, for firms with disproportional ownership, and for dual class shares and pyramids separately. For all countries, the largest owner has a median share of votes of 27 per cent. In other words, for half of the firms the largest owner possesses less than 27 per cent of the votes, whereas in the other half of the sample the largest owner's share of votes is larger than 27 per cent. The cross-country variation is quite high with high concentration of control in Austria, Germany, France, Italy and Portugal. The largest owners in Ireland and United Kingdom possess less than 20 per cent of the votes, which reflects a low concentration of ownership. Firms with a disproportional ownership structure resemble the overall median (second column). This pattern seems to persist across dual class shares and pyramids. The conclusion is that concentration of control is quite high in some countries and low in other countries, whether firms are disproportionally or proportionally owned matters slightly less in this comparison.

In TABLE 3.5, the (absolute) degree of disproportional ownership, which is measured by the difference between the largest owner's share of votes and income rights, is shown for firms with disproportional ownership structures. Italy, Portugal, Denmark and Norway show the largest degree of disproportional ownership.

TABLE 3.5 LARGEST OWNER'S DEGREE OF DISPROPORTIONALITY

	Median Absolute Disproportional ownership		
	All	Dual class shares	Pyramids
Austria	0.13	0.14	0.15
Belgium	0.11	-	0.10
Denmark	0.16	0.24	-
Finland	0.08	0.07	0.17
France	0.06	0.05	0.06
Germany	0.13	0.15	0.12
Ireland	0.07	0.04	0.11
Italy	0.17	0.15	0.24
Norway	0.16	0.06	0.18
Portugal	0.17	-	0.17
Spain	0.13	-	0.14
Sweden	0.13	0.17	0.10
UK	0.02	0.02	0.03
All	0.07	0.06	0.09

Note: Degree of disproprotionality is defined as share of votes minus share of income rights. Missing values are indicated by -. For Denmark the data do not allow calculation of absolute disproportional ownership for all firms with pyramidal ownership structures.
Source: Own calculations.

United Kingdom, France and Ireland have the lowest. As the concentration of votes was very low in UK and Ireland the degree of disproportional ownership is expectedly low. There is a slight tendency towards pyramidal structures having larger degree of disproportional ownership with the exception of Denmark and Sweden. Again country-specific restrictions on dual class shares can explain some of the variation across countries in the degree of disproportional ownership.

Finally TABLE 3.6 shows the share of firms with a single large owner. Large owners are defined as any owner possessing more than 10 per cent of the votes. Thus, TABLE 3.6 shows the fractions of firms where the largest owner is the only large shareholder. TABLE 3.6 shows that in Austria, Belgium, Portugal, France and Sweden the largest owner is likely to be the only large shareholder. In Finland, Norway and Denmark at least one other large shareholder is present in 50 per cent of the firms. Differences between firms with disproportional and proportional ownership structure are very small. But a distinct pattern between firms with dual class share and firms with pyramidal ownership is that for pyramidal ownership structures more than half of the firms have more than one large owner compared to only around one-third for firms with dual class shares.

TABLE 3.6 SHARE OF FIRMS WITH A SINGLE LARGE OWNER

Country	All	DP	DCS	PYR
Austria	0.83	0.68	0.77	0.65
Belgium	0.70	0.71	-	0.77
Denmark	0.50	0.54	0.59	0.33
Finland	0.42	0.40	0.43	0.35
France	0.65	0.64	1.00	0.59
Germany	0.59	0.49	0.63	0.37
Ireland	0.63	0.79	0.87	0.72
Italy	0.58	0.51	0.52	0.43
Norway	0.45	0.25	0.36	0.21
Portugal	0.67	0.74	-	0.74
Spain	0.55	0.44	-	0.44
Sweden	0.64	0.61	0.62	0.48
UK	0.54	0.50	0.54	0.45
All	0.58	0.52	0.58	0.45

Note: DP is disproportionality, DCS is dual class shares, PYR is pyramids.
Source: Own calculation

In summary, the evidence in this section points at a complex connection between the degree of disproportional ownership and mechanisms to separate control and income rights. In general firms with pyramidal structures have a slightly larger degree of disproportional ownership, and are also more likely to be controlled by more than a single large owner than firms with dual class shares.

3.3 Other mechanisms to separate control from income rights

The two most common disproportionality mechanisms are dual class shares and pyramidal ownership. However, other mechanisms exist that can effectively separate control and income rights. These include e.g. golden shares, voting caps, and cross ownership. Golden shares are shares which are able to outvote all other shares in certain specified events and are often held by the government. Voting caps limit the voting rights of shareholders above a certain level. Cross ownership is when a firm, X, controls another firm, Y, which in turn controls part of X. The sample does not allow distinguishing between these other mechanisms except for cross-holdings.

TABLE 3.7 OTHER MECHANISMS TO SEPARATE CONTROL AND INCOME RIGHTS

	Other Mechanisms	
	N	Share
Austria	1	0.01
Belgium	5	0.06
Denmark	8	0.05
Finland	7	0.07
France	0	0.00
Germany	20	0.04
Ireland	1	0.02
Italy	2	0.01
Norway	4	0.03
Portugal	0	0.00
Spain	3	0.02
Sweden	1	0.01
UK	11	0.01
All	63	0.02

Source: Own calculation.

TABLE 3.7 shows that few European firms have implemented other mechanisms than dual class shares and pyramids to separate control and income rights. The share of all firms with other mechanisms is 2 per cent. Across the countries the highest share is found in Finland, Denmark and Belgium. For Finland, Denmark and Belgium none of the firms are cross holdings, whereas in Austria, Germany, and Norway close to all of them are cross holdings.

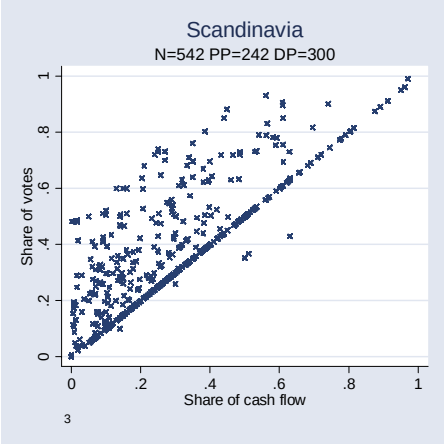
The residual category is not of central concern in this report as the group is quite small. Thus, other disproportionality mechanisms will not be given much attention in the analysis in the following chapter focusing on the effect on firm performance.

3.4 Ownership structures in Scandinavia

The following is a summary of the main characteristics of disproportional ownership structures with a focus on Scandinavia. The comparison of main characteristics is accomplished by dividing the 13 countries into four origins of company law (La Porta et al. (1998)). The four regions are: Scandinavia (Denmark, Finland, Norway, and Sweden), common law (United Kingdom and Ireland), German legal origin (Germany and Austria) and French legal origin (France, Belgium, Italy, Spain, and Portugal). The starting point for this classification of legal regimes is the recognition that laws in different

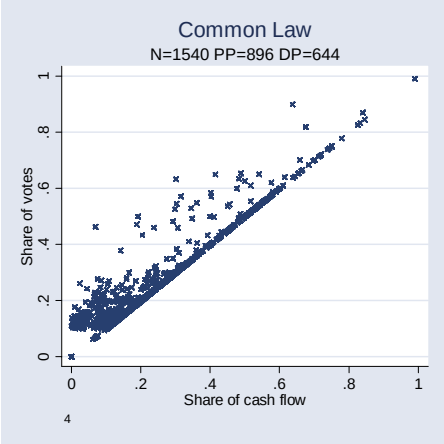
countries are typically not written from scratch, but rather transplanted from a few legal families or traditions. There exist two broad legal traditions; the common law which is English in origin and the civil law which derives from Roman law. Within the civil law tradition three major families exist; French, German and Scandinavian. Moreover, as the legal environment and local traditions shape ownership structures the legal classification provides a framework to compare differences across regions.

