

CORPORATE REFOCUSING IN THE UK:

AN EMPIRICAL INVESTIGATION



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ABSTRACT

It has been widely suggested that since the early 1980s the trend towards ever greater corporate diversification has been reversed in many mature economies; with many diversified firms narrowing the scope of their activities by refocusing on what are perceived to be core businesses primarily, though not exclusively, through major divestments. Whilst recent research, largely in the US context, has started to take place on corporate refocusing there is a paucity of evidence on refocusing in the UK. The aim of this thesis is to address this shortcoming and to examine corporate refocusing activity in the UK.

This study uses a specially constructed data set compiled from primary and secondary sources, covering 158 publicly quoted companies over the period 1985 to 1993. The thesis initially examines the extent and nature of refocusing activity in the UK. It is found that refocusing activity is undertaken by a substantial majority of the sample firms. Firms refocused primarily by divesting unrelated businesses and acquiring related activities. The thesis proceeds to examine the characteristics of refocusing firms using cross-sectional OLS and logit techniques. It is found that refocusing firms are characterised by high levels of diversification, low levels of management ownership and to a limited extent by an attractive core business on which to refocus. The thesis next examines the determinants of firms' divestment behaviour using both cross-sectional and panel data proportions and count data (Poisson and Negative Binomial regressions) techniques. The results indicate that divestment is a purposeful response to financial, strategic, corporate governance and - to a limited extent - market structure characteristics. In the final part of the thesis, we examine the impact of divestment on firm performance by adopting a dynamic profitability equation augmented with divestment variables. The results suggest that divestment has a positive impact on the profitability of divesting firms. The performance effect is greater for firms operating weak governance mechanisms.

It is concluded that corporate refocusing is an important phenomenon in the UK and is not merely an invention of the business press. The determinants of divestment indicate that divestment is not simply a reflection of managerial idiosyncrasies or mean reversion behaviour in the activities undertaken, but a purposeful response to a change in the equilibrium level of diversification. The adoption of a refocusing strategy appears to improve the overall performance of divesting firms.

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DECLARATION

Some of the material in this thesis draws on joint work with Steve Thompson and Mike Wright. Part of Chapter 7 was presented at the 24th annual EARIE meeting in Leuven, and the European Economic Association Conference, Toulouse, both in September 1997 and is forthcoming in the International Journal of Industrial Organisation. Some of the results in Chapter 8 were presented at the Royal Economic Society Conference, Warwick, March 1998. Part of Chapter 9 was presented at the 25th annual EARIE meeting in Copenhagen, August 1998.

1. INTRODUCTION

1.1 Research Subject

In terms of corporate behaviour, the 1980s and beyond have been characterised as a period of extensive corporate restructuring (Shleifer and Vishny, 1991; Denis *et al.*, 1997). Corporate restructuring is a relatively new term employed to embrace significant and rapid changes in the asset, capital or management structure of the firm (Singh, 1993). More specifically, restructuring mechanisms can be classified into one of three categories (Gibbs, 1993; Bowman and Singh, 1989): (1) portfolio restructuring involving divestments, acquisitions, and refocusing; (2) financial restructuring including stock repurchases, leveraged recapitalisations and changes to the financial structure, usually involving the infusion of large amounts of debt; and (3) organisational restructuring including downsizing, reorganisation and changes in business strategies which are designed to increase the efficiency and effectiveness of management teams. Given the scope of restructuring, this study concentrates on one aspect of portfolio restructuring, namely *corporate refocusing*.

Corporate refocusing is defined as the voluntary reduction in the scope of activities by a firm in an attempt to concentrate on the core business, primarily, though not necessarily, achieved through major divestments. This reduction in diversification has also been referred to in the business press as 'de-diversification', 'de-conglomeration' or more colourfully, as 'sticking to the knitting' (Peters and Waterman, 1982). Corporate refocusing is chosen for this

study because it is this form of restructuring that has dominated corporate behaviour in the UK in recent years.

The prevalent explanation for refocusing (for example, Bhagat *et al.*, 1990; Shleifer and Vishny, 1991; Markides 1995a), is that firms are attempting to reverse their excessive levels of diversification, most of which occurred in the late 1960s and early 1970s. This explanation implies two things: first, that there exists some optimal limit to the extent to which a firm may diversify without adversely affecting its performance; and second, that if refocusing became a widespread phenomenon from the 1980s, as Bhagat *et al.* (1990), Markides (1995a, b) etc. suggest for the US and is argued here for the UK, then a large number of firms must have found themselves to have been in breach of this optimum, during the period in question. As a result, the profitability and market value of overdiversified firms will suffer and the issue of externalising transactions by divestment to form an independent entity (e.g. a management buy-out) or to another organisation becomes worthwhile (Wright & Thompson, 1987).

The existence of an optimal limit to firm size is a widely debated subject in the economics literature. Transaction-cost economics (Teece, 1982) and the resource-based view of the firm (Wernerfelt, 1984) emphasise the benefits which may accrue when a firm diversifies to exploit under-utilised, firm-specific assets. However, the benefits to diversification may be strictly limited and will decline as firms diversify further and further from the core business. In addition, certain costs associated with an increase in firm size have been identified. For

example, as Penrose (1959) described in the case of managerial resources, constraints on internal expansion are generated through hiring and training new managers. Williamson (1967) suggested that information and control-loss problems limit the viable height of hierarchical organisations, while intra-firm transactions may inhibit hierarchical decomposition.

If corporate refocusing became widespread in the 1980s, then a large number of firms must have found themselves simultaneously to be in breach of their optimum level of diversification. At least three inter-related explanations for a downward displacement in the optimal level of diversification during the 1980s have emerged from the literature. First, Jensen (1989) and others have argued that the optimal level of diversification has declined due to an increase in the effectiveness of the market for corporate control during the 1980s. From the agency literature, if divestment is a reversal of past managerial discretion then diversifying expansions are more likely in situations of weak governance. The increase in the use of debt-financed takeovers, hostile bid advisors and the emergence of a venture capital market in the 1980s, have not merely reduced the ability of managers to divert free cash flow to preferred but unprofitable expansions, but have also encouraged them to divest loss-making activities.

Second, firms may have experienced a reduction in the optimal level of diversification in the 1980s as a consequence of the decline in the comparative advantage of the multidivisional form of organisation. Williamson (1975) argued that informational and decision-control failures led to the superiority of the internal capital market, organised around inter-divisional competition of funds,

over its external counterpart. However, if capital market innovations during the 1980s made it easier for external investors to finance and monitor projects, as has been suggested, then the information advantages of the internal capital market would be attenuated (Bhide, 1990).

Finally, the capital market reversed its previous optimistic stance on conglomerate mergers in the 1960s and 1970s and started to prefer more narrowly focused firms in the 1980s. The effect has been to encourage firms to engage in de-diversifying transactions.

The emergence of corporate refocusing in the 1980s represents a dramatic shift from the previous merger trend by UK firms. This emphasis upon specialisation appears to have reversed the formally dominant tendency towards increasing levels of diversification that had characterised business development for several decades. The business press abounds with examples of firms narrowing the scope of their activities in an attempt to maximise shareholder value. For example, during the 1980s Lex Service Group divested its interests in transportation in order to concentrate on electronics and strengthen its core motor-distribution activities. Both Hanson and Thorn EMI demerged quoted conglomerates into tightly-focused individual businesses in an attempt to create greater focus and growth opportunities. BTR announced plans in the 1990s to sell off businesses worth £622 million to concentrate on its core business.

This apparent reduction in diversification over the past 15 years or so has been associated with widespread divestment in the US (Kaplan and Weisbach, 1992;

Ravenscraft and Scherer, 1987). The fragmentary evidence available also suggests that UK firms have narrowed their range of activities through high levels of voluntary divestment over the same period (Geroski and Gregg, 1997), although to date there is little substantive evidence to support this. As shown in Tables 1.1 and 1.2, in terms of the overall pattern of corporate restructuring, divestment has become an important feature of the UK market for corporate control during the 1980s both in terms of the total value and number of transactions. A significant contributor to the increase in divestment activity has been the emergence of management buy-outs (MBOs) where existing managers become equity holders in the newly acquired divested unit (see Wright *et al*, 1997 on the historical development of the MBO). Earlier divestment activity was much less significant and typically involved the disposal of business units horizontally or vertically related to the core business (see Hannah, 1983 for a discussion on earlier restructuring waves). In contrast, corporate refocusing activity from the 1980s onwards is perceived to be associated with widespread diversification-reducing divestments.

Whilst recent research, largely in the US context, has started to take place on corporate refocusing (Johnson, 1996), a number of important questions need to be addressed and further analysis is warranted. In particular, what is the extent and nature of this phenomenon, what factors have prompted this change in corporate behaviour, and what effect, if any, has it had on the UK firm?

Table 1.1 The UK Market for Corporate Control – Value of Transactions (£m)

Year	Acquisition ¹	%	Divestment ²	%	Total
1983	1,907	70	811	30	2,718
1984	4,353	74	1,534	26	5,887
1985	6,298	76	1,968	24	8,266
1986	12,278	73	4,595	27	16,873
1987	11,871	59	8,106	41	19,977
1988	17,307	62	10,541	38	27,848
1989	21,572	62	13,165	38	34,737
1990	5,388	47	6,046	53	11,434
1991	7,487	56	5,826	44	13,313
1992	4,108	45	5,095	55	9,203
1993	2,986	30	6,944	70	9,930
1994	5,743	48	6,142	52	11,885
1995	25,647	67	12,423	33	38,070

Notes:

¹Independent acquisitions²Includes sell-off of subsidiaries, buy-outs and buy-ins

Source: CMBOR (1998)/Barclays Private Equity/Deloitte & Touche and Office for National Statistics

Table 1.2 The UK Market for Corporate Control – Number of Transactions

Year	Acquisition ¹	%	Divestment ²	%	Total
1983	305	44	387	56	692
1984	398	49	418	51	816
1985	340	44	425	56	765
1986	621	51	590	49	1,211
1987	1,188	61	774	39	1,962
1988	1,123	56	869	44	1,992
1989	896	48	966	52	1,862
1990	437	32	944	68	1,381
1991	292	27	787	73	1,079
1992	232	23	791	77	1,023
1993	337	33	681	67	1,018
1994	465	38	760	62	1,225
1995	299	27	798	73	1,097

Notes:

¹Independent acquisitions²Includes sell-off of subsidiaries, buy-outs and buy-ins

Source: CMBOR (1998)/Barclays Private Equity/Deloitte & Touche and Office for National Statistics

1.2 Shortcomings of Previous Research

The purpose of this study is to provide an empirical investigation of corporate refocusing in the UK. The aim is to evaluate the extent of refocusing by UK firms, to distinguish the characteristics of refocusing firms and to analyse the causes and performance consequences of a refocusing strategy using a large sample of UK quoted companies over the period 1985 to 1993. This period is chosen to correspond with intense refocusing activity in the UK (see Tables 1.1 and 1.2). A sample of quoted companies is adopted since it is believed that it is these firms that are undertaking most of the refocusing. The data consist of a unique panel of observations on firms through time compiled from primary and secondary sources.

Whilst there is a large descriptive and analytical literature on restructuring in general, there is a lack of systematic empirical evidence on refocusing, particularly for the UK. Given the importance of the phenomenon and the relative scarcity of information in this area, the goal of this study is to learn more about refocusing in the UK and to offer some informed opinions. This study is primarily concerned with the decision to refocus through divestment activity, where divestment is defined as the disposal of a firm's assets. It is believed to be the first comprehensive attempt to analyse divestment activity in the UK.

Whilst research is beginning to take place, largely in the US, most empirical work has concentrated on the *ex ante* stock market response to sell-offs or

refocusing announcements. However, since it is clear that the market initially favoured and then turned against conglomerate mergers, there is no guarantee that its initial view of divestment is any more reliable. The event study approach also relies on the identification of the event as a single divestment, yet for larger firms multiple divestments are typically part of larger restructuring programmes.

Whilst more recent research has started to look at the *ex post* performance effects of refocusing firms (e.g. Markides, 1995a) many studies provide little more than indirect evidence on the performance consequences for the vendor company. Moreover, much of the previous evidence on corporate refocusing is limited because of its use of cross-sectional models to examine longitudinal relationships (Bergh and Holbein, 1997). As such, previous research which examines the causes of divestment may be subject to specification bias and inefficient estimates of relationships. It is clear that a substantial amount of further empirical work is necessary to investigate the antecedents and consequences of the refocusing process.

One explanation for the apparent neglect of research on refocusing is the inherent difficulty in obtaining detailed and reliable data on diversification and divestment activity in the UK. In addition, divested activities have no separate share price and/or accounting data, rendering analysis problematic. This contrasts with the availability of stock market and accounting data for merger studies.

1.3 Statement of this Research

The approach adopted in this study is novel in a number of respects. First, it utilises a unique data set compiled from primary and secondary sources, covering 158 publicly quoted companies over a number of industrial sectors over a period of 9 years (i.e. 1985 to 1993). Second, it provides an econometric analysis of the causes and consequences of refocusing activity, using what is believed to be more appropriate and sophisticated techniques than previously adopted. Given that diversification is a dynamic process, it seems more appropriate to use a panel of firms to examine the relationships between the causes and consequences of refocusing than a cross-section. In addition, count data techniques are employed to model divestment given the discrete nature of the divestment data. Neither of these techniques has been used explicitly in this area before.

In order to address some of the shortcomings in previous research, the first objective of the study is to determine the extent and nature of refocusing across a sample of UK firms. It is found that approximately half of the sample reduced their level of diversification over the period. The extent of refocusing is therefore consistent with the perception that refocusing is a relatively widespread phenomenon and not merely an invention of the business press. The majority of divestment undertaken by firms also appears to be unrelated to their core business. This result is consistent with previous research in the US (for example, Markides 1995a).

The second aim is to analyse the characteristics of refocusing firms. An examination of the data revealed that the refocusing firms are those with the highest mean level of diversification at the beginning of the period. These firms also suffered, on average, from lower start-of-period performance compared to firms who diversified over the study period. Regression techniques were adopted to estimate the distinguishing characteristics of refocusing and non-refocusing firms using a variety of firm-specific and industry characteristics. The results indicate that firms that refocused are characterised by high diversification, low insider ownership and to a limited extent, by the existence of an attractive core business on which to refocus.

The third main objective of the study is to provide an econometric analysis of the causes of refocusing. In so doing, the intention is to try and isolate the determinants of divestment and to discriminate between the alternative hypotheses put forward to explain such transactions. Developments in the theory of the firm have extended the characterisation of the firm as a “black box” and a number of competing and complimentary explanations for refocusing activity have emerged in the theoretical literature. However, the antecedents of corporate refocusing remains a relatively under-researched area and only a few studies attempt to distinguish between the theoretical approaches (Johnson, 1996). In this study, the determinants of refocusing are modelled using both proportion and count data techniques in which divestment is related to financial, corporate governance, business strategy and market structure characteristics. Divestment is found to be systematically related to financial, governance, strategy and - to a limited extent - market structure characteristics. The results

confirm that corporate divestment is not merely a reflection of managerial idiosyncrasies or mean-reversion behaviour in the activities undertaken, but is a purposeful response to exogenous change in a manner broadly consistent with both the agency theoretic and strategic views of the firm.

Finally, the research seeks to determine whether, and under what circumstances, the adoption of a refocusing strategy improves the performance of large, quoted companies. In order to address these issues, a standard dynamic profitability equation, augmented by divestment variables, is estimated for the sample of firms. The results suggest that divestment does have a non-trivial and statistically significant impact on the profitability of the divestor. Attempts to discriminate between hypotheses indicate that the performance effect is greater for firms operating weak governance mechanisms and gives support to those who see divestment as a reversal of the consequences of previously exercised managerial discretion.

The results from this study help to contribute to our knowledge and understanding of corporate refocusing activity by UK firms, which to date has received very little attention.

1.4 Outline of Chapters

This thesis is divided into four main parts. The first part considers the treatment of diversification and refocusing in the economic, finance and strategic management literatures. Chapter 2 sets the thesis in context by analysing

corporate diversification. Trends in diversification and the nature of diversification in the UK over the post-war period are highlighted. Chapter 2 also examines the theoretical arguments for diversification and reviews the available empirical evidence. The development of diversification in theories of the firm is considered, including resource-based, transaction costs, market power and managerial explanations for diversification. The empirical literature is organised around four broad themes: the measurement of diversity; the nature and extent of diversification; the determinants of diversification; and the consequences of diversification. This framework is chosen since few studies are direct tests of existing theories of diversification. It also provides a framework for the empirical analysis of the thesis.

Chapter 3 follows on from the review of the treatment of diversification to discuss the corporate refocusing literature. It considers the theoretical explanations for refocusing and summarises the existing empirical literature. The main focus of this chapter is on the divestment process through which refocusing is primarily, but not necessarily, achieved. The view that there exists an optimal limit to diversification is presented, followed by a detailed analysis of the factors which are likely to lead to divestment and the consequences of a refocusing strategy on the vendor company. The empirical studies are organised in a similar fashion to that in Chapter 2.

Part II considers the features of the study design and the methods adopted. Chapter 4 outlines the approach adopted in the thesis and relates it to the objectives of the study. It also examines the characteristics of the sample and

defines the study variables. Problems associated with the measurement of certain variables are also highlighted. Chapter 5 outlines the methods adopted during the course of this study. Four separate techniques are used to examine the different aspects of corporate refocusing activity: first, linear static cross-sectional models; second, linear static panel data models; third, nonlinear cross-sectional and panel data models with discrete dependent variables (logit, Poisson and Negative Binomial regressions); and finally, dynamic panel data models.

Part III comprises the empirical analysis of the thesis. It is divided into four chapters. The first, Chapter 6, concentrates on the extent and nature of corporate refocusing and examines the characteristics of refocusing firms. It considers the importance of refocusing in the UK with an extension to the characteristics of refocusing firms. The purpose is to assess the extent of refocusing both across the sample and within the sample. Summary statistics of the data and cross-sectional regression techniques are adopted to determine the distinguishing characteristics of refocusing and non-refocusing firms.

Chapter 7 examines the determinants of the divestment decision. It considers the impact of performance, strategy, governance and market structural characteristics on divestment. Divestment is alternatively estimated using the proportions measure and count data analysis, employing Poisson and negative binomial distribution regressions, to explore the determinants of divestment in a cross-sectional framework.

Chapter 7 can be considered a preliminary analysis and relates closely to Chapter 8; the latter considers the same relationships but in a panel context and including additional explanatory variables. Chapter 8 has the merit of covering a larger number of observations and by employing unbalanced panel data techniques is better able to discriminate between the alternative hypotheses put forward to explain refocusing transactions. This analysis is unique within existing studies on the antecedents of corporate refocusing which largely adopt a cross-sectional design.

Chapter 9 investigates the *ex post* relationship between performance and refocusing for UK firms. In particular, attention is given to the effect of divestment on the subsequent performance of the divesting firm. Divestment is considered to improve the subsequent performance of the vendor firm. In order to test this proposition a dynamic panel data model is employed to estimate the long-run effect of refocusing on the vendor. In addition, the extent of diversification and governance for each firm is used to classify firms into 'complex' and 'non-complex', and 'weak' and 'strong'; the relationship between performance and divestment is considered separately for each group to see if performance varies over the groups. This analysis is unique within existing studies on refocusing which largely concentrate on the stock market performance of divestment. This chapter aims to extend the existing analysis of firm performance to include refocusing activity.

Finally, Part IV concludes with a summary and discussion of the results. Chapter 10 aims to draw together the separate conclusions from each chapter to

provide a broader view of the relationship between these results and the implications they have for the themes discussed throughout this thesis. In addition the limitations of the analysis are discussed and areas of further research are identified.

2. CORPORATE DIVERSIFICATION

2.1 Introduction

Throughout the 1950s, 1960s and 1970s, both the US and the UK witnessed a significant trend towards increasing levels of diversification (see for example, Rumelt, 1974; Utton, 1977; Amey, 1964; Gorecki, 1975; Hassid, 1975). Table 2.1 highlights the distribution of firms by strategic category for these two countries over the post-war period. The table indicates that in the 1950s both countries' corporate population was composed largely of relatively undiversified firms. By the 1970s, there had been a significant reduction in the proportion of single business firms and a dramatic increase in the degree of diversification.

Diversification describes the process by which a firm extends its activities beyond the products and markets in which it currently operates. (A narrow definition excludes expansion in the direction of closely substitutable products, as with horizontal integration, or in the direction of supplies or outlets, as with vertical integration.) A firm may diversify in the direction of broadly similar activities (i.e. related diversification) or shift direction into an entirely new activity (i.e. unrelated diversification). Diversification may occur through the internal development of an existing resource or through acquisition. The latter form is the primary means of firm diversification (Porter, 1987), although not all mergers occur for diversification purposes.

Table 2.1 Trends in Diversification, UK and US

Strategic Category	UK			US		
	1950	1960	1970	1949	1959	1974
Single business	34	20	6	42.0	22.8	14.4
Dominant business	41	35	34	28.2	31.3	22.6
Related business	23	41	54	25.7	38.6	42.3
Unrelated Business	2	4	6	4.1	7.3	20.7

Note: percentage in each category

Source: Channon (1973) for the UK; Rumelt (1974) for the US

Since corporate refocusing is essentially a reduction in the level of diversification it is necessary to review the literature in this field. (The discussion in this chapter provides a precursor to Chapter 3 of this thesis which examines the literature on corporate refocusing.) The process of diversification has received much attention in the literature; as far back as the 1960s, Chandler (1962) in his seminal work suggested that successful firms expand their operations by diversifying their product offerings. The aim of this chapter is to examine the theoretical explanations for diversification and to summarise the main empirical studies in this area. There exists a series of complementary models drawn from the economics, finance and strategic management literatures which attempt to explain firm diversification behaviour and these are presented in detail in Section 2.2. Section 2.3 reviews the empirical evidence on diversification. The literature review is organised around four broad themes; the measurement of diversity; the extent and nature of diversification; the determinants of diversification; and the effects of diversification. A brief summary follows in Section 2.4.

2.2 Theoretical Explanations for Diversification

This section examines the alternative theoretical explanations for diversification. Attempts to explain diversification have involved either adaptations of the neo-classical theory of the firm or more frequently, the adoption of a different approach to examining firm behaviour by dropping the assumption of perfectly competitive markets.

2.2.1 Neo-Classical Theory

The neo-classical theory of the firm assumes that firms are homogeneous profit-maximising producers of single products operating in perfectly competitive markets with zero transaction costs and complete information. This approach has little interest in the organisation and role of the firm and essentially treats it as a “black box”. That is, the firm is known to exist but no attempt is made to justify the internal operations or decision making process.

Limited diversification may occur within this framework if one introduces economies of scope¹ (Panzar and Willig, 1981) and/or firm risk (Fama, 1970), both of which are different variants of profit-maximising behaviour. For example, Panzar and Willig (1981) suggest that multi-product firms may exist in perfectly competitive markets due to cost savings resulting from the scope of enterprise. Fama (1970), assuming a perfect capital market, argues that firms will diversify to reduce firm risk. This view is essentially based on portfolio theory and argues that when separate cash flows of a multi-product firm are not perfectly correlated, total risk (measured by the variability of consolidated cash

flows) is reduced by diversification (Markham, 1973). In addition, a firm may diversify through acquisition if the value the potential buyer places on the potential victim is higher than the value placed on it by its current owners. This will occur if there exists a potential synergy between the two firms. All of these explanations suggest that diversification will lead to improved performance.

However, Teece (1980, 1982) argues that the existence of multiproduct firms cannot be adequately explained by neo-classical theory because there is no justification for why joint production needs to be organised within one firm if contracts can be devised to share the inputs yielding the economies of scope. Therefore, economies of scope have no direct implication for the breadth of the firm unless external transfer is subject to market failure. Deneffe (1993) also argues that the static concept of economies of scope cannot adequately explain the dynamics of the diversification process. Assuming perfect foresight and invariant demand, with static economies of scope a firm may start up as multiproduct but will never diversify. In such a context, all diversification must be demand driven.

Teece also disputes whether financial synergy is a justification for diversification because it does not necessarily reduce the risk to shareholders. In perfect capital markets shareholders can obtain the same benefits by diversifying their own portfolio of shares (Alberts, 1966; Levy and Sarnat, 1970). Even with market imperfections, the traditional explanation for diversification to reduce firm risk is questionable given the relatively low cost of portfolio diversification in the capital market. Moreover, call-options pricing

models (for example, Black and Scholes, 1973) suggest that the adoption of projects that reduce the variance of an income stream may adversely affect equity holders by inducing a wealth transfer from stockholders to bondholders (see Benston, 1979 for a comprehensive study). Teece therefore concludes that there is no justification for diversification under the assumptions of perfect product and capital markets. Instead, he argues that multi-product firms exist due to the presence of market failures (see also Chandler, 1962).

2.2.2 Resource Heterogeneity

The resource-based view of the firm (for example, Wernerfelt, 1984; Barney 1991) models the firm as a collection of historically-determined distinctive resources and capabilities (also referred to as 'core competencies'; Prahalad and Hamel, 1990). A firm's resources may be defined as those (tangible and intangible) assets which are tied semi-permanently to the firm (Caves, 1980). (Tangible resources include financial reserves and physical resources, such as plant and equipment. Intangible resources include reputation, technology and human resources.) The analysis assumes that these resources are distributed heterogeneously across firms and are imperfectly mobile. Rent-seeking firms will diversify in response to excess capacity in these resources, in the presence of market failure, as long as expansion provides a way of more profitably employing its under-used resources. Because firms are heterogeneous, they will have different optimal levels of diversification (this will be discussed in detail in Chapter 3 of this thesis).

The resource-based view provides a basis for identifying what resources diversification should be based on and into what markets diversification should take place and what firms should be acquired (see for example, Teece *et al.*, 1997). Diversification patterns will reflect attempts to utilise existing 'rent-yielding' resource endowments more intensively and to exploit the economies of scope which arise from the possession of imperfectly marketable, non-transferable, firm-specific assets. Generating higher returns through acquisition should involve taking over a firm that has supplementary resources (i.e. more of the same resources) or complementary resources (i.e. resources that combine effectively with existing resources) to those of the acquiring firm. In other words, a firm should acquire activities that have some form of synergy or 'fit' between the buyer and target's resources (Venkatraman, 1989). This suggests that related diversification will be more profitable than unrelated diversification since there is a greater strategic fit between resources.

2.2.3 Internal and External Incentives

The above resource-based theories of diversification may not lead to diversifying activities unless activated by incentives. These incentives may come from the external environment or from within the firm. External incentives include high transaction costs, tax incentives, capital market signals and government competition policy. Internal incentives include low performance, the desire to reduce firm risk (see Section 2.2.1), uncertainty over future cash flow and market power motivations.

The seminal work of Coase (1937) views the firm as a governance or control structure rather than a production function as neo-classical economics would seem to suggest. At any point in time, the optimal boundary of the firm will be determined by the extent of transaction and organisation costs. The core prediction of transaction cost economics is that if total transaction costs exceed the costs of governing the same transaction within a hierarchical structure, the transaction should be internalised within a firm. Thus, the failure of the market through the existence of transaction costs provides an explanation for diversification. This is especially relevant for the market for firm-specific assets, which is imperfect and characterised by high transaction costs. A firm will therefore diversify (i.e. internalise the market) in order to exploit these assets in other markets (Chatterjee & Wernerfelt, 1988).

Williamson (1970, 1975) suggests that firms diversify in response to external capital market failure. In line with transaction cost economics, if the costs of using the external capital market become too great due to asymmetric information, firms may forego some positive net present value (NPV) projects (Myers and Majluf, 1984). Firms will therefore diversify and create internal capital markets with a multi-divisional (M-form) structure characterised by lower information asymmetry, enabling easier access to capital through the cross-subsidisation of divisions.

Another external influence argued to encourage firms to diversify is tax benefits. Tax incentives of diversification may be examined from both individual and corporate tax points of view. With regards to individual tax

levels, whilst Jensen (1986) argues that free cash flow should be redistributed to shareholders in the form of dividends, dividends were substantially more heavily taxed than personal income up to the 1980s. As a result, shareholders may prefer managers to retain these funds to buy and/or build companies in high performance industries. If the stock value appreciates over the long term, shareholders may receive a better return because they are more lightly taxed under capital gains rules. However, this situation changed in the 1980s and this may account for some of the de-diversification that occurred over this later period. Also, the tax savings available from shifting the financing of an enterprise from equity to debt have been argued to be a major factor in stimulating the growth of divestment by management buy-out from the 1980s (Lowenstein, 1985).

With regards to corporate taxation, Auerbach and Reishus (1988) argued that firm acquisitions typically increase depreciable *asset allowance* which produces lower taxable income, therefore providing an additional incentive for diversification. Lewellen (1971) argues that corporate diversification allows firms to maintain a higher level of debt. If tax shields of debt increases firm value then conglomerates will be more valuable than single business firms.

Capital market signals may also encourage diversification. During the 1960s and 1970s the capital market responded favourably to conglomerate mergers, providing an incentive for firms to engage in diversifying activities. For example, Matsusaka (1993) found that conglomerate acquisitions in the 1960s and 1970s were associated with increases in the stock price for the acquiring

firm. (The role of the capital market will be examined in greater detail in Chapter 3 of this thesis).

Finally, competition policy has been argued to encourage firms to diversify. The evidence on anti-trust policy in the US suggests that constraints on horizontal mergers in the 1960s and 1970s may have led to the merger wave that was predominately conglomerate in nature (Ravenscraft and Scherer, 1987; Scherer, 1980; Shleifer and Vishny, 1991). As takeover constraints became more relaxed in the 1980s, highly diversified firms became more focused. In the UK, as a response to the increased internationalisation of the world economy, government policy encouraged consolidation within industries as an effective means to compete.

Incentives from within the firm have also been cited as explanations for diversification. It has been argued that firms will diversify in response to poor performance, especially if under-utilised resources exist to pursue a diversification strategy (e.g. Rumelt, 1974). However, continued poor performance after further diversification may slow the pace of diversification and may even lead to restructuring divestments. Therefore, theory predicts a curvilinear relationship between performance and diversification.

Firms may also diversify to overcome uncertainty with regards to expected future cash flows in their primary industry. That firms diversify as a defensive action to survive over the longer term is evident in maturing industries at the advanced stage of a corporation's "life cycle" – i.e. after opportunities in the

original businesses have been exhausted. Both Penrose (1959) and Marris (1964) emphasised the role diversification plays to increase size and sustain growth.

Finally, the market power view of diversification argues that diversified firms “thrive at the expense of non-diversified firms not because they are more efficient but because they have access to what is termed conglomerate power” (Hill, 1985). This may be obtained through cross-subsidisation (potential for predatory pricing by using funds from a profitable market to undercut rivals in another market), mutual forbearance (competitors meeting each other in multiple markets recognise their interdependence and compete less vigorously; Bernheim and Whinston, 1990) or reciprocal buying (interrelationships between large diversified firms foreclose markets to smaller competitors). The predicted result is reduced competition and increased profits, implying a positive relationship between diversification and firm performance.

2.2.4 Managerial Motivations

Following Mueller (1969), Jensen (1986) and others, diversification is seen as an outgrowth of the agency problem that arises between managers and owners when ownership and effective control are largely separated. An agency relationship is defined as one in which a principal (e.g. shareholders) engages an agent (e.g. managers) to perform some service on their behalf which involves delegating some decision-making authority to the agent (Jensen and Meckling, 1976). According to agency theory there is a divergence of interest

between shareholders and managers; shareholders want their firms to maximise profits, whereas managers derive personal benefit from the expansion of the firm. This may be due to a number of reasons: first, firm growth may reduce employment risk (Shleifer and Vishny, 1989); second, diversification may reduce the risk of undiversified personal portfolios (Amihud and Lev, 1981); third, managerial compensation and non-pecuniary rewards are related to firm size (for example, Murphy, 1985, 1986; Rosen, 1982, 1992; Jensen and Murphy, 1990); and finally, managers may benefit from the power and prestige associated with managing a larger firm (Jensen, 1986; Stulz, 1990). Such activities are considered as managerial perquisites in the context of the agency cost model.

The effect of a separation of ownership and control depends on the extent to which managers and owners' interests differ and the effectiveness of constraints, if any, on managerial discretion. Corporate governance² structures such as the board of directors, ownership monitoring, the market for corporate control and executive remuneration may limit tendencies to diversify. However, in an environment of weak corporate governance, managers will over-invest in diversification (i.e. invest in projects whose net present value – NPV – is less than zero). Jensen (1986) suggests this is a particular problem for multi-output firms located in mature but profitable industries, which generate cash flows in excess of those needed for reinvestment ("free cash flow hypothesis"). Managers can use these funds to finance managerially preferred diversifications without resorting to the external capital market, which can monitor and discipline them. As a result they may maintain a diversification

strategy even if doing so reduces shareholder wealth. Furthermore, under this analysis managers will reduce diversification only if pressurised to do so by internal or external monitoring mechanisms. The agency view therefore predicts a negative relationship between diversification and firm value.

Managers pursuing shareholder value maximisation, may also diversify if their expectations differ from those of shareholders. This may occur if managers are overoptimistic about their ability to manage assets across industries. Consequently, they will (mistakenly) assign a higher equilibrium value to their firm than is really the case and will therefore diversify beyond their optimum. This is essentially Roll's (1986) 'hubris' hypothesis of corporate takeovers. This appears applicable to managerial behavior in the 1960s and 1970s when diversification was a relatively new phenomenon and especially confident managers were encouraged to diversify.

In summary, there exist a variety of theoretical models drawn from the economics, finance and strategic management literature. The explanatory power of each one is limited because of their neglect of equally important motives for diversification. An integrative perspective would help to accommodate the complex web of reasons that induce a firm to diversify and may impel future efforts to examine more closely the underlying rationale for diversification. (This is beyond the scope of the current study).

2.3 Empirical Evidence on Diversification

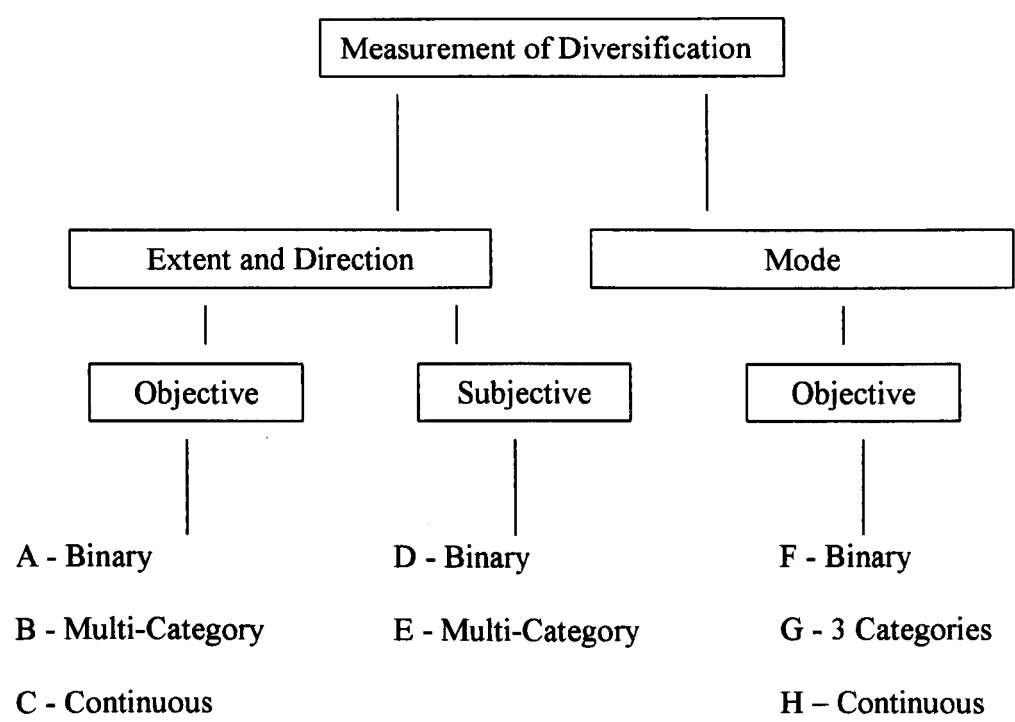
This section aims to consider the empirical research on diversification and to provide a systematic review of the literature. The literature review is organised into four main sections corresponding to important features of the empirical work. The first section is an examination of the various approaches adopted to measure diversity. Second, empirical studies on the extent and nature of diversification are reviewed. The third section examines the empirical literature on the determinants of diversification. Finally, we focus on the empirical modeling of the consequences of a diversification strategy. The summary will include a discussion of possible directions for future research.

2.3.1 Measurements of Diversity

Previous empirical research has focused on three different measurements of diversification, namely, the extent (i.e. more or less), direction (i.e. relatedness or unrelatedness) and mode (i.e. acquisition versus internal development) of diversification. Figure 2.1 gives an overview of the variety of approaches adopted to measure diversity and illustrative examples (see Ramanujam and Varadarajan, 1989, for details). While the three approaches are related, individual studies have not examined them simultaneously. Studies that examine the extent of diversification from an industrial organisation perspective generally employ a count measure or continuous measure. Count measures are normally based on Standard Industrial Classification (SIC) codes or US Census Bureau information to identify the number of businesses that a

firm operates in and this number is then used to capture the extent of firm diversification. Continuous measures have been adopted to take into account both the number and relative size of industries operated in by a given firm (see for example Berry, 1975; Jacquemin and Berry, 1979; Palepu, 1986).

Figure 2.1. Approaches to the Measurement of Diversity



Level of Measurement	Illustrative Examples
A	Conglomerates v non-conglomerates (e.g. Beattie, 1980)
B	
C	
D	
E	Relatedness-based measures (e.g. Rumelt, 1974)
F	
G	Internal growth, acquisition-based growth, mixed mode
H	Diversifying acquisition ratio (Pitts, 1978)

Source: Ramanujam and Varadarajan, 1989

The direction of diversification builds on the nature of relatedness among a firm's various activities. In these studies, generally originating in the strategic management literature, subjective categories for diversification have been employed and have generally followed Rumelt's (1974) relatedness-based categories. However, more recently, corporate-level relatedness is stressed as a more important determinant than operational relatedness. If the firm is viewed as a collection of resources and capabilities rather than as a collection of products (Penrose, 1959; Prahalad and Hamel, 1990), then existing measures of diversification may be inadequate and further empirical work will be needed to develop a more appropriate metric for diversification. However, this would be difficult to operationalise since it is a cognitive concept and is likely to have only a limited applicability in future empirical work (Grant, 1988).

The mode of diversification refers to the approach adopted to diversify into different product markets. The two alternative approaches are internal development and acquisition. Porter (1987) suggests that the latter has been the most popular. It is very difficult to obtain information on activities generated internally and consequently the majority of the work in this area has concentrated on measuring acquisition. In some studies, categorical measures are employed (e.g. conglomerates and non-conglomerates, as in Beattie, 1980), while other studies use a continuous measure (e.g. Pitts, 1978).

To summarise, the concept of diversification is not straightforward to measure and this may account for the relative neglect of research on refocusing. One of the difficulties with defining diversification is to assess the degree to which a

firm spreads its operations over different activities. If the boundaries between different products, markets and industries are narrowly defined then the greater the apparent diversification. This particular measurement problem implies that the evidence on the extent of diversification must be treated with caution, since it is sensitive to the definition of markets used. In addition, a number of studies make little attempt to discriminate between vertical integration and diversification proper, so that both forms of multi-industry operation are treated as diversification, overstating the extent of diversification. Given that there exists a variety of measures of diversification, the choice of which measure to adopt should be guided by the research question at hand (Pitts and Hopkins, 1982). This study employs multiple measures of diversification in order to establish the robustness of findings to the choice of measure (see also Markides, 1995a).

It has also traditionally been easier to obtain activity data for manufacturing industries, especially in the UK context. Therefore, the majority of UK studies have measured diversification by manufacturing firms. Given that diversification appears to be a widespread phenomenon, it is important to obtain activity data in industries outside manufacturing, otherwise the extent of diversification will be underestimated. In this study the extent of diversification within and across a number of industries is examined.

