

# THE PERFORMANCE OF MAJOR FIRMS IN THE HEATING AND VENTILATING INDUSTRY

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Because of the fragmentation of the construction industry into separate specialisms, each sub-industry involved in the construction process requires separate analysis to understand differences (and similarities) between them. As a start in this process of analysis the heating and ventilation industry is discussed in terms of the turnover, fixed assets, plant hire and labour, profits, and shareholder funds of the largest firms, which were members of the Major Contractors' Group of the Heating and Ventilating Contractors Association. This provides the context and basis for a discussion concerning the conduct and performance of the dominant firms in the heating and ventilating industry in the latter half of the twentieth century. Taking this group of specialist firms as a whole the paper provides evidence of the extreme volatility of branches of the construction sector and firms' responses. Furthermore this analysis makes use of long run data from all the firms in the Major Contractors' Group. The study also reveals that few mergers took place between firms in the sector but all the firms in the Major Contractors Group had been taken over by firms outside the heating and ventilation sector. None had displayed any significant diversification out of the sector. Most firms then became loss leaders for their parent companies. The discussion of the accounting variables concludes that although the population of firms in the study is small, it would be possible in principle to model the variables and use the model for comparison with other sub-industries in construction.

**Keywords:** heating and ventilation industry, profits, turnover, shareholder funds

## INRODUCTION

The construction sector is comprised of a variety of specialisms, which co-operate in the production of the built environment. These separate specialisms employ different skills, use different materials and apply different technologies. The construction industry is therefore fragmented but relatively little detailed research into the subdivisions of the sector has been carried out, with only a few exceptions, (Gray C., and Flanagan, R., 1989, Constantino, N., Pietroforte, R., and Hamill, P., 2001). Gruneberg and Ive (2000) refer to the economic implications of different types of specialisation by construction firms. As a first step in the study of a particular specialism in construction this paper examines a group of firms over a period of thirty to forty years in the second half of the twentieth century. This study makes use of data from all the firms in the Major Contractors' Group (MCG) of the Heating and Ventilating Contractors Association.

The MCG was formed in 1971, comprising a small number of the largest members of the Heating and Ventilating Contractors Association. The following survey of the accounts of firms mainly covers the period 1972 to 1997. The purpose of this survey

of a small group of major firms in the heating and ventilating industry is to examine the volatility and variability of the responses of a group of firms in a particular specialism within the construction industry over a long period given the effects of the business cycle of the heating and ventilating industry on the reported accounting performance of firms. A further aim of this survey of the largest firms in the HVCA is to understand the changes, which these firms experienced in their ownership patterns.

This paper describes the behaviour of turnover, fixed assets, plant hire and labour, profits and shareholder funds of the firms in the Major Contractors' Group at 1995 prices and indexed at constant prices. Although annual averages of these accounting variables are used in the analysis, there are wide differences between individual firms as suggested by Carroll and Hannan, (2000). The purpose of this paper is to present the variables before analysing their performance in terms of volatility over time and variance between firms.

## **METHOD**

A total of 18 companies, whose annual reports are held on microfiche in Companies House in London, were analysed out of a total of 20 firms, which had been members of the HVCA Major Contractors Group at one time or another. One member of the MCG, MF Kent, was not available in Companies House, London, because it was registered in Northern Ireland. Unfortunately because firms only provided accounts on a voluntary basis before 1970, few companies furnished Companies House with a full set of accounts prior to the early 1970s.

Table 1 shows the firms whose accounts were used to calculate the annual average change in shareholders' funds. All available data was used and no sampling was carried out. The size of the population varied annually for different variables, depending on the information given in each firm's annual return. In later years a larger proportion of the 18 accounts could be used but as the population of firms was in any case small and specifically biased to the largest firms, the following analysis is not representative or statistically representative of the wider population of heating and ventilating contractors. Moreover, apart from the inconsistencies of using different firms and different combinations of firms each year depending on the availability of data, there are inconsistencies in reporting accounts from one firm to the next.