FIGURE 3.1 LARGEST OWNER'S SHARE OF CASH FLOW AND VOTES, SCANDINAVIA



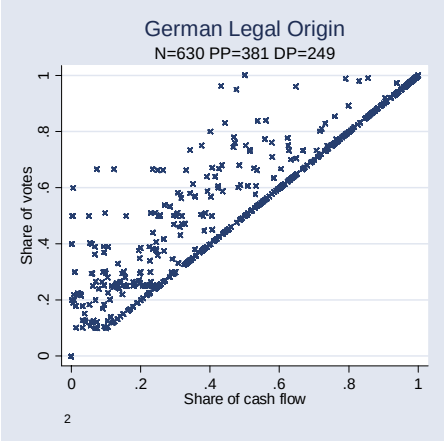
Source: Own calculation.

FIGURE 3.2 LARGEST OWNER'S SHARE OF CASH FLOW AND VOTES, COMMON LAW



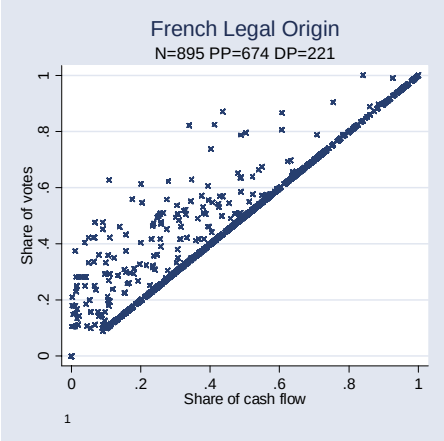
Source: Own calculation.

FIGURE 3.3 LARGEST OWNER'S SHARE OF CASH FLOW AND VOTES, GERMAN LEGAL ORIGIN



Source: Own calculation.

FIGURE 3.4 LARGEST OWNER'S SHARE OF CASH FLOW AND VOTES, FRENCH LEGAL ORIGIN



Source: Own calculation.

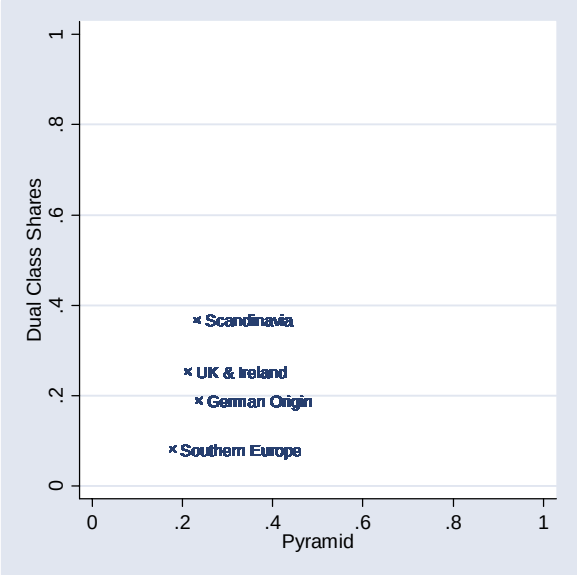
FIGURE 3.1 to FIGURE 3.4 show a plot of the largest owner's votes and income rights for each of the legal regions. The 45-degree lines in FIGURE 3.1 to FIGURE 3.4 contain all firms with a proportional ownership structure. Comparing Scandinavia with the other regions show that Common Law countries have the smallest concentration of ownership followed by Scandinavia. This is clearly supported by TABLE 3.4 where UK and Ireland have the smallest concentration, whereas Austria and Germany have the highest. Thus, firms in Scandinavia on average have a lower ownership concentration than firms in Continental Europe, but a more concentrated ownership structure than firms in the UK and Ireland.

FIGURE 3.1 to FIGURE 3.4 also allow for a comparison of the degree of disproportionality for firms with disproportional ownership across the legal regions. The off-diagonal points in the diagrams are firms with a disproportional ownership structure. The degree of absolute disproportionalilty is the vertical distance between a point and the 45-degree line (see in TABLE 3.5 for a detailed cross-country comparison of the median degree of disproportionality).[9] Scandinavian firms with disproportional ownership have on average a significant wedge between the concentration of control and income rights. Among the firms with disproportional ownership, firms in Scandinavia show a pattern similar to the French and German legal origin. This is slightly surprising as the concentration of ownership in general is larger in the latter regions, which can be seen from TABLE 3.4. However, this effect is opposed by a higher concentration of votes for firms with disproportional ownership structures in Scandinavia (again see TABLE 3.4 for Denmark and Sweden).

The prior analysis showed large differences in the use of dual class shares across countries. To shed further light on these differences FIGURE 3.5 shows a plot of the share of firms with dual class shares against the share of firms with pyramidal ownership structures for the four legal regimes.

[9] Notice that Scandinavia is the only legal region with firms with a negative degree of absolute disproportional ownership structures. The explanation is that for these firms the proportion of superior voting shares of total shares is very small and the largest owner is found among owners with limited voting shares.

FIGURE 3.5 MECHANISMS TO SEPARATE CASH FLOW AND VOTES



Source: Own calculation.

From FIGURE 3.5 it is evident that Scandinavia is characterized by many firms with dual class shares. In both Denmark, Finland and Sweden there is a high fraction of publicly traded firms that have dual class shares. FIGURE 3.5 also shows that use of pyramidal ownership is quite constant across the four legal regions.

In summary, this implies that dual class shares is a very important characteristic of ownership structures in Scandinavia. Scandinavian firms simply use dual class shares more frequently than firms in other European countries. Moreover, firms with dual class shares in Scandinavia have a significant wedge between the concentration of control and income rights. This implies that dual class shares are used differently in Scandinavia than in e.g. the UK, where many firms have dual class shares, but few have a significant separation of control and income rights. Thus, the analysis shows that if firms in Scandinavia are forced to unify their share classes it would have a significant effect on ownership structures, since the controlling owners would be forced to reduce their control stakes – unless they possess capital to buy up larger stakes in the firms.

3.5 Motives for using disproportional mechanisms

The large dispersion across countries in the use of dual class shares makes it important to consider the reasons that firms separate control and income rights by implementing disproportional mechanisms.

There are many reasons for a firm to end up with disproportional ownership structures. Some firms have a disproportional ownership structure because the owners find that it is the best organizational form that can help the firm and the owners realize future goals and visions. Other firms end up with disproportional ownership structures due to changes in the numbers and identities of owners of the firm, e.g. through privatization, mergers or acquisitions.

Dual class shares are typically implemented because the founder of the firm has a strategy of how control with the company could be preserved in the future. Thus, dual class shares are frequently used as a remedy to preserve control within the family in succession decisions or to preserve control in the hand of the founders after an initial public offering. The first argument provides a historical reason why Scandinavian firms today have dual class shares, whereas the second argument is a reason for why a number of firms outside Scandinavia today go public with dual class shares - even in countries like the US and UK. Dual class shares also serves as a strong protection of the current ownership structure in Scandinavian and parts of Continental Europe. If these firms abandon dual class shares, many firms would be vulnerable against uninvited takeovers from other companies or buyout funds. Thus, an important reason to keep a disproportional ownership structure is to protect the companies and controlling owners against uninvited takeovers.

