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Further reflections on the Golden Age in  
British multiple retailing 1976-1994: capital  
investment, market share and retail margins

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Further reflections on the Golden Age in British multiple retailing 1976-1994: capital investment, market share and retail margins

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## Further reflections on the Golden Age in British multiple retailing 1976-1994: capital investment, market share and retail margins

### Abstract

Our understanding of the 'Golden Age' of British retailing, during the period from the mid-1970s through to the mid-1990s, has centred around a discussion of the impact that a rising retail concentration and a perceived increase in retailers' market power has had on social welfare and competition policy. This increase in concentration and market power is itself understood to have evolved from the defining feature of the golden age, a rapid increase in capital investment by large-scale retailers.

This paper examines the role played by capital investment in the golden age and demonstrates that whilst capital investment is negatively correlated with turnover it is positively correlated with both margins and market share. It is suggested that this relationship is significant as it provides evidence that the golden age of retailing did indeed lead to the rise in market power much of the literature feared was taking place.

## Introduction

The mid-1970s saw a rapid change in the dynamics of British retailing. New economies of scale emerged with larger hypermarket store formats leading to rising concentration, while the geographical distribution of retailing altered as out-of-town developments expanded rapidly. Internally, to the firms themselves, the use of information technology altered networks within the supply chain with distribution becoming more centralised through the development of independent logistics companies and the introduction of just-in-time techniques known as Efficient Consumer Response (Bromley and Thomas, 1993; Foord et.al., 1996). As a result this period, from the mid-1970s through to the mid-1990s, became widely referred to as the ‘Golden-Age’ of British retailing (Wrigley, 1991).

By the end of the golden-age a series of major debates had emerged across the academy as researchers grappled with the significance of the changes taking place. Geographers, particularly, were at the forefront of identifying the characteristics of this era, discussing not simply the spatial changes in consumption patterns but also identifying a ‘new retail geography’ linking growing capital investment in retailing to issues of industrial restructuring and patterns of development in wider contexts of circuits of power or international political economy (Hallsworth and Taylor, 1996; Hallsworth, 1997; Langston et.al. 1997, 1998; Wrigley, 1987, 1991, 1993, 1998). Within the area of management the issues of firm specific changes, supply chain management, efficiency and inter-firm relationships took centre stage (Akehurst and Alexander 1995a, 1995b; Burke and Shackleton, 1996; Fernie, 1989, 1992; Sparks, 1995). Finally, within the areas of economics and public policy questions of competition, consumer welfare and regulation were to the fore (Dobson and Waterson 1997; Fine and Leopold, 1993; Gardener and Shepherd, 1989; Raven and Lang, 1995).

To date much of the debate contained within this literature remains unresolved, partly due to the lack of evidence available to provide definitive answers to the wide range of questions raised but

more fundamentally due, as Coe effectively argues, to the contested views on the dynamic changes retailing is undergoing within a wider global environment (Coe, 2004; Sparks, 1996). One attempt to move beyond the limits imposed by the scarcity of official data was that of Morelli (2004) which sought to shed some light on the debates raised. Surprisingly, the key finding of the paper was that the key role identified for capital investment and accepted throughout the literature was missing. Indeed, if anything it was the reverse of the accepted interpretation within the literature with capital investment being negatively correlated with turnover. A number of reasons for this perverse result were highlighted, although left unresolved. This paper takes a more in-depth look at this result and demonstrates that the role of capital investment should indeed be placed central to explanations for the golden age in British retailing. However, in doing so it demonstrates that the role played by capital investment was not one linked to turnover but to margins and market share. The consequence of this result is that more weight should be given to recent research raising concerns over the social impact of the golden-age, namely; the emergence of food deserts, the anti-competitive impact of regional monopolies and limitations upon retailing's role in urban regeneration (Poole, Clarke & Clarke, 2002; Wrigley, 2002; Dixon, 2005). In conclusion then the paper reinforces a pessimistic view of the changes to the retail environment. A view that suggests that welfare and competition issues were sacrificed at the expense of greater profitability, market power and market share for larger retailers.

The following section of this paper examines in greater depth the development of debates over the golden age in British retailing from 1976 to 1994 and in section two the discussion focuses specifically upon the importance of capital investment for these debates. This is followed in section three by a demonstration of the apparent similarities in the relationship between patterns of growth in real turnover, market share and real gross margins with real net capital investment for large-scale retailers. These initial similarities are subsequently disaggregated using OLS

regression analysis in section four in order to highlight the differing relationships that exist between changes in real turnover and real net capital investment in comparison to that of changes in market share or real gross margins with real net capital investment. The importance of these findings is then discussed in conclusion in relation to the debates on the golden age.