There is also the added problem that some firms submitted identical accounts in the 1990s (consisting only of the same balance sheets) in consecutive years, the minimum required because they were no longer trading as separate entities from their parent companies. Some pertinent data was also omitted from certain annual reports, such as the profit and loss accounts of firms whose accounts had been merged with a parent. These firms took advantage of their exemption from the obligation to provide profit and loss accounts under Section 225 of the 1985 Companies Act. Other firms provided only group sets of accounts, making it difficult or impossible to separate their heating and ventilating interests from that of their other activities and subsidiaries. By the end of the period of study, the data used invariably refers, to group accounts and therefore provides information about the underlying financial strength of the firms rather than identifying their heating and ventilating activities.

The survey of accounts nevertheless provides interesting anecdotal evidence concerning the reported performance of a specific group of firms. However, because of the extremely small number of useable accounts especially in some years, any broad conclusions drawn from the results would be unreliable and unjustified.

Nevertheless the company accounts of the members of the Major Contractors Group of the HVCA were analysed as far as the published data would allow.

**Table 1:** Contractors and their Parent Companies in 1997

Heating and Ventilating Contractor	Ultimate Holding Company
Andrews-Weatherfoil Ltd	Kvaerner plc
James Scott Mechanical Electrical Services Ltd.	AMEC plc
Benham Building Services Ltd	Bimec Industries plc
Brightside Mechanical and Electrical Services Group Ltd.	Mohammed Jalal and Sons Co Ltd, Bahrain
CWS Engineering Group	CWS Group
Drake and Skull Engineering Co Ltd	EMCOR Group Inc., Delaware, USA
Ellis Mechanical Services Ltd.	Finaster SpA, Italy
HAT Lorne Stewart plc	BET plc
Haden Young Ltd	BICC plc
Henry Hargreaves and Sons Ltd	Senior Engineering Group plc
How Engineering Services Ltd	How Group plc <sup>1</sup>
Lee Beesley Humphries and Glasgow Services Ltd	SMF (Holdings) Ltd.
MF Kent Services Ltd	Registered in N. Ireland.
Matthew Hall Mechanical Services Ltd	AMEC plc
Marryat-Jackson-Norris Ltd	Staveley Industries plc
Rosser and Russell (London) Ltd	Norwest Holst Ltd
Sulzer (UK) Building Services Ltd.	Gebrüder Sulzer AG, Switzerland
Towco Ltd ceased trading in 1985/6.	Not found
Wheeler Crittall Berry Ltd/ Crown House	Tarmac plc
Young, Austen and Young Ltd	Mohammed Jalal and Sons Co Ltd, Bahrain

Sources: Major Contractors Group companies' annual returns and HVCA Annual Reports.

Note: <sup>1</sup> In 1999 the ultimate holding company became Tilbury Douglas plc.

Most, if not all, of the members of the MCG had been family firms. However, by 1997 all of the firms surveyed had been taken over by or merged with companies outside the heating and ventilation industry, with the exception of How Engineering Services Ltd a subsidiary of the How Group plc. However, in 1999 even this company was taken over by a construction firm, Tilbury Douglas plc. The firm did not survive as an independent company without the determination of a family member for it to remain so in the face of possible offers and take-over bids. Hence, Table 1 also shows the parent companies of the members of the Major Contractors Group.

As trends and the timing of particular annual changes are of greater use for this research than the actual size of the variables themselves, the method used to analyse the data provided by the annual accounts of the major contractors in the HVCA has been based on the average annual change in each of a number of variables. These variables are shareholders' funds, tangible assets, turnover, hire of plant and labour costs. Using the annual mean changes of each firm allows that in different years different numbers of firms supplied data, the minimum number of firms in any one

year being 9. Thus, for example, Figure 3 shows the real annual average change in shareholders' funds for the firms whose accounts were examined in any given year.