Pyramidal ownership structures typically arise as a consequence of merger and acquisition activity. Ownership structures most likely change as a result of corporate transactions and therefore merger and acquisition transactions are the main source that creates pyramidal ownership structures.

Golden shares are rare in European firms, but typically observed in former state owned companies in e.g. France, where the government has kept a controlling stake after privatization.

Voting caps are rare and mainly found in the financial sector. These are typically implemented as a mechanism to preserve control in the hand of the managers of the firms.

Finally, cross-ownership is often used in companies that have a common history. This can either be because they are spin-offs from the same original company or they have a common bank or financial institution as controlling owners. The latter is the primary reason for cross-ownership being used in Germany.

3.6 Summary

This chapter showed that ownership structures vary significantly across European countries. In general ownership is highly concentrated in Continental Europe and relatively dispersed in the UK and Ireland. Disproportional ownership structures are common in all European countries, although there are significant differences in how they are used. The use of dual class shares vary across countries, whereas the use of pyramidal ownership structures is fairly constant. The use of dual class shares is dominated by firms in Scandinavia. Scandinavian firms with dual class shares have a significant wedge between the concentration of control and income rights.

4 Disproportional ownership structures, value, performance and growth

Firms' economic situation is of concern for society at large. Countries and regions with well performing firms have a larger income base and more employment. Hence, firms' economic situation is decisive for the standard of living of the surrounding community. This chapter analyzes the interplay between firms' economic situation and their ownership structures.

4.1 Relevant aspects of firms' economic situation

Firms' economic situation and their growth prospects are important to current and potential owners, to employees and to society in general. However, the different stakeholders care about different aspects of firms' economic situation. For example, the current owners have a great interest in the ability of the firm to generate a pecuniary surplus, while the employees have a great interest in keeping their jobs and receiving a satisfactory level of wages. Society is interested in achieving a high standard of living for both firms' owners and employees, and typically society has an interest in raising tax revenue and maintaining a high level of employment.

To facilitate the European discussion on the pros and cons of disproportional ownership, it is necessary to consider a comprehensive set of economic effects of disproportional ownership. We consider firms' value as an indicator of expected future income streams, which are relevant to both owners and society as a whole. We consider firms' return on assets, the growth of firm value and of share prices as indicators of operating performance, which is of direct interest to owners and society as a whole. We also consider sales growth as an indication of the economic outlook of firms. Finally, we consider growth of employment as an indicator of the employment outlook, which is directly relevant for the employees.

From a policy perspective the ideal measures of growth in either sales or employment are organic growth. This excludes growth from e.g. takeovers, mergers and acquisitions (M&A). However, with the

present data it is impossible to distinguish between organic and acquisition growth. Therefore care must be taken in interpreting the results of disproportional ownership on growth in employment and sales. In particular, if the ability to issue equity to finance takeovers differs across ownership structures it will impact the ability to grow through acquisitions. It is therefore impossible to disentangle whether it is the lack of ability to finance acquisitions or the lack of organic growth that caused low growth rates for certain firms.

The following analysis provides an in depth assessment of the effect of disproportional ownership on the indicators mentioned. First, focus is on the effect on each of the indicators in general. Second, the analysis extends to separate effect of dual class shares and pyramidal ownership. Third, the effect of R&D activity will be included in a separate analysis. Protection of long run investment, like research and development, can be an argument for disproportional ownership, which might sacrifice other short term considerations. Fourth, the effect of disproportionality on performance is accessed for a smaller group of high tech firms.

4.2 Descriptive statistics of the economic indicators

In TABLE 4.1 to TABLE 4.4 mean and median of each of the indicators of firms' economic situation are reported across ownership structures together with standard errors and number of firm-year observations. All tables report results from the unbalanced dataset.

TABLE 4.1 DISPROPORTIONAL OWNERSHIP AND MARKET-TO-BOOK RATIO

Ownership structure	Mean	Median	Standard Error	N
Proportional	1.2282	0.8384	0.0311	16,320
Disproportional	1.0711	0.8375	0.0108	10,813
Dual Class Share	0.9890	0.8174	0.0114	6,295
Pyramid	1.1165	0.8451	0.0165	5,534
Other Mechanisms	1.1654	0.7875	0.0746	450

Note: Yearly measures of market-to-book ratio.
Source: Own calculations.

The mean market to book ratio is highest for firms with proportional ownership and firms with other disproportional mechanisms in TABLE 4.1. Dual class share firms have the lowest market to book ratio. These results are partly confirmed by the analyses based on the median values. The median market to book ratio is clearly smaller than the mean value. This can be explained by some very large market to book ratios in the sample.[10] The overall differences across proportionally and disproportionally owned firms disappear for the median firm. The median values show less dispersion across disproportional ownership and mechanisms. However, measured by the mean values, firms with pyramidal ownership structure have slightly higher market-to-book ration than firms which have proportional ownership structure, and much higher market-to-book ration than firms which use dual class shares or other mechanisms.

Turning to return on assets in TABLE 4.2, disproportionally owned firms on average have slightly higher return on assets than the proportionnally owned firms. However, the difference is not statistically signifycant. This result is mainly driven by pyramidal ownership structures, which have a higher return on assets than any other ownership structure. The low values of firms with other mechanisms hardly influence the results for disproportionally owned firms, because of the few firms using these mechanisms (see Chapter 3 for details). These results are confirmed by median values. As it is the case for market-to-book ratios, the median values shows less dispersion than the mean values. Firms with dual class shares and pyramidal ownership are performing relatively similar in terms of the median operating performance.

TABLE 4.2 DISPROPORTIONAL OWNERSHIP AND OPERATING PERFORMANCE (RETURN ON ASSETS)

Ownership structure	Mean	Median	Standard Error	N
Proportional	0.0352	0.0433	0.0016	16,243
Disproportional	0.0422	0.0453	0.0013	10,853
Dual Class Share	0.0390	0.0440	0.0014	6,336
Pyramid	0.0440	0.0465	0.0021	5,541
Other Mechanisms	0.0382	0.0375	0.0041	462

Note: Yearly return on assets.
Source: Own calculations.

[10] The median is not influenced by very large or small values. Remember it is the value for the firm where 50 percent of observations have a larger value and 50 percent has a lower value.

TABLE 4.3 DISPROPORTIONAL OWNERSHIP AND THE ABILITY TO GROWTH (SALES GROWTH)

Ownership structure	Mean	Median	Standard Error	N
Proportional	0.0599	0.0579	0.0040	14,617
Disproportional	0.0541	0.0483	0.0045	9,635
Dual Class Share	0.0500	0.0476	0.0051	5,641
Pyramid	0.0564	0.0475	0.0070	4,900
Other Mechanisms	0.0382	0.0212	0.0199	407

Note: Growth rates are approximated by differences in the logarithm to sales. One-year growth rates.
Source: Own calculations.

The results of sales growth are given in TABLE 4.3. Proportionally owned firms have slightly higher sales growth than disproportionally owned firms. However, the standard errors show that the differrence in mean growth is insignificant. Considering the mechanism to separate control and income rights, pyramids generate the highest sales growth, although the effect is insignificant. The difference between proportional and disproportional ownership structures is slightly more profound for median values. Expanding sales can be achieved by expansions of existing production units or by M&A activity. Thus, some care must be exercised with the results stated in Section 4.1.