2.3.2 The Extent and Nature of Diversification

In both the US and the UK empirical studies of diversification have shown a marked increase in the extent of diversification over the 1950s, 1960s and 1970s regardless of the diversification measure adopted (see for example, Rumelt, 1974; Utton, 1977; Amey, 1964; Gorecki, 1975; Hassid, 1975). The pattern of development in both countries has also been broadly similar (Chandler, 1962 for US; Hannah, 1976 for UK). For example, Rumelt (1974) reports that the proportion of single companies in the US Fortune 500 fell from 22.8 percent in 1959 to 14.8 percent by 1969. Hannah (1976) for a large sample of UK firms found that 25 per cent of firms were classified as diversified in 1950, 45 percent in 1960, and 60 per cent by 1970. Utton (1977) examined the trend of diversification for manufacturing firms in the UK across 120 industries and found that the employment of firms operating in more than one of 51 two-and-a-half-digit industries was 53 percent in 1958, 68 percent in 1963 and 72 percent in 1968. The majority of diversification that took place over this period was unrelated to the core business.

A large proportion of this increase in diversification can be accounted for by the increase in the number of diversifying mergers. A number of studies have examined the extent of diversification over the period by examining data on diversification by merger (for example, Goudie and Meeks, 1982 for UK; Reid 1968 for US). These studies show a rise in the importance of conglomerates in both the UK and US since the 1960s whereby firms are acquiring activities outside their main line of business. For example, Goudie and Meeks (1982)

analysed 1,481 UK mergers over the period 1949 to 1973 and found that the proportion of diversifying mergers (defined as a merger between firms classified to different industry groups) had increased from 9 percent in 1949-53 to 47 percent of mergers in 1969-73. For the US, Ravenscraft and Scherer (1987) document that 36 per cent of all acquisitions between 1964 to 1972 and 32 per cent between 1973 to 1977 were conglomerate in nature. Thus mergers played a major role in the process of corporate growth over this period.

The takeover wave in the 1980s has been substantially different with a predominant increase in the importance of refocusing or de-diversification, primarily through the divestment of activities unrelated to the core business. An analysis of this phenomenon will be examined in detail in the following chapter of this thesis.

To summarise, diversification has increased over the post war period. A large proportion of this can be accounted for by the increase in the number of diversifying mergers. The measure of the extent of diversification depends crucially on the level of aggregation used, and differences in the measures adopted and in the level of aggregation can account for some of the apparent differences across studies. Due to the nature of official data, most studies in the UK are on manufacturing companies and relate to diversification within manufacturing industries. This may be an important omission where manufacturers buy non-manufacturing companies (for example, cigarette companies acquisition of insurance companies). It also excludes wider forms of conglomerate activity in non-manufacturing sectors.

2.3.3 The Determinants of Diversification

In contrast to the extent of research devoted to developing measures of diversity, inadequate attention has been given to direct examinations of the motives underlying the diversification decision. One of the determinants of diversification that has been widely examined is the relationship between firm performance and diversification. With regards to the performance-diversification relationship there are two viewpoints; diversification may be a result of either poor or superior performance in the core businesses (e.g. Gort, 1969; Berry, 1975; Rhoades, 1974). As outlined in Section 2.2.3, poor performance may encourage firms to diversify to exploit profitable opportunities elsewhere. However, by the same line of reasoning, poor performance may encourage firms to reduce their level of diversification. In practice, the performance effect has been difficult to disentangle. This is particularly problematic in studies that adopt cross-sectional techniques.

Another factor which has been found to determine the level of diversification is firm size. Empirical studies, including Gort (1962, 1969) and Amey (1964), widely support a strong positive association between diversification and firm size. However, the failing of Utton's (1977) study to find a strong direct relationship between diversification and firm size within a sample of the largest enterprises suggests that beyond a certain level there may be little further scope for successful diversification. Firm size has also been shown to be an important determinant of the likelihood of acquisition. It has been found that acquiring

firms on average are larger than firms they acquire and larger than average firms in their industry (see for example, Levine and Aaronovitch, 1981).

The life cycle theory of the firm suggests that firms will diversify when they have reached maturity in their primary industry. A number of studies have examined the relationship between diversification and firm or industry growth. Whilst some studies (e.g. Gort, 1969) find a negative relationship between diversification and firm growth, others (e.g. Gorecki, 1975) have failed to find a strong link. The evidence on diversification and growth therefore remains largely inconclusive.

A number of studies have attempted to examine the relationship between a firm's underlying resource endowment and the pattern of diversification. At the industry level, Lemelin (1982) found that similarities between origin and destination industries' distribution and marketing channels were significant predictors of the industries into which a firm would diversify. At the firm level, Chatterjee and Wernerfelt (1991) found that excess physical resources, most knowledge-based resources and external financial resources are associated with related diversification. Similarly, Montgomery and Hariharan (1991) for manufacturing and Ingham and Thompson (1995) in the case of financial services, report that diversifying activity is not a purely random process but follows firm-specific and product-specific characteristics. The limited number of profitable opportunities has also meant that related diversifications tend to be more successful than unrelated ones (Lang and Stulz, 1994).

With regards to technological knowledge and diversification there exists two viewpoints. First, R&D is primarily determined by technological opportunities and diversification takes place in response to innovations generated by R&D. Second, diversified firms are better able to make use of innovations than specialised firms so that greater diversification provides an incentive for greater R&D. Evidence from both UK and US manufacturing studies consistently suggest a positive correlation between R&D (see Gort, 1962 for the US; Amey, 1964; Gorecki, 1975; Grant, 1977 for the UK) and diversification. However, within the existing studies it is difficult to disentangle the two effects and determine the direction of causation.

There are very few studies that examine the relationship between diversification and tax. Turk and Baysinger (1989) remark that there is no current research examining changes in individual tax rates on diversification levels. With regards to corporation tax, Hayn (1989) found tax attributes as determinants of shareholder gains in corporate acquisition. However, from the 1980s onwards some of the corporate tax advantages have been reduced.

There are also relatively few studies on the effect of uncertainty on the decision to diversify. Miles (1982) examined diversification by tobacco firms in the US and found that demand uncertainty (i.e. in response to health reports) acted as an incentive to diversify. Supply side uncertainty may also lead to some diversification, as exemplified by Buckley (1989), where domestic firms have to compete with foreign suppliers with lower average costs.

More recently, empirical research has started to test the agency explanation for diversification and provide empirical support for arguments that managers diversify to increase their own private benefit (for example, Amihud and Lev, 1981; Morck, Shleifer and Vishny, 1990). A number of studies report a negative relationship between diversification and management equity ownership (e.g. Denis *et al.*, 1997; Servaes, 1996). This result is consistent with the idea that managers prefer to diversify when they do not suffer financially. Firms with low concentrations of outside ownership may also be susceptible to excessive diversification because effective monitoring cannot be pursued by diffuse owners (Hoskisson and Turk, 1990).

Some attempts have been made to empirically test Jensen's (1986) free-cash flow hypothesis (defined earlier as cash flow in excess of that needed for profitable reinvestment). A study on tender offers by Lang *et al.*, (1991) found that bidder returns are negatively related to the acquirer's free cash flow. This result is stronger for firms with a low tobin's q and is consistent with Jensen's characterisation of firms pursuing ill-founded diversification.

In summary, a large number of studies have shown that firms do not diversify in a random manner but neither is diversification totally predictable. The pattern of diversification is generally related to a firm's resource base. The existing evidence on the determinants of diversification shows a link between diversification and research intensity and management control. However, there are a number of limitations to the existing studies. The majority of research only addresses a small sub-set of variables of interest and utilises industry and

not firm level data, and is therefore limited to assess issues such as those relating to firm-specific resource bases. Moreover, a number of studies refer only to manufacturing firms, although diversification attempts may also occur across industrial sectors. The adoption of cross-sectional techniques makes it difficult to disentangle the direction of causation between diversification and its hypothesised determinants (e.g. the diversification-performance relationship).

2.3.4 The Consequences of Diversification

The most extensively researched effect of diversification is the relationship between diversification and subsequent performance. Performance has generally been defined as a measure of firm profitability and/or a measure of risk. Studies in the economic and strategic management literature have primarily focused on accounting-based measures of performance (i.e. return on assets, return on equity, or return on capital) and have examined the relationship between a firm's total level of diversification and its overall performance. In contrast, work in the agency-theoretic tradition has largely used risk-adjusted market measures (shareholder wealth gains as measured by abnormal returns assessed using a market model) to test the extent of risk reduction achieved by diversification from an investor's point of view. These studies focus on changes at the margin, rather than an evaluation of a firm's diversification as a whole.

The majority of studies which examine the relationship between firm performance and diversification, and a host of industry structure characteristics, report a neutral or negative relationship between diversification and performance (e.g. Rhoades, 1974; Utton, 1977; Montgomery, 1985; Palepu, 1985). With respect to industry concentration, the available evidence suggests that diversification and the creation of large, multi-product firms does not generally increase concentration (e.g. Clark and Davies; 1983; Berry, 1974; Caves, 1981). The failure to find a positive relationship between diversification and concentration does not support the market power view of diversification. Findings from studies which examine the link between the direction of diversification and performance are largely consistent with the view that related diversification results in superior performance (e.g. Rumelt, 1982; Bettis, 1981; Palepu, 1985; Varadarajan and Ramanujam, 1987).

Although there are some findings to the contrary (e.g. Carter, 1977; Rhoades, 1973; Grant *et al.*, 1988), the existence of a negative relationship between diversification and firm performance can be explained by the agency view which suggests that diversification is undertaken for reasons other than value maximisation. It is also consistent with the resource-based view which suggests that the average diversification-performance relationship reflects the underlying heterogeneity of firms' resources. Thus, firms with more specific resources find it optimal to diversify less than firms with less specific and less valuable resources.

One explanation for these mixed findings is the modeling framework adopted. The majority of studies use a cross-sectional framework which makes it difficult to evaluate the performance effects of diversification and determine with accuracy the direction of causation. Problems resulting from cyclical and/or outlier observations are circumvented by typically averaging several years performance data and then examining diversification at one point in time as a determinant of the (implicit) long-run equilibrium level of profitability. Subsequent diversification occurring during the interval of data averaging is typically ignored. Under these circumstances it is difficult to disentangle the effects of diversity on performance over time frames because diversification profiles are likely to change quite abruptly due to acquisitions and divestments. Moreover, if profitability adjusts sluggishly to the firm's changed characteristics – and the literature on profitability dynamics suggests that it will (see for example, Geroski and Jacquemin, 1988) – the impact on average profits across any interval will depend upon the timing of such changes. Thus there is a definite need for longitudinal studies in this area.

Some of the differences across studies can also be explained purely by the different time periods adopted. The motivations for diversification may differ across time periods. For example, in the 1960s managers were able to pursue their own self-interests due to the existence of weak governance mechanisms (Jensen, 1986). However, due to for example, capital market innovations in the 1980s, managerial activities became closely scrutinised, restricting the extent of unprofitable diversification. This will inevitably affect the performance outcome of diversification attempts. Consideration of whether the

diversification-performance relationship is generaliseable over time remains a relatively under-researched area. The limited number of studies on temporal stability that do exist have found that the relationship varies over the business cycle (e.g. Hill, 1983). The implication is that the relationship is not time-invariant and makes direct comparisons between studies difficult.

The diversification-performance relationship is more apparent from the evidence available from studies on mergers and acquisitions. This research adopts an event study approach and examines the capital market's response to acquisition and merger announcements. Despite the inherent measurement problems of studies of this kind, the evidence from the wealth of studies comes to a common conclusion; on average, target firms realise substantial benefits, whilst the impact of mergers on the profitability of the acquiring firm is on average nil to negative (see Hughes, 1993 for a review of the literature). One noticeable exception is a study by Matsusaka (1993) who finds positive bidder returns at the announcement of conglomerate acquisition in the late 1960s and early 1970s. Thus, contrary to expectations, experience with diversification through merger for the acquiring firm is disappointing. This result is consistent with the view that managers undertake mergers for personal benefits rather than maximisation of shareholder returns. Studies that differentiate between the type of acquisition and performance, generally find that bidding firms in related acquisitions tend to gain higher returns than bidding firms in unrelated acquisitions (e.g. Morck, Shleifer and Vishny, 1990).

There are a number of limitations to the event study approach. One limitation is the usual treatment of acquisition as an isolated event, however acquisition attempts usually occur as part of a larger expansion programme extending over a number of years. Moreover, if the capital market is efficient then the share price on any one day would be expected to fully reflect the expansion value inherent in its resource base. Thus an acquisition program could have a substantial impact on firm value but only register a marginal adjustment to the share price on the day of a specific announcement (e.g. Schipper and Thompson, 1983).

Studies examining performance differences between internal diversifiers and acquisitive diversifiers are virtually non-existent. This is an important omission with regards to support for the resource-based view of the firm that suggests that the highest profits can be generated by leveraging resources from existing businesses. One exception is a study by Lamont and Anderson (1985) which reports that, on average, internal diversifiers are more profitable. Most studies have limited themselves to a comparison of the performance between conglomerates and non-conglomerates. The majority of these studies find that conglomerates are less profitable than non-conglomerates (e.g. Prosper and Smith, 1971), although once again, the results are inconclusive.

2.4 Summary

To summarise, diversification has been an important element of corporate development over the post-war period. Despite difficulties in measuring

diversification, there is overwhelming evidence to suggest that firm diversification increased substantially throughout the 1950s to the 1970s. The largest proportion of this increase can be accounted for by merger activity.

From the theoretical literature, diversification makes sense and should be profitable up to a limit. There exists a series of complementary theories to explain diversification which include economies of scope, resource heterogeneity, risk reduction, poor performance, tax incentives, weak corporate governance and market power explanations. The empirical evidence generally supports both the agency-theoretic (managerial motives and hubris hypothesis) and resource-based views of diversification (firms that diversify around specific resources tend to be more profitable than firms that diversify more widely). However, there is little evidence in support of the market power view that diversified firms attain the sort of market power that leads to increased profit and concentration. There appears to be a need for a more integrated theory of diversification and further work as to why the market values diversification differently over time, and why diversification works for some firms and not others (see Gertner *et al*, 1994; Matsusaka and Nanda, 1994). However, this is beyond the scope of the current study.

An evaluation of the empirical research points to successive refinements in the measurement of diversification. However, difficulties still occur over the assessment of the degree to which a firm spreads its operations over different activities. One implication is that the existing evidence on diversification must

be treated with caution, since it is sensitive to the exact definition of markets used. This may account for some of the inconsistencies across studies.

The evidence on the determinants of diversification shows considerable diversity. The factors that influence diversification include firm performance, firm size, resource endowment, technology base and the market for corporate control. However, the majority of studies only address a small sub-set of these variables. Much of the existing research is bivariate in nature, although more recently some studies have begun to examine more complex inter-relationships. Since a number of studies use industry and not firm-level data, they are limited to assess issues such as those relating to firm-specific resource bases. The contradictory findings may also be attributable to unlike methods or underlying non-linearities in the performance-diversification relationship.

Studies attempting to demonstrate the effects of diversification on performance remain largely inconclusive. Previous work has either employed a cross-sectional regression model to examine the profitability effects of diversification or an event study to isolate the stock market impact of diversifying acquisitions. Neither approach is particularly satisfactory. The event study approach assumes an efficient capital market in which fads and bubbles play no significant role. However, it is clear that the market initially favoured and then turned against conglomerate mergers. The use of a cross-sectional design is problematic here since the researcher is looking at the impact of (possibly endogenous) structural change on performance, which is difficult to evaluate in the context of a long-run equilibrium. This approach is also disconcerting given

that diversification is a dynamic process and diversification effects typically take a long time to reach reasonable levels of effectiveness. In addition, profitability levels are strongly influenced by firm-specific factors which cannot adequately be controlled for in cross-sectional work. Despite difficulties in their design and execution, longitudinal studies of diversification must be attempted. This is a vital but unmet stream of the research.

Overall, the evidence presented suggests that, on average, diversification has not been beneficial for diversifying firms. The expectation of the 1960s and 1970s that conglomerate mergers would increase profitability has not materialised. The profit of diversifying firms did not improve on average and a substantial amount of acquisitions were subsequently divested. It is argued that firms from the mid-1980s onwards have been attempting to reduce their level of diversification and focus on the core businesses primarily, though not necessarily, through divestments. The following chapter of this thesis examines in detail the theoretical explanations and the empirical evidence for this reduction in diversification or refocusing activity.

Notes

¹Economies of scope exist when for all outputs of y_1 and y_2 , the cost of joint production is less than the cost of producing each output separately; $C(y_1, y_2) < C(y_1, 0) + C(0, y_2)$

²We follow Shleifer and Vishny (1997) in viewing corporate governance as dealing with: “the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment.” Therefore we denote as corporate governance characteristics those variables which would appear to determine the power of shareholders with respect to managers.

3. CORPORATE REFOCUSING

3.1 Introduction

It is widely perceived that since the 1980s there has been a dominant trend towards de-diversification or refocusing by large UK companies, primarily but not necessarily achieved through major divestments. This emphasis on specialisation has been conjectured to have reversed the formerly dominant tendency towards increasing levels of diversification which had dominated business development for several decades (see Chapter 2 for a discussion).

The aim of this chapter is to examine the existing theoretical explanations of corporate refocusing and to review the literature in this field. There are a series of complementary hypotheses which seek to explain refocusing activity and these are discussed in detail in Section 2.2. Section 2.3 reviews the empirical evidence on corporate refocusing. The literature review is organised around three broad themes: the extent and nature of refocusing; the determinants of refocusing and the consequences of a refocusing strategy. Section 2.4 concludes.

3.2 Theoretical Explanations of Corporate Refocusing

The prevailing explanation for refocusing was that firms are getting rid of so called 'bad' acquisitions from the 1960s. However this explanation is not very plausible and contradicts much of the existing evidence (for example,

Montgomery and Wilson (1986) report that of the 434 US acquisitions made between 1967-69, more than 67 percent were still in place in 1982). It is difficult to see how investments that have lasted over 20 years are now being classified as bad and even harder to understand how and why so many firms came to the same realisation that these acquisitions were mistakes at the same time.

Following an established literature in the US (Bhagat *et al.*, 1990; Hoskisson and Turk 1990; Shleifer and Vishny 1990 and Markides, 1995a, b), corporate refocusing may be referred to as an attempt by firms to reverse their excessive levels of diversification, most of which occurred in the 1960s and 1970s. This explanation implies two things: first, that there exists some limit to the extent to which a firm may diversify without adversely affecting its performance; and second, if refocusing became a widespread phenomenon from the 1980s, as Bhagat *et al.* (1990), Markides (1995a, b) etc. suggest for the US and is argued here for the UK, then a large number of firms must have found themselves in breach of this optimum during the period in question. Consequently, the profitability and market value of over-diversified firms will suffer and the issue of de-diversifying becomes worthwhile. These propositions will be examined in turn.

3.2.1 An Optimal Limit to Diversification

The existence of a limit to which a firm can diversify is still a subject of debate in the economics literature (for example, see Calvo and Wellisz, 1978; Mueller,

1987; Williamson, 1967). Transaction cost economics (Coase, 1937; Teece, 1982) and the resource-based theory of the firm (Wernerfelt, 1984 and Ingham and Thompson, 1995) emphasise the benefits which may accrue when a firm diversifies to exploit its under-utilised, imperfectly imitable specific assets (see Chapter 2 of this thesis for details). However, the benefits of diversification may be strictly limited and easily exhausted. Moreover, the resource-based approach suggests that surplus capacities are unlikely to be uniform across firm-specific assets and significant economies of scope will only be present under fairly stringent conditions.

Other benefits to diversification cited in the literature include market power advantages (e.g. Gort, 1962; Rhoades, 1973), tax benefits and other financial advantages (e.g. Lewellen, 1971), benefits associated with growth (e.g. Guth, 1980) and various other benefits associated with reductions in agency problems (e.g. Aron, 1988). These benefits to diversification tend to decrease as firms try to exploit their excess assets further and further away from their core businesses (e.g. Montgomery and Wernerfelt, 1988), implying a downward-sloping marginal benefit (MB) curve.

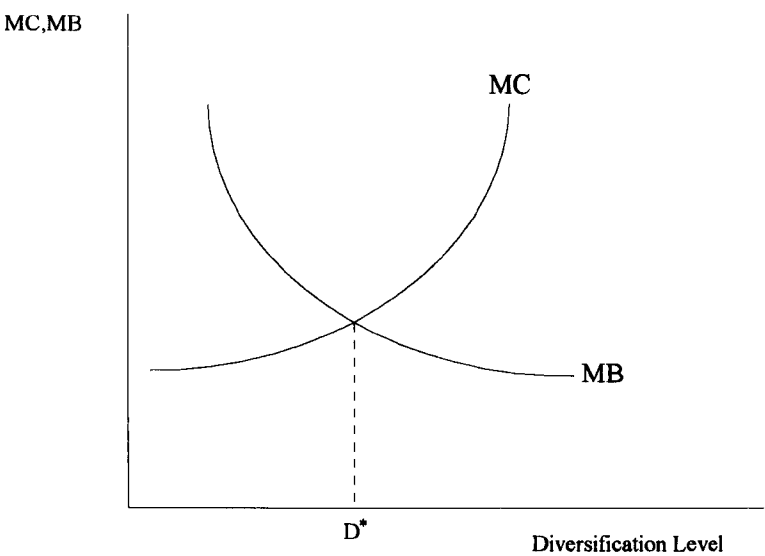
In addition to the above benefits, research has identified certain costs associated with diversification. For example, as Penrose (1959) described in the case of managerial resources, a constraint on internal expansion is generated through recruiting, training and assimilating new managers. Surplus capacities are unlikely to be uniform across firm-specific assets and bottlenecks will occur, particularly in the availability of managerial resources, causing

organisational costs to rise with further expansion. Also, size and diversity increase the informational and monitoring problems that internal hierarchies need to address. The seminal work of Williamson (1967) on the organisation of firms argued that control loss problems¹ associated with transferring information across hierarchical levels limit the viable height of organisational hierarchies, while intra-firm transactions may inhibit hierarchical decomposition.

Other types of costs to diversification emphasised in the literature include co-ordination and control costs in the expansion of the firm's hierarchical structure as a result of limited managerial spans of control (e.g. Keren and Levhari, 1983, Sutherland, 1980); managerial X-inefficiencies arising when managers continue to apply their existing "dominant logic" to newly acquired, strategically dissimilar activities (e.g. Prahalad and Bettis, 1986); and the costs created when a "detached" corporate staff makes inappropriate interventions in the operations of the divisions (e.g. Ravenscraft and Scherer, 1987). It is suggested that such costs increase as a firm diversifies, implying an upward-sloping marginal cost (MC) curve.

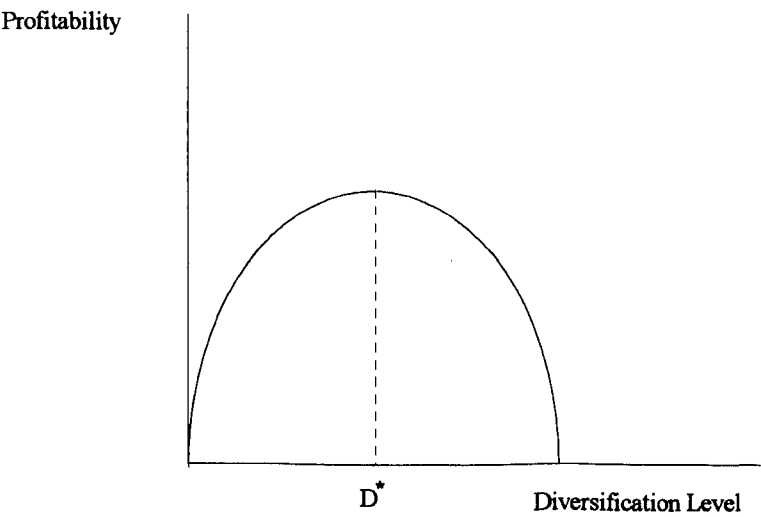
The optimal limit to diversification will occur where the marginal benefits and marginal costs to diversification are equal (i.e. where the MB and MC curves intersect, at equilibrium point D^* in Figure 3.1):

Figure 3.1 The Optimal Level of Diversification



A firm can diversify profitably up to D^* since marginal benefits exceed marginal costs, however, beyond D^* the costs to diversification exceed the benefits and the firm will incur a loss. This implies a curvilinear relationship between diversification and profitability. A number of studies have shown support for this relationship (for example, Grant and Thomas, 1988 for the UK and Hoskisson and Hitt, 1990 for the US).

Figure 3.2 The Relationship between Diversification and Profitability



In Figure 3.2 maximum profits are achieved at the optimal level of diversification D^* (where $MC = MB$). Beyond D^* any further increases in diversity will reduce profitability since marginal costs to diversification exceed marginal benefits. Thus, whilst poor performance may lead to diversification in the first place, if firms diversify beyond their optimal level, it will result in poor returns which may lead to restructuring divestments (Ravenscraft and Scherer, 1987). This perspective predicts that refocusing will have a positive impact on the performance of over-diversified firms.

3.2.2 The Existence of “Over-Diversified” Firms

The foregoing discussion suggests that diversification brings performance benefits to the firm and hence value gains to its owners, but that such benefits are subject to decreasing returns as organisational costs rise. That is, *ceteris paribus*, the value of the firm (V) is a concave function of the level of diversification (D): $V = V(D)$. Allowing that any particular firm at time t has an optimal level of diversification determined by its current resource endowment and its external environment does not however, help to explain why many firms apparently came to find themselves in breach of this optimum. If refocusing became a widespread phenomenon in the UK from the 1980s, then some firms must have found themselves in the region beyond D^* . A number of explanations why firms may be over-diversified have been put forward:

Principal-Agent Reasons

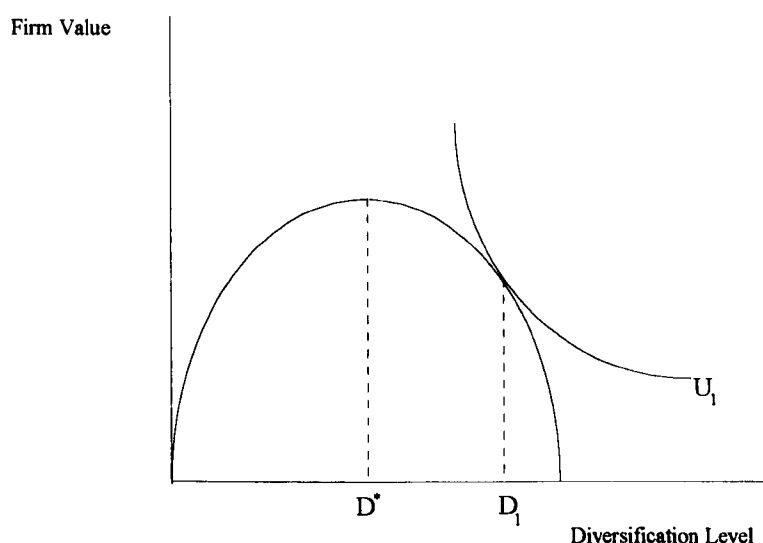
Following Mueller (1969), Jensen (1986) and others, over-diversification is seen as a consequence of the agency relationship between the firm's owners and managers. Jensen (1986), for example, suggests that managers typically derive more personal benefit from diverting free cash flow (i.e. cash flow in excess of those needed for profitable reinvestment) to unprofitable expansions rather than maximising dividend pay-outs. He suggests this is a particular problem for multi-output firms located in mature but profitable industries, which generate cash flows in excess of those needed for reinvestment.

Much of the available empirical evidence appears to support Jensen's free cash flow hypothesis. The theory suggests that the marginal rate of return on projects financed by retained earnings will be lower than those financed by new capital. Several studies on the rates of return on investment finance, support this prediction and imply that in the absence of external discipline, firms in mature industries will tend to over-invest in diversification (e.g. see Baumol *et al.*, 1970; Brealey *et al.*, 1976).

This suggests that we would expect to find some firms that systematically over-diversify even if doing so reduces shareholders' wealth. Under the agency cost hypothesis, managers will generally only reduce their scope of diversification if pressurised to do so by either internal or external monitoring mechanisms (Denis *et al.*, 1997). Thus it appears reasonable to expect that both V and D enter the managerial utility function (U): $U = U(V, D)$.

Therefore whilst the maximisation of shareholder value would yield an optimal diversification D^* , unconstrained firms, in an environment characterised by slack capital market discipline, would arrive at an over-diversified equilibrium such as D_1 in Figure 3.3:

Figure 3.3 The Relationship between Diversification, Profitability and Managerial Preferences



Capital Market Signals

Markides (1995a, b) and others have pointed out that even those managers motivated by shareholder value maximisation may over-diversify if the capital market supplies an incorrect signal to diversifying expansions. There is considerable evidence that the capital market took an unjustifiably optimistic view of conglomerate mergers in the 1960s and 1970s (Morck *et al.*, 1990; Shleifer and Vishny, 1991), providing an incentive for firms to engage in diversifying activities. When *ex post* diversification did not prove as profitable as expected, the capital market reversed its previous stance and started to prefer

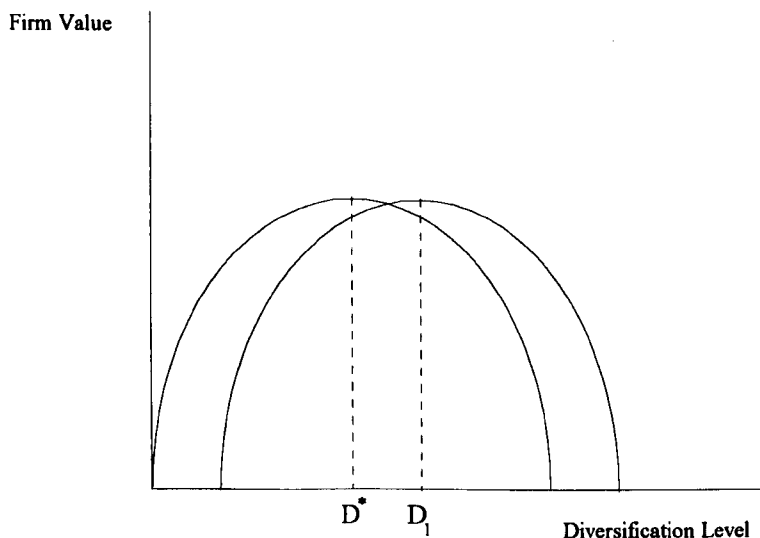
more tightly focused firms in the 1980s (Wernerfelt and Montgomery, 1988; Morck, Shleifer and Vishny, 1990). This phenomenon certainly helps to explain in part the *timing* of the reversal of the trend towards ever-greater diversification.

A number of explanations have been offered for the capital market systematically “overvaluing” diversifying acquisitions. In particular, growth companies whose stock is selling at a high multiple and acquire companies with a low price-earnings (P/E) ratio will experience an increase in their earnings per share (EPS). The market applies the higher multiplier on the new EPS, and hence the stock price of the firm increases. This makes further acquisitions attractive.

However, this does not explain why the market continued to apply the high multiple on a company that is made up of non-growing acquired parts. Jacoby (1969) argues that it is because promoters and bankers take advantage of the public’s optimism during stock market booms to generate profits for themselves. The existence of sophisticated investors who knowingly buy an overvalued stock can be explained within the framework of an efficient capital market by the speculative bubble argument; investors knowingly pay more for a stock in the belief that they can pass it on for even more. Once the public recognises that there is no growth in the operating earnings of the acquired companies, the P/E ratio will fall to a normal level, making further acquisitions unattractive.

Whatever the reasons for overvaluing conglomerate mergers, its effect has been to encourage firms to engage in excessive diversification. Markides (1995a,b) notes that even managers motivated purely by shareholder value considerations could therefore find themselves with an over-diversified firm in these circumstances, for example at D_1 rather than at D^* in the following diagram:

Figure 3.4 The Effect of Capital Market Signals on the Diversification-Profitability Relationship



Hubris Hypothesis

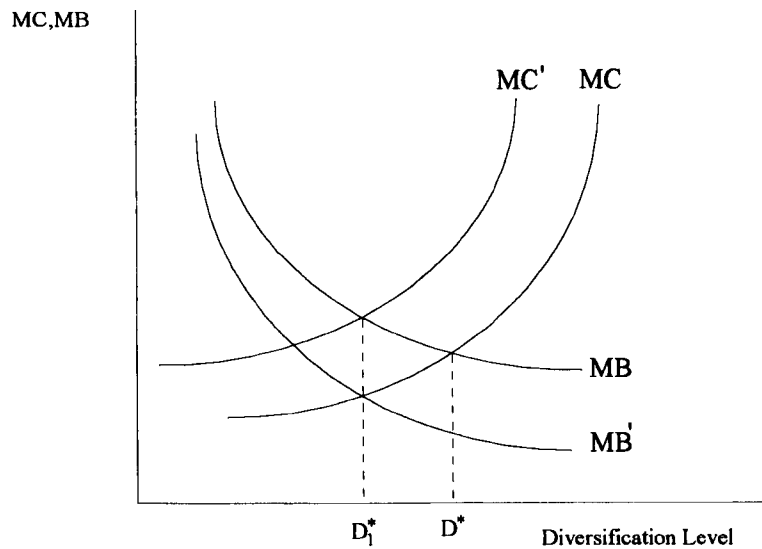
Managers pursuing shareholder value maximisation, may also consistently over-diversify if their *expectations* differ from those of shareholders. This may occur if managers are over-optimistic about their ability to manage assets across industries. Consequently, they will (mistakenly) assign a higher equilibrium value to their firm than is really the case and will therefore diversify beyond their optimum.

This is essentially Roll's (1986) *hubris hypothesis*. This appears applicable to managerial behaviour in the 1960s and 1970s when diversification was a relatively new phenomenon and confident managers were encouraged to diversify. *Ex post*, organisational learning occurred as more information became available. The occurrence of refocusing from the 1980s may signify that some managers have learned from their mistakes and are now rectifying them. The decision to refocus is taken because managers have realised that the firm is over-diversified and this causes diseconomies that harm the firm's profitability (see for example, Mueller, 1987).

Change in the Optimal Level of Diversification

Finally, even firms that were optimally diversified will find themselves in disequilibrium if there has been a change in their optimal level of diversification. Markides (1995a) argues that over the past twenty years, changes in both the product and financial markets have reduced the optimal level of diversification for firms. This will occur if the marginal benefits of diversification decrease or the marginal costs increase, resulting in an inward shift of the MB and MC curves with a new lower equilibrium value, D_1^* in Figure 3.5:

Figure 3.5 Shift in the Optimal Level of Diversification



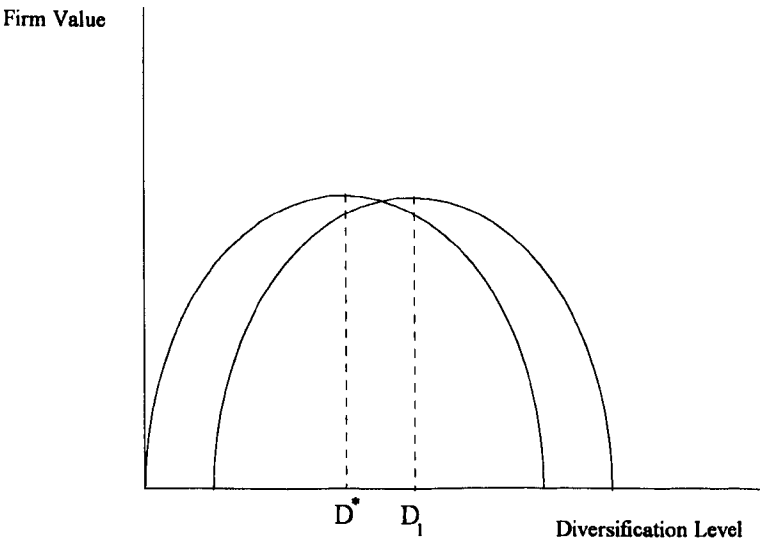
It has been hypothesised that many firms experienced a reduction in the optimal level of diversification in the 1980s as a consequence of the decline in the *comparative advantage* of the multidivisional form of organisation. Williamson (1975) attributed to the internal capital market of the multiproduct M-form considerable informational advantages over the external capital market. For example, the M-form organisation can reallocate funds from slow growth divisions to finance high growth activities without resorting to the external capital market for funding and disclosing sensitive information. In addition, due to asymmetric information managers have an information advantage over outside investors in allocating funds, as well as evaluating and disciplining divisions. (See Cable, 1988 for a review of the supporting evidence on the M-form hypothesis).

However, Bhidé (1990) and others have argued that countervailing innovations in the external capital market has attenuated the informational advantages of the M-form's internal capital market. It can be argued that corporate

diversification may have been a substitute for portfolio diversification in the past, allowing investors to diversify their risk. However, increasing competition in the capital market has meant that portfolio diversification has become a simpler alternative, reducing one of the benefits of corporate diversification. In addition, the growth of the contracting out of supply and support functions within the private sector attests to the fall in transaction costs. Survey evidence (e.g. Geroski and Gregg, 1994) confirms the reduced popularity of the M-form among large UK firms.

Overall, the rising sophistication of the external capital market has weakened the advantages of corporate diversification, reducing the optimal level of diversification. Arguments such as these point to a backward shift in the value-diversification function, illustrated in Figure 3.6:

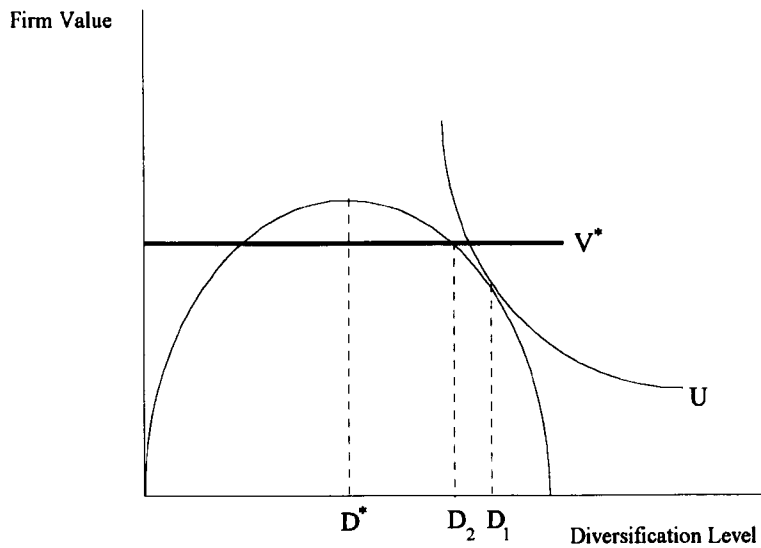
Figure 3.6 The Effect on the Diversification-Profitability Relationship of Capital Market Innovations



Also Jensen (1986) and others have argued that capital market innovations - including debt-financed takeovers, the use of hostile bid advisers and the emergence of venture capitalists to finance management buyouts - have increased the effectiveness of the market for corporate control², prompting some firms to reduce their diversification levels and realign their interests with those of shareholders (e.g. Shleifer and Vishny, 1990; Denis *et al.*, 1997). Thus, for example, the rise of a large venture capital industry permits business units to be divested via management buy-outs, enabling decentralised control and specialised investor monitoring (Wright and Robbie, 1996). Informational advantages have also been eroded due to firms being forced to disclose more information about their activities. This in turn, it is suggested, has not merely reduced the ability of managers to divert free cash flow to preferred - but unprofitable - diversifications, but encouraged them to divest and disinvest in loss-making activities.

Reductions in the level of diversification may also be attributable to other disciplinary forces such as block purchases and management turnover. These disciplinary events can reduce agency costs and explain why some of the firms that over-diversified in the 1960s and 1970s are the same firms that refocused during the 1980s. For example, Fama (1980) suggests that the managerial labour market disciplines agents to maintain value-enhancing strategies. Product market competition may also act as a disciplinary device to managers (Hart, 1983). Such an effect is equivalent to constraining managers to maintain a value of V^* in the following diagram and hence reducing diversification from D_1 to D_2 in Figure 3.7:

Figure 3.7 The Effect of Market Discipline on Diversification



The marginal costs to diversification may also have increased over recent years as a result of globalisation and a more volatile and uncertain economic environment (Markides, 1995a; Hill and Hoskisson, 1987; Mueller, 1972). If this is indeed the case, external volatility would accentuate the costs of diversification outlined above. For example, Liebeskind and Opler (1993) suggest that globalisation and its effect on competition may have forced firms to focus more on their core business. Also, it is argued that environmental uncertainty and volatility in the 1980s have increased the information and control loss problems associated with the steep hierarchies of diversified firms, increasing the relative value of a refocusing strategy.