Various deflators have been used to deflate the current data. Firms' profits data was deflated using the RPI 1995 = 100. Construction costs and employee costs were deflated using GCPI 1995 = 100. GCPI, which is based on the implied deflator used by the DETR (currently the DTI) to deflate current output of the construction industry,

Plant hire and shareholder funds data were deflated using the GDPI, 1995 = 100 with 1990 weights 1995 = 100. Arithmetic mean of data was used only in years when  $n \geq 9$ .

## ANALYSIS OF FIRMS IN THE MCG

### Turnover

Annual changes in deflated turnover data reflect changes in demand for the services of firms. This may be seen as organic growth if the change is driven by internal expansion. Changes in turnover may also reflect changes in business size due to acquisitions and restructuring of firms. Although interim payments to specialist firms working on projects with a long duration account for current turnover in general, a proportion of turnover and profit figures in company accounts are lagged and reflect work won one year or more earlier, as subcontractor firms often experience disputes outside their control and incur delays in their payments from main contractors. Thus 1970 growth in turnover may be influenced by demand expansion in 1968 to 1969.

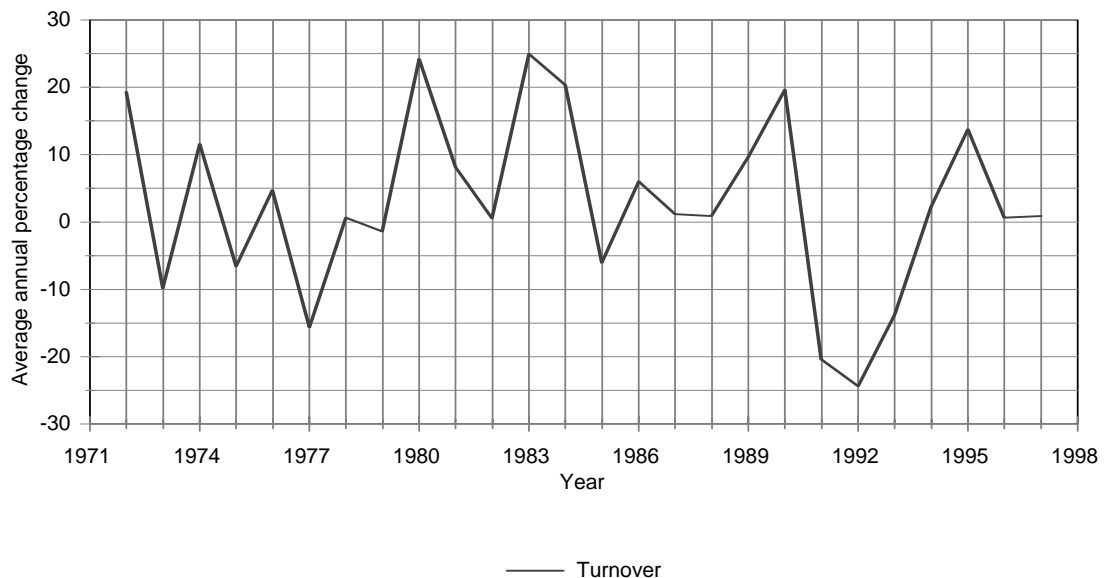
Figure 1 shows that in 1972, 1980, 1983 and 1990 turnover increased exceptionally rapidly. The 1980 peak in turnover may have been due to merger activities recorded in the accounts of firms, as increases in turnover were due to the acquisition of subsidiaries. In contrast, the peak in 1990 reflects the height of activity in construction due to the speculative property boom at the end of the 1980s and therefore reflects the increase in work load especially for larger heating and ventilating engineers engaged on commercial projects requiring sophisticated heating and ventilating systems.