### **Section 1 The Emergence of the Golden Age**

By the mid-1970s changes were under way which were fundamentally reordering the retail environment. The abolition of resale price maintenance and the rise of high inflation, reaching 29% in July 1975, saw price competition intensify in consumer markets. These pressures further intensified with the development of a new era of price competition within food retailing itself, symbolised by Tesco's abandonment of Green Shield Stamps and the launch of its 'Checkout' price discounting campaign in June 1977 (Williams, 1994, p.178). Government regulation of prices and margins through the Social Contract after 1974 and the continuing pressures on labour costs in retailing through the Selective Employment Tax encouraged retailers to look towards scale economies to boost profitability (Woodward, 1991, p.204; Thomas, 1995, p.61). Retailers accelerated the adoption of new retail formats such that more than three times as many superstores (stores of over 25,000 sq ft.) opened in the thirteen years after 1977 compared to the thirteen years prior to 1977 (Institute of Retail Studies, 1992; Morelli, 1999, p.182). It was this growth that was to be identified in the 'Golden Age'.

By 1994, however, a crash in property values saw this expansion in retail sites slow dramatically. Major retailers were now concerned about the extent to which an over capitalisation in new store development was leading to profitability being undermined by rising debt repayments (Wrigley, 1996a, p.116-136). By 1994 then the period identified as the golden age is recognised to have ended (Wrigly, 1998).

While the stylised facts regarding the rise of the golden age of British retailing, its periodisation as well as its significance, are largely uncontested this cannot be said of its interpretation

One interesting aspect of this lack of consensus regarding the golden age is the degree to which the contemporary academic world failed to recognise the significance of the changes taking place. Not until the late 1980s do we begin to see the first assessments of these changes.

Gardener and Shepherd's (1989, p.2) explanation for this tardiness is the countervailing impact of retailing during a period, in the late 1970s and the early 1980s of high unemployment and de-industrialisation within manufacturing. As they note the suggestion that the British economy might 'shop its way out of decline' was taken seriously. Indeed such was the delay in understanding the scale of change taking place that the phrase the 'Golden Age' was not coined until Wrigley's 1991 article appeared, almost at the end of the period.

While there are many areas of contested interpretation of concern here is the key debate over the degree to which retailers themselves gained too much economic power within consumer society through this period. Here we immediately run into an immediate subjective problem of definition. What precisely is too much economic power? Government triggers for monopoly investigation include a 25% national market share or alternatively acting against the public interest. However, national market share may not provide an accurate estimate of monopoly power in markets which, even today, continue to be highly regional in nature (Poole, Clarke and Clarke, 2002). Further, both Raven and Lang (1995) and Dobson and Waterson (1997) highlight the nature of monopoly power derived from reducing consumers ability to utilise spatial competition in either highly monopolistic local markets or from the use of barriers to entry in the development of large individual hyper-market stores. Yet Burke and Shackleton's preference for a model of competition based upon market entry and contestability leads them to reject ideas of local monopoly power suggesting that 'high profits in retailing seems unlikely to be the product of

barriers to entry' (Burke and Shackleton, 1996, p.460). Thus the very existence of spatially derived market power is contested. The government's own view, as expressed in the Competition Commission Report (2000) *Supermarkets: A report on the supply of groceries from multiple stores in the United Kingdom*, itself has left this issue unresolved. While it accepted that conditions could give rise to complex monopoly and conceded that retailers in some 175 local markets did exhibit characteristics of monopoly or duopoly no remedial action, such as enforced store sell-off programmes, were recommended. However, further concentration in the food retailing sector was to be more closely monitored as was the case with the merger of Safeway stores (Clarke and Clarke, 2002, p.646-652; Hallsworth and Evers, 2002, p.303).

A second strand of the economic power debate revolves around the uniqueness of the retailing function. Coe (2004) draws out this distinction with respect to the degree to which the globalisation of retailing can be understood within the political and economic developments underpinning globalisation process itself or whether retailing's uniqueness requires retailing specific theories of development. Here Wrigley and Lowe (1996b) have engaged with the wider new economic geography to locate retailing within a wider political economy, recognising retailers' adaptability to the widening opportunities offered by globalisation. Economic power, within the context of the golden age, is understood in terms of the changing structure of networks and linkages between the firm, suppliers, consumers and governments (Hughes, 1999; Morelli, 2003). Thus discussions of regulation and competition were linked to an examination of the degree to which government could devolve food safety policy to larger retailers as their influence within the supply chain grew (Harrison et.al, 1997). This theme is also to be found within the critical literature on retailing, localisation and sustainability where the growing dominance of larger retailers and their demands for standardisation has led to a reduction in food choice and sustainability (Monbiot, 1999; Hines, 2000; Madeley, 2000; Blythman, 2004). In contrast to the political economy approach the management focused literature emphasises the

role of individual firms. Economic power here is defined more narrowly in terms of a firm's ability to influence its own internal structures or immediate relationships with suppliers and innovate for firm level efficiency (Fernie, 1996; Godley and Fletcher, 2000; Moir, 1990).