A number of other explanations have been advanced to explain the occurrence of refocusing. The optimal position of an operation may be breached when economies of scope become exhausted or when there are opportunities for capital gains by divestment to a more synergistic or related acquirer than the

vendor. If this is the case, externalising the transaction by divestment to form an independent entity (e.g. MBO) or to another organisation becomes worthwhile (Wright & Thompson, 1987). According to the life-cycle hypothesis (Stigler, 1951) divestment may be expected during the expansionary stage of decreasing cost activities so as to allow for maximum scale economies. Performance of the vendor company may be expected to improve post divestment due to the elimination of negative synergies with the divested asset or increased efficiency arising from better allocation of management time and other resources in the more focused firm. The performance of independent buy-outs (e.g. MBOs) may be expected to increase due to more effective monitoring, improved decision making and increased managerial incentives.

In summary, there exists a series of complementary explanations why firms diversify and why some firms consequently found themselves to be over-diversified and hence in need of refocusing. Taken together they suggest that de-diversification will enhance internal efficiency and improve the performance of over-diversified firms (Shleifer & Vishny, 1991; Hoskisson & Turk, 1990).

3.3 Empirical Evidence on Corporate Refocusing

As mentioned elsewhere in this thesis, corporate refocusing primarily, but not necessarily, occurs through major divestments. The majority of the literature on refocusing therefore relates to divestment activity. In reviewing the existing empirical evidence in this area it is convenient to divide the analysis into three

broad themes: the extent and nature of refocusing activity, the determinants of refocusing and the consequences of a refocusing strategy.

3.3.1 The Extent and Nature of Corporate Refocusing

It is widely perceived that refocusing primarily occurs through divestment. Divestment can be categorised into two broad groups: voluntary and forced divestments. Forced divestments refer to situations where a change of ownership is forced upon the firm, usually by government regulators. Voluntary divestments are based on strategic decisions to partially withdraw or exit from a market. The latter type accounts for the vast majority of divestment activity and is the focus of this study.

Table 3.1 (adapted from Coyne and Wright, 1986) summarises the different types of divestments. Divestments, in contrast to acquisitions, is usually initiated by the selling firm and normally deals with one or a limited number of buyers. Divestment may occur to another organisation or to form an independent entity (e.g. MBO). In terms of divestment to another organisation, by far the most important form of divestment is a sell-off. This involves the sale of an asset to a separate company and the asset remains a division or subsidiary of the buyer (also referred to as parent-to-parent divestment). A spin-off occurs when some of the existing assets of a firm are set up as an independent entity. This form of divestment usually, but not necessarily, still involves a strong trading relationship between the demerged companies. An asset swap requires a mutual agreement on the valuation of two sets of assets in

a barter arrangement between firms. This arrangement is often difficult to achieve in practice and is most noticeable in recent years in the UK brewing industry. Franchising normally involves some kind of competition for the exclusive right to produce a firm's product or service in a particular area for a given period. Contracting-out has similarities to franchising, however, the distinction is that contracting-out involves the provision of a specific good or service to the parent company.

Table 3.1 Types of Divestment

Type	Ownership Severance	New Ownership Form
Sell-off	Complete; usually permanent	Subsidiary
Spin-off	Splitting rather than severance; may involve dilution of Ownership; usually permanent	Quasi-independent
Management/Leveraged /Investor Buy-out/Buy-in	Usually complete and Permanent; parent may retain equity interest	Independent
Franchising	Complete; limited period	Subsidiary or Independent
Contracting out	Complete; trading relationship Remains	Independent
Asset swap	Complete, but exchange Involved so size of parent Maintained	Subsidiary

A major development in the market for corporate control has been the management buy-out (MBO) where existing managers become equity holders in the newly acquired divested unit (see Wright *et al.*, 1997). Conversely, in a

management buy-in (MBI) a new management team obtains a significant equity stake in the newly formed company. In both cases, the remaining funds are usually provided in the form of loans and quasi-equity so that the new company is highly leveraged. Servicing the debt will foster better asset utilisation, resulting in greater efficiency in the firm and in an appropriate focus on cash generation. The rationale is that company will benefit from reduced agency costs following the realignment of ownership and control (Jensen, 1989). The rise of a large venture capital industry in the UK has permitted divestment via management buyout and facilitated specialist monitoring (Wright and Robbie, 1996) and initiated the more recent investor-led buy-outs (IBOs).

Divestment activity may be a single event or more typically, a multiple event as part of a major and continuing restructuring programme. A restructuring programme may also involve the simultaneous acquisition and divestment of activities. Here, divestment may be seen as a convenient way of disposing of those parts of a recently acquired group that are peripheral to the main activities of interest (also known as 'unbundling'). The existing evidence suggests that the existence of firms engaging in divestment and acquisition activity within the same period is quite widespread (e.g. Ravenscraft and Scherer, 1987; Markides, 1995a). This issue will also be examined in the context of the current study in the later empirical chapters.

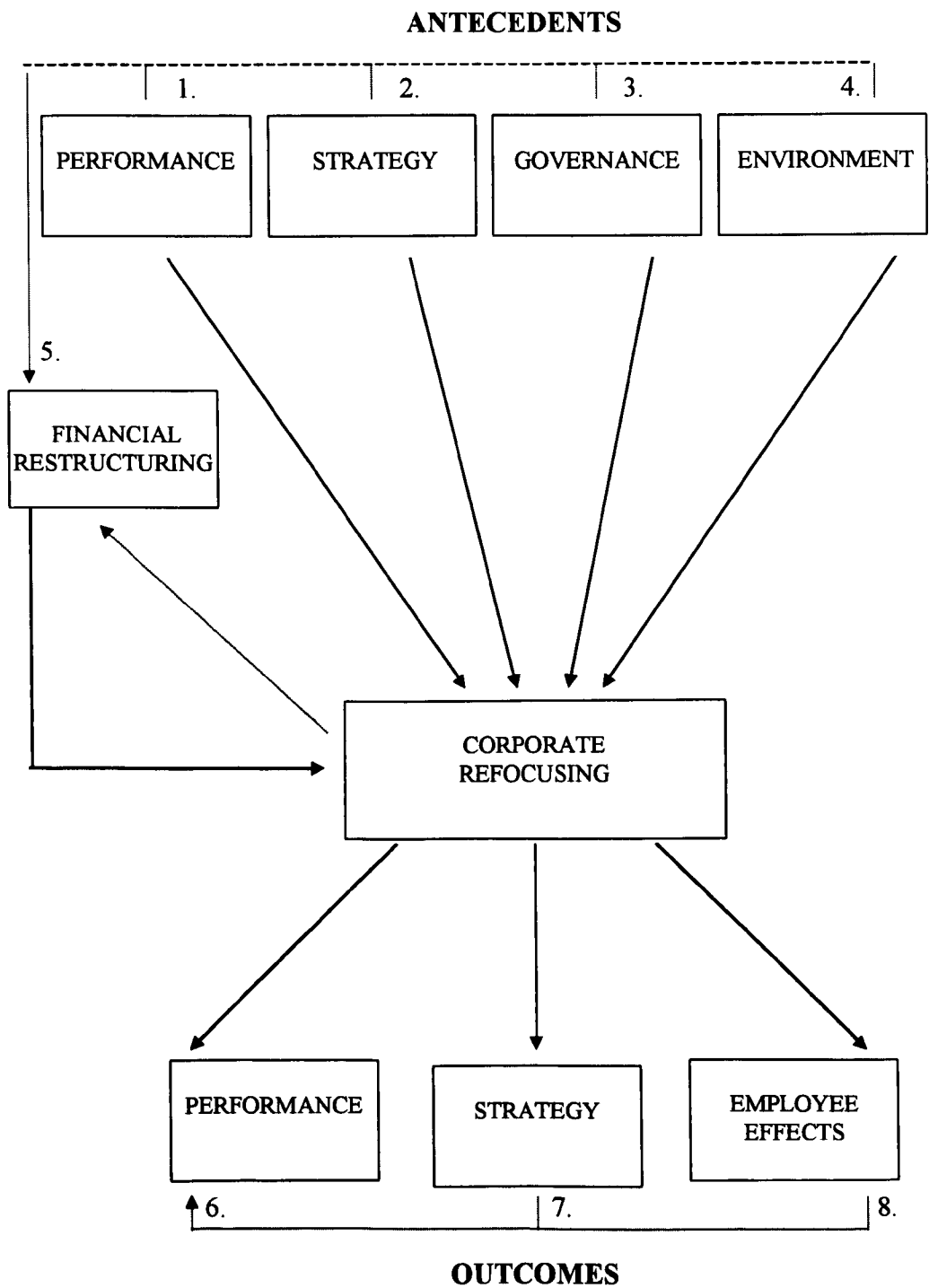
The extent of divestment activity in the UK since the 1980s was examined in Tables 1.1 and 1.2 in Chapter 1. In terms of the overall pattern of corporate

restructuring, divestments to other organisations and management teams accounted for 73 per cent of the volume and 33 per cent of the value of all mergers and acquisitions in the UK in 1995. Divestment has therefore become an important and permanent feature of the corporate scene. They are no longer regarded as an admission of mistake or failure, nor are they just recession-related (see below). Divestment is a positive aspect of the restructuring process and is expected to remain a major means of adjusting merger and acquisition activity to shifts in corporate strategy and changing economic conditions. However, whilst attempts have been made to examine the extent of divestment activity in the UK context, the extent of refocusing in general has not been systematically examined. The current study will address this important omission in the existing literature. The following sections review the empirical studies on refocusing.

3.3.2 The Determinants of Corporate Refocusing

Figure 3.1 illustrates the major factors hypothesised in the literature that lead to refocusing and its outcomes (Johnson, 1996). The dashed lines indicate the interrelations that may exist between the several alternatives within the two sections of the model (for example, see Hoskisson *et al.*, 1994; Smart and Hitt, 1994). An examination of the factors that influence divestment indicates that the literature can be divided into five main streams: performance, corporate strategy, governance, environmental and financial restructuring explanations of divestment.

Figure 3.8 Model of the Antecedents and Outcomes of Corporate Refocusing



Source: adapted from Johnson (1996)

Performance to Corporate Refocusing

Performance represents one of the most researched antecedents of corporate refocusing. An overwhelming number of single divestment studies have found that poor performance at both the business unit and corporate level is a major factor preceding the divestment decision (e.g. Duhaime and Grant, 1984, Ravenscraft and Scherer, 1987, Hamilton and Chow, 1993). The majority of research has found that it is poor performance relative to industry counterparts, rather than relative to past performance, that prompt firms to refocus. The only exception is the case of spin-offs. For example, Rosenfeld (1984) found that spin-offs took place after a period of positive abnormal returns. It is possible that spin-offs are used for pro-active reasons rather than reactive. For example, Ito (1995) argues that Japanese firms commonly use them to achieve growth and reduce transaction costs associated with managing large diversified firm.

However, refocusing generally encompasses a programme of divestments intended to return to the core business, rather than a single divestment. Evidence on multiple divestments suggests that firms who engage in refocusing may not do so simply because business unit performance is poor. For example, Singh and Chang (1996) find that turnover may be prompted by poor performance, but this may relate more to the lower growth of a unit as opposed to financial ratios. Studies examining corporate refocusing find a number of factors that lead to refocusing, some of which are stronger than firm performance. Hoskisson *et al.* (1994) suggest that firm performance moderates and mediates many of the antecedents of refocusing activity. This result

implies that focusing on firm performance as a primary criterion may inflate the effect on the decision to sell.

Finally, many refocusing firms are outperforming their industry prior to refocusing, suggesting that other factors in addition to poor performance are driving a firm's decision to refocus. For example, Johnson *et al.* (1993) find that whilst an average firm's return on assets (ROA) was below industry average, one third of the sample was performing at or above industry levels before initiating refocusing. Similarly, Hoskisson and Johnson (1992) found that those firms making acquisitions during refocusing exhibited higher performance than those just divesting.

Business Strategy to Corporate Refocusing

An equally important factor that may pre-empt a firm's decision to refocus is business strategy. As argued earlier in this chapter, there exists an optimal limit on the extent to which a firm can diversify without adversely affecting its performance. One explanation for refocusing therefore is that a large number of firms have over-diversified, prompting the decision to divest. A number of studies provide evidence that refocusing firms are characterised by high levels of diversification relative to their industry (for example, Markides, 1992, 1995a; Hoskisson *et al.*, 1994).

In addition, high levels of debt may encourage firms to refocus, not least because sell-offs can be used to pay off debt and reduce this constraint on managerial discretion (Lee and Cooperman, 1989; Jensen, 1986). The

contention that high leverage determines divestment is supported in a number of studies (for example, Hamilton and Chow, 1993; Bergh, 1997). Markides (1992b); Ravenscraft and Scherer (1987) and, Liebeskind and Opler (1993) find that firms are less likely to refocus if the core business has a high level of R&D expenditure, which is consistent with the literature on diversification detailed in Chapter 2 of this thesis (for example, Lemelin, 1982). Researchers have found that firms in these industries will tend to diversify to exploit firm-specific technological know-how and expertise (e.g. Prahalad and Hamel, 1990).

Markides (1992b) finds that firms are more likely to refocus if they have an attractive core business, in terms of high performance, size, concentration ratio and advertising intensity. However, Ravenscraft and Scherer (1987) find that high market share is viewed as strategically advantageous, inhibiting sell-off. Therefore the effect of these market structural characteristics is ambiguous.

Focusing on firm-specific factors to explain divestment activity is not sufficient because motives (and outcomes – see next Section) also depend on unit specific characteristics. The strategic motives for refocusing varies across studies and can be classified into two categories: (1) the refocusing category, and (2) financial goals. The need to focus on core activities is often cited as a reason to divest (for example, Hamilton and Chow, 1993; Kaplan and Weisbach, 1992). A number of studies suggest that unrelated and ill-fitting operations are more likely to be divested (Duhaime and Grant, 1984; Markides, 1995a; Wright and Robbie, 1996; Bergh, 1995). Ravenscraft and Scherer

(1987); Porter (1987) and Kaplan and Weisbach (1992) find that a significant number of unrelated units brought into the firm through acquisition are later divested. Thus, in general, studies suggest that firms are inclined to, and probably better off, staying close to their core competencies.

However, there is also evidence that subsidiaries which have a trading relationship with the parent may be divested if a managed market relationship improves efficiency (Wright, 1986). In two surveys covering MBOs during the early 1980s (Wright, 1986; Wright *et al.*, 1990), a percentage of MBOs were linked to the parent company. These findings help to explain the occurrence of related divestments. A study by Bergh (1995) reported that 43 per cent of US firms sold related assets, suggesting that sell-offs are motivated by economic benefits of competitive resource allocation efficiencies.

In contrast, financial goals emphasise either short-term performance targets or fund raising to pursue other objectives such as growth. For example, Hamilton and Chow (1993) find that firms use proceeds to reinvest in the core business and fund future acquisitions. Lang *et al.* (1995) report that managers sold assets when doing so provided the cheapest funds to pursue managerial objectives.

Governance to Corporate Refocusing

Weak corporate governance has been suggested as a rationale for corporate refocusing. It is widely argued that weak or inadequate corporate governance allows managers to divert free cash flow to unprofitable expansions (Jensen, 1986), resulting in high levels of diversification and poor strategy formulation

(Bethel and Liebeskind, 1993; Hoskisson *et al.*, 1994). Following Mueller (1969) and Jensen (1986), diversification confers size benefits on managers, since their personal wealth and employment risk is linked more to firm size than performance. Inadequate governance may be the result of diffusion of shareholdings, the characteristics of managers and board members, or board passivity.

In a comprehensive study by Hoskisson *et al.* (1994) the most important governance influence on the divestment decision was blockholder equity (also found in study by Bethel and Liebeskind, 1993). There was marginal significance for the proportion of outsiders on the board but a failure to find any significant results for outside or inside equity holdings on divestment. Bergh (1995) examines the size and relatedness of a unit sold and finds that where ownership concentration is the highest, companies sell unrelated and small units, to refocus on the core business and to enable them to achieve benefits of internal cooperation among related businesses. On the other hand, when outside director equity is low, firms sell more related and larger units. This result suggests that managers favour diversity over size and use sell-offs to achieve economic benefits of competitive resource allocation.

An early case study by Gilmour (1973) on major divestment decisions found that replacement of top management preceded each divestment study. In a later study, Ravenscraft and Scherer (1987) also report that a recent change in top management increases the probability of divestment. These results are consistent with the view that a radical change in the strategy of the firm is

usually undertaken when a new management team arrives either because they have a weaker emotional commitment to the old activities or because the changes indicate deeper shareholder dissatisfaction (e.g. Gabarro, 1985).

A firm's decision to divest may also be influenced by the threat of take-over. Bhagat, Shleifer and Vishny (1990) and Shleifer and Vishny (1990) present evidence that the market for corporate control accounts for a substantial amount of restructuring during the 1980s. For example, Gibbs (1993) and Denis *et al.* (1997) find that refocusing is positively related to corporate control threats. These findings suggest that firms facing the threat of take-over either considered themselves as likely candidates for a repeat offer and thus realised the need for change, or were pressurised by their board or blockholders to reorganise. Thus reductions in agency problems through market disciplinary forces increases divestment activity (Berger and Ofek, 1995).

Environment to Corporate Refocusing

The fourth rationale for engaging in refocusing is changes in the business environment. Suggestions include changes in US tax policy (e.g. Hoskisson and Hitt, 1990) and/or antitrust policy (Shleifer and Vishny, 1991) that have made certain types of restructuring more attractive. In addition, the advent of junk-bond financing in the US and the growth of the venture capital market in the UK during the 1980s has removed size as a deterrent to takeover (Bhide, 1990) and opened management to monitoring and discipline from the external capital market (Jensen, 1994). Others have argued that increases in global competition have prompted firms to specialise by refocusing on their core

businesses (Hoskisson and Hitt, 1994). These explanations certainly help to explain the timing of refocusing.

Research on divestment during recession has yielded mixed results. For example, Duhaime and Grant (1984) did not find any significant differences in divestment decision frequency among the economic cycle phases. In contrast, Hamilton and Chow (1993) find that the general economic environment was relatively important in influencing the divestment decision. However, the economy was in decline during the study period and is therefore expected to influence the results. Research on MBOs indicates an increase in the number of buy-outs of failed firms during periods of recession (see for example, Robbie *et al.*, 1993).

Financial Restructuring to Corporate Refocusing

Finally, financial restructuring may be an antecedent to corporate refocusing. Financial restructuring may lead to refocusing if firms engaging in the former end up divesting units to increase efficiency and reduce the level of debt (Seth and Easterwood, 1993, provide evidence to suggest that this is often the case in leveraged buy-outs). In addition, financial restructuring may occur simultaneously with refocusing, for example, via stock repurchases and recapitalisations.

To summarise, existing attempts to analyse divestment activity appear methodologically unsatisfactory in that they typically employ the same hypotheses which have been used to explain prior *levels* of diversification to

analyse subsequent *changes* in the same variable, or some proxy for it. Thus, for example, the agency problem between shareholders and managers is widely assumed to generate higher equilibrium levels of diversification than would be justified by shareholder value maximisation. Researchers then contend that corporate governance variables, intended to capture shareholder power with respect to managers, are expected to *decrease* diversification and hence increase divestment. However, in the absence of any change in these variables, the same characteristics presumably have already acted to depress levels of diversification *before* any exogenous shock. Therefore it is unclear why such shareholder dominated firms should display higher rates of divestment than, say, firms which are more weakly controlled but which have had the corresponding opportunity to diversify more widely.

Also, as argued in detail in Chapter 2, a majority of studies only examine the direct relationship between divestment and individual hypothesised influences. These relationships are likely to entail more complex combinations. One noticeable exception is a study by Hoskisson *et al.* (1994), which adopts a structural equation framework to examine the interrelationships between combinations of influencing factors. The study finds that firm performance moderates and mediates many of the antecedents, suggesting that focusing on firm performance as a primary criterion for refocusing may inflate the effect on the decision to sell. A very few studies focus on the fit between the divested unit and the parent (Duhaime and Grant, 1984; Ravenscraft and Scherer, 1991; Bergh, 1997).

The most common approach adopted in all these studies is to test pooled longitudinal data with OLS regression analysis by focusing on changes in observations between two points in time. This approach is problematic and the results may be vulnerable to bias if regression towards the mean effects are not controlled for or correlation between the change and initial measurement of a variable is ignored. The dynamic aspects of the data are therefore typically neglected and as such, previous research which examines the causes of refocusing may be subject to specification bias and inefficient estimates of relationships. Many studies also fail to include time-related change as a structural component or as a factor in the model, to test the stability of relationships over time. For example, managerial motivations differed between the 1970s and the 1980. In the former period, managers were better able to pursue their own self-interests due to weak governance (Jensen, 1986). However, in the later period, managerial activities were more closely scrutinised; mistakes could lead to takeovers, more acquisition targets became available and, owners and boards became more actively involved in corporate affairs (Gibbs, 1993; Jensen, 1988).

3.3.3 The Consequences of Corporate Refocusing

The existing research on the outcomes of corporate refocusing can be separated into three broad streams: performance, strategy and employee implications:

Corporate Refocusing to Performance

The effect on performance of a refocusing strategy has received the most attention in the literature. The majority of research has taken a relatively short-term measure of performance by adopting an efficient market methodology to examine the share price effect around the time of a refocusing announcement. The two primary modes of refocusing researchers have identified are sell-offs and spin-offs. This research overwhelmingly indicates that selling firms exhibit an improvement in the share price at the time of the announcement, which suggests that refocusing creates market value (for example, Jain, 1985; Rosenfeld, 1984; Klein, 1986, Hite *et al.*, 1987; Alexander *et al.*, 1984).

These returns to refocusing have shown to be moderated by several factors. For example, Hite and Owers (1983) found that spin-offs undertaken for strategic reasons earn positive abnormal returns, whereas spin-offs as a response to regulatory issues earn negative returns. Montgomery *et al.* (1984) find that non-strategic sell-offs are negatively valued by the market. Both Klein (1986) and Sicherman and Pettway (1992) show that non-disclosure of the divestment price results in non-significant returns. This result is consistent with the inferences made by Milgrom (1981) that failure to disclose may convey unfavourable information to shareholders and therefore an unfavourable reaction from shareholders. In addition, firms whose credit rating has been downgraded (Sicherman and Pettway, 1992), firms who announce they will retain the proceeds from an asset sale (Lang *et al.*, 1995), and focus-decreasing transactions (John and Ofek, 1995) have been found to earn lower returns. Markides (1992a) found that refocusing announcements earned positive and significant abnormal gains, with 'overdiversified' firms in particular generating

an average gain of about 4 per cent in shareholder value. Sell-offs are therefore seen as firm-specific events, whose effects depend on the various underlying strategic motivations.

The characteristics of the unit sold may also moderate the returns to refocusing. For example, Miles and Rosenfeld (1983) for spin-offs and Klein (1986) for sell-offs found that firm returns are associated positively with the size of the sale. With regards to the relatedness of unit sold, drawing from the resource-based view of the firm, firms selling unrelated assets should have higher ex-post performance than those selling related assets. A study by Bergh (1995) finds that the relatedness of unit sold is associated negatively with selling company's post-sell-off performance. This is consistent with the view that selling a related business may threaten a seller's source of competitive advantage. If firms are selling related businesses than this may account for some of the lack of findings regarding performance. Kaplan and Weisbach (1992) examine the relationship between acquisitions and divestments, and find that abnormal returns from divestment are lower for unsuccessful acquisitions (those which are sold at a loss or those stated by the business press at the time of the divestment as being a mistake) than corresponding returns for successful divestments.

There are a number of studies that look specifically at the announcement effects of buy-outs. The available evidence generally supports the view that buy-outs improve performance. In a survey study by Amihud (1989) substantial excess stock market returns are reported for buy-outs, which appear

to exceed any gains made by downgrading senior debt (e.g. Jensen, 1989) or from tax benefits (KKR, 1989). Divestment of a unit by MBO may enable the profitability of the disposed unit to increase, partly due to the change in incentive structure post restructuring (Kaplan, 1989, Smart & Waldfogel, 1994). In an attempt to discriminate between different incentive changes in buyout transactions, a study by Thompson *et al.* (1992) using a sample of 31 UK MBOs between 1984 and 1989 demonstrates that managements' equity share emerges as the dominant determinant of performance improvements, supporting the view that value gains from corporate restructuring result primarily from increasing managerial motivations (Jensen, 1989).

There are a number of limitations associated with event studies (Halpern, 1983, Brown and Warner, 1980; Hite, 1986). One particular problem is the isolation of single divestments as a single news announcement. Many divestments occur typically as part of a programme of disposals and therefore it is difficult to disentangle any overlapping effects. Denning and Shastri (1990) examine firms making single, large divestments with no other announcements in the relevant period and fail to report any significant announcement effects. There is also very little public information about a divested business, especially in terms of performance. The potential for selection bias is also a problem if only the financial press is used to collect data, as only a sub-set of announcements are reported through this medium.

More recently, researchers have begun to study the longer-term performance of divesting firms. Most research examines the impact on performance one to

three years post refocusing. Initial research indicates that refocusing is associated with profitability improvements. Montgomery and Thomas (1988), examining single divestments, found that industry-adjusted ROA improved post-divestment but that it was significantly lower than matched non-divesting firms over the same period. Comment and Jarrell (1995), based on a sample of US firms, found that firms that refocused during the 1980s experienced an upward trend in net-of-market wealth, whilst those that reduced focus experienced a decline. John and Ofek (1995) and Hoskisson and Johnson (1992) also report that ROA improved following asset sales and refocusing respectively.

Markides (1995b) found a large and statistically significant refocusing effect in an *ex post* analysis of the profitability consequences of reduced diversification. However, there is some variance in these observations. The earlier the firm's refocusing activity (i.e. 1981-1983) the greater its impact on subsequent performance, whereas middle and late refocusers did not exhibit performance improvements. One interpretation of these results is that the gains from refocusing may take time to realise. Bergh (1996) suggests that it may take up to two years post sell-off before performance improvements are realised.

There is also considerable evidence that MBOs improve short-term real operating profit post-buyout (see Palepu, 1990 for a review of US studies and Wright *et al.*, 1992 for a review of UK studies). However, the longer-term performance effects of MBOs are ambiguous. More rigorous studying is required, however there is an inherent censoring problems associated with the

reversion to quoted status or the sale to a third party (Kaplan, 1991). Moreover, it tends to be the larger and more successful MBOs that return most rapidly to the stock exchange, so that long-term performance may be biased downwards as strong performers exit from the sample. There may also be a possible selection bias in that firms without satisfactory performance may have difficulty in obtaining funding to finance a buy-out.

There are, however, a number of important limitations with cross-sectional performance studies on refocusing. As Bergh (1997) points out, it is difficult to evaluate the performance effects of divestment in a cross-sectional context, since it may take up to two years post-sell-off before performance improvements are realised. To circumvent problems resulting from cyclical and/or outlier observations, most researchers average several years' data and then examine prior divestment as a determinant of the (implicit) long-run equilibrium level of profitability. However, subsequent divestment occurring during the interval of data averaging is typically ignored. This is a particular disadvantage if there is a relatively high level of divestment activity across the sample. Moreover, if profitability adjusts sluggishly to the firm's changed characteristics - and the literature on profitability dynamics (e.g. Geroski and Jacquemin, 1988) predicts that it will - the impact on average profits across any interval will depend upon the timing of such changes.

Corporate Refocusing to Business Strategy

One of most commonly stated goals of refocusing is to change firm strategy (e.g. to increase fit, restore competitiveness or improve efficiency). High levels

of diversification have been linked to lower R&D intensity. If refocusing reduces diversified scope, then we may expect managerial risk-taking to increase through R&D expenditures (Hoskisson and Johnson, 1992). However, Hitt *et al.* (1996), using structural equation modeling, found that acquisition and divestment intensity lead to an emphasis on financial controls, which has a negative impact on internal innovation (see also Kose, Lang and Netter, 1992).

Corporate refocusing implies that firms narrow the scope of their activities by concentrating on related businesses. Hoskisson and Johnson (1992) support this proposition and find that the majority of US firms who had completed restructuring had focused on related businesses. Similarly, Chang (1996) reports that any acquisitions made following restructuring are more related and allow existing knowledge and skills to be transferred.

Hatfield *et al.* (1996) and Liebeskind *et al.* (1996) examine the effect of refocusing on industry specialisation and concentration respectively. Experience with refocusing in the US indicates that industry specialisation has not been affected by refocusing activity during the 1980s. Similarly, average industry concentration levels have changed little in the economy as a whole. These studies suggest that the goal to produce a population of specialised firms in response to global competition has not materialised. Whether this is also the case in the UK remains to be established.

Corporate Refocusing to Employment

The popular business press abounds with examples of mass layoffs in conjunction with asset sell-offs. However, the effect on employees is one of the least examined aspects of restructuring. Kose *et al.* (1992) find that 43 percent of refocusing firms cut the number of employees by 5 percent and 50 percent replaced some senior management. Brown *et al.* (1994) report a smaller but still significant 34 percent replacement of CEOs when refocusing was initiated by firms in default.

Johnson *et al.* (1990) argue that “psychological shock” associated with low morale, fear of layoff and a higher level of turnover may result in a period of post-restructuring drift. Hitt and Keats (1992) suggest that while one of the goals of restructuring is to enhance competitive advantage, the actual outcome may be degenerative and dysfunctional. Another strand of the literature suggests that survivors are more likely to translate feelings into increased work motivation (e.g. Brockner *et al.* (1993).

With regards to MBOs and employment there are mixed findings. A number of studies report a sharp decline in employment after the buy-out (for example, Wright and Coyne, 1985; Jensen, 1989). Whilst there is evidence that employment appears to fall immediately after a buy-out, the subsequent employment record appears to outperform the industry average in the US (Lichtenberg and Siegel, 1990) and show some absolute recovery in the UK (Wright *et al.*, 1993). Since there is an indication that buy-outs occur in

relatively weaker sectors, the effect of the buy-out may be to prevent further adverse changes in employment.

3.4 Summary

To summarise, the prevalent explanation for refocusing in the 1980s is that overdiversified firms are reducing their level of diversification in an attempt to improve profitability and market value. It is argued that a large number of firms found themselves overdiversified in the 1980s due to a downward displacement in their optimal level of diversification, during the period in question. At least three inter-related explanations for this downward displacement have emerged from the literature. First, Jensen (1989) and others have argued that the optimal level of diversification has declined due to an increase in the effectiveness of the market for corporate control. Second, capital market innovations have weakened the informational and control advantages of the internal capital market, attenuating the benefits from diversification. Third, the capital market reversed its previous optimistic stance on conglomerate mergers and started to prefer more tightly focused firms in the 1980s.

Corporate refocusing typically, but not necessarily, involves major divestments. Divestment as a corporate strategy tool has grown in importance in the UK over the past 10 to 15 years. An important contributor to this increase has been the development of management buy-outs. However, despite the evidence on divestment activity, there is still little systematic evidence on the extent of refocusing in general (e.g. Comment and Jarrell, 1991; Liebeskind and Opler,

1993). Nor do we know the nature of refocusing firms and the exact reasons why they divest. The *ex post* effect of divestment on profitability is also an under-researched area.

Compared to merger activity, which continues to receive extensive scrutiny in the industrial organisation and finance literatures, this situation appears anomalous. The underlying issues which motivate so much work on mergers - namely the effectiveness of the market in corporate control and the efficiency consequences of altering the boundaries of the firm - would appear to apply with equal force to refocusing activity.

A review of the recent literature on corporate divestment reveals a number of qualifications: first, the published studies are limited mainly to US data and to manufacturing industries. Given that divestment has also been predominant in the UK and has had an impact across all industrial sectors, it would be insightful to analyse divestment activity using UK data across sectors. A further limitation of previous research concerns the coverage of the type of divestment used to measure the dependent variable in regression equations. Collecting data on divestment is fraught with difficulties both in terms of the number of subsidiaries/divisions which are sold and their value. The transaction price may not be disclosed, while comprehensive tracing of the number of disposals may also be difficult especially for smaller loss making subsidiaries. Given that some enterprises may engage in extensive divestment programmes, these divestments may collectively represent a quite significant proportion of a parent company's assets. There are also indications that while

previous studies have focused on parent-to-parent divestments (sell-offs), less attention has been paid to sales of subsidiaries to management (management buy-outs and buy-ins). This is a potentially important omission as the number of divestments which result in buy-outs is of the same order of magnitude as parent-to-parent sell-offs (CMBOR, 1997).

There are also a number of qualifications concerning the methodology adopted in previous studies. The existing literature can be divided into two broad strands: event studies and cross-sectional studies. The limitations of these approaches have been discussed in detail both in this chapter and Chapter 2. Briefly, event studies rely on the identification of a single divestment, yet for larger firms multiple divestments are typically part of larger restructuring programmes. There are also problems regarding lack of performance information for the divested unit and possible selection bias if only the financial press is used to identify divestment announcements. Also much of the previous evidence is limited because of its use of cross-sectional models to examine longitudinal relationships (Bergh and Holbein, 1997). This is an important issue in the case of divestment, given the dynamic nature of the conditions which may prompt firms to dispose of assets and the persistent nature of profitability effects following divestment. As such, previous research may be subject to specification bias and inefficient estimates of relationships.

Notes

¹Control loss occurs because “only a fraction of the intentions of a superior are effectively satisfied by the subordinate” (Williamson, 1967, p. 127).

²The market for corporate control has been defined as “a market in which alternative managerial teams compete for the rights to manage corporate resources” (Jensen and Ruback, 1983).

4. SAMPLE AND DATA CHARACTERISTICS

4.1 Introduction

This chapter describes the sample of publicly quoted UK companies which is used in the empirical parts of the study (Chapters 6, 7, 8 and 9 of this thesis). Section 4.2 outlines the approach adopted and relates it to the objectives of the study. Section 4.3 considers the dating, sampling method and data sources involved. Section 4.4 examines the characteristics of the sample and defines the study variables.

4.2 The Nature and Purposes of the Study

The purpose of the study is to examine refocusing activity for a sample of publicly quoted UK companies, over the period 1985-1993. The period was chosen principally to correspond with the widespread perception that refocusing was a dominant business strategy over this period. Following the review of the literature, we attempt to investigate the following research questions in the UK context:

1. What is the extent and nature of corporate refocusing?
2. What are the characteristics of refocusing firms?
3. What are the prior determinants of the divestment decision?
4. What is the impact of divestment on firm performance?

The more specific questions will be elaborated in the individual empirical chapters in Part III of this thesis.

In order to test these research questions, data were collected from a number of published and unpublished sources. A discussion of the estimation techniques adopted to analyse this data will be left until the following chapter of this thesis. This data collection approach was chosen in preference to a questionnaire survey for a number of reasons: First, in many cases the initial adoption of a programme of refocusing would have taken place a number of years before the study. A questionnaire would require a company representative to comment on events going back into the company's history and possibly pre-dating the representative's association with the company. A possible bias could therefore be introduced if they were unable to identify true reasons for refocusing. Second, during the period of investigation, takeover activity and bankruptcy lead to significant changes in the population of quoted companies. Since any questionnaire approach must be made to extant companies it would omit such cases entirely and may entail some bias in the sample. And finally, some of the questions could only be answered by referring to data available from public sources; for example, in the case of examining changes in industry concentration levels.

Some of the disadvantages of the data collection method include obtaining less precise conclusions regarding refocusing than would be the case with insider co-operation, and the variation in quantity and quality of information between

firms. The data limitations of using published sources in the context of this study are discussed in detail in Section 4.3.3.

4.3 Dating, Sampling and Data Sources

4.3.1 Dates

The period chosen to investigate refocusing activity by quoted UK companies was 1985-1993. The main criteria for choosing this period was that it corresponds with the perceived move towards more tightly focused firms. The starting date also coincides with the commencement of publication of the most comprehensive coverage of divestment and acquisition information - Acquisitions Monthly.

4.3.2 The Sample

The criterion for inclusion in the sample was an appearance in the leading 500 companies in the "Times 1000" in 1988-89 - a convenient midpoint in the study period. The population of FT500 firms was selected because, as for US data (for example, Markides, 1995a), it is expected to be primarily the larger firms who engaged in refocusing activities. Since refocusing was expected to impact across industrial sectors, the sample was not restricted to manufacturing companies. However, the following companies were excluded:

a) *Unquoted companies.*

As it was intended to use share price measures, only publicly quoted companies were included in the target sample. This meant that private companies and UK subsidiaries of foreign-based multinationals were dropped from the population.

b) *Financial companies - including banks, insurance companies, etc.*

Financial companies were excluded from the population, because it is very difficult to make output and input comparisons between financial and manufacturing firms. All financial companies were therefore excluded, despite the existence of extensive restructuring within this industry.

c) *Commodity traders, import/export merchants, etc.*

Commodity traders were excluded because despite their large turnover, they typically have a very small workforce and asset base. This meant that their accounts were not comparable to those of other firms.

These exclusions are unlikely to introduce bias into the results, given their relatively small appearance in the FT500 list.

The resulting random sample of firms used is 158 publicly quoted UK companies. Table 4.1 shows the number of firms within each industrial sector, classified at the 1-digit Standard Industrial Classification (SIC) level. Since a substantial number of firms are highly diversified, they were classified according to the SIC in which they had the majority of their sales. The single largest

classification is manufacturing, which contains 97 firms (i.e. 61 per cent of the sample).

Table 4.1 Industrial Classification for Firms in Sample

Industrial Sector	No. of Firms
Manufacturing	97
Distribution, Hotels & Catering	35
Construction	15
Transport	7
Business Services	4
Total	158

The sample was unbalanced in the sense that firms were allowed to enter and exit the sample at random, and was therefore not restricted to those firms that remain in existence throughout the entire period. An unbalanced sample allows for a much larger sample to be analysed and reduces the impact of self-selection of individual cross-sectional units. Selection bias is inherent in a balanced sample since highly unsuccessful firms would have disappeared through takeover or bankruptcy. The balance of the panel is given in Table 4.2. As shown, 77 per cent of firms survived intact over the study period.

Table 4.2 Balance of the Panel

No. of Years	No. of Companies
2	1
3	1
4	12
5	6
6	5
7	6
8	6
9	121
Total	158

4.3.3 Data Sources

Data on the sample was collected from a number of sources to compile a unique data set to analyse corporate refocusing activity. This is the largest database on UK divestments ever collected. The principal sources are as follows:

a) *Acquisitions Monthly*

This provided the most comprehensive coverage of parent-to-parent divestments and acquisitions for the companies in the sample. The principal collections used were at 'The Centre for Management Buyout Research' (CMBOR) at the University of Nottingham. Prior to 1989 no library held all copies and therefore information was provided direct from Acquisitions Monthly.

b) *CMBOR database*

Information on divestment by management buy-out and buy-in was supplied by CMBOR at the University of Nottingham. The CMBOR database itself is compiled from various sources including regular surveys of financial institutions, local press and circulars which companies are obliged to issue to shareholders when disposals involve directors.

c) *Popular business press*

Acquisition and divestment data were supplemented by a search through the popular business press. This enabled us to identify especially small transactions. This source was also used to identify take-over bids or bid rumours over the sample period.

d) *Datastream database*

The majority of firm-level accounting data was constructed from Datastream. Datastream also provided some analysis of firm sales by business activity. A Datastream programme was also used to calculate industry figures.

e) *Fame database*

Fame was consulted mainly for a description of a firm's activities and corresponding SIC codes.

f) *Company Reports*

Company reports provided the most comprehensive record available for managerial shareholdings, the number of executive and non-executive directors, blockholder share ownership and the analysis of firm sales by activity. The principal collection used was at the University of Warwick.

g) *Business Monitor*

The Report on the Census of Production (Series PA1002) contained industry sales information for manufacturing enterprises and the proportion of industry sales accounted for by the 5 largest firms, both classified at the 3-digit SIC level.

h) *OECD Trade Sources*

Information on imports and exports at the 3-digit SIC level are calculated from the OECD trade database and was kindly supplied by the Department of Economics at the University of Nottingham.

The data set was compiled by cross-referencing against different sources, as no single source contained all the relevant information. There are a number of data limitations using the above sources. For example, the Business Monitor only contains industry information on manufacturing companies and therefore did not provide information for some of the firms in the sample. Some company reports provided more detailed information than others. This problem is particularly evident prior to requirements for full disclosure in the accounts of certain company information, for example, managers' equity interests. There was also

the problem of consistency with the reporting of substantial interests, which changed definition in 1990. Finally, there is an additional problem of data omissions, especially regarding sales price information on divestments. This latter data limitation is a well-recognised issue in US studies on divestment (see for example, Hite, 1986).