The greatest falls in turnover are shown to have occurred in 1973, 1977 and 1991 to 1993 and reflect recessions in demand. The real drop in turnover in 1991 to 1993 appears to have been greater in scale and longer than the drop in turnover, which occurred in 1973 and the decline in 1977. Indeed the average turnover of the firms in the survey declined in real terms by over 20 per cent per annum for two consecutive years (see Figure 1). The length and severity of the recession in the early 1990s confirms that the drop in turnover between 1991 and 1993 facing the major firms in the heating and ventilating sector was unprecedented in the post war era although it recovered again in the 1990s.

Figure 1 indicates a gradual long run decline in the growth rate of turnover of the largest heating and ventilation contractors from 1980 to 1997. Downward phases in the turnover series indicate a tightening of the market as growth slowed down. This tightening of the market becomes particularly relevant if there is a difference between the rates of change of capacity and sales. If capacity grows at the same rate or faster than the previous year, any reduction in the rate of increase in annual turnover, would increase spare capacity and therefore increase overhead costs per unit of output. Only by laying-off labour or selling-off plant could firms off-set reductions in turnover in order to maintain their current resource utilisation ratios (the ratio of used to unused resources). For firms in aggregate, profitably would be increasingly difficult to

achieve or maintain. This would occur even if growth rates of firms were positive and the market was expanding but still in aggregate below that level of growth of turnover necessary for maintaining full employment of resources, especially labour.

**Figure 1 Annual change in real turnover 1972-1997**



Sources: Major Contractors Group companies' annual returns.  
Outlier data for Ellis 1981 omitted.

### **Tangible fixed assets**

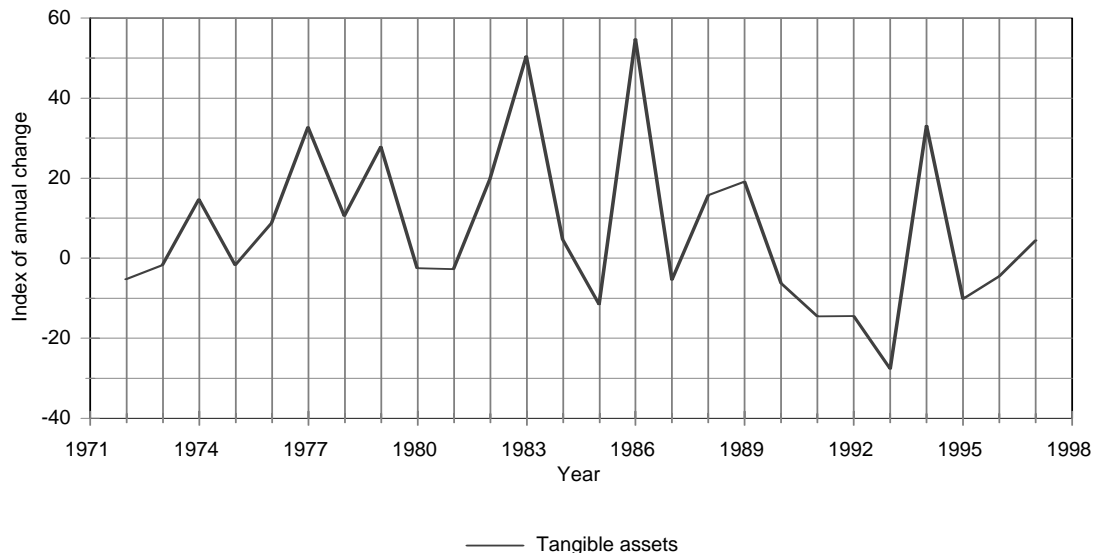
In the previous section turnover was used as a proxy measure of demand. In most industries firms do not respond immediately to changes in the market by altering their fixed assets. However, in many specialist construction firms certain tangible assets such as plant and machinery are often less long lived than in other sectors of the economy. It therefore follows that change in fixed assets in construction firms reflects changes in market conditions more than in other sectors and may be expected to relate to changes in turnover. In order to establish part of this argument, an index of the average annual change in the fixed assets of firms in the MCG is shown in Figure 2.