With respect to employment growth, proportionally owned firms have slightly higher employment growth, both when measured by mean and median growth, compared to disproportionally owned firms, as can be seen in TABLE 4.4. Within the disproportionally owned firms the mean effect is driven by a low growth rate of firms with dual class shares. The median value for dual class share, however, shows that the median firm with dual class shares is not significantly different from pyramids in terms of employment growth. An interesting pattern of each mechanisms' effect on growth emerge from TABLE 4.3 and TABLE 4.4, where the median growth rate for each mechanism is less than the median for the combined group of firms with disproportional ownership structures. The reason is that some firms combine mechanisms, e.g. dual class shares and pyramidal ownership structures, and these firms have very low growth rates.

The final performance measure, growth in market value, in TABLE 4.5 reveals that the firms in the sample on average decreased in market value. However, disproportionally owned firms did so to a lesser extent than proportionally owned firms. Within disproportionally owned firms some variation exists. Dual class shares experienced the

best performance followed by pyramids and other mechanisms. The latter had mean and median growth very much like proportionally owned firms. It is interesting to note the difference between the results in TABLE 4.1 on the level of market value and the result on the growth rate. First, the dynamics of firm value seem to be an important aspect of the story. Second, growing and downsizing firms might not perform identically conditional on ownership structure.

Overall the pattern of ownership structures and performance are identical to Bennedsen and Nielsen (2006). Firms with proportional ownership structures have a higher market to book ratio on average, though the results are less clear for the median firm. No differences appear on return on assets across ownership structures. The ability to grow is in favour of proportionally owned firms, although this might be caused by the ability to grow through M&A activity if firms with disproportional ownership structures are restricted in their ability to finance growth through acquisitions. In addition, it should be noted that the above differences in the partial analysis might be driven by differences in firm characteristics. The following section analyzes the differences in performance in a regression framework that include controls for differences in firm characteristics.

TABLE 4.4 DISPROPORTIONAL OWNERSHIP AND THE ABILITY TO GROWTH (EMPLOYMENT GROWTH)

Ownership structure	Mean	Median	Standard Error	N
Proportional	0.0324	0.0120	0.0039	13,112
Disproportional	0.0243	0.0097	0.0049	8,567
Dual Class Share	0.0186	0.0082	0.0066	5,039
Pyramid	0.0302	0.0089	0.0071	4,376
Other Mechanisms	0.0184	0.0	0.0122	343

Note: Growth rates are approximated by differences in the logarithm to employment. One-year growth rates.

SOURCE: OWN CALCULATIONS.

TABLE 4.5 DISPROPORTIONAL OWNERSHIP AND THE ABILITY TO GROWTH, (MARKET TO BOOK RATIO GROWTH)

Ownership structure	Mean	Median	Standard Error	N
Proportional	-0.0132	-0.0036	0.0032	14,075
Disproportional	-0.0083	0.0011	0.0034	9,359
Dual Class Share	-0.0039	0.0018	0.0042	5,494
Pyramid	-0.0125	0.0004	0.0049	4,753
Other Mechanisms	-0.0131	-0.0075	0.0148	386

Note: Growth rates are approximated by differences in the logarithm to market to book ratio. One-year growth rates.

Source: Own calculations

4.3 Effects of ownership structures

The differences in the value, performance and growth indicators across ownership structures might be driven by other variables than ownership structure per se. For example, in Chapter 3 larger firms were more likely to have a disproportional ownership structure. But larger firms might also have a lower market-to-book ratio. To control for firm characteristics that might affect firms' economic situation the effect of ownership is investigated in an empirical model.

The control variables included are standard from the related literature (Sutton (1997), Claessens et al. (2002), and Bennedsen and Nielsen (2006)). First, firm size is in general a very important predictor of firms' economic situation whether it is market value, growth rates in sales or employment or return on assets. In the empirical model, log sales and squared log sales approximate firm size. Second, leverage, which is the debt-to-asset ratio, is included to reflect the capital structure of the firm. Third, country effects are included to capture institutional differences across countries. Fourth, income rights of the largest owner control for the largest owners' incentives. Fifth, industry dummies pick up various industry specific effects. Sixth, year dummies reflect differences in business cycle effects across time. Finally, R&D intensity is introduced in a separate analysis to account for differences in the level of research and development within industry and country. As discussed in Chapter 2, the report includes OECD's R&D measures on an industry basis (ANBERD).

Instead of estimation of the five equations separately, estimation proceeds with joint estimation of them. Joint estimation restricts analysis to complete cases for the dependent variables with a small loss in the number of observations. However, joint estimation improves the efficiency, since we allow for correlation of error terms across equations.

4.4 Results

TABLE 4.6 shows the result for the five performance measures after controlling for observable differences in firm characteristics. For firms' market value, the effect of disproportional ownership is negative and significant, which is consistent with the literature (see Bennedsen and Nielsen, 2006 and references herein).

TABLE 4.6 REGRESSION ANALYSIS OF DISPROPORTIONAL OWNERSHIP ON PERFORMANCE

	MB	RoA	SG	EG	MBG
DP	-0.091	0.003	-0.026	-0.023	0.010
	(4.73)	(1.12)	(3.79)	(3.41)	(1.76)
Industry	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
R^2	0.1091	0.0647	0.0543	0.0186	0.0496
No of obs.	18,277	18,277	18,277	18,277	18,277

Note: MB is market to book ratio, RoA is return on assets, SG is sales growth, and EG is employment growth as dependent variable. MBG is growth in market to book ratio. DP is disproportionality, T-statistics are reported in parenthesis.
Source: Own calculations.

Using the mean market to book ratio for proportionally owned firms, the interpretation of the coefficient of -0.091 is that disproportionally owned firms have on average 8.2 per cent lower market to book ratio compared to proportionally owned firms (ceteris paribus). This estimate is smaller than e.g. Bennedsen and Nielsen (2006). The main expla-nations are a slightly different sample, and a longer period of analysis. Moving to return on assets in column 2 of TABLE 4.6 the difference between proportional and disproportional ownership disappears. The effect of disproportional ownership is positive but insignificant. Thus, firms with disproportional ownership structures have a similar operating performance to firms with a proportional ownership structure.

Column 3 and 4 in TABLE 4.6 show the impact of disproportional ownership structures on firm growth. Column 3 shows that firms with a disproportional ownership structure have a 2.3 percentage point lower employment growth per year. This difference is significant at the one per cent level. Consistently, Column 4 shows that firms with a disproportional ownership structure have a 2.4 percentage point lower sales growth compared to proportionally owned firms. Thus, both our specifications of firm growth show that firms with disproportional ownership structures have low growth compared to firms with proportional ownership. As discussed in the introduction of the chapter, this difference in growth rates might be driven by growth through acquisitions rather than organic growth. In particular, this is likely to be the case if firms with disproportional ownership structures are restricted in their ability to obtain external financing e.g. through

share issues. This is likely to be the case for the group of firms that have introduced disproportional mechanisms to preserve control in the hands of the controlling owners and/or founders of the firm (c.f. Chapter 3.5). Finally, it should be noted that the results in TABLE 4.6 are consistent with previous literature (see e.g. Bennedsen and Nielsen (2006)).