4.4 Characteristics of the Sample

The full sample consisted of 158 UK publicly quoted firms randomly selected from the FT500 list (see section 4.3.2 for exclusions). Since much of the empirical work involves panel data estimation, data was collected for each firm, for each year, from 1983 through to 1993. A search through Acquisitions Monthly and the business press produced 2,001 divestments and 2,599 acquisitions for the sample firms over the 1985-93 period. All divestments were screened to isolate only those undertaken voluntarily (i.e. not forced upon companies by regulatory issues). Involuntary divestments in any case were an insignificant part of the UK market until 1989 when “divestment deals” were introduced as part of the change in merger policy. Table 4.3 shows divestment activity by companies in the sample. The figures support the view that divestment is likely to be a multiple event, associated with a major and continuing restructuring programme (see Chapter 3 of this thesis). Of the sample, 86 per cent of firms which divested in the period 1985 to 1993 engaged in more than one divestment, with 43 percent undertaking at least 11 sales of subsidiaries. Table 4.4 lists the most intensive divestors in the sample over the period 1985 to 1993. As shown, there appears to be no industry-specific

characteristics for the most frequent divestors. As with US data (for example Singh, 1993; Markides 1995a), the impact of refocusing through divestment appears to be felt across all industrial sectors.

Table 4.3 Divestment Activity by Companies in the Sample

Number of divestments	No. of Companies	Percentage
0	13	8%
1-5 ^a	45	29%
6-10	32	20%
11-15	23	15%
16-20	14	9%
20-30	18	11%
30 or more	13	8%
Total	158	100

Notes: 9 firms undertook one divestment

Table 4.4 Most Active Divestors in the Sample

Vendor Name	No. of Divestments 1985-1993
Hanson	87
British Petroleum	64
Grand Metropolitan	63
I.C.I.	57
Thorn EMI	50
T.I. Group	50
Unilever	40
Beecham	37
B.T.R.	37
B.E.T.	36
Allied Lyons	36
Guinness	35
Lex Service	33

Table 4.5 shows the number and value of divestments by year for the sample firms. Divestment activity increases steadily from 1985 and reaches a peak in

1989 (1988), in terms of the number (value) of divestments by year. Whilst divestment declines after this date, the number and value of sell-offs is at a higher level in 1993 than at the start of the study period, reinforcing the general trend of divestment as an increasingly positive aspect of the restructuring process (see Section 1.2, Chapter 1 of this thesis).

Table 4.5 Divestments by Year

Year	Number	Value(a) ¹ (£000's)	Value(b) ² (£000's)
1985	159	1,801,150.00	1,805,922.00
1986	183	5,096,707.47	5,152,742.47
1987	203	6,553,075.47	6,707,107.47
1988	319	12,449,497.40	12,561,745.40
1989	329	11,110,016.47	11,341,308.47
1990	259	9,385,957.47	9,603,093.47
1991	175	3,294,812.00	3,503,647.00
1992	196	5,078,341.47	5,253,564.47
1993	178	5,798,043.93	5,984,432.93
<i>Total</i>	<i>2001</i>	<i>60,567,601.68</i>	<i>61,913,563.68</i>

Notes:

¹value of divestments with reported sales price

²value of divestments assuming unpriced divestments have a value of 0.1 per cent of market value of that firm

4.4.1 The Variables

(i) Divestment variables

Number of divestments. The number of business units divested is a count of the total number of divestments (defined to include demergers, spin-offs, sales to third parties and disposals via management buy-outs) by a firm during a one

year period. In the UK, by far the majority of these transactions involve sales to third parties (sell-offs) and management buy-outs/buy-ins, with the total numbers and values of each being fairly even (CMBOR, 1998). From Table 4.1 the mean number of divestments is 1.54 and ranges from zero to 20 (undertaken by Hanson in 1989).

Proportion of assets divested. The proportion of assets divested is calculated as the sales price of a divested unit divided by the market value of the firm in the year before the divestment. These percentages are summed over the year to obtain a total proportion of assets divested by a firm during a one year period. This procedure is similar to existing studies (for example, Hoskisson *et al.*, 1994) except that due to a lack of information on the actual sales of the divested unit, the sale price is used as a proxy for the market value of the divestment.

In the cases where a sales price was not reported the following procedure was adopted: first, using a subgroup of 45 companies over the period 1985 to 1991 we plotted the frequency distribution for the proportion of assets divested based on 627 divestments. This represents 72.5 percent of the total 865 divestments reported over the period, implying 27.5 per cent failed to report a price (22.75 percent for the whole sample of 158 companies). Various cut-off points were selected and assigned to divestments with an unobserved value. The results appeared insensitive to the allocation rule selected. Even at the 25 percent value, the value of divestments was 0.2 percent of the firms market value. We would expect the unreported values to represent small and/or under-performing divestments and hence a small proportion of total divestments. Therefore, this

potential bias is unlikely to be important. Assigning a proportion of 0.1 per cent of market value to divestments with no sales price, the average proportion of assets divested is 4 per cent.

The rationale for using separate measures rests on both methodological and practical reasons. The number of recorded divestments relates more obviously to any control problems associated with diversity. Furthermore, this approach is advantageous in so far as value data are inevitably unobtainable for some smaller divestments. Divestment expressed as a proportion of the firm's initial assets represents a measure of the importance of divestment activity over the period.

(ii) Refocusing variables

To measure the extent of refocusing activity we need an index of diversification, since refocusing essentially refers to a reduction in the level of diversification. A variety of measures have been used in previous studies on diversification and exhibit a fair amount of correlation. We adopt two measures:

Number of SICs. The number of SICs in which a firm operates is calculated at the 2-digit SIC level. This measure is based simply on a count of the number of business segments in which a firm operates and as such, weights all segments equally. Diversification is categorised as related if a firm diversifies within the same 2-digit SIC and unrelated otherwise.

The sole use of this measure may lead to incorrect inference to the extent of diversification. For example, a firm may operate in five SICs but these may all be steel. A count of the number of SICs would therefore lead to an incorrect inference that the firm is highly diversified. Moreover, a firm operating in n segments each with a $1/n$ share of the firm's total sales is more diversified than a firm also operating in n segments but with one segment representing, say, 90 percent of the firm's sales.

It was noted in Chapter 2 of this thesis that many of the inconsistencies in results may be due to the use of business count measures of diversification. A count of the number of SICs is not appropriate for examining firm specific variables among diversified firms and therefore a second continuous measure of diversification is employed to address strategic differences.

Entropy Index. A more complex diversification measure is the entropy index of diversification [Palepu (1985)] and is defined as:

$$DT = \sum P_i \ln (1/P_i)$$

where P_i is the share of the i th segment in the total sales of the firm and $\ln(1/P_i)$ is the weight for each segment i . The entropy index is a continuous measure and takes into account both the number of segments in which a firm operates and the relative importance of each of the segments in total sales. The closer DT is to zero, the more concentrated are a firm's sales within a few of its industry segments. The index only measures product diversification and does

not capture geographic diversification. The entropy index has an additional benefit of separating total diversification into its related and unrelated components.

The diversification index is calculated for each firm by treating (SIC) codes at the 3-digit level as the industry segments and SIC codes at the 2-digit level as industry groups. The index was calculated using data from Datastream and company accounts (analysis of turnover by activity). Given the nature of disclosure in company accounts, it is not possible to disaggregate a firm's sales to the 4-digit level. It is recognised that constructing firm-level diversification measures is inevitably problematic: First, the firm's description of its activities is subjective and mapping these into the SIC is not always straightforward. Further, in the cases where a unique SIC code was not assigned to an activity, an upper bound estimate of two industry segments was assumed. For both these reasons, the extent of firm diversification will tend to be underestimated. Further, where it was impossible to match discontinued operations back to a specific activity they were categorised as miscellaneous and the above allocation rule was assigned. Although this is not a satisfactory procedure, it appears to be the only practical alternative. However, given the small number of cases where this occurred, it is expected to have very little effect on the results.

Refocusing is represented by a dummy variable equal to 1 if the firm refocused over the period 1985-1993 and 0 otherwise. A firm was classified as refocused in one of three ways: first, firms were classified as refocused if their entropy index of diversification (DT) fell by more than -0.05 between the years 1985

and 1993 (denoted classification A). Second, each firm's DT was calculated for the years 1985, 1989 and 1993. Following Markides (1992b), firms whose DT decreased by more than -0.05 over the period and whose DT(93-89) was smaller than +0.05 were classified as refocused. In addition, firms whose DT(89-85) was between -0.05 and +0.05, and whose DT(93-89) decreased by more than -0.08 were also classified as refocused. This ensures that any inconsistent refocusers are not included in the sample (B). Finally, firms were classified as refocused if their DT reduced in the period 1989 to 1993 and DT(1993-1985) fell over the period. This captures firms who refocused in the latter part of the study period (C). These classifications correspond to those used by Markides (1992, 1995) in studies of refocusing activity by a sample of US firms.

Although the level of firm diversification is measured using a continuous measure, refocusing is classified using a dichotomous variable for three main reasons. First, although the index is able to tell us which firms are more diversified than others, the numerical difference in DT between firms has little specific meaning (Palepu, 1985). Second, as mentioned above, the index takes into account both the number of segments in which a firm operates and the relative importance of each of the segments in total sales. Consequently, the index can change not only as a result of diversification moves on the part of the firm but also when the firm changes its investment in a particular industry, or following demand-side changes. Thus large changes in the index are more accurate indicators of refocusing activities.

Finally, calculating the index for a number of years allows us to examine both the direction and the magnitude of any changes, enabling a more accurate classification of refocusing firms. For example, a firm whose DT(89-85) decreased by -0.20 but whose DT(93-89) increased by +0.15 would not be classified as refocused even though its index over the whole period decreased.

(iii) Financial variables

In this study, both accounting-based and market-based measures of performance are adopted. Previous studies have generally focused on one or the other and this may account for some of the inconsistencies in existing evidence. Accounting data have been subject to substantial criticism in recent years, although it has generally been felt that they can be used with caution to analyse company performance. Fisher and McGowan (1983) and Benston (1985) give several reasons why accounting profits are incorrect measures of economic performance. However, whilst accounting data is subject to error (as is also the case with market data), as long as errors are unsystematic or uncorrelated with the phenomenon under study, then there will be no serious biases. Moreover, it is argued that account measures are more appropriate since managers rely most heavily on accounting-based performance in formulating diversification strategy (Holzman *et al.*, 1975).

Accounting performance. Accounting-based performance is calculated using four different measures taken from Datastream: return on capital employed (ROCE), return on equity (ROE), return on sales (ROS) and trading profit

margin (TPM). ROCE is measured as pre-tax profit plus interest charges divided by the sum of capital employed, total intangibles, borrowings repayable within one year minus future income tax benefits (multiplied by 100). ROE equals earned for ordinary divided by equity capital and reserves plus deferred tax minus total intangibles (multiplied by 100). ROS is operating profit divided by sales (multiplied by 100). TPM is calculated as trading profit divided by sales (multiplied by 100).

These performance measures will differ systematically from industry to industry due to different input structures. In addition, in the case of firms who are active divestors and acquirers, their industry composition will change dramatically and as a result may affect accounting ratios. To remove such biases, each firm's performance must be adjusted by industry.

To calculate industry-weighted performance figures for each firm, for every year, the following procedure is followed: first, a Datastream programme was used to identify all firms assigned to a Datastream industry. The Datastream industry is the most detailed level of data on a sector and is roughly equivalent to a 3-digit SIC. To calculate industry ratios, the constituents of the ratios were summed for all firms within an industry and then the ratio was calculated on the summed values. For example, an aggregation of ROS represents the sum of all operating profit of companies in a sector divided by sum of all sales of same companies. This method improves accuracy because the aggregation is not distorted by extreme values within a single company. Where year ends differ, the year covering the maximum amount of the accounts in that year is taken as

the year end. The industry-weighted ROS for each firm in the sample is then calculated by subtracting the industry's ROS from firm ROS. Similarly, for industry-weighted ROCE, ROE and TPM.

Adjusting each firm's performance by its industry-weighted performance, allows for cross-sectional variation across industries to be directly comparable. Industry-adjusted performance also allows for comparisons between a company and the sector to which it belongs. It is important to adjust for industry effects as poor performance may be indicative of the industry as a whole, and therefore some relative measure is required. However, there are a number of limitations in this approach. First, Datastream only covers public quoted companies and therefore industry figures may not be precise. This is compounded by the fact that Datastream only identifies existing companies. The further back in time the more difficult it is to identify companies that have left the Datastream sample (i.e. through merger), so sector information becomes less accurate. However, since industry ratios are used as a benchmark, we do not think there is any serious problem in adopting this approach. Also, it is difficult to conceive any easier and more accurate alternative.

Market performance. Market performance is measured as the ratio of market value to book value of assets (an approximation to Tobin's q).

Shareholders Return. Both total shareholder return and total shareholder return relative to the market are calculated. Shareholder return for each company is

extracted on an annual basis from Datastream. The Returns Index (RI) is calculated as follows:

$$RI = P_t - P_{t-1} + d / P_{t-1}$$

where P_t is price of the share in t , P_{t-1} is the price in $t-1$ and d is dividend per share. To calculate shareholder return relative to the market, the returns index for the FT Allshare is subtracted from the firm's returns index.

Firm leverage. Firm leverage is measured as the ratio of debt to total assets and the ratio of debt-to-equity, both measured as book values. Where debt to total assets (or capital gearing ratio) equals preference capital plus subordinated debt plus total loan capital plus borrowings repayable within one year, divided by the sum of capital employed, total intangibles, borrowings repayable within one year minus future income tax benefits (multiplied by 100). Debt-to-equity (or the borrowing ratio) is measured by subordinated debt plus total loan capital plus borrowings repayable within one year, divided by equity capital and reserves plus deferred tax minus total intangibles. Again, industry-adjusted figures are obtained using the same approach as that outlined above.

(iv) Corporate Governance Variables

Management equity interests. Management equity interests, in line with previous research (for example, Johnson *et al.*, 1993) is calculated as the percentage of total beneficial and non-beneficial ordinary shares owned by the

directors of the firm. The total interests of the directors is calculated from the company accounts and divided by the issued and fully paid ordinary shares of the company.

Blockholder ownership. Prior to 1st June 1990, companies were required to disclose in their annual accounts, information on holders of five per cent or more of the ordinary capital of their company. On the 1st June 1990, company law changed so that holders of 3 per cent or more of the issued ordinary capital were now requested to disclose their interests in a company. In order to maintain consistency across the sample period, in this study a blockholder is defined as an owner of five per cent or more of a firm's ordinary share capital. This definition has also been adopted by previous researchers (for example, Bethel and Liebeskind, 1993). Blockholder ownership is measured as a dichotomous variable equal to 1 if there was a blockholder during the year and 0 otherwise.

Board composition. Representation of outsiders on the board of directors is calculated as the ratio of non-executive to executive board members. This measure has been used in previous studies (see for example, Hoskisson *et al.*, 1994). Non-executive directors are defined as directors with no personal relationship with a firm other than the position of director. Executive directors are current or former managers of the firm. Information was obtained directly from the company reports.

Change in top management. A change in top management is measured as a dichotomous variable equal to 1 if there was a change in Managing Director during the year and 0 otherwise. This information was checked on a yearly basis in the company accounts. Any change in the name of the Managing Director from the previous year was reported as a change in management in that reported year.

Takeover threat. Takeover threat is measured as a dichotomous variable equal to 1 if there was an actual takeover bid or bid rumour during the year, and zero otherwise. Take-over bids and bid rumours were identified in Acquisitions Monthly and by announcements in the business press.

(v) Strategy Variables

Diversification level. It is necessary to select a diversification measure from the wide range of indices available. In the event we found that the principal alternative measures, including the Herfindahl, were highly intercorrelated and the entropy measure was employed for comparability with earlier work. This is consistent with Markides 1995b. The entropy index is calculated as (see definition above and Palepu, 1985): $\text{entropy index} = \sum P_i \ln (1/P_i)$, where P_i is the share of the i th segment in the total sales of the firm and $\ln(1/P_i)$ is the weight for each segment i . The index was calculated using sales data and SIC codes for each of the principal segments of the company at the 3-digit level. In the cases where it was not possible to assign a unique SIC code to a segment, the sales were split evenly between two SIC codes assigned to that segment.

Firm size. Firm size is calculated by taking the book value of total assets, total sales, and the number of employees. All measures are highly correlated. Although the use of the FT500 biases the sample towards larger firms, there is still considerable variation in firm size within the sample.

Core business. The core business is calculated as the 2-digit SIC in which a firm has the largest percentage of its sales (Markides, 1992). This was calculated for each year. This is a rather crude measure given the involvement of firms in a number of industries but it is the only practical alternative.

Industry. An industry variable was calculated as the industry in which a firm operates the largest percentage of its sales calculated at the 2-digit level. Represented by dichotomous variable equal to 1 if operates in a particular industry and 0 otherwise.

Acquisition. Acquisition is measured as a dichotomous variable equal to 1 if there was an acquisition by a firm during the year and 0 otherwise.

Market share. Market share is calculated in the standard manner as total firm sales divided by industry sales. Industry sales were available from the Business Monitor for manufacturing firms. In addition, a Datastream programme was used to identify all firms assigned to a Datastream industry (see above for details). To calculate industry sales, the sales for all firms within an industry was summed.

Concentration. The five firm concentration ratio was taken from Business Monitor PA1002 (Report on the Census of Production - Summary Tables) which calculates the concentration measure as the percentage of sales accounted for by the top five enterprises within a 3-digit SIC. However, as noted above, this source only covers the manufacturing sector and concentration within an industry was also measured using the Herfindahl index of concentration which is calculated as the sum of the squared market shares, S_i , of the firms in an industry:

$$H = \sum_{i=1}^n S_i^2$$

where S_i is the market share of the i th firm measured as the sales of the i th firm divided by total sales. H takes values between zero and one. The closer H is to one, the more concentrated is the industry. This is a standard measure in many studies on industry concentration (for example, Liebeskind *et al.*, 1996) Again, a Datastream programme was utilised to identify all firms within an industry and their reported sales.

Import Intensity. Import intensity was measured as imports divided by total domestic sales in each 3-digit SIC industry. The value of imports was calculated at the 3-digit SIC level for manufacturing firms from the source tapes of the OECD. The reported values were converted from US dollars using the end of year dollar-sterling exchange rates obtained from Datastream.

The descriptive statistics for the continuous variables in the sample are presented in Table 4.6. The number of observations vary for different variables due to the data limitations discussed in Section 4.3.3 and consequently different sample sizes will be utilised in the empirical chapters of this thesis.

Table 4.6 The Descriptive Statistics for the Continuous Variables in the Study

Study Variable	Mean	S.D.	N
No. of divestments	1.54	2.40	1292
Proportion of divestments	0.04	0.14	1285
Entropy index	0.83	0.50	1258
Number of SICs	3.16	1.66	1258
Firm-level ROCE	19.14	9.58	1264
Firm-level ROE	17.21	27.39	1264
Firm-level ROS	8.63	5.60	1264
Firm-level TPM	11.43	6.65	1264
Tobin's q	1.44	0.93	1261
Shareholder returns	0.02	0.36	1211
Debt-to-assets	32.80	19.01	1264
Debt-to-equity	0.70	7.40	1264
Management equity	0.04	0.10	1049
Board composition	0.69	0.51	1236
Total assets	1314511.2	2763429.97	1264
Total sales	2156891.6	4152325.20	1264
No. of employees	30173.80	37171.36	1264
Size of core	0.73	0.22	1258
Market share	0.76	1.65	709
Concentration	38.79	19.20	714
Imports	1242788.6	1332905.34	630
Exports	1244421.1	1199460.75	630

5. METHODS

5.1 Introduction

The purpose of this chapter is to outline the statistical techniques adopted to analyse the data described in Chapter 4 of this thesis. Four separate techniques are used to examine the different aspects of corporate refocusing activity: first, linear static cross-sectional models. Second, linear static panel data models. Third, nonlinear cross-sectional and panel data models with discrete dependent variables (logit, Poisson and Negative Binomial regressions); and finally, dynamic panel data models. The econometric analysis is performed using the statistical packages LIMDEP (Greene, 1994) and DPD (Arellano and Bond, 1991) for the case of dynamic panel estimation.

5.2 Cross-Sectional Models

The basic econometric technique used to analyse refocusing activity is a multiple regression model using cross-sectional data. A cross-sectional data set refers to the collection of data on a number of individual units at one point in time. The parameters of regressions are estimated using Ordinary Least Squares (OLS), that is, the relationship between the dependent variable and the regressors is estimated by minimising the sum of the squared errors from the following regression equation:

$$y_i = \alpha + \beta'X_i + \varepsilon_i \quad \dots(5.1)$$

where $i = 1, 2, \dots, N$, y_i is the dependent variable, and X_i represents a vector of $k-1$ explanatory variables. The stochastic component, ε_i , is assumed to be normally distributed and independent and identically distributed (i.i.d.) random variables with a zero mean, $E[\varepsilon_i] = 0$, constant variance, $\text{var}[\varepsilon_i] = \sigma_\varepsilon^2$ and covariance, $\text{cov}(\varepsilon_i, \varepsilon_n) = 0$. α and β' are the parameter estimates from the regression model. Under these classic conditions, OLS provides consistent, best-linear unbiased and asymptotically efficient estimates of the regression parameters α and β .

The individual regression coefficients, β , can be interpreted as measuring the *partial* effect of an explanatory variable on the dependent variable, holding all other variables constant. The coefficient of determination (or R-squared) of the fitted regression model measures the proportion of variability of the dependent variable explained by its linear dependence on the explanatory variables and is calculated as follows:

$$R^2 = \frac{\text{ESS}}{\text{TSS}} \quad \dots(5.2)$$

where ESS and TSS are the explained sum of squares and total sum of squares respectively from the regression equation.

The assumption that the disturbances are normally distributed ensures that the OLS estimators are normally distributed and that the hypothesis testing procedures are valid. To test the statistical significance of the individual coefficients, the following test statistic is calculated:

$$t = \frac{\beta^*}{S.E.(\beta^*)} \quad \dots(5.3)$$

where β^* is the parameter estimates from the regression equation and S.E. is its respective standard error. The test statistic follows a t distribution with $(n-k-1)$ degrees of freedom (d.o.f.). The null hypothesis is rejected if the above test statistic is greater than the critical value of the t -statistic in the tables. To test the overall significance of the model (i.e. to test the null hypothesis that taken as a group the independent variables do not linearly influence the dependent variable) the following F statistic is calculated:

$$F = \frac{(RRS_r - RRS_u)/r}{RSS_u/(n-k-1)} \quad \dots(5.4)$$

where RRS_r and RRS_u are the residual sum of squares obtained from the restricted and unrestricted models respectively and follows a F distribution with $(r, n-k-1)$ d.o.f.. (R-squared may be used in replace of RSS if this is more convenient.) As above, the null is rejected if the test statistic is greater than the critical value for the F statistic.

One potential problem with linear static cross-sectional models is that they provide estimates that characterise a long-run equilibrium. If the data represent a process of adjustment then the estimated coefficients will be unreliable. One option is to average the data over an extended time interval. However, this approach only provides a limited solution. Another particular problem of using cross-sectional data is that it is unable to control for heterogeneity (i.e. unobservable individual specific effects). The consequence is a possible

specification bias, making inference in a cross-sectional model problematic (see Moulton, 1986, 1987). Therefore, the analysis using cross-sectional data is supplemented by a panel data approach.

5.3 Panel Data Models

The panel approach combines dimensions of cross-sectional and time series data (for example, see Greene, 1993). This can be achieved by surveying a sample of individual units and following them over time, thus providing multiple observations on each individual in the sample. The problem when using this data to estimate a relationship, is to specify a model that adequately allows for differences in the behaviour over cross-sectional units as well as any differences in behaviour over time for a given cross-sectional unit. The adoption of panel estimation in this study is an attempt to address one of the major weaknesses of previous research on corporate refocusing which is limited by its cross-sectional design (see Chapter 3 of this thesis for more details).

For research purposes, panel data possess a number of benefits over conventional cross-sectional or time series data sets (for example, see Hsiao, 1986; Baltagi, 1995). First, panel data sets usually provide additional, more informative data due to the large number of data points. Second, the number of degrees of freedom are increased and collinearity between the variables is reduced since the cross-sectional dimension adds a lot more variability resulting in more efficient parameter estimates. Third, unobservable individual-specific effects can be controlled for and finally, panel data is well suited to analyse the

dynamics of the adjustment process. It should be noted that there are a number of limitations of panel data, including data collection problems (see Kasprzyk *et al.*, 1989), measurement errors, selectivity problems and possible attrition bias. Measurement errors may arise because of memory errors, faulty responses to unclear questions, deliberate distortion of responses, inappropriate informants, misrecording of responses and interviewer effects (Kasprzyk *et al.*, 1989). Selectivity problems include self-selection and non-response. However, many of these problems are not unique to panel data.

In the following sections the estimation techniques and hypothesis tests for misspecification in specific models will be discussed in the context of one-way models (i.e. where the individual effects vary over individual cross-sectional units only), since this is the approach adopted in the study. The relevant issues for choice between the fixed and random effects models are examined, followed by a brief discussion on unbalanced or incomplete panels.

5.3.1 A Basic Model

Using i subscripts to identify cross-sectional units and t subscripts for time, the basic panel framework involves estimating relationships of the following form:

$$y_{it} = \alpha + \beta'X_{it} + \varepsilon_{it} \quad \dots(5.5)$$

where $i = 1, 2, \dots, N$ and $t = 1, 2, \dots, T$, y_{it} is the dependent variable, and X_{it} represents a vector of $k-1$ explanatory variables. As in Section 5.2, the error

term, ε_{it} , is assumed to be i.i.d. with mean zero and constant variance. As it stands this model is a classical regression model with OLS providing consistent and efficient estimates of the regression parameters α and β which are assumed constant over time and individuals.

In many circumstances the assumption of constant coefficients is too restrictive. In this study we consider a more general case where the slope coefficients, β , are constant and the intercept varies over individuals. A varying intercept is assumed to capture differences across cross-sectional units and may be thought of as capturing the effect of unobservable time-invariant individual effects. The error term for this model can be written as:

$$\varepsilon_{it} = \mu_i + u_{it} \quad \dots(5.6)$$

where μ_i represents the unobservable individual effects and u_{it} denotes the remaining disturbances. μ_i is time-invariant and accounts for any individual specific effect that are not included in the model. Substituting the disturbances given by (5.6) into (5.5) the model becomes:

$$y_{it} = \alpha + \beta'X_{it} + \mu_i + u_{it} \quad \dots(5.7)$$

The choice of an appropriate estimation technique depends on what assumptions are made about the individual effects. The variation across cross-sectional units μ_i , can be *fixed* or *random*. If μ_i are fixed, or random and

correlated with X_{it} , the dummy variable model is appropriate while if μ_i are random and independent of X_{it} then the error components model is adopted.

5.3.2 Fixed Effects Model

The fixed effects model assumes that the unobservable variable μ_i , is non-stochastic and the remaining disturbances are i.i.d. random variables with zero mean and constant variance. Each intercept is a fixed parameter to be estimated along with the slope coefficients, β' :

$$y_{it} = (\alpha + \mu_i) + \beta'X_{it} + u_{it} \quad \dots(5.8)$$

where $u_{it} = (\alpha + \mu_i)$ is the intercept for the i th individual.

To estimate equation (5.8) dummy variables for each cross-sectional unit, i , can be included in the regression and the model is estimated without the constant term by performing OLS. This is known as the least squares dummy variable (LSDV) model and can be conveniently written as:

$$y_{it} = \mu_j D_{jt} + \beta'X_{it} + u_{it} \quad \dots(5.9)$$

where D_{jt} are dummy variables which take the value 1 if $j = i$ and 0 otherwise. Thus there is a dummy variable corresponding to each individual and the dummy variable that corresponds to individual j will take the value one for

observations on j and zero for observations on other individuals. Alternatively, the model can be reformulated to include a constant term and $N - 1$ dummy variables. In both instances, the model can be estimated as a multiple regression by OLS.

Although there are no practical problems involved in obtaining parameter estimates from this model, there could be some numerical problems if, as is typical, there are many cross-sectional units. When N is large, (5.9) will include too many individual dummies and may aggravate the problem of multicollinearity among the explanatory variables. Under these circumstances, it is convenient to express each variable in terms of deviations from individual means and perform OLS on the transformed variables to obtain parameter estimates. This approach eliminates the individual effects and the resulting transformed model is:

$$y_{it} - \bar{y}_i = \beta(x_{it} - \bar{x}_i) + (u_{it} - \bar{u}_i) \quad \dots(5.10)$$

where \bar{y}_i , \bar{x}_i and \bar{u}_i denote the individual means of the variables. Because (5.10) utilises the variation of the variables within each individual, it is often referred to as the within-group regression.

Of particular interest is whether the model would be adequate if it were simply assumed that all intercepts are identical (i.e. there are no individual fixed effects). If this is the case, then there is no basis for differentiating the time-

series/cross-sectional nature of the data. A simple F-test that compares the restricted and unrestricted residual sum of squares can be performed to test for fixed effects. Under the null hypothesis, the intercepts are assumed equal for all individuals (i.e. the individual effects are the same) against the alternative that the intercepts are not all equal. The relevant test statistic is given by:

$$F = \frac{(RSS_r - RSS_u)/(N-1)}{RSS_u/(NT-N-K)} \quad \dots(5.11)$$

where RSS is the residual sum of squares, u indicates the restricted or pooled model with a single overall constant and r refers to the unrestricted model, $(N-1)$ is the number of linear restrictions and $(NT-N-K)$ is the number of degrees of freedom in the unrestricted model. Under the null, the test statistic has an F distribution with $[(N-1),(NT-N-K)]$ degrees of freedom. Rejection of the null confirms the existence of intercept heterogeneity.

5.3.3 Random Effects Model

Alternatively, the random effects model assumes that the individual effects, μ_i , are i.i.d. random variables with mean zero and constant variance, and independent of the u_{it} . In addition, it is assumed that the explanatory variables are uncorrelated with μ_i and u_{it} . This is also referred to as the error components model.

In the random-effects model the error term no longer satisfies the classical assumptions of serial independence as there is within-individual correlation

through time. The structure of the model is such that, for a given individual, the correlation between the disturbances over different time periods is the same. Moreover, the correlation is not only constant over time but it is also identical for all individuals. Therefore, OLS is not appropriate for estimation purposes and Generalised Least Squares (GLS) is best linear unbiased (see for example, Greene, 1993).

If all the $\mu_i = 0$ then the random effects do not exist and the least squares estimator in the fixed effects setting is best linear unbiased. To test this hypothesis, Breusch and Pagan (1980) derived a Lagrange Multiplier (LM) test based only on the restricted residual sum of squares and is given by:

$$\lambda = \frac{NT}{2(T-1)} \left[\frac{\sum_i (\sum_t u_{it})^2}{\sum_i \sum_t \hat{u}_{it}^2} - 1 \right]^2 \quad \dots(5.12)$$

Under the null of no random effects, λ is asymptotically distributed as chi-squared distribution with one degree of freedom. Rejection of the null is evidence in favour of the error components model in Section 5.3.2.

Another basic assumption of the random effects model is that the individual effect is uncorrelated with the explanatory variables X_{it} (i.e. $\text{corr}[\mu_i, X_{it}] = 0$). If there is correlation between the individual effect and regressors GLS will not be valid. The following Hausmann (1978) statistic can be used to test the null hypothesis of zero correlation between μ_i and X_{it} :

$$W = (\hat{b} - \hat{\beta})' [\text{var}(\hat{b} - \hat{\beta})]^{-1} (\hat{b} - \hat{\beta}) \quad \dots(5.13)$$

where \hat{b} is the GLS estimate and $\hat{\beta}$ is the LSDV estimate. Under the null W is asymptotically distributed as a chi-squared distribution with K degrees of freedom. The basic idea of this test is under the null, both OLS in the fixed effects model and GLS are consistent, although the former is inefficient. In this case, the two estimates should not differ systematically. Under the alternative case where μ_i and X_{it} are correlated, OLS estimates are consistent but GLS estimates are not. Rejection of the null suggests the dummy variable estimator is the most appropriate one.

5.3.4 Fixed versus Random Effects

Given the distinction between fixed and random effects models, an inevitable question is which specification should be used in a particular case. One criterion may be the following: if the focus is on a specific set of N individuals and inference is restricted to the behaviour of these sets of individuals, the fixed effects model is an appropriate specification. Alternatively, the random effects model is appropriate if N individuals are drawn randomly from a larger population. However, this approach may not always give clear guidance in selecting an estimation procedure.

One disadvantage of the fixed effects model is the loss in degrees of freedom by using dummy variables for each i . This has an effect on the quality of the

estimates obtained. However, the fixed effects model has one considerable advantage in that there is no need for treating the individual effects as uncorrelated with other regressors, as is assumed in the random effects model. The regression estimates from the random effects model may therefore be inconsistent due to an omitted variable misspecification and the GLS estimator will be biased. As seen in Section 5.3.3 if there is correlation between the individual effect and the regressors, then the OLS estimates from the fixed effects model will be consistent but GLS estimates will not. Under these circumstances, the fixed effects estimator will be best linear unbiased.

However, there are two possible undesirable effects of using the fixed effects estimator when μ_i and X_{it} are correlated. First, if the regressors contain time-invariant measurable variables, it is impossible to separate these variables from the dummy variables. In the within regression they will be eliminated. This problem does not arise in the random effects model but in this case, the estimates are biased and inconsistent as mentioned previously. Second, the within estimator may be less efficient than alternative consistent estimators that exploit information on the nature of the correlation relationship and do not ignore sample variation across individuals.

In this study, both estimation procedures are utilised and the appropriate test statistics are reported in determining which estimator to rely on.

5.3.5 Unbalanced Panels

Since the data in this study is in the form of an unbalanced panel, it is appropriate to consider the differences between unbalanced and balanced panel techniques. An unbalanced panel refers to a data set where the individual cross-sectional units are not observed throughout the entire study period i.e. they are allowed to enter and exit the sample at random. For example, it is not unusual for some firms to exit the market (e.g. through take-over, merger or bankruptcy) or for new entrants to emerge. A particular advantage of using this approach is that it allows for a much larger sample and reduces the impact of self-selection of individual cross-sectional units. The basic difference in estimation technique, is that in the unbalanced case, the weights used in GLS are dependent on the lengths of the time series available for each cross-sectional unit. As for the balanced case, the OLS and GLS estimates will be consistent.

5.4 Models with Discrete Dependent Variables

The third method adopted to examine refocusing activity is models with discrete dependent variables. Specifically, the study utilises a logit model approach and count data models (see Section 5.4.2).

5.4.1 Logit Model

The logit model is adopted to estimate relationships when the dependent variable is in the form of a dichotomous variable. In the study, refocusing is

measured as a dummy variable equal to 1 if the firm reduced its level of diversification over the period and 0 otherwise. Given the nature of the dependent variable, OLS estimation would be inefficient in this case since it can give estimates which imply predictions outside its possible range (i.e. higher than one and lower than zero) and it assumes normally distributed errors. Given the dichotomous nature of the dependent variable the error structure is likely to be bimodal.

The relationship between the dependent variable and the regressors is estimated by the following regression model:

$$y_i^* = \alpha + \beta X_i + \varepsilon_i \quad \dots(5.14)$$

where $i = 1, 2, \dots, N$, X_i represents a vector of $k-1$ explanatory variables, ε_i is the error term and y_i^* is an underlying latent variable which we do not observe. Instead a variable, y_i , can be observed which takes the value one when $y_i^* > 0$ and zero otherwise. In this study, y_i is taken from the diversification data; that is y_i equals one when a firm refocuses and zero otherwise. The logit model assumes that the distribution of the error term is logistic. It estimates the probability that the dependent variable will have a value of one as a function of the explanatory variables whose coefficients are estimated using maximum likelihood techniques i.e. a positive coefficient implies the variable increases the probability of refocusing activity.

5.4.2 Basic Poisson Model

The count data method is applied when the data features a number of events occurring in a given interval. The count data approach is used to model the determinants of divestment since the observations on divestment are in the form of repeated counts. That is, the dependent variable, divestment, is calculated as the *number* of sell-offs in a given time period. Although the count data approach has been widely used in applied econometrics (see for example, Hausman, Hall and Griliches, 1984, in an application to the patents-R & D relationship), it has not been previously adopted to examine refocusing activity. Thus, this approach offers a novel and improved method to modeling divestment activity in that it makes full use of the divestment data without having to assign ad hoc procedures or exclude missing observations, such as for the case of a missing sales price.

The count data approach is based on the Poisson distribution which captures the discrete and non-negative nature of count data, and allows for the non-negligible probability of zero as a natural outcome. Inference in the model is drawn on the probability of the event occurring and the parameter estimates are obtained by the method of maximum-likelihood (ML). The method of ML consists in estimating regression parameters in such a manner that the probability of observing the given values of the dependent variable is as high (or maximum) as possible. This involves finding the maximum of the likelihood function by differentiation. (Details of the likelihood function are given below.) In comparison, the usual normal probability model for which OLS is the

maximum likelihood estimator, admits of fractional as well as negative integers, and does not represent the true data generating process underlying non-negative counts. Application of the normal distribution to analyse non-negative counts will therefore produce inefficient parameter estimates and biased inference.

In this study, the number of divestments, y_i , is modeled as being generated by the following Poisson process:

$$\text{Prob}(y_i) = \lambda_i^{y_i} e^{-\lambda_i} / y_i ! \quad \dots(5.15)$$

where $y_i = 0, 1, 2, \dots$, $i = 1, 2, \dots, N$ and λ_i is the conditional mean and variance of the Poisson distribution. The most common formulation for λ_i is to assume that it is log-linearly dependent on a set of explanatory variables, X_i , as follows:

$$\ln \lambda_i = \beta X_i \quad \dots(5.16)$$

where X_i is a vector of regressors. This parameterisation ensures the non-negativity of λ . The log-likelihood function for the sample of firms can be written as:

$$\ln L = \sum (y_i X_i \beta - \lambda_i - \ln y_i !) \quad \dots(5.17)$$

Parameter estimates are obtained by solving the first order condition using, for example, Newton's iterative techniques:

$$\frac{\partial L}{\partial \beta} = \sum (y_i - \lambda_i) X_i = 0 \quad \dots(5.18)$$

Global concavity of the log-likelihood function ensures rapid convergence to a unique solution. This property follows from the negative-definite Hessian matrix of the likelihood function:

$$\frac{\partial^2 L}{\partial \beta \partial \beta'} = - \sum (X_i' X_i \lambda_i) \quad \dots(5.19)$$

Estimates of the asymptotic variances of the ML estimates, which are needed for hypothesis testing, are obtained from the negative inverse of the above matrix.

5.4.3 Negative Binomial Model

One restriction of the basic Poisson model is the imposition of an equal conditional mean and variance. In many economic applications, it is not uncommon to find that the variance of y_i exceeds the mean, implying ‘overdispersion’ in the data. Overdispersion, or extra-Poisson variation, occurs if there is unobserved heterogeneity or interdependence between events, for instance, prior events influencing the probability of future occurrences of the same event (see for example, Heckman and Borjas, 1980 in the context of unemployment spells). The latter cause of overdispersion is to be suspected in many economic phenomena. An important consequence of fitting overdispersed data to the Poisson model, is that the estimated covariance matrix will be biased

downwards, producing spuriously small estimated standard errors of the parameter estimates and overstated t -statistics. The presence of overdispersion has consequences similar to those for heteroscedasticity in the classical linear regression model i.e. the estimated standard errors are inconsistent and invalidate hypothesis testing.