Increased profitability is therefore a result of internal efficiency rather than market power.

In summary a key distinction within the literature on economic power in retailing is the degree to which we see retailers within a wider social and economic context or simply within their own boundaries, ie how important are market externalities? Irrespective of which approach is taken within the various strands of the economic power literature the issue of capital investment, its use and its transformative effect on retailers is nevertheless central to the discussions. It is to this that we now turn.

## **Section 2 Capital Investment in the Golden Age**

Capital investment in larger stores, making use of new out-of-town formats, resulted in retailers benefiting from the increasing opportunities derived from a more spatially concentrated retailing landscape. Not only was average floorspace increasing but the rapid decline in store numbers ensured that spatial concentration increased still further. Of the 30% fall in store numbers between 1961 and 1978 some 80% of the fall was in the period 1971-1978 (Thomas, 1995, p.60).

During the golden age itself stores numbers fell from an estimated 389,006 stores in 1976 to 196,563 stores in 1994 (Business Monitor, 1976, table 12 and 1994, table 3).

If this increase in retail concentration provided retailers with opportunities to increase their market power we would expect this to be reflected in an increase in retailer's market share within this more spatially monopolistic market. Certainly, as stated above the Competition Commission 2001 report recognised that local monopoly power existed in 175 cases. As such therefore the golden age would be identified with a reduced rather than increased competitive environment (Marsden & Wrigley, 1996; Dobson and Waterson, 1997). Conversely, the increase

in spatial concentration may lead to an increase in competitive pressures on firms and thus under these circumstances we would expect margins to be either insignificantly or negatively correlated with changes in capital investment (Burke and Shackleton, 1996). Here again as noted by Poole, Clarke and Clarke (2002, p.645) the Competition Commission recognised that ‘price flexing’, ie varying prices locally irrespective of costs, and below-cost selling were utilised by large retailers. Thus the extent to which large multiple retailers were able to engage in rent-seeking behaviour and gain monopoly profit through the utilisation of growing concentration and market power has important implications for competition policy. This was indeed the focus of much of the key discussions within the literature on the golden age at the time (Langston, et.al., 1997, 1998; Wrigley, 1991,1993, 1998). Thus the first hypothesis we seek to test is that: retailers’ market share is positively related to capital investment.

Capital investment in the golden age also went into extensive investment in supply-chain management with the use of computer technology and changes in inter-firm contracting rather than simply store expansion. George (1968) demonstrated that capital investment linked to these changes could be expected to lead to an increase in margins achieved through efficiency gains. While investment in supply chain management could subsequently be embedded within an organisation through growth in turnover and increasing market share (George, 1968, p.32) such a relationship would not be automatic. An increase in margins, derived from efficiency gains, could be retained by the retailer in a market where they had sufficient market power to resist demands from suppliers to pay higher input prices. Alternatively, higher margins may be offset by reductions in final consumer prices if the market is competitive. Thus, if changes in margins were positively related to changes in capital expenditure we would have evidence that investment, linked to supply chain management, during the golden age was strongly linked to

changes in the internal organisation of large multiple retailing firms' themselves. We therefore have our second hypothesis that; margins are positively linked with capital investment. We now turn to testing these two hypotheses but before doing so introduce the data and methodology.

### **Section Three Data and Model**

Much of the difficulty in testing hypotheses related to the golden age lies with the limitation researchers have had in accessing data. The substitution of the *Census of Distribution* after 1971 with the more restricted, if more frequent, *Business Monitor* series of government datasets imposed severe restrictions upon researchers to such an extent that Sparks (1996) suggested that a 'black hole' was created in our understanding of the changes taking place in retailing. As such the only examination of the golden age using econometric methods was undertaken by Morelli (2004). Morelli (2004) used *Business Monitor* data combined with data from *Annual Abstract of Statistics* and the International Monetary Fund's *International Financial Statistics Yearbook* to create a dataset linking changes amongst large retailers, defined as retailers with ten or more stores, to a range of supply and demand variables on an annual basis from 1976 to 1994. The dates were chosen in the original study due to both their coinciding with the rapid expansion in superstore retailing and its abrupt ending in 1994 (Wrigley 1998) and the fact that 1976 was the first year of comparable data following the switch to the *Business Monitor SDA25*. The dataset aggregated large retailers across each sector together and took the change in real turnover as the dependent variable and examined this against a wide range of variables.