The final column shows the results of disproportional ownership structure on growth in market value. Here disproportional ownership structures grow at a one per cent higher rate on average from 1996 to 2004 ceteris paribus. The estimated effect of disproportional ownership structure is significant only at the ten per cent level. The difference in level and growth of market to book ratio is puzzling and reveals that it is important to account for dynamics changes in ownership structure. Since the report rely on time invariant ownership variables it is impossible to establish a dynamic link.[11]

TABLE 4.7 sheds light on the effect of R&D intensity and disproportionnal ownership, when we introduce the R&D intensity in the statistical framework used above. The analysis in Chapter 3 showed that firms with disproportional ownership structures were associated with a high R&D intensity. The analysis is restricted to the manufacturing sector where measurement problems related to R&D are less severe.

For firms in industries without R&D the effect of disproportional ownership structures is given by the first row in TABLE 4.7. The numbers cannot be directly compared with TABLE 4.6, which focused on all industries. If we restrict the sample to manufacturing industries we generally find a small significant effect of disproportionality on firm value and no significant effect on operating performance, whereas firms with disproportional ownership structures have significantly lower growth.[12] Thus, these results are similar to the effect for firms in industries without R&D with the exception of the significantly lower effect of disproportionality on operating performance.

[11] An alternative measure of growth in value is growth in share prices. Here the estimated effect of disproportionality is zero. This underlines the complexity of the problem. Not only is dynamics a serious specification issue but the mere definition of value is also important.

[12] The effect of disproportional ownership for manufacturing without R&D intensity (cf. Table 1.5) is -0.085, -0.005, -0.039 and -0.032 for market to book ratio, return on assets, sales growth, and employment growth, respectively.

TABLE 4.7 REGRESSION ANALYSIS OF DISPROPORTIONAL OWNERSHIP ON PERFORMANCE INCL. R&D (MANUFACTURING SECTOR)

	MB	RoA	SG	EG	MBG
DP	-0.039	-0.019	-0.032	-0.037	0.004
	(0.99)	(4.81)	(2.99)	(3.59)	(0.33)
R&D	1.322	-0.134	0.163	0.017	-0.082
	(4.91)	(4.86)	(2.23)	(0.24)	(1.02)
DP*R&D	-0.833	0.199	-0.078	0.073	0.043
	(2.18)	(5.06)	(0.75)	(0.72)	(0.38)
Industry	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
R^2	0.1283	0.1589	0.0871	0.0372	0.0524
No of obs.	7,341	7,341	7,341	7,341	7,341

Note: See note to TABLE 4.6. R&D is research and development intensity. DP*R&D is the interaction of disproportionality and R&D.
Source: Own calculations.

Firms in industries with high R&D intensity generally have significantly higher firm value, lower operating performance and higher sales growth. This is not surprising, as the positive effect on firm value reflects the value of growth options, the negative effect on operating performance is most likely driven by current expenses to R&D, whereas the positive effect on sales growth might be driven by successful companies' introduction of new innovations on the market.

There is an interesting interaction effect between R&D intensity and disproportional ownership, as shown in the third row in TABLE 4.7 This effect results in a significantly lower market to book ratio. However, it is worth noticing that the joint effect of R&D intensity is a positive effect on firm performance (0.489 = 1.322-0.833). Thus, firms with disproportional ownership structures in R&D intensive industries have higher firm value than firms outside R&D intensive industries, but significantly lower firm value compared to proportionally owned firms in R&D intensive industries.

For disproportionally owned firms the effect of R&D on return on assets is positive (0.065=0.199-0.134). Thus, R&D intensive firms with disproportional ownership structures have better operating performance than R&D intensive firms with proportional ownership structures. Again, the results should be interpreted with care, as we measure R&D intensity on industry level rather than on the firm level.

For growth in either employment, sales or firm value the impact of R&D is not significantly different for disproportionally owned firms compared to proportionally owned firms. Although the effect on employment growth is positive the effect is grossly insignificant.

To further shed light on the effect of the actual mechanisms to separate ownership and control on performance, TABLE 4.8 reports the effect of each mechanism on the five performance measures. The sample again includes all industries. The results from TABLE 4.8 points in one direction. The analyses reported in TABLE 4.8 thus suggest that all the results reported earlier in TABLE 4.6 are driven by firms with dual class shares. The other mechanisms are not statistically significant from firms with proportional ownership.

Firms with dual class shares have significantly lower firm value and lower growth measured by both sales and employees, but higher growth in market value. An important caveat to the interpretation of these results is that our ownership information is static, which means that firms which have abandoned dual class shares are categorized as having dual class shares. Thus we cannot distinguish whether the higher growth in market value is driven by unifications or better economic performance. The effect on operating performance is insignificant. The results for pyramids and other mechanisms are insignificant. Thus, the results in TABLE 4.6 are driven by firms with dual class shares.

TABLE 4.8 REGRESSION ANALYSIS OF MECHANISM TO SEPARATE CASH FLOW AND VOTES ON PERFORMANCE

	MB	RoA	SG	EG	MBG
DCS	-0.198	0.000	-0.037	-0.032	0.015
	(8.81)	(0.01)	(4.71)	(4.07)	(2.23)
PYR	-0.015	0.002	-0.008	-0.009	0.003
	(0.70)	(0.62)	(1.00)	(1.09)	(0.41)
ODP	0.122	-0.010	-0.010	-0.008	-0.007
	(1.71)	(0.97)	(0.39)	(0.30)	(0.34)
Industry	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
R^2	0.1121	0.0647	0.0547	0.0189	0.0497
No of obs.	18,277	18,277	18,277	18,277	18,277

Note: DCS is dual class shares, PYR is pyramids, ODP is other disproportionality.
Source: Own calculations.

Until now the effect of disproportional ownership has been assessed on the mean.[13] The analysis in section 4.2 showed that the mean and median performance measure did not always agree. TABLE 4.9 contains the estimates of the effect of disproportional ownership on performance on each of the four performance measures for each of the three mechanisms in a model for the median firm. The main result is that the mean regression results are confirmed by the median regressions when we include firm characteristics as controls. The exception is return on assets, which reveals a negative effect of firms with dual class shares and a positive effect of firms with pyramidal ownership.

The final evidence of disproportional ownership structure and performance is accessed for firms which operate in high tech industries as classified by the OECD.[14]

TABLE 4.9 MEDIAN REGRESSION ANALYSIS OF MECHANIMS TO SEPARATE CASH FLOW AND VOTES ON PERFORMANCE

	MB	RoA	SG	EG	MBG
DCS	-0.078	-0.004	-0.023	-0.011	0.009
	(9.15)	(5.16)	(10.12)	(5.88)	(2.42)
PYR	0.014	-0.001	-0.008	-0.007	-0.002
	(1.75)	(0.84)	(2.74)	(3.64)	(0.51)
ODP	-0.018	0	-0.016	-0.003	0.002
	(0.66)	(0.05)	(1.53)	(0.58)	(0.13
Industry	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Pseudo-R^2	0.0565	0.0442	0.0685	0.0128	0.0283
No of obs.	21,209	21,209	21,209	21,209	21,209

Note: See note to TABLE 4.8
Source: Own calculations

[13] From a policy perspective the mean is of course of central importance, as it often describes the centre of the distribution of firms. However, policy makers might also be interested in other segments (non-central) of the data. This will not be taken up here, but instead another central measure will be used, the median, which is more robust towards extreme values in the dependent variable. Moreover, some of the statistical defiance's mentioned by Bennedsen and Nielsen (2006) can perhaps be dealt with.