A solution to the problem of overdispersion is to use a distribution that allows for a less restricted variance function. Within these generalisations the negative binomial model has been proposed as a useful alternative to the Poisson model (e.g. Cameron & Trivedi, 1986). The negative binomial model allows for unobserved heterogeneity in the mean function by introducing an additional stochastic component to λ_i :

$$\ln \lambda_i = X_i\beta + \varepsilon_i \quad \dots(5.20)$$

where ε_i captures unobserved heterogeneity and is uncorrelated with the explanatory variables. The model can be derived by assuming λ_i to be distributed randomly and follow a gamma distribution of the form:

$$f(\lambda_i) = 1/\Gamma(1/\alpha) \lambda_i^{1/\alpha-1} e^{-\lambda_i/\alpha} \quad \dots(5.21)$$

By choosing the particular form of gamma distribution given above, one obtains a model which has the same conditional mean as the Poisson model but admits of overdispersion since:

$$\text{var}(y_i|X_i\beta) = \lambda_i(1 + \alpha\lambda_i) > \text{var}(y_i|X_i\beta) = \lambda_i \quad \dots(5.22)$$

Since the mean equals the variance when y_i is Poisson distributed, the natural basis for testing the adequacy of the Poisson model is to propose tests of the form $\alpha = 0$.

5.4.4 Count Data in a Panel Context

The above can be extended with minor modifications to the case of analysing panel data where the observations are in the form of a count. For this case, the fixed effects Poisson model is: $\ln \lambda_{it} = \alpha_i + X_{it}\beta$, where α_i is a firm-specific effect. The model is estimated by conditioning separately the count distribution of each firm on the total sum of outcomes over the observed years. This removes the fixed effect from the resulting distribution, which is then estimated by maximum likelihood techniques. The random effects Poisson model is given by: $\ln \lambda_{it} = X_{it}\beta + u_i$, where u_i is a random effect for the i th group such that e^{u_i} is distributed as gamma. Thus, e^{u_i} has mean 1 and variance $1/\theta = \alpha$. The model can then be derived by integrating out the random effect and estimating by maximum likelihood the parameters (β, α) of the resulting distribution.

For the fixed effects negative binomial model: $\ln \lambda_{it} = \alpha_i + X_{it}\beta + \varepsilon_{it}$ which with minor modifications is the estimating framework for the Poisson model with random effects, as above. The random effects negative binomial model is: $\ln \lambda_{it} = X_{it}\beta + u_i + \varepsilon_{it}$, where ε_{it} captures unobserved heterogeneity and is

uncorrelated with the explanatory variables. As above, u_i is gamma distributed with parameters (θ_i, θ_i) , which produces the negative binomial model with a parameter that varies across groups. Then, it is assumed that $\theta_i/(1+\theta_i)$ is distributed as $\text{beta}(a_n, b_n)$, which layers the random effect onto the negative binomial model. Once again, the approach is to integrate out the random effect and estimate by maximum likelihood techniques.

5.5 Dynamic Panel Models

The final technique to be considered is dynamic models where lagged values of the dependent variable appear as regressors in an estimating model. In the context of this research it is reasonable to assume that past firm performance will be a significant determinant of present performance and should be included in a model which analyses the performance consequences of a refocusing strategy. The inclusion of past measures of performance captures the persistent nature of profits (see for example, Geroski and Jacquemin, 1988) and allows for the lagged response of performance to changes in its determinants.

One of the obvious advantages of dynamic models over cross-sectional models is that they explicitly consider the behaviour of a variable over time whereas cross-sectional models generally analyse a static or equilibrium relationship. This approach is plausible for many economic situations since it is reasonable to assume that not all responses to change will be instantaneous (see for example, Arellano and Bond, 1991 on a dynamic model of employment). A particular advantage of using a dynamic panel model over time-series analysis is that it

allows for an improved understanding of the dynamics of the adjustment process and can be used where the number of time periods, T , is short.

The dynamic panel data model can be written as follows:

$$y_{it} = \lambda y_{it-1} + \beta' X_{it} + u_{it} \quad \dots(5.23)$$

where $i = 1, 2, \dots, N$ and $t = 1, 2, \dots, T$, y_{it} is the dependent variable, y_{it-1} is a lagged dependent variable, λ and β are parameter estimates, X_{it} is a vector of $k-1$ regressors and u_{it} is the stochastic component and assumed to follow the error structure in the one-way error component model outlined in Section 5.3.3, such that:

$$u_{it} = \mu_i + v_{it} \quad \dots(5.24)$$

where μ_i is i.i.d. with zero mean, $E[\mu_i] = 0$, constant variance, $\text{var}[\mu_i] = \sigma_\mu^2$, and v_{it} is i.i.d. with $E[v_{it}] = 0$ and $\text{var}[\mu_{it}] = \sigma_v^2$. As in the basic panel data model, μ_i , refers to the individual specific (fixed or random) effects.

The basic problem of the introduction of a lagged dependent variable is that the error term and the lagged dependent variable are correlated. This is because since y_{it} is a function of the individual effect, μ_i , and μ_i is not time dependent, y_{it-1} must also depend on μ_i . The OLS and GLS estimates will therefore be biased

and inconsistent even if v_{it} is serially uncorrelated. For this reason an alternative estimation technique needs to be adopted.

One solution is to first difference the model to remove the individual specific effect:

$$\Delta y_{it} = \Delta \lambda y_{it-1} + \Delta \beta X_{it} + \Delta v_{it} \quad \dots(5.25)$$

where $\Delta y_{it} = (y_{it} - y_{it-1})$, $\Delta y_{it-1} = (y_{it-1} - y_{it-2})$, $\Delta X_{it} = (X_{it} - X_{it-1})$ and $\Delta v_{it} = (v_{it} - v_{it-1})$.

The error term, Δv_{it} , is a moving average (MA) process of order one with unit roots.

The result of first-differencing is to eliminate the fixed effect, since $(\mu_i - \mu_i)$ drops from the equation. Although the regressor-disturbance correlation in the original model (i.e. μ_i) is removed, the transformed error term and Δy_{it-1} are now correlated (Nickell, 1981). However, one solution is to estimate the differenced equation using instrumental variable techniques.

A potential instrument is any variable which is highly correlated with the lagged dependent variable and uncorrelated with the error term. A particular problem of this technique is that such a variable may be difficult to find in practice. An obvious candidate is to use lags beyond one of the dependent variable as instruments as these will be uncorrelated with the differenced error in the absence of serial correlation in the error process. Anderson and Hsiao (1981) suggest using the second difference of y_{it} (i.e. $\Delta y_{it-2} = y_{it-2} - y_{it-3}$) or simply y_{it-2} as an instrument for Δy_{it-1} . These instruments are correlated to Δy_{it-1} but will not be correlated to the error term as

long as the v_{it} themselves are not serially correlated. This method will produce consistent estimates of the dynamic regression equation. However, the estimators will not necessarily be efficient since this technique does not make use of all the available moment conditions (see for example, Ahn and Schmidt, 1995).

An extension of Anderson and Hsiao (1981) has been developed by Arellano and Bond (1991) which utilises the generalised method of moments (GMM) procedure to accommodate the inclusion of further lagged variables as instruments. Additional instruments can be obtained by utilising the available orthogonality conditions that exist between the lagged values of the dependent variable and the disturbances. Thus the further advanced the panel, the greater the number of instruments available. For example, if we were estimating an eight year panel from year three through year eight, year three's estimation would use variables dated year one, year four's would use variables dated years one and two, etc. The advantage of this procedure is that it allows both the cross-section and time-series elements of the data to be exploited in constructing valid instruments. The resulting estimates are claimed to offer significant gains in efficiency where T is small relative to N . It is this approach that is adopted in this study.

In order to illustrate this procedure consider the following dynamic panel model with no regressors:

$$y_{it} = \lambda y_{it-1} + u_{it} \quad \dots(5.26)$$

To obtain a consistent estimate of λ the model is first differenced to eliminate the individual effects:

$$(y_{it} - y_{it-1}) = \lambda(y_{it-1} - y_{it-2}) + (v_{it} - v_{it-1}) \quad \dots(5.27)$$

Since one period is lost due to a lag in the data and another due to first differencing, the first period this relationship is observed will be at $t = 3$. Therefore, at $t = 3$ the following equation is estimated:

$$(y_{i3} - y_{i2}) = \lambda(y_{i2} - y_{i1}) + (v_{i3} - v_{i2}) \quad \dots(5.28)$$

In this instance, a valid instrument for Δy_{it-1} would be y_{i1} since it is highly correlated with $(y_{i2} - y_{i1})$ but uncorrelated with the residuals as long as the v_{it} are not serially correlated. In the second period (i.e. $t = 4$) the estimating equation is:

$$(y_{i4} - y_{i3}) = \lambda(y_{i3} - y_{i2}) + (v_{i4} - v_{i3}) \quad \dots(5.29)$$

Here, both y_{i1} and y_{i2} are valid instruments, since both are correlated to $(y_{i3} - y_{i2})$ but not correlated to $(v_{i4} - v_{i3})$. By adding an extra instrument with each additional observed period, the set of valid instruments becomes $(y_{i1}, y_{i2}, \dots, y_{iT-2})$. Denoting the matrix of instruments (for each i) as Z_i , the orthogonality conditions can be expressed as $E[Z_i' \Delta v_{it}] = 0$. The one-step consistent estimator of λ can be obtained by pre-multiplying the differenced equation by Z' :

$$Z'\Delta y_{it} = Z'(\Delta y_{it-1})\lambda + Z'\Delta v_{it} \quad \dots(5.30)$$

and performing GLS. The optimal weighting matrix W is:

$$W = [Z_i'(\text{var}(\Delta v_{it})Z_i] \quad \dots(5.31)$$

which is unknown. However, it can be obtained via the first-step estimator by setting W as:

$$W = Z_i'GZ_i \quad \dots(5.32)$$

where G is the covariance matrix. To operationalise the optimal GMM estimator, Δv_{it} is replaced by the differenced residuals obtained from the one-step estimation procedure. The resulting estimator is the two-step Arellano and Bond (1991) GMM estimator.

The legitimacy of this econometric approach depends critically on two features: first, the validity of the instrument set; and second the success of the instrumentation process in purging the estimates of second-order serial correlation. These characteristics are examined using the Sargan statistic and a robust test for second-order serial correlation, respectively. The Sargan test of instrument validity is adopted to test the null hypothesis of exogeneity of the instrument set and is calculated as follows:

$$J = \Delta \hat{v}'Z [\Sigma Z_i'(\Delta \hat{v}_i)(\Delta \hat{v}_i)'Z_i]^{-1} Z'(\Delta \hat{v}) \quad \dots(5.33)$$

where $\Delta \hat{v}$ are the residuals from the two-step estimation and Z is the matrix of instruments. The J-statistic follows a chi-squared distribution with $(p-k-1)$ d.o.f., where p refers to the number of columns of Z and k is the number of regressors. The null is rejected if the J-statistic is greater than the critical value of the chi-squared distribution. In this instance, an alternative set of instruments will be required.

The assumption of a lack of serial correlation in the error is essential for the consistency of the estimates. This can be tested by utilising a robust $N(0,1)$ test for the presence of second order serial correlation in the error term. A test on the joint significance of all the regressors in the model, is calculated using a Wald test as in Section 5.3, which follows a chi-squared distribution.

As a final note on dynamic panel models, the parameter estimates would improve (at least theoretically) if all the moment restrictions implied by the assumptions of the model were exploited. However, there are at least two points to consider here: first, the more moment restrictions employed the more likely the model will be misspecified; and second, in finite samples the growth of the set of instruments is not necessarily a good thing (see Bowden and Turkington, 1984).

5.6 Summary

In this chapter, the statistical methods adopted in the study have been outlined. Similar to previous studies, cross-sectional models are used to investigate refocusing activity. However, the limitations of these studies influenced the decision to supplement conventional cross-sectional models by utilising a panel

data approach. The adoption of panel data techniques constitutes an improved approach to examining refocusing activity. For research purposes, the particular advantages of using panel data models include controlling for unobserved individual effects and overcoming the problems of causation and multicollinearity which plague much cross-sectional work in this area. Panel estimation also allows for the measurement of the dynamic effect of corporate refocusing rather than having to assume that some cross-sectional variation represents a long-run equilibrium result. The use of an unbalanced panel removes the sample bias inherent in restricting firms to those which survived intact until the end of the study period. Finally, the adoption of count data techniques offers a new approach to modeling divestment activity. The results from using these techniques will be presented in the following chapters of this thesis.

Notes

¹This is only one of a number of possible parameterisations of the gamma distribution

6. CORPORATE REFOCUSING IN THE UK

6.1 Introduction

The aim of this chapter is to provide a detailed examination of corporate refocusing activity in the UK over the period 1985 to 1993. In so doing, it will answer research questions 1 and 2 from Chapter 4 of this thesis. There is a widespread perception in the business press that over the past 15 years or so, a number of firms have reduced their level of diversification by refocusing on the core business. Whilst there exists limited empirical research on this phenomenon for the US, there is a paucity of evidence on refocusing by UK firms. At the most basic level, there is very little systematic evidence on the extent of refocusing. Nor do we know the exact nature of refocusing and the distinguishing characteristics of refocusing firms. This chapter will attempt to address these issues by employing a large sample of UK quoted companies randomly selected from the FT500 list over the period 1985 to 1993.

The remainder of this chapter is structured as follows: Section 6.2 examines the extent and nature of corporate refocusing across the sample. Section 6.3 attempts to identify the characteristics of refocusing firms. Finally, a conclusion follows in Section 6.4.

6.2 The Extent and Nature of Corporate Refocusing

This section examines the change in diversification across the sample of firms at the beginning and end of the study period. To date, there has been very little systematic evidence on the extent of corporate refocusing. Part of the reason is that it is difficult to obtain reliable measures of diversification (see Chapter 2 of this thesis for a discussion). In this study, we have attempted to examine the extent of refocusing by using activity data on companies, taken from Datastream and company accounts on a yearly basis from 1985 to 1993 (see Chapter 4 of this thesis for a discussion of the problems using this data). Two measures of diversification are employed: first, a count of the number of industries a firm operates in and second, the entropy index of diversification.

The entropy index is widely used in diversification studies and has been shown to be a robust objective measure (Hoskisson *et al.*, 1993). Markides (1995a) finds little difference in the results concerning refocusing measured by the entropy index and the results using alternate measures. The entropy index differentiates between diversification within and between major industry groups, and takes into account the relative importance of each of the segments in total sales. It is calculated as: $DT = \sum P_i \ln(1/P_i)$ where P_i is the share of the i th segment in total sales of the firm and $\ln(1/P_i)$ is the weight for each segment i . The diversification index is calculated for each firm by treating SIC codes at the 3-digit level as an industry segment (see Chapter 4 of this thesis for a detailed discussion on the construction of this index). Alternative continuous measures

of diversification were tried (e.g. the Berry-Herfindahl index) but the entropy measure was highly correlated with these and allowed for comparisons with other refocusing studies, especially Markides (1995a). Some previous research, especially in the US context, has used a discrete classification scheme following Rumult's (1974) relatedness-based categories to measure diversification. However, the use of a continuous measure, as is adopted here, appears preferable in a quantitative study primarily concerned with analysing changes in diversification.

Table 6.1 reports the mean level of diversification for the sample, calculated using the entropy index, in 1985 and 1993. Also shown is the average number of industries in which a company operates calculated at the 2-digit SIC level. The two measures indicate a reduction in total diversification across the sample over the period. The entropy index of diversification declined by 8 per cent (from 0.87 to 0.80) and the mean number of industries in which companies operated declined by 11 per cent (from 3.39 to 3.02). Only the second measure of diversification reported a weakly significant decline in diversification over the study period ($t = 1.1757$ and $t = 1.8416$ respectively).

Table 6.1 Level of Diversification, 1985 and 1993 – Unbalanced Sample

	1985	1993	Difference	<i>t</i> -statistic
Diversification level	0.8717	0.7998	0.0719	1.1757
Number of industries	3.39	3.02	0.37	1.8416*
	n = 143	n = 125		

Notes: * = $p < 0.10$

The reported reduction in diversification across the sample period is not merely a reflection of the exit of diversified firms from the sample due to takeovers. When the sample is restricted to firms that survive intact over the period 1985 to 1993 there is still a reduction in diversification over the period (see Table 6.2). For the 121 firms that remained intact over the period, the entropy index of diversification fell by 10 per cent (from 0.91 to 0.82) and the mean number of industries operated in fell by 14 per cent (from 3.54 to 3.04). Once again, only the latter measure reports a significant reduction in diversification over the period.

Table 6.2 Level of Diversification, 1985 and 1993 – Balanced Sample

	1985	1993	Difference	t-statistic
Diversification level	0.9127	0.8153	0.0974	1.5140
Number of industries	3.54	3.04	0.5	2.304**
	n = 121	N = 121		

Notes: ** = $p < 0.05$

The literature in Chapter 3 of this thesis implies the existence of a curvilinear relationship between diversification and performance. This suggests that firms can diversify profitability up to their optimum level of diversification but their profitability and market value will suffer if they go beyond this optimum. If we examine diversification in a dynamic way, then we would expect to find profit-maximising firms below their optimal level of diversification increasing their diversification and overdiversified firms reducing their diversification i.e. refocusing. The following examines the distribution of changes in diversification over the study period.

Table 6.3 shows the distribution of changes in diversification over the period 1985 to 1993 for the whole sample. According to this measure, 79 companies reduced their level of diversification while 79 increased it (includes 17 with no change). A firm was classified as reducing its diversification level if its entropy measure of diversification declined over the period 1985 to 1993. Approximately 50 percent of firms in the sample reduced their level of diversification between 1985 and 1993. This percentage easily dominates those which diversified further in the period (i.e. 39 percent). The two groups appear to have changed their level of diversification by similar degrees. For example, 66 per cent of refocusers decreased their level of diversification by less than 0.5. The corresponding number for diversifiers is 68 per cent (after excluding those who reported no change in diversification level). A similar result emerges when diversification is measured using the number of 2-digit SICs that firms are operating in. As shown in Table 6.4, 63 companies decreased their diversification, 40 increased it, and 55 experienced no change.

Table 6.3 Distribution of Changes in Diversification, 1985 to 1993

DT93-DT85	Number of firms
-1.00 - $-\infty$	3
-0.9 - -0.99	1
-0.8 - -0.89	2
-0.7 - -0.79	2
-0.6 - -0.69	3
-0.5 - -0.59	9
-0.4 - -0.49	7
-0.3 - -0.39	10
-0.2 - -0.29	11
-0.1 - -0.19	11
-0.00 - -0.09	20
<i>Total refocused</i>	79
0 - 0.09 ¹	33
0.1 - 0.19	12
0.2 - 0.29	6
0.3 - 0.39	8
0.4 - 0.49	4
0.5 - 0.59	4
0.6 - 0.69	4
0.7 - 0.79	2
0.8 - 0.89	3
0.9 - 0.99	1
1.0 - $+\infty$	2
<i>Total diversified</i>	79
Total number of firms	158

¹Includes 17 no change

Table 6.4 Distribution of Changes in SIC, 1985 to 1993

SIC93-SIC85	Number of firms
-8	1
-5 : -7	0
-4	2
-3	10
-2	16
-1	34
0	55
1	19
2	18
3	3
4	0
Total	158

This data suggests strictly limited support for the popular view that the 1980s and beyond is a period characterised by intensive corporate refocusing. Individual firms may be refocusing but this is counterbalanced by diversifying firms, and on average, there is a small and weakly significant reduction in overall diversification for our sample. This finding can also be examined by calculating the concentration ratio for each firm in the sample in 1985 and 1993. If most firms are refocusing then we would expect aggregate concentration ratios to increase. Concentration is calculated using the Herfindahl index, which is the sum of the squared market shares in an industry:

$$H = \sum_{i=1}^n S_i^2$$

where S_i is the market share of the i th firm measured as the sales of the i th firm divided by total sales. H takes values between zero and one. The closer H is to one, the more concentrated is the industry (see Chapter 4 of this thesis for a description of the construction of this variable). The mean level of concentration in 1985 for our sample of firms was 0.35. This fell to 0.31 by 1993 ($t = 1.772$). Thus, it would appear that corporate refocusing had little effect on overall concentration across industries in our sample. If anything, aggregate concentration fell over the period.

The distribution of changes in diversification indicates that some firms reduced their diversification level substantially over the period whilst others increased

theirs. To examine within-sample changes, we separated firms into those that refocused and those that moved towards increasing levels of diversification, using the classification scheme detailed in Section 4.4.1, Chapter 4 of this thesis.

A firm was classified as refocused in one of three ways: first, firms were classified as refocused if their entropy index of diversification (DT) fell by more than -0.05 between the years 1985 and 1993 (denoted classification A). Second, each firm's DT was calculated for the years 1985, 1989 and 1993. Following Markides (1992b), firms whose DT decreased by more than -0.05 over the period and whose DT(93-89) was smaller than +0.05 were classified as refocused. In addition, firms whose DT(89-85) was between -0.05 and +0.05, and whose DT(93-89) decreased by more than -0.08 were also classified as refocused. This ensures that any inconsistent refocusers are not included in the sample (B). Finally, firms were classified as refocused if their DT reduced in the period 1989 to 1993 and DT(1993-1985) fell over the period. This captures firms who refocused in the latter part of the study period (C).

Table 6.5 presents the mean values of diversification in 1985 and 1993 for refocusing and diversifying firms, according to the different classifications. Also reported is the mean change in diversification and the corresponding *t*-statistic. The *t*-value tests the hypothesis that there is no significant change in diversification for each group. As shown in Table 6.5, there is substantial divergence within the sample as some firms move towards increasing levels of diversification and others apparently refocus.

Table 6.5 Level of Diversification for Refocusers and Diversifiers, 1985 and 1993

	1985	1993	Change	<i>t</i> -value (n)
Refocusers (A)	1.11	0.73	-0.38	4.821*** (70)
Diversifiers (A)	0.68	0.86	0.18	2.169** (88)
Refocusers (B)	1.11	0.67	-0.44	4.915*** (48)
Diversifiers (B)	0.77	0.86	0.09	1.223 (110)
Refocusers (C)	1.07	0.69	-0.38	4.795*** (63)
Diversifiers (C)	0.74	0.88	0.14	1.745* (95)

Notes: *= $p < 0.1$; **= $p < 0.05$; ***= $p < 0.01$

There is a significant change in diversification for both groups regardless of the classification scheme adopted. Among the 70 firms which reduced their level of diversification according to classification (A), the mean entropy measure fell by approximately 0.38 to 0.73. Similarly, the other refocusing classifications (B) and (C) reported a fall in mean entropy value by 0.44 and 0.38 respectively. These results indicate that some firms experienced a substantial reduction in the scope of their activities. However, also reported in Table 6.5 is the mean change in diversification for firms who moved towards increasing levels of diversification. From the table, the majority of firms either increased or left unchanged their levels of diversification. The change in diversification ranged from an increase of between 0.09 and 0.18, depending on what classification was adopted.

It is widely believed that the nature of refocusing activity is the divestment of unrelated assets and the acquisition of activities related to the core business.

The result is that firms will be operating in fewer but related businesses. Markides (1995a) finds evidence to support this proposition using a sample of 100 US firms over the period 1981 to 1987. To assess whether this is the case for the UK, all divestments and acquisitions were identified over the period for the full sample of 158 companies. This data set was compiled from ‘Acquisitions Monthly’, ‘The Financial Times’ and the CMBOR database at the University of Nottingham for the years 1985 through to 1993. Overall, there were 4,600 transactions, made up of 2,001 divestments and 2,599 acquisitions. This represents, on average, 13 divestments and 16 acquisitions per firm.

Once the list was compiled, activities were classified as related if there was a match between the divested or acquired activity, and the core business at the 2-digit level and unrelated otherwise. The unrelated activities were then assessed to see if they had anything in common with the core, for example if they shared the same distribution requirements, etc. If a relationship existed, the transaction was reclassified as related. The results are shown in Table 6.7.

Table 6.6 Methods of Refocusing

	Divestments	Acquisitions
Related	841	1,550
Unrelated	1,160	1,049
Total	2,001	2,599

$$\text{Refocusing ratio} = \frac{\text{unrelated divestments} + \text{related acquisitions}}{\text{related divestments} + \text{unrelated acquisitions}} = 1.43$$

From a total of 2,001 divestments, the majority of divestments (58 per cent) were unrelated to the core business and 60 percent of acquisitions were related to the core business. Given that refocusing is perceived to be a widespread problem, these figures do not appear particularly high. Markides found a similar figure (60 per cent) of unrelated divestments for his sample of 100 firms over the period 1981 to 1987. Following, Markides (1995a) the 'refocusing ratio' is defined as the number of unrelated divestments plus related acquisitions, divided by the number of related divestments plus unrelated acquisitions. For the whole sample this equals 1.43 which indicates that firms are refocusing by the logic described above. (This is a similar result to that reported by Markides 1995a, who calculated a value of 1.38 in his study on US firms over the period 1981 to 1987.) The results also reinforce existing evidence that divestment and acquisition activity is often conducted simultaneously as part of an unbundling or corporate restructuring process (Ravenscraft and Scherer, 1987).

In summary, a closer examination of diversification levels, has shown that refocusing is a real phenomenon and not merely an invention of the business press. However, its extent must not be overstated. Even though a substantial number of firms reduced their level of diversification (approximately 50 per cent of the sample) over 1985 to 1993, a large number of firms continued to diversify (39 per cent) or experienced no change (11 per cent). The net effect of some firms refocusing and some diversifying was a relatively small change in average diversification and concentration over the period in question. The average firm was still involved in 3.02 2-digit SIC industries at the end of the

period, down from 3.39 in 1985. With regards to concentration levels, the experience in the UK appears to be similar to that in the US (e.g. Hatfield *et al.*, 1996; Liebeskind *et al.*, 1996). The conjecture that refocusing will lead to higher concentration levels has not materialised in practice.

Using the classification scheme outlined in section 4.4.1, at most 44 percent of the sample firms refocused (using classification scheme (A) and at least 30 percent (i.e. just under a third of the sample) refocused following Markides' (1995b) classification scheme (B). (Markides, 1995b reports a result of 42 percent for US firms that refocused over the period 1981-1987.) Therefore it is possible to conclude that corporate refocusing is not a myth but has been undertaken by a substantial minority of UK firms over the period 1985 to 1993. Thus whilst it is not widespread in the sense that not all firms are refocusing, there is evidence to suggest that it is an important phenomenon as exemplified in the business press.

Firms refocused primarily by divesting unrelated businesses and acquiring related ones. For our sample, the total number of acquisitions dominated divestments by 2,599 to 2,001 over the period 1985 to 1993. Of these 60 percent of acquisitions were related to the firm's core business, whilst 58 percent of divestments were unrelated to it.

6.3 The Characteristics of Refocusing Firms

Whilst Section 6.2 examined the extent and nature of corporate refocusing, it is still unclear what the distinctive characteristics of refocusing firms in the UK are. Table 6.6 reports the mean levels of some of the study variables for the refocusing and diversifying firms, in 1985 and 1993 following the classification scheme (B) (a similar pattern of results emerges for the remaining refocusing classifications).

Table 6.7 Refocusers versus Diversifiers, 1985 and 1993

Variable	1985		<i>t</i> -test
	Refocusers	Diversifiers	
Industry-adjusted ROCE	-0.12	1.26	0.995
Tobin's <i>q</i>	1.25	1.52	1.470
Diversification	1.11	0.77	***4.026
Assets	836,136	725,269	0.323
Concentration	0.41	0.32	**2.430
Market share	0.31	0.20	*1.681
Size of core business	0.65	0.76	***2.7866
	1993		<i>t</i> -test
	Refocusers	Diversifiers	
Industry-adjusted ROCE	2.56	0.10	1.342
Tobin's <i>q</i>	1.64	1.50	0.869
Diversification	0.67	0.86	**2.007
Assets	1,885,388	2,082,529	0.242
Concentration	0.34	0.29	1.260
Market share	0.26	0.21	1.106
Size of core business	0.77	0.71	1.334
	n=66	n=84	

Notes: *= $p < 0.1$; **= $p < 0.05$; ***= $p < 0.01$

As can be seen in the table, the refocusing firms are those whose mean level of diversification and firm size (calculated using the book value of total assets) are highest at the beginning of the period (a *t*-test for the difference between the means for refocusing and diversifying firms is significant only for the former of these two variables). As might be expected, these firms also suffer, on average, from lower relative performance as indicated by industry-adjusted accounting performance measure ROCE and market measure, Tobin's *q* (however, neither report a significant *t*-statistic). It would appear that it is the larger, more diversified and less profitable firms in the sample who undertook most of the refocusing in the study period, and as such, are exactly those firms who have the most to gain from refocusing.

The refocusing firms also have, on average, higher concentration and market share figures in their primary industry at the beginning of the period (both report a significant difference for refocusing and diversifying firms). This provides some evidence in support of the argument that firms will refocus if their core market is attractive, as indicated by high market share and concentration measures (Markides, 1992b). Refocusing firms are also characterised by a smaller core business, suggesting that they are able to exploit growth prospects in their core business. The table also shows initial evidence that refocusing has a positive impact on firm performance. The average level of profitability for refocusing firms increases over the period and in 1993 it exceeds the level for diversifying firms. This relationship will be examined in detail in Chapter 9 of this thesis when we estimate the performance consequences of divestment.

Also reported is the mean value of these variables at the end of the period. At the start of the period, diversifying firms' mean level of diversification was lower than that of refocusing firms and their relative performance was higher. These results imply that profitability drives diversification. It is exactly these more profitable firms that decided to diversify further over the period and by 1993 they were the most diversified. However, their performance fell over the period, whilst refocusing firms' mean performance increased and outweighed diversifying firms at the end of the period.

Whilst the above summary statistics provide some indication of the differences between refocusing and diversifying firms, the approach is supplemented by cross-sectional OLS and logit models to examine more precisely the characteristics of refocusing firms. The analysis was performed on those firms who survived as a public corporation over the study period, 1985 to 1993 (i.e. 121 companies). After the omission of 7 firms due to incomplete data coverage, the final sample size is 114 firms.

The literature review in Chapter 3 of this thesis provided a comprehensive examination of the likely characteristics of refocusing firms. If, as is widely argued (e.g. Williamson, 1967; Penrose, 1957), there exists an optimal limit to which a firm can diversify without adversely affecting its performance, then profit-maximising firms who find themselves in breach of this optimum will attempt to reduce the scope of their activities in an attempt to improve performance. This line of reasoning implies that refocusing firms will be

characterised by high levels of diversification and poor performance relative to their industry counterparts. Reasoning from the strategic literature also suggests that larger firms are more likely to have breached some Penrose (1959) type constraint on expansion and are more likely to refocus.

Another characteristic that may influence the firm's decision to change the scope of its activities is their level of debt. Jensen (1986, 1989) and others have argued that debt constrains managers' capacities to allocate free cash flow to unprofitable diversification. The incentive effects associated with highly leveraged firms foster better asset utilisation, not least because it forces the company to sell divisions to repay its debt (Ravenscraft and Scherer, 1987) and reduce this constraint on managerial discretion. It is therefore expected that refocusing firms will be characterised by a high level of debt.

If corporate refocusing is a reversal of prior managerial empire-building stimulated by a slack market for corporate control (Jensen, 1986), then we would expect refocusing firms to be characterised by low levels of management equity ownership. It will be the managers of these firms that have been able to indulge managerial preferences in the past. Preliminary evidence of this is given in Table 6.8 which shows that firms with a lower level of managerial ownership are more diversified (measured alternatively as the number of SIC industries a firm operates in and as the entropy index of diversification) than managers of firms with high levels of ownership. However, this does not necessarily imply that managers of firms with low levels of insider ownership will respond quickly

in the event of a dis-equilibrium level of diversification. On the contrary, we may expect firms with high levels of insider ownership to be more responsive and divestment to be more likely under conditions of reduced managerial discretion (this relationship will be examined in Chapter 7 of this thesis).

Table 6.8 Mean Levels of Diversification by Equity Ownership of Managers

Insider Ownership	SIC	Entropy Index	N
<1%	3.67	1.006	71
1-10%	3.58	0.775	28
>10%	3.20	0.698	15
<i>Total</i>			<i>114</i>

We would not expect a firm to refocus on its core business if that business was stagnating or unprofitable. High values of concentration and market share in a firm's core market and the size of the core business, simultaneously raise its profitability whilst reducing the potential for core expansion. These are precisely the conditions which may drive diversification into new activities and may be expected to discourage managers from undertaking a programme of refocusing. However, Markides (1995a) argues conversely that core market conditions such as concentration, market share and a large core business determine the attraction of a refocusing strategy. Thus the higher the attractiveness of the core industry the higher the likelihood that a firm will refocus. Which of these two effects will dominate cannot be determined *ex ante*, so the relationship between refocusing and market structural characteristics is ambiguous.

Finally, it is also suggested in the literature that corporate reorganisation may be associated with the introduction of a new management team. For example, Gabarro (1985) argues that a radical change in the strategy of the firm is usually undertaken when a new management team arrives: either because they have a weaker emotional commitment to the old activities or because the changes indicate deeper shareholder dissatisfaction (Ravenscraft and Scherer, 1987; Markides 1995a).

Given the discussion above on the factors that influence the decision to refocus, our model is specified as:

$$\begin{aligned} \text{Refocus} = & \alpha + \beta_1 \text{PERF}_i + \beta_2 \text{DIVERSE}_i + \beta_3 \text{SIZE} + \beta_4 \text{LEV}_i + \beta_5 \text{INSIDE} \\ & + \beta_6 \text{MS}_i + \beta_7 \text{CON}_i + \beta_8 \text{CORE}_i + \beta_9 \text{NEWMD}_i + \varepsilon_i \quad \dots (1) \end{aligned}$$

Where i subscripts denote firms, ε_i is an (i.i.d) error term, (PERF) is performance, (DIVERSE) is firm diversification, (SIZE) is firm size, (LEV) is leverage, (INSIDE) is insider ownership, (MS) is market share, (CON) is concentration, (CORE) is size of the core business and (NEWMD) is a change in management. The definitions and methods of construction of the variables are given in Chapter 4 of this thesis. The predicted signs of the explanatory variables are given in Table 6.9.

Since the phenomenon to be explained is corporate refocusing, the dependent variable is alternatively calculated as a change in diversification and as a

dichotomous variable equal to one if the firm reduced its level of diversification and zero otherwise. Two measures of diversification are adopted: first, the entropy index of diversification and second, the number of industries in which a firm operates (full details are given in Chapter 4 of this thesis). The change in diversification is calculated as the level of diversification in 1993 minus the level of diversification in 1985. Using the entropy index, 63 firms reduced their diversification and 51 increased or showed no change. When diversification was measured by the number of industries, 54 firms reduced and 60 firms increased or experienced no change.

In the first model, equation (1) is estimated using OLS techniques. In the second case, given that the dependent variable is dichotomous, equation (1) is estimated as a logit model. OLS estimation would be inefficient in this case since it can give estimates which imply predictions outside its possible range (i.e. higher than one and lower than zero) and it assumes normally distributed errors. The logit model assumes that the distribution of the error term is logistic. It estimates the probability that the dependent variable will have a value of one as a function of the explanatory variables whose coefficients are estimated using maximum likelihood techniques i.e. a positive coefficient implies the variable increases the probability of refocusing activity.

In both instances, the independent variables are calculated in 1984 thereby avoiding any spurious correlations. Both methods are adopted to test the sensitivity of the results to the specification of the dependent variable.

The regression results from estimating equation (1) are given in Table 6.10. Columns (1a) and (1b) report the results when the dependent variable is measured as a change in diversification using the entropy index and the number of industries in which a firm operates, respectively. The results from the logit model when the reduction in the entropy index and the number of industries is represented by a dichotomous variable are given in columns (2a) and (2b) respectively.

In a number of cases, alternative versions of the independent variables were generated: firm size was alternatively measured as the logarithms of total employees, total assets and total sales; leverage as the debt-to-assets and debt-to-equity ratios and; firm and industry-adjusted accounting performance as return on capital employed (ROCE), return on equity (ROE), return on sales (ROS) and trading profit margin (TPM). In each case the alternatives were highly correlated. The reported results in Table 6.10 use industry-adjusted ROCE as the firm-specific performance measure, debt-to-assets as the leverage variable and log of the number of employees as the firm size indicator. The alternative measures yielded very similar estimates.

The regression diagnostics in Table 6.10 reveal that the overall significance of the models is satisfactory. The results show some consistency across specifications and are in accord with some of our prior expectations. In both models, the start of period level of diversification has a significant coefficient. In the OLS model, a change in diversification is negatively related to its start of

period value. This result suggests that highly diversified firms are more likely to reduce their diversification level over the subsequent period. In the logit model, a positive coefficient implies that diversification increases the probability of refocusing activity. These results are consistent with strategy-type arguments that the more diversified firms have the most to gain from refocusing. The coefficient on firm size is insignificant across all specifications.

The coefficient on Management equity interests is negative and significant in the logit model and positive in the OLS model. This suggests that firms with low levels of equity ownership are more likely to refocus over the subsequent period. This result is robust to the choice of the diversification measure.

Core industry characteristics produced mixed effects. Core concentration was insignificant across all specifications. The size of the core business and market share both carried a negative coefficient in the logit model and a positive coefficient in the OLS model. Only size of core showed any level of significance. This implies that firms are more likely to refocus if their core is a small proportion of industry sales. This result suggests that refocusing firms are able to exploit growth prospects in the core business. In contrast, Markides (1995a) found that US firms are more likely to refocus the higher the attractiveness of the core business as measured by core size, concentration and advertising intensity.

In both specifications, firm performance failed to attract a significant coefficient. It had been conjectured that refocusing firms would be characterised by poor performance relative to their industry counterparts. However, no alternative measure of performance approached any level of significance. Dropping the market structural variables, equivalent to employing a reduced-form version in which market structural effects work through performance alone, did nothing to change these results. Similarly, firm leverage and a change in management failed to provide any significant estimates. The regressions were additionally estimated using changes in the independent variables prior to the study period but again this had little affect on the results.

Before rejecting the existence of a link between refocusing and performance in the UK context we are mindful of one particular caveat: the estimation approach in this section uses a cross sectional design in which the explanatory variables are measured *prior* to the start of the period of investigation to avoid problems of simultaneity bias. It is possible that the implied lag between the variables' measurement and the subsequent period of refocusing was simply too long - i.e. adjustment may occur quite rapidly - and averaging the effects across a nine year time interval may introduce unnecessary contamination. Panel techniques were not adopted since we were examining the existence of refocusing activity by firms over the period 1985 to 1993. A firm's level of diversification can fluctuate upwards or downwards on a yearly basis without implying that a firm was necessarily refocusing over the period. Thus, examining changes on a yearly basis would have included inconsistent refocusers in the sample.

6.4 Summary and Conclusions

Using firm level activity data, we calculated that approximately 50 percent of our sample firms reduced their level of diversification over the period 1985 to 1993 and the remaining 50 percent either reduced or had no change to their diversification level (calculated using the entropy index of diversification). The net result, across the sample as a whole, was a small and insignificant reduction in the level of diversification. This reduction in diversification did not materialise as an increase in aggregate concentration across industries in our sample.

Within-sample changes indicate that some firms reduced their level of diversification substantially over the period whilst others increased theirs. These changes were found to be significant for refocusing and diversifying firms. Using the classification scheme outlined in Chapter 4 of this thesis, at most 44 per cent (classification scheme (A)) and at least 30 per cent (classification scheme (B)) of the sample refocused. Thus, we can conclude that corporate refocusing was an important phenomenon over the period in question and not just an invention of the business press. Over the period 1985 to 1993 a substantial minority of firms in our sample refocused.

Using summary statistics it was shown that refocusing firms were more diversified, larger, lower performers and had a more attractive core business at the start of the period than firms who diversified further. Controlling for other factors, the results from cross-sectional regressions using OLS and logit

techniques show that refocusing firms are characterised by high diversification, low insider ownership and, to an extent, by an attractive core on which to refocus. Rather surprising, in view of the US evidence (Markides, 1995a), UK refocusing firms were not characterised by low levels of performance. However, this result should be treated with caution since it is possible that the cross-sectional design influenced this outcome by requiring performance to be measured too far ahead before the actual refocusing programme begun.