As in the previous section, some of these annual changes may be partly due to merger activity. These annual changes also reflect changes in the consolidated accounts of the firms in question, and not only their heating and ventilating activities. Nevertheless Figure 2 provides approximate data on changes in the size and strength of these firms in terms of their fixed assets from one year to the next, but not necessarily the amount devoted directly to their heating and ventilation activities. A large proportion of the tangible assets of heating and ventilating contractors is comprised of buildings and these are of course usually the longest lived tangible assets of all, notwithstanding their tradability as assets. Nor, of course, does investment in buildings necessarily increase the capacity of the heating and ventilation industry.

Nevertheless the volatility of the average annual changes in tangible assets indicates that the largest heating and ventilation contractors tended to increase their purchases of tangible assets including buildings up to 1990, but during the 1990s the annual amount invested in fixed assets tended to decline until 1994 following a number of

years of falling investment. The apparent increase in investment in 1994 may have been caused by the need to replace worn out plant and equipment rather than expansion policies, as the decline in investment continued until the end of the period covered in this study. Investment activity increased most in 1977 and again in 1983 (following recession), and in 1986 but fell most rapidly in 1985 and 1993, as illustrated in Figure 2.

**Figure 2 Annual change in real fixed assets 1972-1997**

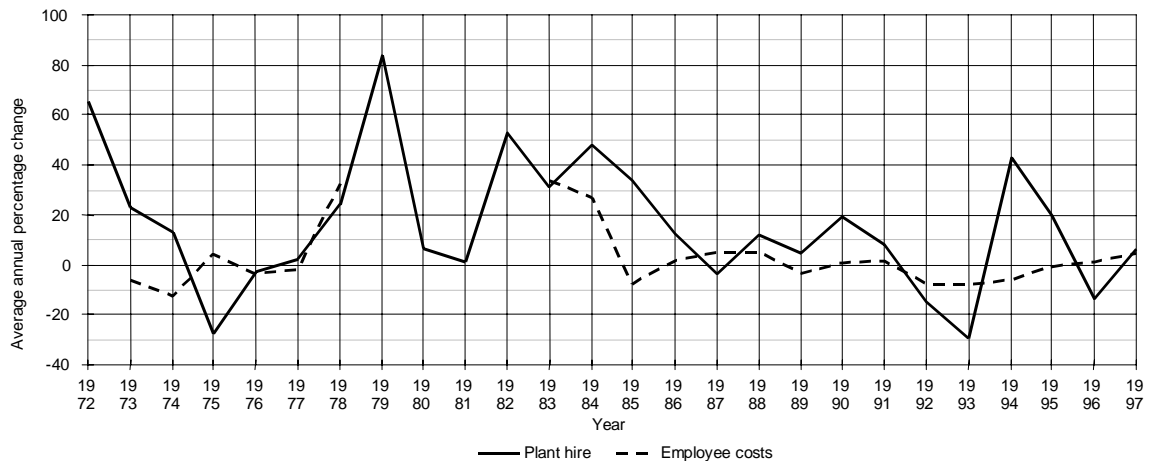


Sources: Major Contractors Group companies' annual returns.

Note: Young, Austen and Young 1983 change in tangible fixed assets is omitted as an outlier.

### **Plant hire and labour**

Figure 3 shows the average annual percentage change in plant hire and labour costs from 1972 to 1997 and 1973 to 1997 respectively. The time series of these variables is extended because of the availability of data. The minimum number of firms reporting the plant hire and labour cost variables in any one year was 9. Data on direct employment costs did not appear in the notes in company accounts until 1969 except on a voluntary disclosure basis. Firms record plant hire and direct employment costs in the notes to their annual accounts. Indirect labour, such as labour only subcontractors' costs, is included in the accounts under cost of sales in the profit and loss account and creditors in the balance sheet. It may be assumed that indirect employment of labour increased in the late 1960s partly as a consequence of Selective Employment Tax. Certainly the data for the years after 1985 imply a tendency for employment costs in the firms in the MCG to decline.