[14] The definition of high tech firms follows OECD and includes manufacture of pharmaceuticals, medical chemicals and botanical products (ISIC 2423), manufacture of office, accounting and computing machinery (ISIC 30), manufacture of radio, television and communication equipment and apparatus (ISIC 32), manufacture of medical, precision and optical instruments, watches and clocks (ISIC 33), and manufacture of aircraft and spacecraft (ISIC 353).

TABLE 4.10 REGRESSION ANALYSIS OF DISPROPORTIONAL OWNERSHIP STRUCTURE ON PERFORMANCE, HIGH TECH INDUSTRIES

	MB	RoA	SG	EG	MBG
DP	0.105	0.006	-0.087	-0.035	0.014
	(0.81)	(0.54)	(3.06)	(1.84)	(0.48)
Industry	Yes	Yes	Yes	Yes	Yes
Country	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
R^2	0.1671	0.2568	0.0680	0.0774	0.1159
No of obs.	1,149	1,149	1,149	1,149	1,149

Note: See note to TABLE 4.6.
Source: Own calculations.

The results in TABLE 4.10 indicate that the earlier results on the effects of disproportional ownership on firms' value, operating performance and growth are to a large extent driven by low technology firms. For high technology firms, disproportional ownership has no significant effect on the market-to-book ratio, and the effects on employment growth and growth in the market-to-book ratio are insignificant.

4.5 Summary

This chapter has analyzed the connection between ownership structures and firm performance. The main findings are two: First, firms with disproportional ownership structures on average have a lower firm value than firms with a proportional ownership structure. However, the disproportional ownership structure is also associated with a larger growth in firm value. This indicates a dynamic analysis of firm value is relevant. Second, there is on average no significant difference in operating performance between the two groups.

The chapter also showed that the negative value effect and positive growth in value are driven by firms with dual class shares, although firms with dual class shares have the same operating performance as other firms.

R&D and market value is positively related for firms with disproportional ownership structure: Market value rises with R&D intensity. However, this effect is smaller for firms with a proportional ownership structure. Ownership structure has little or no influence on return on assets. The exception is firms with disproportional

ownership structure and high R&D intensity, which shows good performance in terms of return on assets.

The chapter also analysed the effect of ownership on sales and employment growth. The effect of disproportional ownership structures was negative; but the result is very likely to be sensitive to the definition of sales and employment growth. This report uses a measure, which includes organic as well as growth that origins from merger and acquisitions. If the ability to issue equity to finance takeovers differs across ownership structures, this result might be influenced by the definition of growth.

Finally, this chapter has analyzed the effect of disproportional ownership on firms' value, operating performance and growth for a set of high technology firms. For this group of firms the only significant effect of disproportional ownership is a negative effect on firms' sales growth.

5 Results for the pharmaceutical industry

In the performance analysis in Chapter 4 industry effects were included to account for differences in research and development intensity across industries. In this section focus will be on the pharmaceutical industry relative to all other industries. The pharmaceutical industry is interesting for at least three reasons: First, the industry is one of the most important sectors in Scandinavia as well as in the rest of Europe. Second, the industry is characterised by having a high research and development intensity. Third, the industry has witnessed significant growth rates over the last decades.

The objective of this analysis is twofold: First, are the ownership structures of pharmaceutical firms different from non-pharmaceutical firms? Second, is the effect of disproportional ownership structures on firm performance and outcomes different for pharmaceutical firms?[15]

5.1 Industry distribution of disproportional ownership structures

The industry grouping in Chapter 4 followed Bennedsen and Nielsen (2006). Industry grouping from Worldscope is by SIC codes. Industry affiliation is defined by where the largest sale occurs in firms that operate in multiple industries. Therefore it is likely that firms have activities in other areas, although the industry classification captures the primary industry affiliation.

[15] A disclaimer to the result in this chapter compared to the previous chapters is the small sample size. Thus, care must be exercised in interpreting the results.

TABLE 5.1 OWNERSHIP STRUCTURE IN THE PHARMACEUTICAL SECTOR COMPARED WITH OTHER INDUSTRIES

	French legal origin		German legal origin		Scandinavia		Common law		All	
	N	Share	N	Share	N	Share	N	Sha-re	N	Mean
Pharma										
DP	9	0.50	3	0.60	14	0.74	13	0.35	39	0.49
DCS	3	0.17	2	0.40	11	0.58	5	0.14	21	0.27
PYR	7	0.39	1	0.20	4	0.21	9	0.24	21	0.27
ODP	0	0.00	0	0.00	1	0.05	0	0.00	1	0.01
Non-pharma										
DP	212	0.24	246	0.39	286	0.55	631	0.42	1375	0.39
DCS	70	0.08	117	0.19	188	0.36	184	0.26	559	0.22
PYR	152	0.17	148	0.24	122	0.23	318	0.21	740	0.21
ODP	10	0.01	21	0.03	19	0.04	12	0.01	62	0.02

Note: French legal region is Belgium, France, Italy, Portugal and Spain. German legal origin is Germany and Austria, Scandinavia is Denmark, Norway and Sweden. Common law is Ireland and United Kingdom, DP is disproportional ownership, DCS is dual class shares, PYR is pyramids, and ODP is other disproportional mechanicms.
Source: Own calculations.

The number of firms in the sample with a primary industry code in the pharmaceutical industry is quite small, 39 to be precise. Therefore an alternative definition of pharmaceutical sector is applied. This alternative is defined 'Health Care' and is identified by using the Nordic Stock Exchange's definition of the health care sector.[16] The health care sector is referred to as the pharmaceutical sector throughout this chapter. TABLE 5.1 compares numbers and proportions of firms with disproportional ownership structures in the pharmaceutical industry with all other industries. The total number of pharmaceutical firms is 79. In TABLE 5.1 this group of firms is labeled 'Pharma' , whereas all other industries are referred to as 'Non-pharma'.

Focusing on the reported shares in TABLE 5.1 pharmaceutical firms has a slightly larger share of firms with disproportional ownership structures, around 50 per cent compared to 39 per cent for non-pharmaceutical firms. Across the legal regions, only Common Law has a higher proportion of disproportional ownership structures in non-pharmaceutical firms compared to pharmaceutical firms.

[16] The industry codes include SIC industry codes:2830-9 'Drugs', 3821 'Laboratory Apparatus and Furniture', 3841 'Surgical and Medical Instruments and Apparatus', 3842 'Orthopedic, Prosthetic, and Surgical Appliances and Supplies', 5047 'Medical, Dental, and Hospital Equipment and Supplies', 8071 'Medical Laboratories', and 8731 'Commercial Physical and Biological Research'.