Table 6.9 Predicted Coefficient Signs of Explanatory Variables

Variable	Predicted Sign
Performance	-
Diversification	+
Firm size	+
Leverage	+
Management equity	-
Market share	?
Concentration	?
Size of core business	?
Management change	+

Table 6.10 Dependent Variable equals (1) the Change in Diversification and (2) the Probability of Refocusing

	(1a)	(1b)	(2a)	(2b)
Constant	-0.210 (0.460)	0.462 (0.242)	-0.674 (0.862)	-1.259 (0.455)
Firm performance	0.008 (0.125)	-0.009 (0.339)	0.003 (0.166)	0.059 (1.349)
Diversification level	-0.284 *** (3.667)	-0.355 ** (1.965)	0.261 * (1.756)	0.342 * (1.854)
Firm size	-0.023 (0.540)	-0.002 (0.313)	0.091 (0.355)	0.022 (1.510)
Firm leverage	0.029 (0.694)	0.311 (1.018)	0.025 (0.091)	0.599 (0.933)
Management equity	0.819 ** (2.200)	0.734 * (1.785)	-0.681 ** (2.115)	-0.627 ** (1.988)
Concentration	-0.398 (0.845)	-0.319 (1.046)	0.538 (0.198)	0.440 (0.966)
Market share	0.060 (1.559)	0.010 (0.620)	-0.294 (1.188)	-0.198 (0.410)
Core size	0.339 *** (2.885)	1.719 *** (3.506)	-1.340 * (1.708)	-1.993 ** (2.509)
Change in management	-0.087 (0.875)	-0.461 (1.106)	0.106 (0.177)	0.196 (0.328)
χ^2			***31.33	***30.22
F-test	***5.00	***3.91		
R ²	0.21	0.20		

Notes: n = 114; t-statistics appear in parentheses: * = $p < 0.1$, ** = $p < 0.05$, *** = $p < 0.01$.

7. THE DETERMINANTS OF CORPORATE DIVESTMENT FOR UK FIRMS: CROSS-SECTIONAL ESTIMATES

7.1 Introduction

The aim of this chapter is to analyse the determinants of corporate divestment by UK firms over the period 1985-89, a period chosen to pre-date any recession-induced changes of the early 1990s (see Geroski and Gregg, 1997). This chapter begins from the position adopted by recent American researchers (e.g. Hoskisson and Turk, 1990; Hoskisson *et al.*, 1994 and Markides, 1995a) that widespread voluntary divestment is consistent with some exogenous environmental change which lowers the optimal level of diversification across the population of large firms. However, it is suggested here that existing attempts to explain intra-sample variations in the extent of divestment are methodologically unsatisfactory insofar as they typically employ the same hypotheses which have been used to explain prior *levels* of diversification to analyse subsequent *changes* in the same variable, or some proxy for it. For example, following in particular Mueller (1969) and Jensen (1986), it is widely considered that non-equity holding managers will have a preference for diversified expansion which may be realised in an environment of strong cash flow and weak corporate governance. In an apparent extension of this argument, researchers exploring divestment typically hypothesise that corporate governance variables, intended to capture shareholder power with respect to managers, should *decrease* diversification and hence *increase* divestment. However, in the absence of any *changes* in these variables - and characteristics such as board composition and

managerial shareholdings tend to be stable in the medium term - the same factors presumably have already acted to depress levels of diversification *before* any exogenous shock. Therefore it is unclear why such shareholder dominated firms should display higher rates of divestment than, say, firms whose managers enjoy greater discretion but which have had the corresponding opportunity to diversify more widely.

This chapter treats divestment as an adjustment process through which the firm attains its optimal level of diversification. It allows that one or more of several factors may induce an initial downward shift in the optimal level of diversification. However, since divestment involves the transfer of real productive assets across markets where the number of potential buyers is typically small it is likely to involve transaction and dislocation costs, which are themselves influenced by the pace of the adjustment process. Therefore it appears unlikely that firms will make a full instantaneous response to any shock. Instead it is hypothesised that there exists some form of partial adjustment mechanism. This implies that the *observed* divestment across some interval following the shock depends upon two factors: first, the impact of the shock itself on the optimal level of diversification; and second, the speed of adjustment which determines the extent of any potential change which is achieved over the observed interval. It is hypothesised that the potential change is largely determined by strategic factors within the firm whilst the speed of adjustment depends critically upon those performance and corporate governance characteristics which determine the firm's degree of insulation from capital market pressures.

The remainder of the chapter is divided into five sections. Section 7.2 provides the background to the model estimated later in the chapter. Section 7.3 outlines the data set used for the empirical part of the analysis. Section 7.4 presents the empirical model to be tested and discusses the *a priori* expectations of the results. Section 7.5 shows the results for the proportion of assets divested and for the number of divestments. Finally Section 7.6 gives some conclusions of the analysis.

7.2 Theoretical Considerations

7.2.1 The Causes and Timing of Divestments

It has been widely established in a US context [e.g. Bhagat *et al.*, (1990), Hoskisson and Turk, (1990), Shleifer and Vishny, (1991), Markides, (1995a,b), and Denis *et al.*, (1997)] and conjectured in a UK one, that corporate refocusing, via voluntary divestment, has become a commonplace strategy since the early 1980s. An explanation for the existence, timing and extent of such a phenomenon requires an examination of two propositions: first, that each firm possesses an optimal level of diversification; and second, that substantial numbers of firms found themselves to have breached this optimum, during the period in question, with the corresponding need to reduce the spread of their activities. These propositions are examined in turn (see Chapter 3 of this thesis for a more detailed discussion):

First, in an environment of non-zero transaction costs, multi-output firms may be considered to exist to economise on the costs of using markets. Williamson (1975) described the benefits of bringing vertically related activities under common ownership. More recently, transaction cost economics (Teece, 1982) and the resource-based theory of the firm (Wernerfelt, 1984; Barney, 1986; Ingham and Thompson, 1995) have emphasised the gains that may accrue when a firm diversifies to exploit under-utilised, imperfectly imitable specific assets. However, expansion brings with it organisational costs. Informational transfers across hierarchical levels generate control loss problems that limit the viable height of organisational hierarchies, while intra-firm transactions may inhibit hierarchical decomposition. In general, increasing firm size will require decentralisation of decision-making, as exemplified in the M-form described by Williamson (1975). Furthermore, as Penrose (1959) demonstrated, the very indivisibilities in factor supply which generate the potential for economies of scope also constrain internal expansion. Surplus capacities are unlikely to be uniform across firm-specific assets and bottlenecks will occur, particularly in the availability of managerial resources, causing organisational costs to rise with further expansion.

The foregoing discussion suggests that diversification brings performance benefits to the firm and hence value gains to its owners, but that such benefits are subject to decreasing returns as organisational costs rise. That is *ceteris paribus* the value of the firm (V) is a concave function of the level of diversification (D). However, agency theory suggests that senior managers may derive direct benefits from diversification in at least two ways: first, because it will reduce the variability of a

firm's earnings thus lowering the risk attaching to the managers' firm-specific human capital [Amihud and Lev (1981)]; and second, because, following Mueller (1969) and Jensen (1986), it has been seen as a means of facilitating growth in firms whose core activities have a strictly limited potential for expansion. Jensen (1986), for example, argues that firms in mature but profitable industries, which generate cash flows in excess of those needed for reinvestment, will systematically over-diversify. Thus it appears reasonable to expect that both V and D enter the managerial utility function.

At least three inter-related arguments¹ have been advanced in the literature to explain downward displacement in optimal diversification levels since the early 1980s: First, Jensen (1986, 1989) and others have argued that capital market innovations - particularly including debt-financed takeovers, the use of hostile bid advisers, the emergence of venture capitalists to finance management buyouts etc. - have increased the effectiveness of the market for corporate control. This in turn, it is suggested, has not merely reduced the ability of managers to divert free cash flow to preferred - but unprofitable - diversifications, but encouraged them to divest and disinvest in loss-making activities.

Second, a combination of capital market innovations and the lowering of transaction costs may have reduced the comparative advantage of the multidivisional form of organisation. It has been argued by Bhidé (1990) and others that external capital market evolution has attenuated the informational advantage of the M-form's internal capital market, as described by Williamson (1975). In addition, the growth

of the contracting out of supply and support functions within the private sector attests to the fall in transaction costs. Survey evidence [e.g. Geroski and Gregg (1997)] confirms the reduced popularity of the M-form among large UK firms. Arguments such as these point to a backward shift in the value-diversification function.

Third, there is growing evidence that the capital market itself came to take a more negative view of diversified firms during the 1980s. It appears that an optimistic stance with respect to conglomerate mergers in the 1960s and 1970s [Morck *et al.*, (1990), Shleifer and Vishny (1991)] gave way to a more pessimistic viewpoint as the evidence accumulated [Ravenscraft and Scherer (1987)], leading to a preference for more narrowly focused firms in the 1980s [Wernerfelt and Montgomery (1988)²]. Markides (1995a,b) notes that even managers motivated purely by shareholder value considerations could find themselves with an over-diversified firm in these circumstances.

7.2.2 Divestment as a Process of Adjustment

Assume that the managers of firm i are operating with an equilibrium level of diversification when some exogenous change occurs in the firm's environment which causes a shift in *desired* diversification from D_i to D^*_i . Since this analysis is primarily concerned with corporate divestment as an *adjustment* to such a change we remain agnostic, for the moment, about its proximate cause. However, following on from the previous discussion this could involve *either* an increase in the effectiveness of

the capital market as a disciplinary device *or* a downward revision by the capital market in the assessment of the benefits of multi-output operations, or some combination of these. Managers may be expected to respond to their new circumstances by divesting activities. However, the literature on divestment indicates that this typically occurs only with some considerable delay³. This is scarcely surprising. Locating and negotiating with potential buyers for specific corporate assets may be problematic, whilst rapid change may imply high organizational costs, not least for the managers themselves⁴. This suggests that the *observed* divestment over the succeeding interval will depend upon two effects: first, the *speed* with which managers have to respond to capital market discipline; and second the extent to which the new optimal level of diversification diverges from the previous equilibrium. For representational purposes this may be written:

$$\Delta D_{it} = \lambda_i(D_{it-1} - D^*_{it}) \quad \dots(1)$$

where ΔD_{it} is the observed period divestment, λ_i is a firm-specific lagged adjustment operator and $(D_{it-1} - D^*_{it})$ is the divergence between the desired and (start of period) actual levels of diversification.

It is conjectured that λ_i will be negatively related to the firm's insulation from capital market pressures. Thus, for example, corporate governance characteristics and factors determining the managers' security from takeover threat will influence adjustment and hence divestment in the event of a disequilibrium level of diversification. Given the capital market changes described above and the findings of

the empirical literature in the US (see Markides, 1995a, b; Bergh, 1997; etc.) it is assumed that the extent of any such divergence between desired and actual diversification will be primarily determined by the strategic and market characteristics of the firm (*size, market structure* etc.).

It was considered that identification problems and issues of endogeneity with firm-level variables made it infeasible to specify and estimate a satisfactory structural model of the divestment process. Instead we adopted the approach of estimating a reduced form equation in which divestment across the interval was examined using *prior* values of the governance and strategic variables. The resulting estimating model is as follows:

$$\begin{aligned} \text{Divestment}_i = & \alpha_0 + \alpha_1 \text{Performance}_i + \alpha_2 \text{Leverage}_i + \sum_{j=1}^3 \alpha_{2+j} \text{Corporate} \\ & \text{Governance Variables}_j + \alpha_6 \text{Diversification}_i + \alpha_7 \text{Size}_i + \alpha_8 \text{Management Change}_i \\ & + \alpha_9 \text{Acquisition}_i + \alpha_{10} \text{Market Share}_i + \alpha_{11} \text{Concentration}_i + \varepsilon_i \quad \dots (2) \end{aligned}$$

where the explanatory variables are as follows:

Performance has been widely shown to be negatively related to the contemporaneous probability of being taken over and hence would appear to convey partial insulation from the capital market's discipline (see Palepu, 1985 for a discussion).

Leverage, following Jensen (1986), may be considered to reduce managerial discretion insofar as it precommits cash flows to meet debt servicing obligations. *Ceteris paribus*, higher levels of leverage were expected to increase the pressure on sluggish managers to reduce diversification, not least because divestments can be used to pay off debt.

Corporate Governance arrangements function so as to make managers more responsive to the interests of the shareholders. Therefore the more effective the institutions of governance in place the faster should be the speed of adjustment. Here a vector of widely recognised corporate governance variables is employed including: *management equity ownership*, *board composition* and the existence or otherwise of an identifiable (large) *blockholder* [e.g. Gibbs (1993), Johnson *et al.* (1993)].

The second source of variation in observed divestment across the sample is assumed to arise from the deviation of each firm's actual and optimal levels of diversification. This, it is conjectured, depends principally on strategies deployed *prior* to whatever exogenous shock has now occurred. Thus initial *size* and *diversification* were expected *ceteris paribus* to increase the distance between the actual and desired levels and have a positive effect on divestment. Size is included both as a proxy for organizational costs, and hence as an indication of the potential for "downsizing" in a period of falling transactions costs, and also as a necessary control regressor in the count data estimations since the *number of potential* disposals will be a function of size⁵.

Core product market characteristics have often been considered to drive diversification into new activities. Thus high values of *concentration* and *market share* in a firm's core market simultaneously raise its profitability whilst reducing the potential for core expansion. These are precisely the conditions under which size-motivated managers might be expected to pursue diversifying expansions. Therefore, by extension, these conditions might be expected to discourage such managers from divestment even where capital market sentiment favoured more tightly focused firms. However, Markides (1995a) argues conversely that core market conditions such as *concentration* and *market share* determine the attraction of a refocusing strategy and hence impact *positively* on divestment. Which of these two effects will dominate cannot be determined *ex ante*, so the relationship between the extent of divestment and market structural characteristics is ambiguous. Empirical evidence in the US (e.g. Chatterjee and Wernerfelt, 1991; Chang, 1996) largely confirms the importance of these factors. Of course, the same variables may be considered as key determinants of *performance* and hence to work through that construct on the speed of adjustment.

The strategy (*diversification* and *size*) and product market variables (*primary market share* and *primary market concentration*) were taken at their start-of-period value to avoid possible simultaneity problems. For example, firm size may not only affect diversification but is itself also affected by diversification. Therefore, by measuring firm size at the beginning of the period it removes any causality problem. Two additional binary controls were included for within-period changes. These

were: first, a senior *management change* variable, which almost by definition is exogenous to the existing decision takers, and which was expected to lower the desired level of diversification; and second, an acquisition variable which appeared a necessary control since any additional acquisition raises the stock of potentially divestable businesses⁶ and therefore may be predicted to have a positive impact on the divestment decision.

Table 7.1 provides a summary of the explanatory variables and their predicted coefficient signs.

7.3 Data and Variables

In this chapter, the initial sample consists of 141 publicly quoted UK firms randomly selected from the FT500 list. Financials, foreign-owned and trading companies were excluded because of problems of comparability with other firms (see Chapter 4 of this thesis for details). The extent of divestment activity is separately measured using the *proportion* of assets divested and the *number* of business units divested. The rationale for using separate measures rests on both methodological and practical reasons. The count data specification, using the number of recorded divestments, relates more obviously to any control problems associated with diversity. Furthermore, this approach is advantageous in so far as value data are inevitably unobtainable for some smaller divestments. Divestment expressed as a proportion of the firm's initial assets represents a measure of the importance of divestment activity over the period.

The proportion of assets divested is calculated as the sales price of divested units divided by market value for the previous year. This measure was used as information was not available on the sales of the divested unit as a percentage of the total sales of the firm. These percentages are summed over the period to obtain a total percentage of assets divested (similar measure to Hoskisson *et al.*, 1994). This can and does exceed one hundred per cent in the case of firms who were active divestors and acquirers over the period (this was the case for 3 of the firms). In the cases where a sales price was unreported, a proportion of 0.1 per cent of market value was assigned to that divestment⁷. Alternative assumptions were made but the results appeared insensitive to the allocation rule selected. The number of business units divested is the total number of sell-offs recorded over the period calculated for each firm.

Altogether a total of 1149 voluntary divestments was reported (involuntary divestments were excluded for reasons given in Chapter 4 of this thesis). Table 7.2 shows the extent to which the companies in the sample were involved in divestment activity. Approximately 90 per cent make at least one divestment. The majority of firms undertake between 1 and 5 divestments. On average, each firm made 8.15 divestments over the period, representing 1.6 divestments per year and representing 4.4 per cent of its assets in the previous year.

The determinants of divestment mentioned in Section 7.2.2 are performance, leverage, management equity, board composition, blockholder, diversification, firm

size, management change, acquisition, market share and concentration. Performance is alternatively measured using ROCE, ROE, TPM and ROS both at the firm level and relative to the industry. Market performance is measured using an approximation to tobin's q . In addition relative shareholder returns are used as an alternative measure of performance. Leverage is measured as the ratio of debt-to-equity and debt to total assets. Management equity is calculated as the percentage of total outstanding ordinary shares owned by the directors of the firm (Johnson *et al.*, 1993). Board composition is calculated as the ratio of non-executive to executive board members (Hoskisson *et al.*, 1994). Blockholder ownership is defined as an owner of 5 per cent or more of the firm's ordinary share capital (Bethel and Liebeskind, 1993). Diversification is measured using the entropy index (Palepu, 1985). Firm size is calculated by taking the book value of total assets, total sales, and the number of employees. Management change is measured using a dichotomous variable equal to 1 if there was a change in Managing Director (or equivalent) immediately prior or during the period and 0 otherwise. Acquisition is measured as a dichotomous variable equal to 1 if there was a recorded acquisition over the period and 0 otherwise. Market share uses a standard measure of total sales of a firm divided by industry sales. Concentration is measured using the Herfindahl index. A detailed description of the measurement of the explanatory variables is given in Chapter 4 of this thesis.

From this sample, seven firms were eliminated due to incomplete data coverage, reducing the final number of firms with all necessary data to 134.

7.4 Methods

The empirical analysis of divestment examined both the proportionate value and the number of activities divested. Whilst the former is indicative of the magnitude of the firm's divestment strategy, it is highly sensitive to single decisions involving very large disposals. (Furthermore, in some cases the asset sale price will become inflated by the buyers willingness to overpay.) The second divestment measure, the number of recorded disposals, has the advantage of making full use of the data available without our having to assign values to those disposals where there was no recorded sale price. Both versions of the divestment measure give rise to limited dependent variable estimation. In the proportions case an OLS log-linear model is used. The count data version employs alternative specifications based upon the Poisson and negative binomial distributions, respectively. It is contended here that the two approaches are complementary and necessary given the nature of the data on divestment.

The proportions model is estimated using OLS techniques. That is the relationship between divestment and the regressors in equation (2) is estimated by minimising the sum of squared errors (see Chapter 5 of this thesis for more details). While the proportions model is straightforward, the count data models are probably less familiar and are described in detail below (see also Chapter 5 of this thesis).

The Poisson distribution is widely used in analysing count data where the dependent variable is discrete and defined for non-negative integers corresponding to the

number of events occurring in a given interval (e.g. Hausman, Hall and Griliches, 1984). We model the number of divestments, y_i , as being generated by the following Poisson process: $\text{Prob}(y_i) = \frac{\lambda_i^{y_i} e^{-\lambda_i}}{y_i!}$, where λ_i is the conditional mean and variance of the Poisson distribution. To incorporate explanatory variables X_i , the most common formulation for λ_i is: $\ln \lambda_i = X_i b$. Parameter estimates are obtained by solving the log-likelihood function using maximum likelihood techniques: $\ln L = \sum (y_i X_i b - \lambda_i - \ln y_i!)$.

One restriction of the basic Poisson model is the imposition of an equal conditional mean and variance. In many economic applications, it is not uncommon to find that the variance of y_i exceeds the mean, implying 'overdispersion' in the data. An important consequence of fitting overdispersed data to the Poisson model is that the estimated covariance matrix will be biased downwards, producing spuriously small estimated standard errors of the parameter estimates and overstated t -statistics.

A solution to the problem of overdispersion is to use a distribution that allows for a less restricted variance function. To this end the negative binomial model has been proposed as a useful alternative to the Poisson model (Cameron and Trivedi, 1986). The negative binomial model allows for unobserved heterogeneity in the mean function by introducing an additional stochastic component to λ_i : $\ln \lambda_i = X_i b + \varepsilon_i$, where ε_i captures unobserved heterogeneity and is uncorrelated with the explanatory variables. The model can be derived by assuming λ_i to be distributed randomly and follow a gamma distribution of the form: $f(\lambda_i) = 1/\Gamma(1/\alpha) e^{-\lambda_i/\alpha} \lambda_i^{1/\alpha-1}$.

By choosing the particular form of gamma distribution given above, one obtains a model which has the same conditional mean as the Poisson model but allows overdispersion since: $\text{var}(y_i|X_i, b) = \lambda_i(1 + \alpha\lambda_i) > \text{var}(y_i|X_i, b) = \lambda_i$. Since the mean equals the variance when y_i is Poisson distributed, the natural basis for testing the adequacy of the Poisson model is to propose tests of the form $\alpha = 0$.

7.5 Results

The descriptive statistics and inter-correlations of the variables used in the study are given in Table 7.3. An inspection of these for the *number of divestments* provides a priori evidence of overdispersion in the data, since the variance is appreciably larger than the mean. This indicated the importance of testing for the validity of the Poisson specification in the regression model which follows.

Equation (2) was estimated using the *proportion of assets divested* and the *number of divestments* as alternative versions of the dependent variable. Since the sample statistics led us to suspect overdispersion in the data, we tested the moments restriction implied by the Poisson model using the regression-based tests for overdispersion suggested by Cameron and Trivedi (1990) – see Appendix 7A for details. This is based on the weighted least squares estimation of $(y_i - \mu_i)^2 - \mu_i$ on $g(\mu_i)$, where y_i is the dependent variable, $g(\mu_i)$ is some specified function and μ_i is the predicted mean from the Poisson regression. The Poisson model is rejected if the

coefficient on $g(\mu_i)$ is significantly different from zero. Cameron and Trivedi (1990) suggest two possibilities for $g(\mu_i)$: $g(\mu_i) = \mu_i$ and $g(\mu_i) = \mu_i^2$. Using ROCE as the measure of firm performance, debt to total assets as a measure of leverage and the log of employees as a proxy for firm size in equation (2), yielded t -ratios of 6.24 and 7.61 respectively which were highly significant and suggested a rejection of the Poisson model. Rejection of the mean-variance equality led us to re-estimate the regression using the negative binomial model. The Wald statistic for testing the Poisson model against the negative binomial model is 5.745 pointing to the superiority of the latter. This conclusion was reinforced by the likelihood ratio statistic of 209.434 [$2 \times (491.285 - 386.568)$]. This conclusion was robust to specification changes involving the alternative size, leverage and performance variables. For example, the corresponding regression-based, Wald and likelihood ratio (LR) tests using relative ROCE, tobin's q and relative shareholder returns are 6.31 and 7.70 (t -ratios), 5.749 (Wald), 209.866 (LR), 6.27 and 7.63 (t -ratios), 5.820 (Wald), 208.02 (LR), 6.32 and 7.75 (t -ratios), 5.822 (Wald), 197.62 (LR) respectively. However, it is the case that the two alternative functional forms gave very similar parameter estimates and differed largely because the lower variance in the Poisson model has the effect of downwardly biasing the coefficients' standard errors. Table 7.5 gives illustrative Poisson estimates for comparative purposes, but the following discussion of the count data results relates to the negative binomial results, which we consider to be the more reliable.

In several cases alternative versions of the independent variables were generated: thus firm size was alternatively measured as the logarithms of total employees, total

assets and total sales, leverage as the debt-to-assets and debt-to-equity ratios and firm and relative performance as return on capital employed (ROCE), return on equity (ROE), return on sales (ROS) and trading profit margin (TPM). Inevitably, in each case the alternatives were highly correlated, as seen in Table 7.3. The reported results, in Tables 7.4 and 7.5, use ROCE as the firm and relative performance measure, debt-to-assets as the leverage variable and log of the number of employees as the firm size indicator. The alternative measures yielded very similar estimates.

The results are given in Tables 7.4 and 7.5 and show a considerable consistency across specifications and with either version of the dependent variable. The results across the models are very largely in accord with prior expectations. Among the variables which were predicted to increase the firm's responsiveness to the capital market and hence accelerate any downward adjustment in diversification, *Firm Leverage* and the corporate governance variables of *Board Composition* and *Management Equity* exercised a significant positive effect in both the proportions and count models. Alone among the governance variables, only the existence of an identifiable *Blockholder* failed to attract a significant coefficient.

These relationships suggest that the percentage of divested units or the number of divestments is greater when debt is higher, the proportion of outsiders on a board is higher and management equity holdings are higher. The former result is consistent with the disciplinary role of debt hypothesised by Jensen (1986). The significant effect of the corporate governance variables, *Board Composition* and *Management Equity*, is consistent with the view that divestment is more likely under conditions of

reduced managerial discretion. There is no evidence of divestment being related with blockholder ownership.

Turning to the strategy variables, both *Diversification Level* and *Firm Size* have a consistently positive and significant effect across each specification. The very large coefficients for these variables in the count data model are not unexpected, given an anticipated mean regression effect. However, their significant performance in the *proportions* model is consistent with our strategic priors that larger and more diversified firms may have experienced a proportionately greater fall in their optimal levels of diversification. Those firms which experienced a *Change in Management* displayed a significantly higher extent of divestment, *ceteris paribus*, using either the proportions or count data models. Finally, the binary variable *Acquisition*, used to distinguish those firms which made at least one successful acquisition within the quoted sector over the period, was positive but significant only in the proportions model.

The market structural characteristics produced mixed effects. *Concentration* carried a negative coefficient which was significant to at least the 10 percent level in all specifications. This suggested that location in a cushioned core market tended to reduce any fall in the optimal level of diversification. By contrast, *Market Share* carried a positive coefficient but was insignificant in every case apart from the Poisson regression which, as we have argued, appears unreliable for our data. As these two variables were moderately strongly correlated ($r = 0.59$) we tried entering them separately, but the same pattern of signs and significance was maintained. Of

course, an ambiguous result for *Market Share* was not entirely surprising; high values for this variable should impact positively upon core activity profitability but will simultaneously restrict the firm's core growth prospects.

Since our count data models are non-linear, there is some opacity about their estimation. Accordingly, we have calculated the marginal effects (i.e. $\delta E[y|X]/X = \lambda_i b$) for the significant regressors only, using the preferred negative binomial specification of Table 7.5. The results are given in Table 7.6. These have been calculated at the sample mean values of the data. They confirm, in particular, the importance of *Firm Leverage*, *Firm Size*, *Diversification Level*, *Board Composition*, *Management Equity* and a *Change in Management* in positively affecting divestment and (principal market) *Concentration* in reducing it.

The most surprising result across all specifications of the model was the failure to find a significant performance effect. It had been conjectured that when firms experienced a downward shift in optimal diversification, the more poorly performing ones would adjust more rapidly under the implicit threat from the takeover market and this would be observed *ceteris paribus* in a higher volume of divestment across the interval examined. However, neither own profitability, profitability relative to the industry average nor Tobin's q even approached any acceptable level of significance. The latter finding was especially surprising in the sense that a forward-looking performance measure, such as Tobin's q , relates more obviously to capital market discipline than one such as profitability whose observed values might be expected to display time dependence. Dropping the market structural variables, equivalent to

employing a reduced-form version in which market structural effects work through performance alone, did nothing to change these results. The nearest each of the models came to producing a significant performance effect was when *relative shareholder returns* was used as the performance measure. Even here the coefficients, although negative, failed to achieve the 10 percent significance level.

Since the results available from the US generally report a significant negative correlation between parent financial performance and voluntary divestment (see Bergh, 1997) the findings here appear particularly surprising. Before rejecting the existence of such a link in the UK context we are mindful of two caveats: first, this chapter uses a cross sectional design in which the explanatory variables are measured *prior* to the start of the period of investigation to avoid problems of simultaneity bias. It is possible that the implied lag between the variable's measurement and most subsequent divestment was simply too long - i.e. adjustment may occur quite rapidly (for example, Jain, 1985 found that firm performance began to suffer approximately one year prior to divestment) - and averaging the effects across a five year time interval may introduce unnecessary contamination. Second, there is evidence from the merger literature (e.g. Ravenscraft and Scherer, 1987, for the US and Meeks, 1977, for the UK) that strong financial performance is associated with acquisition activity which may itself generate divestments after some lag. Therefore it is possible that measured performance before the start of our period captures some element of the potential to divest, thus eroding our initial prior.

Some check on the possibility that averaging across a five year interval was eliminating key relationships was possible by re-estimating the models as yearly cross sections. Given the high proportion of zeros in any year, this tended to produce poorly determined estimations¹⁰. For the most part, however, these estimations continued to reveal an insignificant performance effect. When the previous year's *relative stock market returns* was used as the performance measure it did produce a significant negative effect in two years, 1985 and 1986, although not elsewhere.

7.6 Summary and Conclusions

This chapter has presented an empirical analysis of divestment activity in the UK, over the period 1985-89, using what is believed to be the most comprehensive database on corporate sell-offs yet assembled. The period was chosen partly because the available evidence indicated that it was when "corporate refocusing" became widespread and because it predated any recession-induced changes that might have been anticipated in the early 1990s.

The analysis of divestment used data on both the number and the aggregate value of sell-offs, giving rise to two complementary models of the divestment process. Taken together these two approaches suggest that firms' divestment behaviour was not merely exhibiting mean reversion in the number of activities operated or simple portfolio churning across the set of such activities. Instead they indicate that divestment was systematically related to leverage, corporate governance, strategy

and - to a limited extent - market structural characteristics. The important role for leverage and corporate governance variables is consistent with their impacting upon the speed of adjustment of actual diversification towards lower optimal levels apparently required in the 1980s. They may be considered to proxy the firm's responsiveness to capital market discipline.

The chapter's results also indicate that both the value and extent of divestment activity is related to the size and diversification of the firm concerned. This outcome holds for the proportions model as well as the count data one, indicating that it is not merely a mean reversion process. This finding is consistent with the view from a corporate strategy perspective that gains from divestment will be greatest for those firms experiencing control problems associated with size and diversity. Senior managerial changes and - less distinctly - acquisition activity over the period of investigation also appear to stimulate divestment. The effect of market structural factors appears more ambiguous with core activity concentration having a weakly significant inhibiting effect and market share producing no significant effect at all.

Rather surprisingly, in view of much of the US evidence, the results failed to reveal any significant association between corporate performance and divestment. It had been conjectured that poor performance, like high leverage and a strict corporate governance regime, would encourage rapid adjustment to lower diversification and hence lead to a high observed extent of divestment. It is possible that the cross sectional design employed here influenced this outcome by requiring performance to be measured too far ahead of actual divestment decisions. It is also possible that

prior performance picks up other characteristics, including past merger activity, with implications for divestment. Because of these limitations, the following chapter of this thesis adopts a panel data model, to explore more fully the determinants of divestment activity.

Notes

¹Other possible explanations for a downward displacement in optimal diversification levels include changes in tax policy, globalisation and environmental uncertainty (see Chapter 3 of this thesis for details).

²Lang and Stultz (1994) extend the Wernerfelt and Montgomery (1988) methodology to examine the implied diversification discount using firm and industry values for Tobin's q . They report the existence of a statistically significant discount as far back as 1978. Servaes (1996) has recently detected such a discount in the 1960s, but he finds that it disappeared in the 1970s during the era of conglomerate expansion.

³For example, Denis *et al.*, (1997) examined the timing of voluntary divestments in the US and report significant falls in firm value for three years prior to the divestment. They summarise: "We thus conclude that the sample changes in diversification are not timely responses to sudden changes in the value of diversification." (p. 157) Similarly, the literature on relationship between acquisitions and divestment (e.g. Scherer and Ravenscraft, 1987, Kaplan and Weisbach, 1992) suggests that many acquisitions are unsuccessful and subsequently divested, but frequently only after an extended period. Their results also suggest that the median holding period for subsequently divested acquisitions fell consistently across the period 1971-1982, from over 15 years in 1971-72 to approximately 5 years in 1981-82.

⁴The assumption of a time-cost trade off in altering the configuration of the firm's activities is entirely consistent with the existing literature on diversification and divestment. Penrose (1959) provides the classic explanation of the costs of over-rapid expansion, whilst comparisons of voluntary and involuntary divestment point to the superiority of the former for the vendor's shareholders, suggesting that enforced sell-offs restrict the vendor's ability to locate and negotiate with buyers with a high willingness to pay. However, being over-diversified also imposes costs insofar as it disappoints the capital market with implications for the firm's cost of capital and the managers' expectations with respect to the takeover threat. We assume that good performance, low leverage and weak corporate governance (i.e. weak shareholder to manager power) reduce capital market discipline and allow managers a more leisurely adjustment regime.

⁵That is, simple mean-reversion behaviour implies that $\Delta D_{it} = k(D_{it-1})$ where $k > 0$.

⁶There are, of course, further reasons why we might expect a relationship between divestment activity and (prior) mergers: first, unsuccessful mergers, perhaps initially driven by managerial preference or hubris, may have to be reversed; second, in an era of multi-output firms an acquisition to secure a position in industry A might bring with it an unwanted past expansion into industry B, with the corresponding need for a divestment.

⁷It appears reasonable to assume that the overwhelming majority of divestment deals for which no price is recorded in either the firm's annual accounts or in one of our secondary sources, lie in the lower tail of the divestment size distribution. In general the secondary sources use some size criterion and do not supply full data for very small (e.g. < £1m in the case of Acquisitions Monthly) transactions. Therefore identified but unpriced deals will tend to fall into this category.

⁸The proportions model results were particularly badly determined, no doubt a consequence of the lumpiness or indivisibility attaching to potentially divestable activities. The count data results were somewhat better.

Table 7.1 Summary of Explanatory Variables

Variable	Predicted Sign
Performance	-
Leverage	+
Management equity	+
Board composition	+
Blockholder	+
Diversification	+
Firm size	+
Management change	+
Acquisition	+
Market share	?
Concentration	?

Table 7.2 Divestment Activity by Firms, 1985 to 1989

Number of Divestments	No. of Companies
0	14
1-5	49
6-10	42
11-15	17
16-20	9
20 or more	10
<i>Total</i>	<i>141</i>

Table 7.3 Means, Standard Deviations and Correlations

Independent Vars.	Mean	S.D.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
1. % divested	21.77	28.96																				
2. No. divestments	8.149	8.573	0.702																			
3. ROE	18.01	6.856	-0.17	-0.13																		
4. ROE	14.27	8.345	-0.08	0.007	0.843																	
5. ROS	7.553	4.523	-0.07	-0.02	0.457	0.448																
6. TPM	10.54	5.611	-0.04	-0.05	0.30	0.35	0.94															
7. Tobin's q	1.133	0.836	-0.19	-0.15	0.560	0.464	0.353	0.232														
8. Debt to assets	27.28	13.12	0.220	0.299	-0.22	0.088	-0.14	-0.109	-0.11													
9. Debt-to-equity	0.492	0.467	0.157	0.247	-0.18	0.073	-0.13	-0.09	-0.14	0.844												
10. Management equity	5.18	11.52	-0.13	-0.17	0.125	0.064	0.019	-0.07	0.104	-0.06	0.104											
11. Blockholder	0.745	0.438	0.042	-0.06	0.089	0.052	-0.04	-0.09	0.034	0.061	0.053	0.171										
12. Board composition	0.628	0.592	-0.03	0.011	-0.17	-0.17	-0.08	-0.020	-0.14	0.056	0.012	-0.200	-0.060									
13. Top management	0.709	0.456	0.102	0.077	-0.06	-0.13	-0.01	-0.02	-0.08	-0.10	-0.06	-0.160	-0.180	0.112								
14. Entropy index	0.896	0.498	0.398	0.369	-0.18	-0.07	-0.01	0.065	-0.37	0.285	0.229	-0.240	-0.180	0.122	0.039							
15. Total assets	796606	2227886	0.061	0.277	-0.06	-0.03	0.070	0.10	-0.15	0.050	0.075	-0.110	-0.030	0.098	-0.04	0.157						
16. Total sales	1558958	4156668	0.049	0.274	-0.02	-0.04	0.008	0.04	-0.10	0.054	0.066	-0.090	-0.120	0.099	0.010	0.127	0.981					
17. No. employees	27210	36449	0.179	0.449	-0.06	-0.03	0.023	0.05	-0.11	0.080	0.066	-0.100	-0.140	-0.07	-0.09	0.272	0.626	0.627				
18. Acquisition	0.977	0.148	0.116	0.137	0.080	0.047	0.140	0.169	-0.021	0.068	0.036	-0.291	-0.088	0.289	-0.091	0.266	0.045	0.038	0.112			
19. Market share	0.243	0.272	0.014	0.203	0.003	-0.045	0.053	0.079	0.012	0.056	0.058	-0.073	-0.128	-0.125	0.012	0.169	0.287	0.254	0.358	-0.124		
20. Concentration	0.354	0.209	-0.092	-0.005	-0.044	-0.050	0.106	0.168	-0.006	0.006	0.026	-0.041	-0.084	-0.108	-0.018	0.015	0.161	0.122	0.127	-0.102	0.591	
21. Shareholder return	1.265	0.289	0.214	0.194	0.149	0.263	0.178	0.121	-0.112	0.113	0.121	-0.019	-0.189	0.015	-0.160	0.169	0.044	0.051	0.091	0.270	-0.210	-0.246

Table 7.4 Dependent Variable equals the Proportion of Assets Divested

Constant	*** -15.682 (-3.444)	*** -15.709 (-4.144)	*** -15.542 (-4.112)	*** -14.391 (4.050)
Firm performance	-0.354 (-0.468)			
Relative performance		0.021 (0.502)		
Market performance			-0.049 (-0.130)	
Relative shareholder returns				-0.001 (0.910)
Firm leverage	*** 1.119 (2.794)	*** 1.191 (3.011)	*** 1.161 (2.968)	*** 1.073 (2.805)
Board composition	0.131 (1.673)	0.126 (1.713)	0.127 (1.725)	0.116 (1.721)
Blockholder	-0.600 (-0.978)	-0.608 (-0.991)	-0.586 (-0.945)	-0.558 (0.928)
Management equity	0.282 (2.353)	0.282 (2.364)	0.285 (2.361)	0.261 (2.193)
Change in management	1.406 (2.313)	1.465 (2.411)	1.442 (2.372)	1.360 (2.285)
Diversification level	0.220 (2.785)	0.226 (2.888)	0.229 (2.751)	0.240 (3.145)
Firm size	0.549 (1.734)	0.577 (1.812)	0.566 (1.756)	0.664 (2.335)
Acquisition	4.689 (2.129)	4.495 (2.049)	4.525 (2.034)	3.991 (1.876)
Market share	0.400 (1.409)	0.389 (1.372)	0.388 (1.358)	* (1.643)
Concentration	-1.010 (-1.892)	-0.958 (-1.767)	-0.996 (-1.853)	*** (2.917)
R ²	0.356	0.357	0.355	0.380

Notes: n = 134; t-statistics appear in parentheses: * = $p < 0.1$, ** = $p < 0.05$, *** = $p < 0.01$.

Table 7.5 Dependent Variable equals: (1) the Number of Divestments - Poisson Model, (2) the Number of Divestments - Negative Binomial Model

Independent variable	(1)	(2)	(2)	(2)	(2)
Constant	*** -4.249 (-4.868)	*** -3.904 (-2.570)	*** -3.814 (-2.695)	*** -3.819 (-2.720)	*** -3.867 (2.894)
Firm performance	0.075 (0.759)	0.026 (0.115)			
Relative performance			0.001 (0.084)		
Market performance				-0.066 (-0.542)	
Relative shareholder returns					-0.005 (1.559)
Firm leverage	*** 0.532 (8.392)	*** 0.451 (3.955)	*** 0.446 (3.931)	*** 0.447 (3.972)	*** 0.418 (3.310)
Board composition	*** 0.058 (5.120)	** 0.057 (2.046)	** 0.057 (2.086)	** 0.058 (2.002)	** 0.052 (1.925)
Blockholder	** 0.136 (1.975)	0.049 (0.285)	0.051 (0.288)	0.059 (0.340)	0.033 (0.199)
Management equity	*** 0.070 (4.652)	*** 0.085 (2.852)	*** 0.085 (2.872)	*** 0.085 (2.881)	** 0.071 (2.331)
Change in management	*** 0.302 (4.040)	** 0.403 (2.332)	** 0.406 (2.331)	** 0.418 (2.346)	** 0.370 (2.163)
Diversification level	*** 0.085 (5.671)	*** 0.070 (3.651)	*** 0.069 (3.657)	*** 0.074 (3.284)	*** 0.065 (3.528)
Firm size	*** 0.424 (12.029)	*** 0.403 (5.263)	*** 0.400 (5.219)	*** 0.411 (5.168)	*** 0.412 (5.071)
Acquisition	0.616 (0.840)	0.932 (0.749)	0.954 (0.765)	0.851 (0.683)	0.915 (0.784)
Market share	*** 0.447 (3.313)	0.372 (0.890)	0.380 (0.907)	0.348 (0.790)	0.420 (1.042)
Concentration	*** -0.705 (-3.508)	* -0.595 (-1.673)	* -0.605 (-1.678)	-0.569 (-1.482)	** -0.691 (2.006)
- ln L	-491.285	-386.568	-386.572	-386.376	-385.202
Variance parameter α		0.381 *** (5.745)	0.381 *** (5.749)	0.380 *** (5.820)	0.367 *** (5.822)

Notes: n = 134; t-statistics appear in parentheses: * = $p < 0.1$, ** = $p < 0.05$, *** = $p < 0.01$.