**Figure 3 Annual change in plant hire and labour expenditures 1972 - 1997**

Sources: Major Contractors Group companies' annual returns.

Note: Ellis (Kensington) Ltd 1983 change in plant hire is omitted as an outlier, as is HAT Lorne Stewart Ltd 1986.

In some years, such as 1974, 1985 and 1994, an increase in expenditure in plant hire is accompanied by a decrease in expenditure on direct labour. The increase in plant hire therefore appears to result from a strategy of subcontracting increasing amounts of work and work packages. For example, from Figure 3 this substitution of labour by plant hire appears to have occurred mainly between 1984 and 1995 when the proportionate expansion of plant hired by the major heating and ventilating contractors was usually greater than the increase in labour costs. It would appear that the major specialist firms in the heating and ventilating industry tended to adopt similar strategies to main contractors regarding employment and plant hire.

### Profits

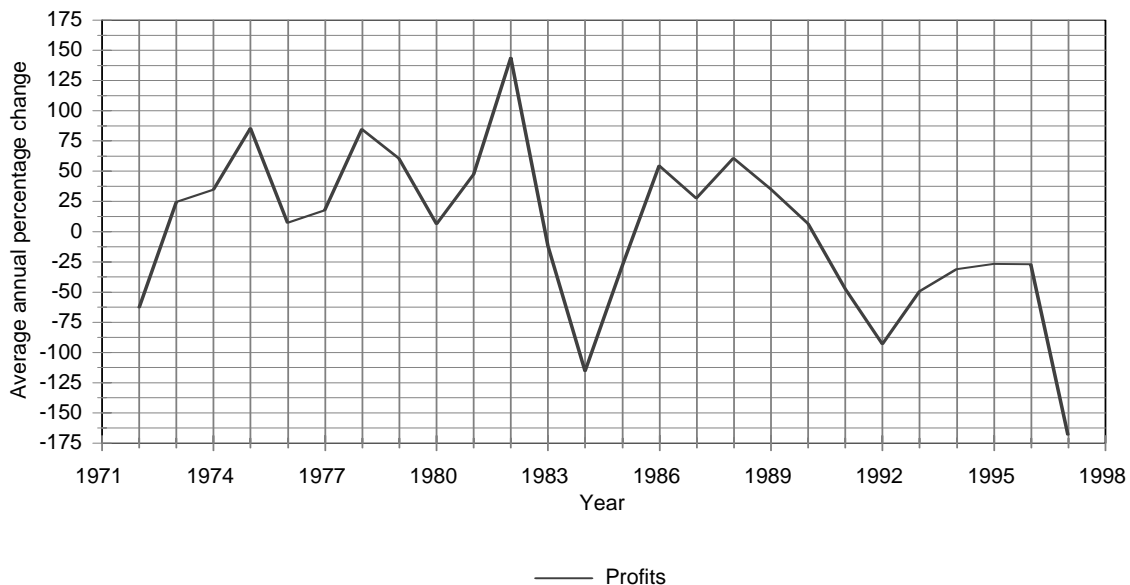
By making a number of simplifying assumptions, it is possible to argue that firms' profits are the managed outcome of the difference between revenues or turnover and responses of firms in terms of their management of plant and labour. We have therefore covered the key variables wittingly or unwittingly used by firms in the heating and ventilation industry in their pursuit of profit. This is not to say that the cost of materials and finance are not also fundamental but because of the nature of the heating and ventilation industry, materials are bought as and when required, and recourse to debt finance and interim payments reduce the financial burdens facing firms.