TABLE 5.2 LARGEST OWNER'S CONTROL AND DEGREE OF DISPROPORTIONALITY, THE PHARMACEUTICAL SECTOR

	Median votes	Median degree of disproportionality
Pharma	Per cent	Percentage points
PP	20.75	0.0
DP	30.56	13.55
DCS	35.88	18.01
PYR	24.66	5.26
Non-pharma		
PP	34.45	0.0
DP	31.87	9.45
DCS	30.72	9.94
PYR	32.35	6.98

Note: PP is proportional, DP is disproportionality, DCS is dual class shares, PYR is pyramids.
Source: Own calculations

TABLE 5.1 also shows that the use of mechanisms to separate control and income rights in all countries are distributed equally across dual class shares and pyramids for pharmaceutical firms. This is similar to firms outside the pharmaceutical industry. Dual class shares are commonly used in the Scandinavian countries and Germany, whereas the use of pyramids dominates in countries with French legal origin and common law. We therefore again observe that Scandinavian firms within the pharmaceutical sector tend to rely more on dual class shares than firms in other countries. Moreover, pharmaceutical firms from countries with a French legal origin use pyramids more frequently than in any other region. This is contrary to the general analysis, which showed that the use of dual class shares varied significantly across countries, whereas the use of pyramids was relatively constant.

TABLE 5.2 looks at the concentration of control and the degree of disproportionality in the pharmaceutical sector relative to non-pharmaceutical firms. TABLE 5.2 shows that the concentration of votes is significantly lower for proportionally owned pharmaceutical firms compared to firms with disproportional ownership structures. This difference is mainly explained by the relatively high concentration of pharmaceutical firms with proportional ownership structures in the common law and the Scandinavian countries, where control is less concentrated. For disproportionally owned firms the control rights are not different when we compare pharmaceutical to non-pharmaceutical firms. However, firms with dual class shares have slightly more concentrated control in the pharmaceutical industry compared to

other industries. Once again the geographical location might explain this difference. Pharmaceutical firms with dual class shares are mainly present in Germany and Scandinavia, where the separation of control and income rights is high. This effect is evident when we focus on the third column in TABLE 5.2, which shows the median degree of disproportionality conditional on the disproportionality mechanism. The difference across industries in the wedge between voting and income rights for firms with disproportional ownership is driven by firms with dual class shares. Again, this difference can be explained by the regional differences in the use of mechanisms separating voting and income rights.

5.2 Firm performance with focus on pharmaceutical sector

This section focuses on the economic situation of pharmaceutical relative to non-pharmaceutical firms. As in Chapter 4 the indicators used are: firm value (market to book value), operating performance (return on assets), and growth in sales and number of employees. With respect to the two latter measures of firm performance, the caveats from the prior analysis apply: Our growth measures do not distinguish between organic growth and growth through merger and acquisitions. Therefore, these results should be interpreted with caution.

TABLE 5.3 and TABLE 5.4 show performance for the pharmaceutical industry as well as for other industries. First thing to notice is the superior performance of the pharmaceutical sector in general. Market to book value is much higher than for other industries; sales and employment growth are significantly higher whether firms are proportionally owned or not; only return on assets provides a mixed picture of the relative performance of the pharmaceutical sector, although return on assets might be downwards biased by the inclusion of biotechnological companies, which are characterized by high cash expenditures on research and development and small current sales, in the definition of the pharmaceutical industry.

Concentrating on the differences within the pharmaceutical industry, TABLE 5.3 reveals that the market to book ratio is lower for firms with disproportional ownership structures than for firms with proportional ownership structure. However, opposite to the general result,

pharmaceutical firms with dual class shares have higher firm value compared to firms with pyramidal ownership. This pattern is independent of whether mean or median firm values are the centre of attention.

TABLE 5.3 also shows that pharmaceutical firms with proportional ownership have negative operating performance for both the mean and the median return on assets. This result is partly driven by the definition of the pharmaceutical sector, which includes biotechnological firms, where the main activity is research and development of new drugs. R&D expenditures reduce (current) return on assets in these firms, which also explains the relatively large difference between mean and median return on assets for pharmaceutical firms with proportional ownership structures. Restricting the sample to the core of the pharmaceutical industry (39 firms) leads to the finding of a positive return on assets for proportionally owned firms, although the mean is still smaller compared to firms with disproportional ownership structures.[17] The main difference across mechanisms is for mean return on assets, where pyramids perform slightly better than dual class shares.

TABLE 5.3 PERFORMANCE IN THE PHARMACEUTICAL SECTOR – MARKET-TO-BOOK RATIO AND RETURN ON ASSETS

	Market-to-Book			Return on assets		
	N	Mean	Median	N	Mean	Median
Pharma						
PP	308	2.7904	1.7431	311	-0.1657	-0.0544
DP	313	1.9358	1.5495	311	0.0379	0.0637
DCS	148	2.1606	1.7043	145	0.0379	0.0708
PYR	126	1.8693	1.5512	127	0.0551	0.0804
Non-pharma						
PP	16,012	1.1406	0.8329	15,932	0.0301	0.0437
DP	10,500	1.0489	0.8298	10,542	0.0423	0.0450
DCS	4,823	0.9772	0.8022	4,856	0.0400	0.0437
PYR	4,084	1.1780	0.8595	4,079	0.0465	0.0469

Note: See note to TABLE 5.2.
Source: Own calculations.

[17] These results are available on request. The small sample size increases uncertainty.

TABLE 5.4 PERFORMANCE IN THE PHARMACEUTICAL SECTOR – SALES AND EMPLOYMENT GROWTH

	Sales growth			Employment growth		
	N	Mean	Median	N	Mean	Median
Pharma						
PP	284	0.1645	0.1116	269	0.0556	0.0511
DP	282	0.0862	0.0545	274	0.0442	0.0310
DCS	133	0.1028	0.0526	130	0.0476	0.0321
PYR	114	0.0969	0.0748	110	0.0561	0.0327
Non-pharma						
PP	14,333	0.0579	0.0569	12,843	0.0319	0.0114
DP	9,353	0.0532	0.0480	8,293	0.0236	0.0088
DCS	4,325	0.0508	0.0490	3,825	0.0169	0.0099
PYR	3,603	0.0600	0.0493	3,182	0.0324	0.0110

Note: See note to TABLE 5.2.
Source: Own calculations.

Results on growth in sales and employment are reported in TABLE 5.4. The mean (yearly) sales growth rate is much higher than the median due to some extraneous large sales growth rates within the pharmaceutical industry. Firms with proportional ownership structures have experienced higher growth in terms of sales. Again, is it worth highlighting that this analysis cannot distinguish between organic growth and growth through acquisitions. Any difference in growth rates between firms can potentially be attributed to differences in the ability to finance growth through mergers and acquisitions. Moreover, TABLE 5.4 shows that the difference between mechanisms is less clear as the mean points towards higher sales growth for dual class shares, whereas the median points towards higher growth for pyramids. TABLE 5.4 also reports results for the (yearly) employment growth. Again proportionally owned firms grow slightly quicker than disproportionally owned firms. But given the small sample and the inability to separate organic and takeover growth, this result is probably not robust.

In TABLE 5.5 growth in market to book ratio is negative for proportionally owned firms and positive for disproportionally owned firms on average and for the median firm.

TABLE 5.5 PERFORMANCE IN THE PHARMACEUTICAL SECTOR – MARKET TO BOOK VALUE GROWTH

Ownership structure	N	Mean	Median
Proportional	143	-0.0555	-0.0109
Disproportional	117	0.0333	0.0299
Dual Class Share	63	0.0485	0.0548
Pyramid	60	0.0198	-0.0023

Source: Own calculations

To complete the analysis of the pharmaceutical sector, TABLE 5.6 shows estimates from regressions with the five measures of firm performance as dependent variables. Compared to the analysis in Chapter 4, industry controls are excluded, but the empirical model still contains controls for country, year and firm characteristics. In TABLE 5.6 the results for firms with disproportional ownership structure are reported. The effect on market to book ratio looks much higher than prior estimates. However, the average market to book ratio is much higher for firms in thee pharmaceutical industry. The parameter estimate in TABLE 5.6 of 0.199 translates into an effect equivalent to 7.1 per cent higher firm value for disproportionally owned firms.