Table 7.6 Marginal Effects: the Number of Divestments – Negative Binomial Model

Independent variable	(2)	(2)	(2)	(2)
Firm leverage	3.040	3.012	3.010	2.811
Board composition	0.385	0.386	0.388	0.352
Management equity	0.574	0.573	0.575	0.476
Change in management	2.765	2.736	2.820	2.486
Diversification level	0.472	0.469	0.501	0.438
Firm size	2.716	2.702	2.770	2.771
Concentration	-4.016	-4.080	-3.840	-4.645

APPENDIX 7A

The Cameron and Trivedi (1990) approach to testing the mean-variance equality implied by the Poisson model is based on the weighted least squares estimation of:

$$(y_i - \mu_i)^2 - \mu_i = g(\mu_i) + v_i \quad \dots(1)$$

Where y_i is the dependent variable, $g(\mu_i)$ is some specified function, μ_i is the predicted mean from the Poisson regression and v_i is a herteroscedatic error term with variance $2\mu_i^2$. By weighting equation (1) with $\sqrt{2\mu_i}$, equation (1) can be estimated using straightforward OLS techniques. The Poisson model is rejected if the coefficient on $g(\mu_i)$ is significantly different from zero, implying overdispersion in the data.

Cameron and Trivedi (1990) suggest two possibilities for $g(\mu_i)$: $g(\mu_i) = \mu_i$ and $g(\mu_i) = \mu_i^2$.

Unlike classical statistical tests, this approach only requires the specification of the moment restriction under the alternative, rather than the complete distribution whose choice is usually arbitrary.

8. THE DETERMINANTS OF CORPORATE DIVESTMENT FOR UK FIRMS: PANEL ESTIMATES

8.1 Introduction

The aim of this chapter is to extend the analysis in Chapter 7 of this thesis by examining the determinants of corporate divestment using longitudinal analysis. This approach combines dimensions of cross-sectional and time-series data, by surveying our sample of firms over time. Whereas Chapter 7 of this thesis adopted a simple cross-sectional model to examine the relationship between divestment and financial, corporate governance, strategy and market structural variables, this chapter adopts panel data techniques. One benefit of this approach is that it helps to overcome the problems of complex causation and multicollinearity which undermines much of the cross-sectional work in this area. It also provides an improved framework for modelling divestment, given that de-diversification is inherently a dynamic process. The inclusion of observations through time on each firm in the sample is an important and necessary extension to the existing evidence. The panel estimates presented in this chapter are intended to complement the results from the cross-sectional model in Chapter 7 by addressing some of the weaknesses in the latter, most obviously to do with reverse causality and the problems of averaging across an interval during which other changes were occurring. However, the cross-sectional approach does have the advantage of not requiring an explicit lag structure.

The remainder of the chapter is set out as follows. Section 8.2 briefly re-examines the literature on refocusing and divestment. A discussion of the data set is given in Section 8.3. Model estimation is outlined in Section 8.4. Section 8.5 presents a review of the results. Finally Section 8.6 concludes.

8.2 Existing Literature

It has been conjectured that corporate refocusing can be understood as an attempt by firms to reverse their excessive levels of diversification, most of which occurred in the 1960s and 1970s (Bhagat *et al.*, 1990; Hoskisson and Turk, 1990; Shleifer and Vishny, 1991; and Markides, 1995a,b). This explanation implies that there exists some limit to the extent to which a firm may diversify without adversely affecting its performance and that if refocusing became a widespread phenomenon from the 1980s, as Bhagat *et al.*, (1990), Markides (1995a, b) etc. suggest for the US and is argued here for the UK, then a large number of firms must have discovered simultaneously (for a variety of reasons) to have been in breach of their optimal diversity levels. As a result, the profitability and market value of overdiversified firms will suffer and the issue of reducing the level of diversification by divestment to form an independent entity (e.g. MBO) or to another organisation becomes worthwhile (Wright & Thompson, 1987).

Explanations for the existence and timing of corporate refocusing have been examined in detail elsewhere in this thesis (see in particular Chapters 3 and 7 of this thesis). Briefly, given the existence of an optimal limit to diversification

(Williamson, 1967; Penrose, 1959), a number of explanations have been provided as to why firms may have experienced a downward displacement in their optimal level during the 1980s and consequently, why some firms came to find themselves in an over-diversified position. These explanations include a stronger market for corporate control (for example, due to the emergence of hostile bid advisers and debt-financed take-overs), a weakening of the informational advantages of the M-form's internal capital market and the more pessimistic stance of conglomerates adopted by the capital market during the 1980s.

From the evidence presented in Chapters 6 and 7 of this thesis, we have determined that divestment is a normal response to this downward displacement in diversification for the majority of firms over the period in question. From the detailed discussion in Chapters 3 and 7 of this thesis, we determined what factors are likely to affect a firm's adjustment to this downward displacement in diversification and their predicted impact on the divestment decision. As before, divestment is hypothesised to be affected by financial, corporate governance, strategy and market structure characteristics.

8.3 Data Description and Variables

In this chapter, the data set consists of an unbalanced panel of 158 publicly quoted companies over the period 1985 to 1991. The adoption of panel techniques allows us to include firms who did not survive intact over the study period. The criterion for inclusion in the sample is detailed in Chapter 4 of this

thesis. The extent of divestment activity is separately measured using the proportion of assets divested and the number of business units divested. The proportion of assets divested is calculated as the sales price of the divested units divided by the firm's market value for the previous year. In the cases where a sales price was unreported (this occurred for approximately 23 per cent of divestments), a proportion of 0.1 per cent of market value was assigned to that divestment. The number of business units divested is the total number of sell-offs (parent-to-parent and buy-outs/buy-ins) recorded in a year. Altogether a total of 1,627 voluntary divestments was reported. Table 8.1 shows the extent to which companies in the sample were involved in divestment activity. Out of the sample of 158 companies, 141 (89 per cent) made at least one divestment. The average is 11.54 divestments per company. The largest proportion of the sample undertake between 1 and 5 divestments. Table 8.2 summarises the number and value of divestments by year for the sample firms.

The determinants of divestment introduced in Section 8.2 are performance, leverage, corporate governance, strategy and market structure characteristics. Data was collected on each variable for every year over the study period. However, given that the corporate governance variables do not vary over time, it was necessary to introduce the corporate governance characteristics as a regime variable instead of as separate variables as in the cross-sectional estimation in Chapter 7 of this thesis. 'Strong' and 'weak' corporate governance regimes were distinguished using two criteria: one, the existence, or otherwise, of a substantial blockholder (defined as one identifiable ownership interest of 5 percent or more of the ordinary share capital) at the start of the

period; and two, the management's own equity stake (the proportion of outstanding ordinary shares owned by the directors of the firm) at the start of the period. Three regime alternatives were defined:

STRONG 1 = 1 if blockholder in existence and management has equity greater than or equal to the median value for the sample as a whole in year t

WEAK 1 = 1 if not

STRONG 2 = 1 if blockholder in existence

WEAK 2 = 1 if not

STRONG 3 = 1 if management has equity greater than or equal to median value for the sample as a whole

WEAK 3 = 1 if not

These regime variables were interacted with the performance and leverage variables to determine whether their effect on divestment is conditioned by the corporate governance characteristics of the firm. It was hypothesised that firms with 'strong' governance are more likely to respond to poor performance indicators and will therefore undertake more divestment than firms operating 'weak' governance mechanisms. If corporate refocusing is a reversal of prior managerial empire building stimulated by a slack market for corporate control (Jensen, 1986), then we would expect the effect of leverage on the divestment decision to be greater for firms operating 'weak' governance mechanisms.

An additional variable was included in the estimation to capture the influence of the threat of take-over on the decision to divest. For example, Gibbs (1993) finds that refocusing is positively related to take-over threat. Bhagat, Shleifer and Vishny (1990) and Shleifer and Vishny (1990) present evidence that the market for corporate control accounts for a substantial amount of restructuring during the 1980s. The findings suggest that firms facing the threat of take-over consider themselves either as likely candidates for a repeat offer, realised the need for change or were pressurised by their board or blockholders to reorganise. *Threat* is measured as a dichotomous variable equal to 1 if there is a takeover threat or rumour of a takeover bid during the year and 0 otherwise. All study variables were calculated on a yearly basis for the sample firms.

As detailed in Chapters 4 and 7 of this thesis, alternative versions of the explanatory variables were generated: thus, firm size was alternatively measured as the logarithms of total employees, total assets and total sales, leverage as the debt-to-assets and debt-to-equity ratios, and performance was measured using firm and relative accounting-based measures [return on capital employed (ROCE), return on equity (ROE), return on sales (ROS) and trading profit margin (TPM)], an approximation to tobin's q and a measure of relative shareholder returns. Inevitably, in each case the alternatives were highly correlated and different combinations of these variables will be used in the analysis. The definition of all these variables are given in Chapter 4 of this thesis. The predicted sign on the coefficients are given in Table 7.1 , Chapter 7 of this thesis. In addition, the threat of takeover is expected to have a positive impact on the divestment decision.

The final number of firms with all the necessary data is an unbalanced panel of 144 firms. The balance of the panel is given in Table 3. The summary statistics for the continuous variables are given in Table 4.

8.4 Methods

A great deal of the previous empirical work on the determinants of refocusing and divestment has been based on cross-sectional models. In this chapter, a panel data set is utilised, which is better able to identify and measure effects that are not detectable in pure cross-sectional or time-series data. By adopting this approach it is also possible to control for unobservable individual characteristics via firm-specific (fixed or random) effects, thus avoiding possible specification bias and resulting in improved efficiency of the estimates.

As noted in the previous section, the literature suggests that divestment is likely to be affected by financial, corporate governance, strategy and market structure characteristics. It is anticipated that the impact of financial strength on divestment will occur with some lag. The literature does not specify the exact nature of the lag structure. However, Jain (1985) found that firm performance began to suffer approximately one year prior to divestment, suggesting that managers will react fairly quickly to poor financial indicators (see also Afshar *et al.*, 1992). Also, the failure to find a significant performance effect (regardless of the measure adopted) in the cross-sectional model in Chapter 7 of this thesis suggests that the implied lag was too long. Therefore, in this study we include

performance and leverage measures for the year prior to the divestment. By similar reasoning we also include lagged values for the remaining variables.

Specifically, we model divestment (DIVEST) as being determined by performance (PERF), firm leverage (LEV), a change in management (NEWMD), takeover threat (THREAT), diversification level (DIVERSE), market share (MS), concentration (CON), acquisition activity (ACQ) and firm size (SIZE). Using i subscripts to identify firms and t subscripts for time, our estimating equation of divestment determination takes the following form:

$$\begin{aligned} \text{DIVEST}_{it} = & f_i + \alpha_0 \text{PERF}_{it-1} + \alpha_1 \text{LEV}_{it-1} + \alpha_2 \text{NEWMD}_{it-1} + \alpha_3 \text{THREAT}_{it-1} \\ & + \alpha_4 \text{DIVERSE}_{it-1} + \alpha_5 \text{MS}_{it-1} + \alpha_6 \text{CON}_{it-1} + \alpha_7 \text{ACQ}_{it-1} \\ & + \alpha_8 \text{SIZE}_{it-1} + \varepsilon_{it} \end{aligned} \quad \dots(1)$$

Where f_i is a firm-specific effect capturing (unobserved) company heterogeneity and ε_{it} is an i.i.d. error term. The corporate governance characteristics are subsequently introduced by interacting PERF and LEV with the regime variables: [PERF*WEAK], [PERF*STRONG], [LEV*WEAK], [LEV*STRONG].

Equation (1) is alternatively estimated using the proportions measure and count data analysis. As noted above, the proportion of assets divested is calculated as the sales price of a divested unit divided by the parent's market value in the previous year. In this instance, equation (1) is estimated using a log-linear specification employing one-way fixed and random effects models.

The one-way model adopted in this chapter assumes that the individual-specific effects vary over cross-sectional units but not over time. Differences across cross-sectional units are captured by a varying intercept. The error term for this model can be written as: $\varepsilon_{it} = \mu_i + u_{it}$, where μ_i represents the unobservable individual effects and u_{it} denotes the remainder disturbances. μ_i is time-invariant and accounts for any individual specific effect that is not included in the model. The choice of an appropriate estimation technique depends on what assumptions are made about the individual effects. The variation across cross-sectional units μ_i , can be *fixed* or *random*. If μ_i are fixed, or random and correlated with the regressors, the dummy variable model is appropriate while if μ_i are random and independent of the regressors then the error components model is adopted (see Chapter 5 of this thesis for details).

The fixed effects or least squares dummy variable (LSDV) model is estimated by including dummy variables for each cross-sectional unit, i , and estimating equation (1) without the constant term. Alternatively, the model can be reformulated to include a constant and $N-1$ dummy variables. In both instances, the model can be estimated as a multiple regression by OLS. In the random effects model, the error term no longer satisfies the classical assumptions of serial independence as there is within-individual correlation through time. In this case, the efficient estimator is generalised least squares (GLS). The parameter estimates are obtained using a two step procedure: the variance components are first estimated by using the residuals from OLS. Then, feasible GLS estimates are computed using the estimated variances. Initially both models will be adopted and the appropriate specification will be selected.

The second method of modelling divestment activity is to examine the number of assets divested, employing Poisson and negative binomial distribution regressions (for example, see Hausman, Hall and Griliches, 1984). These specifications model the non-negative integer property of the dependent variable and allow for the non-negligible probability of zero as a natural outcome. The statistical specification developed models divestment as being generated by the following Poisson process: $\text{Prob}(y_{it}) = \lambda_{it}^{y_{it}} e^{-\lambda_{it}} / y_{it}!$, where i indexes firms and t indexes time, and λ_{it} is the conditional mean and variance of the Poisson distribution. The fixed effects Poisson model is: $\ln \lambda_{it} = \alpha_i + X_{it}\beta$, where α_i is a firm-specific effect. The model is estimated by conditioning separately the count distribution of each firm on the total sum of outcomes over the observed years. This removes the fixed effect from the resulting distribution, which is then estimated by maximum likelihood techniques. The random effects Poisson model is given by: $\ln \lambda_{it} = X_{it}\beta + u_i$, where u_i is a random effect for the i th group such that e^{u_i} is distributed as gamma. Thus, E^{u_i} has mean 1 and variance $1/\theta = \alpha$. The model can then be derived by integrating out the random effect and estimating by maximum likelihood the parameters (β, α) of the resulting distribution.

In many economic applications, it is not uncommon to find that the variance of y_{it} exceeds the mean, implying “overdispersion” in the data. An important consequence of fitting overdispersed data to the Poisson model, is that the estimated covariance matrix will be biased downwards, producing spuriously small estimated standard errors of the parameter estimates and overstated t -

statistics. Therefore, the negative binomial model is also estimated which allows for a less restricted variance function by introducing an additional stochastic component to λ_{it} . For the fixed effects negative binomial model: $\ln \lambda_{it} = \alpha_i + X_{it}\beta + \varepsilon_{it}$ which with minor modifications is the estimating framework for the Poisson model with random effects, as above. The random effects negative binomial model is: $\ln \lambda_{it} = X_{it}\beta + u_i + \varepsilon_{it}$, where ε_{it} captures unobserved heterogeneity and is uncorrelated with the explanatory variables. As above, u_i is gamma distributed with parameters (θ_i, θ_i) , which produces the negative binomial model with a parameter that varies across groups. Then, it is assumed that $\theta_i/(1+\theta_i)$ is distributed as $\text{beta}(a_n, b_n)$, which layers the random effect onto the negative binomial model. Once again, the approach is to integrate out the random effect and estimate by maximum likelihood techniques.

The advantages of the two approaches are discussed in detail in Chapter 7 of this thesis. The two approaches are seen as complementary and necessary given the incomplete nature of data on divestment.

8.5 Results

Equation (1) was estimated using the unbalanced panel of 144 firms across the years 1985-91, using a total of 876 observations. Estimations were carried out for both the proportions measure and count data analysis. In the event each specification yielded a similar pattern of results. The estimated models are presented in Tables 8.5 and 8.6. Table 8.5 presents results when divestment is measured as a proportion of total assets. Column (1) reports the results from

the OLS regression and estimates from the fixed- and random-effects model are presented in columns (2) and (3) respectively. The number of divestments is modelled in Table 8.6. Columns (1)-(3) show the results from the Poisson, negative binomial and negative binomial random-effects model respectively.

The variance parameter, α , in column (2), Table 8.6, is positive and statistically significant implying that overdispersion is a feature of our data. Therefore, the focus is on the results from the negative binomial model. Column (3) presents the results from the random effects negative binomial model¹. For the proportions model, the reported Hausman statistic in Table 8.5 suggests that the random effects model is the preferred specification in the proportion analysis. Therefore, the preferred estimates are in column (3) in both Tables.

The empirical results reported in Tables 8.5 and 8.6 broadly confirm the importance of financial, strategy and market structure variables in explaining the extent of divestment activity. The reported results use relative ROCE as a measure of performance, debt-to-assets as the leverage variable and log of the number of employees as the firm size indicator. The alternative measures yielded very similar estimates. In both models the estimated coefficients generally conform to prior expectations. In contrast to the results in Chapter 7 of this thesis, performance now attracts a significant negative coefficient in both specifications. Again, there are positive and significant diversification, acquisition and firm size effects. Statistically significant positive correlations are also observed for firm leverage, take-over threat and market share (proportions model only), whilst concentration and a change in management have negative

signs (the latter is insignificant at conventional levels). The implications for our study variables may be considered in turn:

In contrast to the cross-sectional results in Chapter 7 of this thesis, which failed to find a significant performance effect, the longitudinal results in Tables 8.5 and 8.6 support the hypothesised effect that divestment is negatively related to firm performance. This reinforces existing US empirical evidence on the relationship between divestment and poor profitability (e.g. Markides, 1995b) and remains robust for alternative performance measures. One explanation for this difference in findings across specification is the nature of the cross-sectional design in which the explanatory variables were measured prior to the start of the period and their effects were averaged over a subsequent five year period. It is possible that the implied lag between the variable's measurement and most subsequent divestment was simply too long. (The performance effect did obtain significance in a number of the yearly cross-sectional estimates but given the large proportion of zero divestments in any year these results were poorly determined). In comparison, the adoption of panel data techniques enabled us to model the effects of the explanatory variables through time, with relatively short lags between the variable measures and subsequent divestment. The panel data approach is believed to be a more appropriate specification for modelling divestment given the dynamic nature of the conditions which may prompt firms to dispose of assets (Bergh and Holbein, 1997). Using this approach it is possible to confirm the existence of a link between performance and divestment in the UK.

Leverage (reported for the debt-to-assets measure) is positively and significantly related to divestment in both the proportion and count data models. This relationship confirms the disciplinary role for debt hypothesised by Jensen (1986) and is consistent with an agency theoretic view of diversification as a managerially preferred objective. This result reinforces the findings from the cross-sectional estimation in Chapter 7 of this thesis and from previous studies (e.g. Hamilton and Chow, 1993; Bergh, 1997)

The coefficient on take-over threat is positive and significant implying that firms facing the threat of take-over realised the need for change and reorganised accordingly. A similar result has been found in US studies e.g. Gibbs (1993); Dennis *et al.* (1997). This finding provides limited evidence in support of the agency theoretic perspective of divestment, that managers are being pressurised by the market for corporate control to reduce firm size by divestment in an attempt to improve profitability.

Using panel data estimation, there is no evidence of divestment being associated with a change in top management. This result contrasts to that in Chapter 7 of this thesis, which found a positive and significant effect of management change on subsequent divestment in a cross-sectional framework. It is possible that this result corresponded to a programme of divestments over the five year period as opposed to divestment in any one year following a management change.

The results again show that the level of diversification and firm size are significant determinants of divestment activity (the results are reported for the

logarithm of the number of employees). The positive relationship suggests that the larger and more diversified firms divest both a larger number and a larger proportion of business units. Similar results emerged when firm size was measured by the book value of total assets and total sales. This is consistent with the view from a corporate strategy perspective that the gains from divestment will be greatest for those firms experiencing control problems associated with size and diversity. The acquisition variable also achieves a positive and significant coefficient, implying that the extent of divestment activity is related to the stock of potentially divestable business. All these results are consistent with those in Chapter 7 of this thesis.

Finally, the market structure characteristics produced mixed results. Concentration and market share attract negative and positive coefficients respectively (although the latter is insignificant in the count data model). The negative relationship between divestment and concentration is consistent with the view that high values of concentration in a firm's core market, whilst increasing profitability, simultaneously reduce the opportunity for core expansion and encourage diversifying expansions by size-motivated managers (Mueller, 1969; Jensen, 1986). By extension, these same conditions tend to cushion the effect of any reduction in the optimal level of diversification and may be expected to discourage managers from divesting even when the capital market favours more tightly focused firms. The positive relationship between divestment and market share is consistent with Markides, (1995a) who argues that favourable market conditions determine the attraction of a refocusing strategy and hence impact positively on divestment. Whilst a positive sign was

also found for market share in the cross-sectional estimates in Chapter 7 of this thesis, it failed to reach any level of significance.

Table 8.7 reports attempts to determine whether divestment is conditioned by the corporate governance characteristics of the firm. Columns (1a) and (2a) report the results when the performance variable is dichotomised between firms operating 'strong' and 'weak' governance regimes for the random effects proportion and negative binomial models respectively. Columns (1b) and (2b) show the results when the leverage variable is dichotomised between firms who operate 'strong' and 'weak' governance mechanisms for the random effects proportion and negative binomial models respectively. The reported results define a 'strong' governance environment as one where a blockholder exists and where the board of directors own equity greater than or equal to the median value for the sample as a whole at the start of the study period. A 'weak' environment is defined as one where these conditions are not present. The results are shown for relative ROCE as the performance measure and debt-to-assets as the leverage variable.

The results show that firms with a prior strong governance environment are more likely to respond to poor performance and undertake divestment. The coefficient on the PERF*STRONG variable is negative and significant. By contrast the coefficient on the PERF*WEAK variable is insignificant. This result holds for both the proportion and count data specifications, and for the alternative definitions of 'strong' and 'weak' governance. In addition, the results show that managers facing weak governance constraints responded to

the disciplinary effects of a high level of debt. The coefficient on the LEV*WEAK variable was positive and significant. By contrast, the coefficient on LEV*STRONG was insignificant across both specifications.

8.6 Summary and Conclusions

Although there is now an extensive literature on corporate refocusing (see Johnson, 1996) and growing research attention to divestment (see Wright, Chiplin and Thompson, 1993 for a review), much of the previous evidence is limited because of its use of cross-sectional models to examine longitudinal relationships (Bergh and Holbein, 1997). As such, previous research which examines the causes of divestment may be subject to specification bias and inefficient estimates of relationships.

In order to address the shortcomings in previous research, this chapter provides a comprehensive investigation of the determinants of corporate divestment using longitudinal analysis. The chapter reports results from what is believed to be the first panel data investigation of divestment activity in the UK. Measures of divestment were constructed based alternatively upon the *proportion* of assets divested and the *number* of recorded business unit sell-offs. Hypotheses concerning the impact of financial, strategic, corporate governance and market structure variables were used to construct a model to explain the incidence of divestment by a large sample of UK quoted companies across the interval 1985-91. This was alternatively estimated using the proportions measure and count data analysis,

employing Poisson and negative binomial distribution regressions, to explore the number of divestments.

Taken together these two approaches indicate that divestment is related to financial, corporate governance, strategy and market structure characteristics and is not merely a mean reversion process or simple portfolio churning across the set of such activities. In particular, the results find that divestment is negatively related to performance, implying that poorly performing firms are more likely to divest. The positive impact of leverage suggests that divestment activity is associated with the reduced managerial discretion which might be expected to obtain under conditions of high leverage. This result is consistent with an agency theoretic view of diversification as a managerially preferred objective.

The results in this chapter also indicate that both the proportion and number of divestments is related to the size and diversity of the firm involved. This is consistent with the view from a corporate strategy perspective that the gains from divestment will be greatest for those firms experiencing control problems associated with size and diversity. Acquisition activity also appears to stimulate divestment. The effect of market structural characteristics is mixed.

Attempts to distinguish between 'weak' and 'strong' governance regimes and their conditioning effect on the impact of performance and leverage on the divestment decision met with success. There is strong support for the view that managers operating 'weak' governance mechanisms do not respond to poor

financial indicators but do respond to the disciplinary effects of a high level of debt and restructure accordingly. By contrast, managers of firms with ‘strong’ governance mechanisms do respond to poor financial indicators, however, since they are already effectively disciplined then high leverage does not have any additional affect on their divestment decision.

Whilst the results in this chapter largely reinforce those found from the cross-sectional model estimated in Chapter 7 of this thesis, there are a few noticeable differences. The most significant difference is between the reported results for the effect of performance on divestment. Whereas the panel data estimates report a significant and negative relationship between divestment and performance, the cross-sectional estimates failed to find any significant relationship. It has already been discussed both here and in Chapter 7 of this thesis that this failing to find a significant performance effect is possibly the result of averaging the effect over five years in the cross-sectional model. The ‘perverse’ result in the cross-sectional model provides an additional justification for the panel model approach. Given the improved specification in this chapter, it is possible to conclude that there does exist a link between performance and divestment in the UK, as has been previously found for US firms.

Other minor differences between the two chapters include the failure to report a significant management change effect in the panel estimates and the failure to report a significant effect of market share in the cross-sectional estimates. Nevertheless, the evidence from both chapters confirms that divestment is more than just a mean reversion process or simple portfolio churning but is a

purposeful response to financial, strategic, corporate governance and - to a limited extent - market structure characteristics. The results from the cross-section and panel estimation approaches are both insightful of the determinants that stimulate a firm to divest. The two approaches are complementary: the panel data method addresses some of the weaknesses of the cross-sectional model, most obviously to do with reverse causality and the problems of averaging across an interval during which other changes were occurring. However, the cross-sectional approach does have the advantage of not requiring an explicit lag structure. The following chapter of the thesis focuses on the effects, if any, of a refocusing strategy on the performance of the divesting firm.

Notes

¹The negative binomial fixed effects model could not be fitted to the data.

Table 8.1 Divestment Activity by Companies in our Sample, 1985 to 1991

Number of divestments	No. of Companies
0	17
1-5	50
6-10	37
11-15	21
16-20	10
20 or more	23
<i>Total</i>	<i>158</i>

Table 8.2 Divestments by Year

Year	Number	Value(a) ¹ (£000's)	Value(b) ² (£000's)
1985	159	1801150.00	1805922.00
1986	183	5096707.47	5152742.47
1987	203	6553075.47	6707107.47
1988	319	12449497.40	12561745.40
1989	329	11110016.47	11341308.47
1990	259	9385957.47	9603093.47
1991	175	3294812.00	3503647.00
<i>Total</i>	<i>1627</i>	<i>49691216.27</i>	<i>50675566.27</i>

Notes:

¹value of divestments with reported sales price²value of divestments assuming unpriced divestments have a value of 0.1 per cent of market value of that firm**Table 8.3** Balance of the Panel

No. of Years	No. of Companies
2	7
3	6
4	10
5	6
6	30
7	85
<i>Total</i>	<i>144</i>

Table 8.4 Full Period Characteristics for Continuous Variables

Variable	Mean	S. D.	N
Number of divestments	1.597	2.516	876
Proportion of divestments	0.041	0.127	876
ROCE	20.022	8.533	876
ROE	17.165	31.382	876
ROS	8.845	5.423	876
TPM	11.830	6.403	876
Tobin's q	1.212	2.754	876
Shareholder returns	0.02	0.361	876
Debt to total assets	31.753	17.224	876
Debt-to-equity	0.568	0.847	876
Board composition	0.353	0.165	876
Management equity	0.038	0.096	876
Diversification	0.852	0.494	876
Assets	1130445.30	2378904.93	876
Employees	27984.849	29906.684	876
Sales	1911511.60	3723639.72	876
Market share	0.319	0.206	876
Concentration	0.218	0.239	876

Table 8.5 Determinants of Divestment - Dependent Variable equals the Proportion of Assets Divested

Independent variables	(1) ^a	(2) ^b	(3) ^c
Constant	-20.191 ***(-11.205)		-20.622 ***(-8.914)
Relative performance	-0.046 **(-1.953)	-0.061 *(-1.833)	-0.050 *(-1.930)
Firm leverage	0.021 **(1.960)	0.031 *(1.831)	0.025 **(2.017)
Change in management	-0.272 (-0.628)	-0.437 (-1.006)	-0.341 (-0.819)
Diversification level	0.166 *** (4.330)	0.213 ** (2.293)	0.175 *** (3.732)
Firm size	1.182 *** (6.499)	2.177 *** (3.097)	1.246 *** (5.344)
Threat	1.046 ** (1.966)	1.244 ** (2.257)	1.107 ** (2.138)
Acquisition	1.099 *** (3.108)	0.674 * (1.685)	0.872 ** (2.444)
Market share	2.978 *** (3.408)	-3.084 (-1.081)	2.444 ** (2.184)
Concentration	-3.191 *** (-3.286)	-3.265 (-1.104)	-2.904 ** (-2.355)
R ²	0.158	0.399	
Hausman			11.53 [p=0.24]

Notes: n = 876; *t*-statistics appear in parentheses: * = $p < 0.1$, ** = $p < 0.05$, *** = $p < 0.01$.

^aOLS regression

^bone-way fixed effects model

^cone-way random effects model

Table 8.6 Determinants of Divestment - Dependent Variable equals the Number of Assets Divested

Independent variables	(1) ^a	(2) ^b	(3) ^c
Constant	-4.566 ***(-13.512)	-4.480 ***(-6.939)	-4.916 ***(-6.411)
Relative performance	-0.014 ***(-2.980)	-0.019 ***(-2.688)	-0.014 **(-1.921)
Firm leverage	0.013 *** (7.258)	0.012 *** (3.599)	0.010 *** (2.910)
Change in management	-0.047 (-0.632)	-0.082 (-0.631)	-0.090 (-0.790)
Diversification level	0.066 *** (6.370)	0.058 *** (4.983)	0.065 *** (4.321)
Firm size	0.484 *** (14.735)	0.475 *** (7.095)	0.529 *** (7.096)
Threat	0.189 ** (2.390)	0.262 ** (1.721)	0.276 ** (2.321)
Acquisition	0.370 *** (5.667)	0.360 *** (3.199)	0.263 *** (2.577)
Market share	0.538 *** (3.444)	0.450 (1.513)	0.495 (1.395)
Concentration	-0.636 *** (-3.211)	-0.554 * (-1.948)	-0.871 ** (-2.334)
- ln L	-1663.595	-1400.918	-1358.249
α		1.131 *** (11.035)	
a			5.720 *** (4.577)
b			5.136 *** (4.369)

Notes: n = 876; t-statistics appear in parentheses: * = $p < 0.1$, ** = $p < 0.05$, *** = $p < 0.01$.

^apoisson model

^bnegative binomial model

^crandom effects negative binomial model

Table 8.7 Determinants of Divestment Conditioned by Corporate Governance Characteristics - Dependent variable equals (1) the *proportion* of assets divested¹ (2) the *number* of assets divested²

Independent variables	(1a)	(1b)	(2a)	(2b)
Constant	-20.177 *** (8.725)	-20.623 *** (8.862)	-4.841 *** (6.312)	-4.926 *** (6.434)
Relative performance		-0.050 *(1.919)		-0.013 *(1.743)
PERF*STRONG	-0.121 *** (2.999)		-0.029 ** (2.090)	
PERF*WEAK	-0.003 (0.103)		-0.004 (0.323)	
Firm leverage	0.024 ** (1.958)		0.010 *** (2.774)	
LEV*STRONG		0.024 (0.953)		0.012 (1.566)
LEV*WEAK		0.025 *(1.783)		0.015 ** (2.496)
Change in management	-0.316 (0.760)	-0.342 (0.820)	-0.085 (0.729)	-0.091 (0.791)
Diversification level	0.170 *** (3.645)	0.175 *** (3.273)	0.064 *** (4.239)	0.065 *** (4.307)
Firm size	1.196 *** (5.128)	1.246 *** (5.317)	0.518 *** (6.949)	0.530 *** (7.115)
Threat	1.108 ** (2.146)	1.107 ** (2.136)	0.282 ** (2.319)	0.277 ** (2.227)
Acquisition	0.905 ** (2.541)	0.870 ** (2.437)	0.265 ** (2.522)	0.262 *** (2.563)
Market share	2.619 ** (2.344)	2.439 ** (2.172)	0.533 (1.501)	0.493 (1.386)
Concentration	-3.029 ** (2.464)	-2.903 ** (2.345)	-0.860 ** (2.320)	-0.867 ** (2.318)
Hausman	12.53 [p=0.25]	11.51 [p=0.32]		
- ln L			1356.773	-1358.22
a			5.791 *** (4.582)	5.722 *** (4.548)
b			5.231 *** (4.414)	5.137 *** (4.360)

Notes: n = 876; *t*-statistics appear in parentheses: * = $p < 0.1$, ** = $p < 0.05$, *** = $p < 0.01$.

¹one-way random effects model

²random effects negative binomial model

9. THE IMPACT OF DIVESTMENT ON UK FIRM PERFORMANCE

9.1 Introduction

The aim of this chapter is to generate empirical evidence on the consequences of voluntary divestment by an examination of its impact on the profitability of a panel of UK firms over the period 1985 to 1993. The objective is to determine whether, on average, a refocusing strategy improves the performance of the divesting company. Previous work - usually in the US - has either used an event study to isolate the stock market impact of divestment announcements, or has employed a cross-sectional regression model to examine performance (see Johnson, 1996 and Wright *et al.*, 1993 for literature reviews). Neither route is particularly satisfactory. The event study approach assumes an efficient capital market in which fads and bubbles play no significant role. However, since it is clear that the market initially favoured and then turned against conglomerate mergers, there is no guarantee that its initial view of divestment is any more reliable. The event study approach also considers single divestment events, yet it is clear that large firms engaged in restructuring programmes, typically undertake multiple divestments even within relatively short periods. The use of a cross-sectional design is also problematic since the researcher is looking at the impact of (possibly endogenous) structural change on performance, which is difficult to evaluate in the context of a long-run equilibrium. Further, profitability levels are strongly influenced by firm-specific factors which cannot adequately be controlled for in cross-sectional work.

Accordingly, the analysis in this chapter uses a dynamic first-differenced panel data model of firm profitability. The dynamic formulation allows us to accommodate the "persistence" of profitability shock, whilst first-differencing takes care of firm-specific fixed effects.

The remainder of the chapter is divided into five sections. Section 9.2 explores the hypothesised linkages between divestment and performance and reviews the existing evidence. A discussion of the sample and data is given in Section 9.3. The model is outlined in Section 9.4. A review of the results follows in Section 9.5. Finally Section 9.6 concludes.

9.2 Divestment and Performance: Discussion and Evidence

Voluntary divestment transactions may be considered as part of the wave of corporate refocusing activity that has characterised corporate behaviour in the UK over the past 15 years or so (see Chapter 3 of this thesis for details). The management literature abounds with discussions of "corporate refocusing", "downscoping", etc.; terms used to describe strategies of reducing diversification by divesting peripheral activities. Indeed management fashions elevated a return to "core competencies" (Prahalad and Hamel, 1990) or, more colourfully, "sticking to the knitting" (Peters and Waterman, 1982) to the status of a principle of organisation in the 1980s. However, following management fashions does not necessarily lead to improved economic performance. For example, the

conglomerate merger wave of the 1960s and early 1970s, lauded by contemporaries as a means of improving resource allocation via the use of internal factor markets, has been shown subsequently to have produced very disappointing results (Ravenscraft and Scherer, 1987; Shleifer and Vishny, 1991; etc.).

The prevalent explanation for refocusing is that firms are attempting to reverse their excessive levels of diversification most of which occurred in the 1960s and 1970s (for example, Bhagat *et al.*, 1990; Shleifer and Vishny, 1991; Markides, 1995a). This explanation implies two things: first, that there exists some optimal limit to diversification and second, that if refocusing became a widespread phenomenon from the 1980s, then a large number of firms must have found themselves to be in breach of this optimum during the period in question. As a result their profitability and market value will suffer, which may lead to restructuring divestments. This perspective predicts that refocusing will have a positive impact on the performance of over-diversified firms.

Three inter-related explanations for voluntary divestment have emerged from the literature (see Chapter 3 of this thesis for a detailed discussion): First, divestment activity may be a reversal of a past managerial preference for diversifying expansions. Mueller (1969) and Jensen (1986) have argued that cash-rich firms with limited opportunities for growth in their core businesses will be observed to diversify into other activities, even where this involves negative net present value investments. These actions may be more likely in situations of weak corporate

governance, notably where there are poor performance-related incentives for managers and where there is an absence of significant external blockholders able to exert an influence on management (Morck, Shleifer and Vishny, 1990). Jensen (1993) argues that the emergence of a stronger market for corporate control, including hostile and debt-financed acquisitions, pressurised firms to reverse this previous misuse of 'free cash flow', resulting in divestment activity.

Second, capital market innovations, including the development of the venture capital industry, have partially eroded the comparative advantage of the multidivisional (M-) form of organisation for large, multi-output firms, thus reducing one of the benefits of corporate diversification (Bhide, 1990). Arguments such as these point to divestment as an adjustment measure as firms respond to the reduction in the optimal level of diversification.

Third, the capital market in the 1960s and 1970s took an unjustifiably optimistic view of conglomerate mergers, providing an incentive for firms to engage in diversifying activities. When *ex post* diversification did not prove as profitable as expected, the capital market reversed its previous stance towards conglomerates and started to favour more tightly focused firms. This explanation helps to explain the timing of the trend towards de-diversification.

While these arguments may help to explain the prevalence of divestment activity, they do not directly link it to the subsequent performance of the divesting firm. A

number of extensions have been developed to advance the hypothesis that voluntary divestment may improve corporate performance: First, whether through benign factors, such as an unsuccessful hunt for economies of scope, or through managerial self-serving, many firms find themselves to be "over-diversified" (Markides, 1995a) in the sense that their organisational capabilities are unable to cope with the range of business activities being undertaken. Such firms may be considered to have breached a Penrose (1959) - type constraint on efficient expansion with corresponding adverse consequences for performance. Markides (1995a), Hoskisson and Turk (1990) and others have conjectured that "refocusing" - i.e. diversification-reducing transactions - should improve the efficiency with which the remaining operations are managed, not least by concentrating senior managerial resources on fewer and less diverse operations. In terms of the resource-based view of the firm, this perspective suggests that firms will be more profitable by remaining close to their core competencies.

Second, if a firm has been performing badly a divestment announcement may signal a reduced danger of total failure. At the very least, it signals that managers are prepared to take decisive action to deal with the current problems and thus might be expected to elicit a positive response from the stock market. Another performance effect may occur through the divesting firm's share in any gains anticipated by the new acquirer. If the change in asset ownership is expected to generate value - for example, by a horizontal consolidation with the new owner's existing activities or via a lowering of agency costs following a management buyout

(Kaplan, 1989; Smart and Waldfogel, 1994) - at least some of the gains might be expected to flow to the vendor via the purchase price. The literature on mergers also suggests that for a variety of reasons – from hubris to poor information – acquiring firms may simply overpay. Other things being equal, this will raise the observed performance of the divesting firm.