Figure 4 shows the average annual percentage change in real profits after interest but before tax. Between 1973 and 1982 profits increased from year to year. They declined slightly in 1983 but then crashed in 1984. Since 1984 the major firms incurred serious losses with occasional annual improvements in profits being insufficient to return the firms as a whole to profitability. This is not to say that all firms were in the same position regarding profitability. On the contrary, even in the worst years of trading some of the members of the MCG were able to return a profit. In 1983 profits declined on average by over 20 per cent. However, the average annual change in 1984 was in excess of -100 per cent implying that several firms in the MCG incurred actual losses in 1984 as the drop in average profits was greater than the level of profits in the previous year. In 1985 losses were even greater by a further 25

per cent on average. During the recovery of the following year losses were reduced by 50 per cent but firms did not on average return to profitability and after 1990 profitability declined still further, a trend that was not reversed before the end of the period of the study.

Following a year of losses, any percentage change in the rate of change would need to be greater than 100 per cent to return firms to profitability. In Figure 4 in 1988 the average annual rate of change in profits began to decline, supporting the suggestion by Sherman (1991) that profits are squeezed at the top of the business cycle. Indeed, by 1991 the rate of change in average losses fell below zero indicating increasing real losses each year until at least 1997.

**Figure 4 Annual change in real profit before tax of MCG firms 1972-1997**



Sources: Major Contractors Group companies' annual returns.

Notes: If profits in year  $t$  are positive, then if in year  $t+1$  profits drop to zero, this is represented as  $-100\%$ . If in year  $t+1$  profits turn into a loss, this is represented as greater than  $-100\%$ . If there are losses in year  $t$  and losses increase in year  $t+1$ , this is represented as a further percentage drop. If losses reduce then the percentage change is upward.

Andrews Weatherfoil 1997 change in profits is omitted as an outlier, as are Ellis 1987 and 1996, Henry Hargreaves 1978, Rosser and Russell 1984, Haden Young 1987, Brightside 1988 and Young, Austen and Young 1995.

We have noted that although turnover may have been volatile, there was no visible increase in its volatility over the period of the study. This picture is also reflected in the purchase of fixed assets. Faced with such volatile market conditions, the use of plant hire and labour by firms was, in contrast, relatively stable. There does not appear to have been significant change in firms' strategies in dealing with the market and attempting to overcome the problem of volatility. As a consequence one can discern a trend in declining profitability throughout the whole period, a trend, which had significant implications for the major firms in the heating and ventilating industry. They were all taken over and became subsidiaries, while retaining their company names or identity.