More interestingly TABLE 5.6 shows a large positive effect of disproportional ownership on return on assets in the pharmaceutical industry, which was expected given that proportionally owned firms appeared to have negative return on assets on average.

The sign of disproportionality on employment is positive whereas the sign on sales growth is negative in TABLE 5.6. However, the estimates are also insignificant.

In TABLE 5.7 the effect of each mechanism on firm performance and outcomes is reported. The results point towards that the positive effect on the market to book ratio is driven by firms with dual class shares. The effect on return on assets is positive and significant for only pyramids. Finally, TABLE 5.7 shows that the results for sales, employment and market value growth are insignificant.

TABLE 5.6 REGRESSION ANALYSIS OF DISPROPORTIONAL OWNERSHIP ON PERFORMANCE – THE PHARMACEUTICAL SECTOR

	MB	RoA	SG	EG	MBG
DP	0.199	0.101	-0.105	0.008	0.015
	(0.65)	(3.25)	(0.93)	(0.15)	(0.20)
Country	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes

Note: MB is market to book ratio. RoA is return on assets, SG is sales growth. EG is employment growth. MBG is growth in market to book ratio. DP is disproportional. T-statistics are reported in parenthesis.
Source: Own calculations.

TABLE 5.7 REGRESSION ANALYSIS OF MECHANISMS TO SEPARATE CASH FLOW AND CONTROL – THE PHARMACEUTICAL SECTOR

	MB	RoA	SG	EG	MBG
DCS	0.897	0.015	0.066	0.083	-0.031
	(2.37)	(0.39)	(0.47)	(1.31)	(0.32)
PYR	-0.307	0.140	-0.178	-0.058	0.044
	(0.95)	(4.28)	(1.48)	(1.07)	(0.53)
Country	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes

Note: See note to TABLE 5.6. DCS is dual class shares, PYR is pyramids, ODP is other disproportionality.
Source: Own calculations.

The results are sensitive. Median regressions confirm the results in TABLE 5.7, but in general show much smaller parameter estimates in absolute value (result not reported). The effect on market to book ratio and return on assets commented upon above both become insignificant. This indicates that the results are driven by outliers in the very small sample of pharmaceutical firms.

5.3 Summary

The ownership structure of the pharmaceutical industry shares certain similarities with other industries, but also has a number of distinct characteristics. The share of firms with disproportional ownership structures is slightly higher among pharmaceutical firms, which is consistent with the evidence on R&D intensity in Chapter 3. Interestingly, the pharmaceutical sector ranks among the most R&D intensive industries.

The differences in the use of mechanisms and the degree of disproportionality between firms in the pharmaceutical and other industries reflect the geographic location of firms within the pharmaceutical industry. These differences are primarily driven by pharmaceutical firms located in Scandinavia and German legal origin countries where the use of dual class shares and a high degree of disproportionality are common traits. This further highlights that ownership structures in Scandinavia are significantly different compared to the rest of Europe.

The analysis of firm performance and outcomes emphasized significant differences between the pharmaceutical and other

industries. The main difference compared to the general performance results from Chapter 4 is the finding that pharmaceutical firms with disproportional ownership have higher return on assets compared to firms with a proportional ownership structure. Moreover, despite potential problems related to the measurement of growth rates, the analysis found no significant differences across ownership structures for both employment and sales growth. Finally, the general negative effect on the market to book ratio for firms with disproportional ownership was confirmed for pharmaceutical firms. Contrary to the results from Chapter 4, the negative effects on firm value seem to be driven by pharmaceutical firms with pyramidal ownership and not firms with dual class shares.

6 Conclusion

This report has analyzed ownership structures and their effects on firms' economic situation in Europe in three parts. The first part of the report provided a descriptive overview of the use of mechanisms to separate control and income rights. Across country, firm and industry characteristics the following findings emerged:

- The use of disproportional ownership structures and in particular dual class shares varies across countries in Europe.
- Scandinavia has the largest share of firms with disproportional ownership structures driven by a frequent use of dual class share.
- The share of firms with disproportional ownership is highest for large firms and for firms within research and development intensive industries.

The second part of this report focused on the link between ownership structures and firms' economic situation and revealed a number of interesting patterns:

- Disproportional ownership structures are associated with a value discount. This value discount is mainly driven by firms with dual class shares.
- The effect of disproportional ownership structures on return on assets is insignificant. The effect of disproportional ownership on the growth in the market-to-book ration is positive.
- Firms with disproportional ownership structures have lower growth measured by both sales and number of employees. However, a clear interpretation of these results is hindered by insufficient to data to distinguish between organic growth and growth through merger and acquisitions.
- Even though firms in research and development intensive industries have higher firm value, the effect is smaller for firms with disproportional ownership structures. The opposite holds with respect to return on assets.

In the third part of the report the pharmaceutical industry was centre of attention. The analysis of differences between pharmaceutical and non-pharmaceutical firms provided a number of different insights:

- Pharmaceutical firms with disproportional ownership structures on average have higher return on assets than proportionally owned firms.

- The employment and sales growth are no different for pharmaceutical firms with disproportional ownership structures.
- The value discount on pharmaceutical firms with disproportional ownership structures was comparable to the general effect found for all firms. However, the value discount seems to be driven by pharmaceutical firms with pyramidal ownership rather than firms with dual class shares.

One important caveat to these results is that the number of pharmaceutical firms is relatively small.

The results of the analyses in this report indicate that one cannot on the basis of existing data draw any general conclusions on whether disproportional ownership is good or bad for firms. On average firms with disproportional ownership have a lower market-to-book value than firms with proportional ownership. The result appears to be generated by firms in low and medium technology industries, as it does not extend to high tech industries. Similarly, the effect of disproportional ownership on operating performance depends on which measure of operating performance is used and which industries are considered. Finally, on average firms with disproportional ownership experience slower employment and sales growth than firms with proportional ownership, but this does not extend to high tech firms.

As such, the findings of this report raise some interesting points to consider in the European debate on the regulation of ownership structures and important topics for future research.

References

Bennedsen, Morten and Kasper M. Nielsen (2006) ”The Principle of Proportional Ownership, Investor Protection and Firm Value in Western Europe”, CEBR Discussion Paper, 2006.

Claessens, Stijn; Simeon Djankov; Joseph P.H. Fan and Larry H.P. Lang (2002) “Disentangling the Incentive and Entrenchment Effects of Large Shareholders”, The Journal of Finance, Vol. LVII, NO. 6, December 2002.

Faccio, Mara and Larry H.P. Lang (2002) “The ultimate ownership of Western European corporations”, Journal of Financial Economics 65 (2002), pp. 365 – 395.

Gompers, Paul A.; Joy Ishii and Andrew Metrick (2004) “Incentives vs. Control: An Analysis of U.S. Dual-Class Companies”, NBER Working Paper No. W10240.

La Porta, Rafael; Florencio Lopez-de-Silanes; Andrei Shleifer and Robert W. Vishny (1998) “Law and Finance”, Journal of Political Economy, December 1998.

Sutton, John (1997) “Gibrat’s Legacy”, Journal of Economic Literature, Vol. XXXV (March 1997), pp. 40-59.