The effects of divestment on performance have been examined in two principal ways (the results from these studies are examined in detail Chapter 3 of this thesis): Most researchers have adopted an "event study" approach and evaluated the stock market response to sell-off announcements. There is now quite a substantial number of event studies, very largely conducted on US data, which report that divestment announcements are associated with significant average wealth gains for the vendor's shareholders. This applies to the voluntary sale of divisions or subsidiaries either to other groups or as MBOs (Jain, 1985; Rosenfeld, 1984; Hite *et al.* 1987; Hite & Vetsuypens, 1989; Afshar *et al.*, 1992; Saadouni *et al.*, 1996) or as spin-offs (e.g. Schipper and Smith, 1983; Hite and Owers, 1983, etc) where the firm is split into two quoted entities. More recent research has tended to suggest that the extent of the announcement effect is conditional upon firm-specific circumstances. These have included variables intended to capture strategic and agency theoretic hypotheses. Thus divestments which appear to reduce diversification, or narrow the focus of a firm's activities, have been found to generate greater wealth gains (John and Ofek, 1995; Montgomery *et al.*, 1984). Markides (1992) found that refocusing announcements earned positive and

significant abnormal gains, with 'overdiversified' firms in particular generating an average gain of about 4 per cent in shareholder value. Lang *et al.* (1995) report that asset sales explicitly linked to retiring debt generated positive effects whilst other disposals produced an insignificant average wealth change. Lasfer *et al.* (1996) find that the positive returns to divestment announcements by distressed firms were significantly higher where the firms displayed higher levels of debt.

There are, however, important limitations with event studies in general (e.g. Halpern, 1983) and of divestments in particular (Hite, 1986). First, the approach relies on the identification of the event as a single divestment, yet for larger firms multiple divestments are typically part of larger restructuring programmes. Afshar *et al.* (1992) do include multiple divestments in their study where such events are separated by more than 82 days of their event window. Second, there is generally little public information about a divested subsidiary/division especially in relation to performance. Third, there is the potential for selection bias if only the financial press is used to collect data, as only a sub-set of announcements are actually reported through this medium. The data collection exercise in this study (see below) corroborates this view about the incompleteness of data reported in the financial press.

A more recent and slender strand of the literature has examined aspects of the post-divestment operation of divesting firms. Montgomery and Thomas (1988) examining single divestments, found that industry-adjusted ROA improved post-

divestment but that it was significantly lower than matched non-divesting firms over the same period. This study links share price and accounting performance improvements. However, it only compares data one year before divestment with one year after for a set of companies announcing single divestments. Comment and Jarrell (1995) found that US firms that refocused during the 1980s experienced an upward trend in net of market wealth, while those that reduced focus experienced a decline. Hoskisson and Johnson (1992), who examine refocusing but do not directly measure divestment, also report that ROA improved following refocusing. Markides (1995a) reports cross-sectional results for large US firms which show that refocusing divestment is associated with improved operating performance. John and Ofek (1995) and Bergh (1995) also report improved performance following diversification-lowering divestments. However, as Bergh (1997) points out, it is difficult to evaluate the performance effects of divestment in a cross-sectional context, since it may take up to two years post-sell-off before performance improvements are realised. To circumvent problems resulting from cyclical and/or outlier observations, most researchers average several years' data and then examine prior divestment as a determinant of the (implicit) long-run equilibrium level of profitability. However, subsequent divestment occurring during the interval of data averaging is typically ignored. This is a particular disadvantage if there is a relatively high level of divestment activity across the sample, as there is in ours. Many large firms typically engage in restructuring programmes which involve multiple divestments over a period of time (e.g. Porter, 1987). Moreover, if profitability adjusts sluggishly to the firm's changed characteristics - and the

literature on profitability dynamics (e.g. Geroski and Jacquemin, 1988, etc.) predicts that it will - the impact on average profits across any interval will depend upon the timing of such changes.

9.3 Data Description and Variables

In this chapter, the data set consists of an unbalanced panel of UK quoted companies over the period 1985 to 1993. The criterion for inclusion in the sample is detailed in Chapter 4 of this thesis. Since the research design involves the use of first differencing, lags and instrumentation, it was also necessary to exclude from the sample those firms lacking five years of continuous accounting data across the interval 1985-93. This requirement had the effect of removing a number of firms that were acquired during the latter part of the period. Taken together, the exclusions reduced the basic sample to 132 large UK public limited companies. The balance of the panel is given in Table 9.1.

The existing literature on the determinants of firm profitability gives clear guidance on the appropriate variables to include in the estimation model. First, considerable research on profitability dynamics (see Geroski and Jacquemin, 1988; Mueller, 1990, and references therein) has demonstrated that profits are persistent, requiring the inclusion of a lagged dependent variable. Firm profitability was measured using industry-adjusted ROCE. The empirical literature typically recognises that real firms operate with heterogeneous cost structures in differentiated oligopolies, thus

precluding any simple profitability - market structure relationship. Accordingly, following the standard practice (e.g. Machin and Van Reenan, 1993; Geroski, Machin and Van Reenan, 1993; etc) measures of concentration, market share and their interaction are included as separate explanatory variables¹. The derivation of profitability equations from differentiated oligopoly models is discussed in Kwoka and Ravenscraft (1986) and Machin and Van Reenan (1993). Import intensity is included as an additional market structural variable to capture the disciplinary effect of foreign competition, and firm leverage (alternatively measured as the ratios of debt to assets and debt to equity) is included, following Kwoka and Ravenscraft (1986), to capture any risk premium attaching to the greater use of debt. A description of the construction of these variables is detailed in Chapter 4 of this thesis.

The divestment data was collected from secondary and primary data sources over the period 1985-1993. In total, some 1839 voluntary divestments were identified. Out of the sample, 126 firms (95%) made at least one divestment. The average number of disposals per firm was 14.6 across the period or 1.6 per firm per year.

In approximately 78 percent of cases it was possible to identify the sale price of the transaction. However, it was clear the remaining 22 percent of cases were overwhelmingly drawn from the lower tail of the divestment size distribution. (The reasons for this supposition are given in Chapter 4 of this thesis). Therefore, in order to construct an overall divestment value measure, unpriced disposals were

assigned a value of 0.1 percent of the seller's market value in the previous year. The proportion of assets divested was then calculated as the sales price of the divested units divided by the market value for the previous year. On this basis it is estimated that each firm's average of 1.6 divestment's per year represented 4.3 percent of its assets in the previous year.

In the regression equation, divestment is alternatively signified using the number of divestments, the proportion of assets divested and a dichotomous variable equal to one for the year any recorded divestment by firm i was undertaken. $DIVEST_{it-1, \dots}$, $DIVEST_{it-3}$ represent variables for observations one, ..., three years subsequent to divestment for firm i .

In addition, a series of regime variables were defined to distinguish between strategic and corporate governance characteristics of the firm: A 'complex' firm (COMP) was defined to be one whose size*diversification was greater than or equal to the median value for the sample as a whole in year t . A 'non-complex' firm was defined to be whose size*diversification was less than the median value for the sample as a whole in year t . Diversification was calculated using the entropy index of diversification (Palepu, 1985) and firm size was alternatively measured as the book value of assets, sales and the number of employees. 'Strong' and 'weak' corporate governance regimes were distinguished using two criteria: one, the existence, or otherwise, of a substantial blockholder (defined as one identifiable ownership interest of 5 percent or more of the ordinary share capital); and two, the

management's own equity stake (the proportion of outstanding ordinary shares owned by the directors of the firm). Three regime alternatives were defined (see Section 8.3, Chapter 8 of this thesis for details).

These regime variables were interacted with the divestment variable to determine whether the performance effects of divestment are conditioned by the strategic and corporate governance characteristics of the firm. From the corporate strategy perspective, it was hypothesised that the gains from divestment will be greatest for larger and/or more diversified firms (i.e. 'complex' firms), since these firms are more likely to have breached some Penrose (1959) - type constraint on expansion. If corporate refocusing is a reversal of prior managerial empire building stimulated by a slack market for corporate control (Jensen, 1986), then we would also expect the benefit from divestment to be greatest for firms operating weak governance mechanisms.

Summary statistics for the continuous variables are shown in Table 9.2.

9.4 Modelling and Estimation Approach

The basis of the empirical design is to treat firm divestment as a shock, or innovation, impacting upon the divesting firm's performance. It is assumed that:

$$(\Pi/K)_{it} = f(X_{it}, D_{it}) \dots (1)$$

where $(\Pi/K)_{it}$ is a measure of the profitability of i at time t , X_{it} is a vector of market structural and firm-specific determinants of performance; and D_{it} represents a vector of variables intended to measure the contemporaneous and lagged effects of divestment.

The choice of return on capital, rather than the more frequently employed return on sales, for the left-hand side of equation (1) was made on both theoretical and pragmatic grounds². On the theoretical side it was considered that the return on capital provided a better yardstick of shareholders' well-being in a context in which managers were being hypothesised to reduce the size of their organisation in the shareholders' interests. More pragmatically, the return on sales for a multi-output firm will be a weighted sum of price-cost margins in its individual markets. Divesting one or more of these will impact directly on that sum, according to the weight and price-cost margin concerned. Unfortunately, these market data were simply unavailable for most divestments in our sample, rendering the use of a return on sales variable problematic.

The appropriate elements of the X_{it} vector are a lagged value of profitability (Π/K), concentration (CONC), market share (MS) and their interaction (CONC*MS), import intensity (IMP) and firm leverage (LEV). Finally, it is assumed that other firm-level differences are captured in a vector of fixed effects (λ_i).

Thus, ignoring for the moment both divestment and macroeconomics influences, we assume an underlying model of the form:

$$\begin{aligned}
 (\Pi/K)_{it} = & \lambda_i + a_1(\Pi/K)_{it-1} + a_2\text{CONC}_{it} + a_3\text{MS}_{it} \\
 & + a_4(\text{MS}*\text{CONC})_{it} + a_5\text{LEV}_{it} + a_6\text{IMP}_{it} + e_{it} \dots (2)
 \end{aligned}$$

where e_{it} is an i.i.d. error term. Equation (2) is then first-differenced to remove λ_i , the fixed effects, and subsequently augmented with the divestment variables (DIVEST). Since macroeconomics factors would be expected to influence profitability over the cycle, a set of year dummies (Y_t) are added. This yields a basic estimating equation:

$$\begin{aligned}
 \Delta(\Pi/K)_{it} = & a_1\Delta(\Pi/K)_{it-1} + a_2\Delta\text{CONC}_{it} + a_3\Delta\text{MS}_{it} \\
 & + a_4\Delta(\text{MS}*\text{CONC})_{it} + a_5\Delta\text{LEV}_{it} + a_6\Delta\text{IMP}_{it} + \\
 & \sum_{r=0}^3 \beta_r \text{DIVEST}_{it-r} + \sum_{t=1}^T \gamma Y_t + e_{it} \\
 & \dots (3)
 \end{aligned}$$

If divestment does improve performance, through any or all of the reasons outlined above, it might be expected that it takes time for the effects of divestment on profitability to be felt (Bergh, 1995). Therefore, separate divestment variables were defined for the year any recorded divestment by firm i was undertaken and then for each

of the following three years to capture lagged effects. Corporate governance and strategic characteristics were interacted with these divestment variables to see if they had any conditioning effect on performance. The predicted signs of the explanatory variables are provided in Table 9.3.

It is well-established that first-differencing a dynamic panel model to remove fixed effects introduces correlation between the lagged dependent variable and the transformed error term, e_{it} in equation (3), and potentially biases the coefficient on the lagged dependent variable (Nickell, 1981). One solution is to estimate the differenced equation using instrumental variable techniques. An obvious candidate is to use lags beyond one of the dependent variable as instruments as these will be uncorrelated with the differenced error in the absence of serial correlation in the error process. To estimate equation (3), Arellano and Bond's (1991) generalised method of moments (GMM) procedure, as contained in their DPD programme, is utilised. This approach accommodates the inclusion of (t-2) or earlier values of the endogenous variables as instruments for the lagged dependent variable. Additional instruments are obtained by utilising the available orthogonality conditions that exist between the lagged values of the dependent variable and the disturbances. Thus the further advanced the panel, the greater the number of instruments available. For example, in estimating a nine year panel from year three through year nine, year three's estimation would use variables dated year one, year four's would use variables dated years one and two, etc. The advantage of this procedure is that it allows both the cross-section and time-series elements of the data to be exploited in constructing valid instruments. The resulting

estimates are claimed to offer significant gains in efficiency where T is small relative to N . This yields valid instrumental variable estimates in the absence of second-order serial correlation.

9.5 Results

Equation (3) was estimated on an unbalanced panel of 132 firms, using the Arellano and Bond (1991) GMM procedure. As one cross-section is lost from first differencing and another three from the instrumentation process, the estimation period runs from 1989 to 1993, inclusive, covering a total of 608 useable observations (this falls to 226 for estimating equations including ΔIMP). The legitimacy of this econometric approach depends critically on two features: first, the validity of the instrument set; and second the success of the instrumentation process in purging the estimates of second-order serial correlation. These characteristics are examined using the Sargan statistic and a robust test for second-order serial correlation, respectively.

The results are given in Tables 9.4 and 9.5, which also displays the absolute t -statistics calculated using heteroskedasticity-consistent standard errors. The estimates from equation (3) using contemporaneous and three lags of the divestment variable, and debt-to-assets as the measure of leverage, are reported in Table 9.4. Columns (1), (3) and (5) report the results using the number of divestments, the proportion of assets divested and a dichotomous variable equal to one for the year in which divestment occurred and zero otherwise, respectively.

Columns (2), (4) and (6) report similar estimations but with the ΔIMP variable included. Given the limited availability of import data, the sample size falls to 79 when the import intensity (IMP) variable is included.

Table 9.5 reports the results when divestment is conditioned by the strategic and corporate governance characteristics of the firm. Column (1) reports the performance results when firms are dichotomised as 'complex' and 'non-complex' by the value of the interaction of their size and level of diversification. The results are reported for total assets as a measure of firm size and where divestment is signified by a dichotomous variable. The estimates in column (3) dichotomise firms operating 'strong' and 'weak' governance regimes. The reported results define a strong governance environment as one where a blockholder exists and where the board of directors own equity greater than or equal to the median value for the sample as a whole. A weak environment is defined as one where these conditions do not hold. Columns (2) and (4) report similar estimations but with the ΔIMP variable included.

As shown in Tables 9.4 and 9.5, the general performance of the profitability model is satisfactory and has sensible properties for a profitability model. That is the coefficients on lagged performance, market share and concentration fall within the range of values typically reported in profitability studies. In each case the overall regression diagnostics are satisfactory. A Wald test on the joint significance of all the regressors is overwhelmingly significant. Similarly, a second Wald test on the joint inclusion of the

subset of divestment variables is comfortably significant at the 0.1 percent level. The assumption of a lack of serial correlation in the error is essential for the consistency of the estimates. A robust $N(0,1)$ test for the presence of second order serial correlation in the error term (p-values recorded in Tables 9.4 and 9.5) is satisfactory and reveals no evidence of statistically significant second-order serial correlation. Similarly, a Sargan test of instrument validity does not reject exogeneity of the instrument set. The estimations include time dummies, to control for macroeconomic influences, although it can be seen that their joint significance was marginal, at best, when a Wald test was applied.

Among the parameter estimates the coefficient on the lagged dependent variable was invariably positive and strongly significant, with a value in the range of 0.39-0.52. This confirms the expected result that profitability shocks have persistent effects. The concentration and market share variables had the expected signs: ΔCON was positive and highly significant; ΔMS was positive but generally insignificant. The interaction term $\Delta(MS*CON)$ is negative and significant again in conformity with prior profitability studies. Both the import intensity and leverage variables displayed the expected sign, but neither were statistically significant.

The principal variables of interest are those intended to capture the impact of divestment. In the estimations summarised in Table 9.4, divestment is signified by the number of divestments (columns 1 and 2), the proportion of assets divested (columns 3 and 4) and by a binary variable equal to one for the year following any

recorded divestment by firm i (columns 5 and 6). The subsequent effects are expected to be captured by additional dummies ($DIVEST_{it-1}$, $DIVEST_{it-2}$, etc). Each model is estimated with and without the IMP variable. In the full sample estimation, all the divestment variables are positive and significant (the one exception is the immediate effect of the number of divestments which is positive but insignificant). The coefficients are small but not trivial: for example, the immediate effect of a divestment (signified by a dichotomous variable in column 5) is equivalent to a rise in the return on capital of three quarters of a percentage point. The long-run effect ($= \Sigma \beta_r / 1 - a_1$) was equivalent to a 9 percent rise in profitability for divesting firms. On the reduced sample size, after IMP is included, the pattern of coefficients is similar but the imprecision of the estimation rises and many of the divestment variables cease to be significant.

Table 9.5 reports attempts to determine whether the performance effects of divestment are conditioned by strategic and corporate governance characteristics of the firm. In all the estimations, divestment is signified by a dichotomous variable. (The results from the proportion and number specifications were similar but poorly determined.) In columns (1) and (2) firms are classified as 'complex' and 'non-complex' by the value of the interaction of their size and entropy index of diversification. Those at or above the median value are 'complex' and those below 'non-complex'. Separate divestment binary variables are included for the two cases. The results give strictly limited support for the view that divestment disproportionately benefits those firms which have breached some Penrose-type

limit. On the full sample all the complex divestment binary variables are positive and significant against two of the non-complex. On the restricted sample there are three positive significant results against two in the non-complex case. Therefore, the evidence that larger and/or more diversified firms will experience greater profitability effects following divestment is, at best, very weak.

A similar exercise was undertaken to distinguish divestments by firms with 'strong' corporate governance environments from those with 'weak' ones. The results are reported in Columns (3) and (4) in Table 9.5. The results using the alternative definitions of strong and weak governance were very similar. If corporate restructuring is a reversal of prior managerial empire-building, stimulated by a greater capital market threat, as Jensen and others have argued, the benefit from divestment should be greater for firms with a 'weak' governance environment - i.e. these will be the firms which will have been able to indulge managerial preferences. This conjecture is quite strongly supported by our results. All of the 'weak' governance divestment coefficients are positive, with all four significant with the full sample and three significant with the limited sample. By contrast, only one of the strong governance coefficients is positive and significant in the full sample case, none with the limited sample and several of the strong governance coefficients are actually negative.

Thus the results suggest that divestment had a statistically significant and non-trivial effect in raising the profitability of our sample firms. However, we find at best very

weak support for the notion that divestment is differentially beneficial for larger and more diversified firms. By contrast, the results are consistent with the arguments of those, for example Jensen (1993), who see corporate restructuring transactions, such as divestments, as a response to capital market pressure on firms with weak governance arrangements.

9.6 Conclusions

This chapter represents a first attempt to derive systematic evidence on the performance effects of voluntary divestment by large UK companies. The analysis has used a specially constructed database of divestments across a sample of 132 UK firms between 1985 and 1993. A standard firm profitability model, augmented by divestment variables, was estimated on an unbalanced panel comprising our sample firms. The results suggest that divestment does have a non-trivial and statistically significant impact on the profitability of the divestor. This finding was robust to alternative specifications of the profitability equation. It also provides symmetrical corroboration of a general finding in the merger literature that acquisition tends to lower profitability (e.g. Dickerson *et al.*, 1997).

Attempts to discriminate between hypotheses, which purport to explain the performance consequences of divestment, met with mixed success. Reasoning from the business strategy literature suggests that larger and/or more highly diversified firms were more likely to be in breach of some Penrose-type constraint on efficient

operations. In the event, attempts to distinguish the consequences of divestment for such firms by segmenting the sample by taking those above and below the median size-diversification product, proved largely inconclusive. The evidence that larger and/or more diversified divestors experience greater profitability effects is, at best, very weak.

By contrast, the results do give support to those who see divestment as a reversal of the consequences of previously exercised managerial discretion. When the sample was split according to the prevailing corporate governance regime, it was found that firms with 'weak' governance display consistent, significant positive profitability gains while those with strong regimes experienced largely inconsistent effects. This is consistent with the view that divestment, stimulated by pressure from a resurgent capital market from the 1980s onwards, reversed diversification previously resulting from agency problems in the firm. These *ex post* results build on the *ex ante* results found in earlier studies of divestment (e.g. Markides, 1992; Rosenfeld, 1984).

Notes

¹The derivation of profitability equations from differentiated oligopoly models is discussed in Kwoka and Ravenscraft (1986) and Machin and Van Reenan (1993).

²Markides (1995) uses ROS, ROA and ROE, though there is little significant difference in the results.

Table 9.1 Balance of the Panel

No. of Years	No. of Companies
6	12
7	6
8	4
9	110
<i>Total</i>	<i>132</i>

Table 9.2 Descriptive Statistics for Continuous Variables

Variable	Mean	S.D.	N
Number of divestments	1.619	2.471	1136
Proportion of divestments	0.043	0.143	1136
ROCE	0.1892	0.0945	1136
Debt to total assets	33.348	19.329	1136
Debt-to-equity	0.7257	7.808	1136
Assets	1372796	2838701	1136
Employees	29916	30215	1136
Sales	2160470	4011512	1136
Diversification	0.8535	0.4988	1136
Market share	0.228	0.238	1136
Concentration	0.316	0.205	1136
Import Intensity	0.26	0.31	608

9.3 Predicted Coefficient Signs of Explanatory Variables

Variable	Predicted Sign
Lagged performance	+
Market share	+
Concentration	+
Market share*concentration	-
Import intensity	-
Leverage	+
Divestment	+
Divestment by firms with weak governance	+
Divestment by 'complex' firms	+

Table 9.4 Profitability Equations, 1989-1993*
(absolute asymptotic t-statistics in parentheses)

	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta ROCE_{it-1}$	0.52 (9.261)	0.454 (3.685)	0.51 (8.888)	0.45 (3.650)	0.52 (10.688)	0.40 (3.003)
ΔCON_{it}	0.70 (3.269)	1.68 (2.159)	0.64 (2.726)	1.79 (3.789)	0.77 (3.685)	1.84 (4.327)
ΔMS_{it}	0.74 (1.931)	1.86 (1.874)	0.89 (2.046)	1.99 (2.581)	0.49 (1.330)	1.58 (1.69)
$\Delta [Ms*Con]_{it}$	-0.89 (2.598)	-2.868 (2.264)	-0.97 (2.27)	-3.05 (2.469)	-0.91 (2.902)	-2.96 (2.174)
ΔLEV_{it}	0.0001 (1.260)	0.0004 (0.620)	0.0001 (0.985)	0.0003 (0.512)	0.0001 (1.254)	0.0006 (1.302)
ΔIMP_{it}		-0.401 (1.008)		-0.21 (0.505)		-0.19 (0.407)
$DIVEST_{it}$	0.0003 (0.269)	0.0005 (0.154)	0.023 (1.769)	0.042 (1.860)	0.0074 (2.326)	0.0239 (3.122)
$DIVEST_{it-1}$	0.002 (2.082)	0.003 (1.645)	0.056 (2.156)	0.060 (1.690)	0.0089 (2.092)	0.0157 (1.687)
$DIVEST_{it-2}$	0.002 (2.904)	0.002 (1.794)	0.054 (2.056)	0.038 (1.090)	0.0182 (4.951)	0.0228 (2.750)
$DIVEST_{it-3}$	0.001 (1.685)	0.003 (1.140)	0.087 (2.179)	0.008 (0.608)	0.0093 (2.556)	0.0068 (0.846)
Wald1	139.76	40.40	103.88	77.42	143.90	48.33
[df]	[9]	[10]	[9]	[10]	[9]	[10]
Wald2	11.58	9.103	10.52	8.44	25.67	15.585
[df]	[4]	[4]	[4]	[4]	[4]	[4]
Wald3	10.68	1.61	11.62	6.12	11.48	1.65
[df]	[5]	[3]	[5]	[3]	[5]	[3]
Serial Correlation	0.690	0.989	0.680	1.222	0.752	0.759
[p-value]	[0.49]	[0.449]	[0.496]	[0.249]	[0.45]	[0.448]
Sargan	23.79	9.18	23.08	10.51	25.79	8.434
[p-value]	[0.474]	[0.515]	[0.293]	[0.485]	[0.365]	[0.674]
No. of firms	132	79	132	79	132	79
No. of observations	608	226	608	226	608	226

Notes:

Wald1: Wald test of overall significance of the equation

Wald2: Wald test on subset of divestment variables

Wald3: Wald test of joint significance of time dummies

*1989-1991 for estimating equations including ΔIMP_{it}

Table 9.5 Profitability Equations Conditioned by Strategic
and Governance Characteristics, 1989-1993*
(absolute asymptotic t-statistics in parentheses)

	(1)	(2)	(3)	(4)
$\Delta ROCE_{it-1}$	0.52 (10.232)	0.39 (3.049)	0.51 (10.919)	0.408 (2.958)
ΔCON_{it}	0.65 (2.918)	1.502 (3.860)	0.75 (3.528)	1.830 (4.268)
ΔMs_{it}	0.60 (1.618)	1.175 (1.427)	0.37 (1.157)	1.573 (1.701)
$\Delta [Ms*Con]_{it}$	-0.82 (2.198)	-1.978 (1.635)	-0.85 (2.778)	-2.899 (2.155)
ΔLEV_{it}	0.0003 (0.884)	0.0005 (1.138)	0.0002 (1.477)	0.0006 (1.243)
ΔIMP_{it}		-0.219 (0.510)		-0.248 (0.554)
$[Div*Comp]_{it}$	0.011 (2.477)	0.023 (2.285)		
$[Div*Comp]_{it-1}$	0.017 (3.072)	0.022 (1.844)		
$[Div*Comp]_{it-2}$	0.013 (2.448)	0.006 (0.454)		
$[Div*Comp]_{it-3}$	0.009 (1.671)	0.0204 (2.090)		
$[Div*Noncomp]_{it}$	0.002 (0.464)	0.021 (2.121)		
$[Div*Noncomp]_{it-1}$	0.002 (0.374)	0.016 (1.299)		
$[Div*Noncomp]_{it-2}$	0.022 (4.227)	0.030 (2.255)		
$[Div*Noncomp]_{it-3}$	0.012 (2.357)	-0.0005 (0.049)		

Table 9.5 (contd.)

	(1)	(2)	(3)	(4)
[Div*Strong] _{it}			0.0062 (1.101)	-0.0002 (0.015)
[Div*Strong] _{it-1}			-0.0071 (0.866)	-0.003 (0.135)
[Div*Strong] _{it-2}			0.0157 (2.676)	0.027 (1.569)
[Div*Strong] _{it-3}			0.0038 (0.596)	0.003 (0.179)
[Div*Weak] _{it}			0.0075 (1.812)	0.029 (3.499)
[Div*Weak] _{it-1}			0.0145 (3.468)	0.019 (2.057)
[Div*Weak] _{it-2}			0.0191 (4.160)	0.023 (2.333)
[Div*Weak] _{it-3}			0.0099 (2.356)	0.007 (0.955)
Wald1	153.66	69.17	173.67	55.71
[df]	[13]	[14]	[12]	[14]
Wald2	26.04	19.81	41.44	20.11
[df]	[8]	[8]	[8]	[8]
Wald3	9.99	1.15	10.51	1.46
[df]	[5]	[3]	[5]	[3]
Serial Correlation	0.695	0.574	0.839	0.737
[p-value]	[0.487]	[0.566]	[0.401]	[0.461]
Sargan	25.24	9.27	26.99	8.92
[p-value]	[0.351]	[0.597]	[0.305]	[0.629]
No. of firms	132	79	132	79
No. of observations	608	226	608	226

Notes:

Wald1: Wald test of overall significance of the equation

Wald2: Wald test on subset of divestment variables

Wald3: Wald test of joint significance of time dummies

*1989-1991 for estimating equations including ΔIMPit

10. SUMMARY AND CONCLUSIONS

10.1 Introduction

The main objectives of this thesis have been to evaluate the extent and nature of corporate refocusing in the UK and to provide an empirical investigation of the characteristics of refocusing firms, and the causes and consequences of a refocusing strategy. There is a widespread perception that from the mid-1980s onwards, firms have been narrowing the scope of their activities in an attempt to focus on their core businesses, primarily through divestment. This emphasis on specialisation has been conjectured to have reversed the formerly dominant trend towards increasing levels of diversification which had characterised the large firm sector for several decades. Despite the plethora of theoretical explanations for corporate refocusing, the existing empirical evidence is sparse. Whilst research has started to take place recently, largely in the US context (see Johnson, 1996), to date there has been no systematic attempt to examine refocusing activity in the UK.

The relative paucity of work on refocusing is due partly to the lack of adequate firm level data on diversification and divestment activity in the UK. Data sources on divestment are subject to a number of omissions, especially with regard to smaller sized disposals, performance and sales price information. The latter problem is well-recognised in the literature (see for example, Hite, 1986). Detailed activity data is also difficult to obtain in the UK context. Whilst firms are required to report activity data in their company accounts this appears at a

relatively aggregated level and miscellaneous groupings conceal the exact number of business segments operated in by firms. For both of these reasons, the extent of firm diversification will tend to be underestimated.

To overcome these difficulties and to provide an examination of refocusing in the UK, a panel of data on UK firms was collected. This provides what is believed to be the most comprehensive coverage of diversification and divestment data in the UK. The combination of time-series and cross-sectional elements has the benefit of allowing the analysis of variations within and between firms. The data period (1985 to 1993) was chosen largely to correspond with the perception that refocusing was a widespread phenomenon over this period.

The remainder of this chapter is structured as follows: Section 10.2 provides a summary of the main results from the thesis. Section 10.3 discusses the limitations of the study. Finally Section 10.4 examines the possible directions for future research.

10.2 Summary of the Results

The thesis initially examined the extent and nature of refocusing in the UK for our sample firms. Using firm level activity data, a count of the number of business segments and the entropy index of diversification were alternately employed to measure the overall degree of diversification in individual firms. An analysis of the extent of refocusing was undertaken and revealed that

approximately 50 per cent of the sample reduced their level of diversification over the study period. However, the remaining 50 per cent were either increasing their level of diversification or experienced no change. The net result was a small and statistically insignificant change in the mean level of diversification across the sample.

However, within-sample changes indicated that some firms significantly reduced their level of diversification over the period whilst others increased theirs. Using the classification scheme outlined in Chapter 4, at most 44 per cent (classification scheme (A)) and at least 30 per cent (classification scheme (B)) of the sample refocused. Thus, we can conclude that corporate refocusing was an important phenomenon in the UK over the period in question and not merely an invention of the business press.

It was also found that firms refocused primarily by divesting unrelated assets and acquiring activities related to the core business. Our sample of firms undertook a total of 2,001 divestments and 2,599 acquisitions over the study period. Of these 58 percent of all divestments were unrelated to the core business and 60 percent of acquisitions were related.

The thesis then proceeded to examine the characteristics of the refocusing firms. A reduction in diversification was alternately signified by a decrease in the number of activities operated in and by a decline in the entropy index of diversification. The results support our hypothesis that refocusing firms are characterised by a high level of diversification relative to their industry

counterparts. This implies that firms refocus in response to 'excessive' levels of diversification, most of which occurred in the 1960s and 1970s. In addition, firms are more likely to refocus if they have low levels of management ownership. As such, it supports our hypothesis that it is the managers of these firms who were able to invest in unprofitable expansions in the past. Finally, refocusing firms were characterised, to an extent, by an attractive core on which to refocus. A change in management, the level of firm debt, firm size, as well as the firm's performance were not found to be distinguishing characteristics of refocusing firms. However, before we dismiss the existence of such relationships in the UK context, we are mindful of one particular caveat: the use of a cross-sectional design may imply that the lag between the variables' measurement and subsequent period of refocusing may be too long and that late refocusers may not be affected by variables measured several years earlier.

Chapters 7 and 8 examined the determinants of divestment using cross-sectional and panel data techniques respectively. Divestment was alternatively calculated as a count of the number of divestments and the proportion of assets divested. These two approaches were seen as necessary and complementary given the nature of the divestment data. Divestment is conjectured to be consistent with some exogenous change in the firm's environment which causes a downward displacement in the optimal level of diversification. The adjustment to such a change was hypothesised to be affected by financial, corporate governance, strategy and market structural characteristics as examined in detail in Chapter 3.

The results in Chapter 7 were based on a cross-sectional design. This approach indicated that divestment is related to the size and diversification of the firm concerned. This finding supports our hypothesis that larger and/or more diversified firms experienced a proportionately greater fall in their optimal level of diversification and therefore have the greatest potential for downsizing. A change in management and acquisition activity over the period also appeared to stimulate divestment activity. The significant effect of debt and the corporate governance variables is consistent with the disciplinary role of debt (Jensen, 1986) and with the view that divestment is more likely under conditions of reduced managerial discretion. The market structure characteristics produced mixed effects with concentration in the core business having a weakly significant inhibiting effect and market share producing an insignificant effect on the divestment process.

The most unexpected finding was the failure to find a significant negative relationship between divestment and performance, regardless of the measure of performance adopted. Before we dismiss the existence of a performance-divestment link in the UK context, we are mindful of a number of caveats. First, the cross-sectional design in which the explanatory variables were measured at their start of period values, may imply that the lags involved were too long and that divestment in the latter half of the period was not affected by variables measured several years earlier. Second, it is possible that measured performance before the start of the study period captures some element of the potential to divest (i.e. strong performance is associated with acquisition activity which may itself generate divestments after some lag), thus eroding our initial prior.

To complement these results and to circumvent some of the problems from using a cross-sectional design, Chapter 8 examined the determinants of divestment using panel data. This approach allowed us to take account of unobservable firm-specific factors which cannot adequately be controlled for in a cross-sectional framework. The panel results broadly corroborated those from the cross-sectional model in Chapter 7. However, using this approach, performance was found to have a negative and significant effect on divestment. This result supports our hypothesis that divestment is negatively related to firm performance and is consistent with previous US work in this area. The panel approach allowed us to model divestment activity through time and permitted a much shorter lag structure between the explanatory variables' measurement and subsequent divestment.

The corporate governance characteristics of the firm were introduced as regime variables and interacted with several of the explanatory variables to determine their conditioning effects on the results. It was found that firms with a 'strong' governance environment were more likely to respond to poor financial indicators. This result is consistent with the agency theoretic perspective that equity holding managers and blockholders have their interests aligned with those of shareholders and will respond rapidly to poor financial indicators. In addition, the results support our hypothesis that managers of firms facing 'weak' governance constraints respond to the disciplinary effects of a high level of debt. By contrast, a high level of debt had no significant effect for firms already operating 'strong' governance mechanisms.

Taken together, the results from these two chapters suggest that firms' divestment behaviour was not merely exhibiting mean reversion in the number of activities operated or simple portfolio churning across the set of such activities. Instead they indicate that divestment is a purposeful response to financial, strategic, corporate governance and, to a limited extent, market structure characteristics. The adoption of count data techniques and the use of a panel of firms represent one of the contributions of the thesis to the existing literature on divestment.

Finally, the thesis sought to determine the performance consequences, if any, of the adoption of a refocusing strategy. Chapter 9 estimated dynamic profitability equations augmented with divestment variables to examine the impact of divestment on the long-run performance of the vendor company. Divestment is alternately measured as a count of the number of divestments, the proportion of assets divested and as a dichotomous variable equal to one if divestment occurred in any one year and zero otherwise. The results confirmed our hypothesis of positive performance effects of divestment regardless of how the divestment measure was operationalised. The effect was non-trivial: the immediate effect is equivalent to a rise in the industry-adjusted ROCE performance measure by three quarters of a percentage point. The long-run effect measured over three years is equivalent to a 9 per cent increase in profitability for divesting firms. (These figures correspond to the specification when divestment is signified as a binary variable).

In addition, divestment activity was interacted with a series of regime variables to determine whether the performance effect was conditioned by the strategic

and corporate governance characteristics of the firm. It was hypothesised that the gains from divestment would be greatest for larger and/or more diversified firms. In the event, attempts to distinguish between firms that have breached some Penrose (1959) -type constraint and those who have not, proved largely inconclusive. The evidence that larger and/or more diversified divestors will experience greater profitability effects was, at best, very weak. By contrast, there was support for our hypothesis that the benefit from divestment would be greatest for firms operating weak governance mechanism. Firms with a 'weak' governance regime displayed consistent, significant positive profitability gains while those with 'strong' regimes experienced largely inconsistent effects. This supports the view that divestment, stimulated by pressure from a resurgent capital market from the 1980s onwards, reversed diversification previously resulting from agency problems in the firm.

These *ex post* results build on the *ex ante* results found in earlier event studies of divestment. They also reinforce the more recent and slender strand of the literature in the US context that has examined the post-divestment operating performance of the divesting firms (e.g. Markides, 1995b). However, the existing studies typically employ cross-sectional models to examine the performance effects of divestment. As Bergh (1997) points out it, is difficult to evaluate performance effects within such a framework. The dynamic panel data approach adopted in this chapter improves upon earlier work. The positive performance effect of voluntary divestment also provides symmetrical corroboration of a general finding in the merger literature that acquisition tends to lower the profitability of the acquiring firm (e.g. Dickerson *et al.*, 1997).

10.3 Limitations of the Research

There are a number of limitations to the work presented here. First, the sample of firms was selected from the FT500 list and as such the analysis concentrated on the largest firms in the UK. This possible sample bias implies that the findings reported may only apply to the UK's biggest firms and not the entire corporate population.

Second, there were a number of data limitations regarding divestment and diversification information. A number of divestments over the study period failed to disclose a sales price. This made it difficult to calculate the proportion of assets divested in a given year and an arbitrary cut-off value from the lower tail of the divestment size distribution was assigned to overcome this problem. With regard to calculating the level of firm diversification, it was difficult to obtain detailed information on activity data. Segment data appears at a relatively aggregated level in company accounts and miscellaneous groupings conceal the exact number of business segments operated in by firms. In the latter case, an upper bound estimate of two industry segments was assumed. For both these reasons the extent of diversification will tend to be underestimated and as such, refocusing activity may be more widespread in the UK than the results suggest.

10.4 Directions for Future Research

As detailed above, a number of contributions to the existing literature have emerged from this thesis and the analysis carried out provides a basis for future work. The research could benefit from extending the sample size and undertaking a case study analysis to enable broader conclusions to be drawn. The latter will enable a more detailed study of the complex web of issues surrounding refocusing and will be applicable to more clearly defined contexts.

Whilst the research goes some way to explaining the nature of firms that are divesting, there are still a number of questions about the specific strategy of refocusing firms which need to be explored. It would be useful to separate total diversification into its related and unrelated components (Jacquemin and Berry, 1979) and to identify, for example, the impact on firm profitability of a reduction in related diversification versus a reduction in unrelated diversification. It would also provide a clearer indication of the nature of refocusing activity.

The study has examined the determinants and consequences of divestment but has made no attempt to distinguish between the type of divestment (i.e. related and unrelated; foreign and domestic; MBO and parent-to-parent) and firm-level characteristics. It would be useful to examine whether the determinants of divestment analysed in Chapters 6 and 7 apply equally to related and unrelated divestments. In addition, we could determine whether the performance effect of unrelated divestments differed from that of related divestments. It would also

be useful to determine the relative performance of the divested subsidiaries. This would give us a clearer indication of whether it is unprofitable or profitable subsidiaries that are being divested.

It would also be interesting to examine the relationship between prior acquisition and subsequent divestment activity. More precisely, it would be worthwhile to distinguish between the proportion of divestments that originated from previous acquisition attempts and those that grew from internal development. Those that originated from prior acquisition activity could be assessed to determine the average length between acquisition and subsequent disposal, as has been done in US studies (e.g. Ravenscraft and Scherer, 1987).

It would also be beneficial to identify the link between the divested unit and the subsequent acquirer. If the divested activity is related to the acquiring firm's existing activities then we would expect this to have a different performance effect than acquisition by an unrelated acquirer. Whilst we identify acquisitions by firms within the sample, some of which will be divestments from firms within the sample, a more detailed analysis of the direction of divestment would provide a clearer indication of the extent of refocusing activity in the UK.

Further research could also be undertaken, in addition to that already mentioned, on the consequences of a refocusing strategy. The business press abounds with announcements of job losses in conjunction with restructuring transactions, however there is very little research in this area in the UK. The

above analysis could also be extended to examine if any changes occurred in the corporate governance mechanisms of firms post-restructuring.

Finally, an interesting extension would be to apply the analysis to an international context. Since the completion of the single European market, acquisitions and joint ventures across countries within Europe have grown in importance but research suggests that multinational activity has a high failure rate. Existing attempts to analyse divestment activity have largely ignored the distinction between the divestment of domestic operations and the divestment of foreign production operations. A significant number of divestments in our sample were by UK firms exiting from overseas markets. It would be of interest to examine the type of factors that influence this decision and to determine whether the determinants of divestment differ for domestic and foreign disposals. The process of globalisation means that countries are increasingly integrated, with events such as divestment in one market affecting markets in other countries.

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