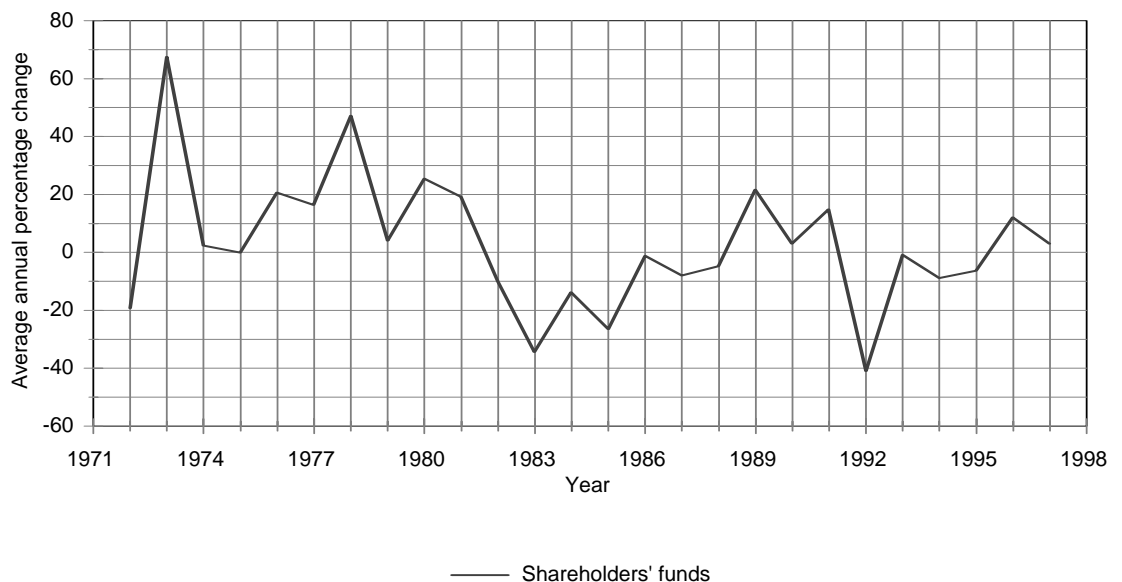


### Shareholders' funds

Only a proportion of net profits are retained in shareholders' funds, the rest being distributed in dividends. Nevertheless, from the annual average change in shareholders' funds given in Figure 5, it can be seen that from 1972 to 1981 shareholders' funds increased in most years but since 1982 they have been in decline with short respites between 1989 and 1991 and again in 1996 and 1997. It is therefore not surprising that the period after 1983 can also be characterised as one in which the major firms in the heating and ventilating industry were taken over by firms outside the industry.

This merger activity also accounts for the annual increases in shareholder funds, whenever these increases occurred, because trading profits for the group of firms as a whole were too small to have been added to shareholder funds. The only other source of shareholder funds would have come from the disposal of assets. From the annual accounts of firms, sudden changes in shareholders' funds, including those removed as outliers in Figure 5, were largely due to merger activity reflected in the balance sheets, which showed an increase in net assets as a result.

**Figure 5 Annual change in shareholders' funds of MCG firms 1972-1997**



Sources: Major Contractors Group companies' annual returns.

Note: Ellis 1997 change in shareholder funds is omitted as an outlier, as are Rosser and Russell 1984, and Young, Austen and Young 1985.

As a general pattern of behaviour the major firms in the heating and ventilating industry grew as a result of being taken over and consequently used the financial strength of the parent company to expand, consolidate their position or maintain a marketing presence in the heating and ventilating industry. During recessions, shareholders' funds were "squeezed" by operating losses and by downward revaluations of assets and growth of debt relative to gross assets or capital employed. In the growth phases of the business cycle (such as between 1982 and 1988) either the set of heating and ventilating firms was by and large not making net profits or their net operating profits were being taken by parent companies as dividends or as interest on group loans. It is unlikely that these firms would not in general make operating profits

in a growing market, although several did indeed incur large losses. It is far more likely that as subsidiaries, their operating profits were not being retained and added to the shareholder funds of the heating and ventilating company.

## CONCLUDING REMARKS

From the accounts of members of the MCG, firms were on average able to maintain their relative positions with growth in turnover occurring more often than decline and contraction. The largest firms' growth rates were low, not because they had not grown at all but because they survived only to experience the major recession of 1990 and 1991. Figure 5 shows that shareholder funds, which is one measure of firms' size, grew in the 1970s. However, after 1982 with the exception of 1989 to 1991 there was a consistent decline in reserves. The firms may have grown in the 1970s but several stagnated in the 1980s. This posed major difficulties for firms in the recession of the early 1990s. However, such generalisations based on average results can be misleading as Carroll and Hannan, (2000) have pointed out. Indeed, further analysis of the variance of all of the variables given in this paper would reveal the extent of the differences between firms.

The study reveals extraordinary volatility in performance of all the firms taken as a group and suggests that future performance may be based more on contingent factors, such as merger activity rather than on trend analysis. Few mergers took place *between* firms in the sector but all the firms in the Major Contractors Group had been taken over by firms outside the heating and ventilation sector by the end of the century. None had displayed any diversification out of the sector. Most firms then became loss leaders for their parent companies.

Having described and explained the behaviour of turnover, plant hire and labour costs, profits and shareholder funds, the next stage is to draw up a model of the MCG firms' strategies involving these variables. The relevance of this research is that it serves as a benchmark for other specialisms and will lead to improving our analysis of construction sector firms' performance and ultimately their management.

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