The key findings of Morelli (2004) were that changes in real turnover for large retailers were positively related to changes in population and retail employment but negatively related to changes in real consumer expenditure, total retail employment and, most significantly real

capital expenditure (Morelli, 2004, 677-81). The reduced form of the model was thus expressed in equation 1 as;

Eqn 1.

$$\Delta\text{Turnover} = C + \alpha\text{GDP} + \beta\text{Population} - \gamma\text{Consumer Expenditure} - \delta\text{Capital} + \eta\text{Labour}$$

Where:

- Turnover, as the dependent variable, was defined as the change in real turnover for large multiples (stores with ten or more outlets).
- GDP was the change in real GDP.
- Population was the change in population, measured either as the total or female population.
- Consumer Expenditure was the change in real expenditure on durables, food or expenditure as a proportion of GDP.
- Capital was the change in real capital investment.
- Labour was the change in the workforce, measured either as the total or female workforce or total retail employment.

The most surprising result of the original estimations was that a negative and significant relationship existed between changes in real turnover and changes in real capital expenditure and that this result was found to be robust under a number of different regression equations. This study therefore specifically extends these results by using the same data set and takes a closer look at the changes in capital expenditure and its impact on market share and margins for large retailers.<sup>2</sup>

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<sup>2</sup> The data set used is the same as used for Morelli (2004) For further details of the data and methods see Appendix 1 and Morelli 2004, pp.678-80.

In attempting to assess the hypotheses we first examine scatter diagrams and correlation coefficients for the relationship between levels of either real turnover or changes in real turnover for large multiples with both absolute levels and changes in real capital expenditure. Figure 1 highlights the relationship between large retailers' absolute levels of real turnover and that of real net capital expenditure with each data point representing one year's aggregated data for all large retailers measured at constant 1990 prices. As can be seen there appears to be a strongly positive trend in the data, borne out by the correlation coefficient of 0.936 in Table 1. Table 1 demonstrates that similar trends also appear in the data for both market share and margins with correlation coefficients of 0.873 and 0.920 respectively. However, such trends are to be expected in time series data and give rise to autocorrelation problems when assessing the impact of changes over time. Thus once we begin to remove the impact of time trends with for example using changes in variables rather than absolute values a very different picture begins to emerge. Figure 2 highlights the relationship between real turnover with changes real net capital expenditure.

	Turnover	Change in Turnover	Market Share	Change in Market Share	Real Gross Margins	Change in Real Gross Margins
Real Net Capital Expenditure	0.936	0.227	0.873	0.139	0.920	0.315
Change in Real Net Capital Expenditure	-0.042	0.432	-0.071	0.031	-0.033	0.500

Source: *Business Monitor* 1976-1994.

As can be seen there appears to be two clusters of data, the first exhibiting a positive trend at lower levels of turnover, ranging from £55-£75b, while a second less discernable trend appears at higher levels of turnover, £75b and above. A correlation coefficient of -0.042 in Table 1 suggests a weakly negative relationship exists between these sets of data which again is replicated when we use market share or real gross margins instead of turnover. Finally, when we examine the relationship between changes in real turnover and changes in real net capital

expenditure in Figure 3 we see a weakly positive relationship appears. Again Table 1 highlights a similar pattern emerges if we use changes in market share or changes in real gross margins instead of turnover. However, while scatter diagrams and correlation coefficients for turnover, market share and margins all appear to be similar, as we now demonstrate, once we use regression analysis to decompose these relationships we see that significant differences appear.

INSERT FIGS 1 – 3 HERE

### **Section 3 OLS Regressions and Results**

Tables 2-4 show the regression analysis for the same set of regression models used by Morelli (2004) and discussed in Eqn.1 above. The dependent and explanatory variables are all measured as differences to reduce problems arising from autocorrelation noted in the scatter diagrams above. Thus changes in real turnover (Table 2), changes in market share (Table 3) and changes in real margins (Table 4) are the dependent variables respectively.

INSERT TABLES 2-4 HERE

The results in Tables 2-4 show that;

- Change in real GDP continues to show a consistently positive and significant correlation in all three types of model irrespective of whether changes in real turnover (Table 2), changes in market share (Table 3) or changes in real gross margins (Table 4) or is adopted as the dependent variable. As expected changes in retailing is highly dependent upon general economic conditions and therefore changes in GDP plays an important role determining the fortunes of the large multiple retailers.
- In all three sets of regression equations changes in population are similarly consistently positive and significantly related to the dependent variable while changes in the total

workforce are consistently negative and significantly related to the dependent variables. The results suggest that while population provides an important demand driver for retail growth changes in wider employment opportunities outside of the retail sector, especially for women, provided limits on the growth of the sector in the golden age.

- The variety of consumer expenditure measures used in the three sets of equations again show consistency in their negative correlation with each of the dependent variables. Although in the case of market share equations 2 and 4 (Table 3) we also gained significant correlations with changes in expenditure on consumer durables and changes in expenditure as a percentage of GDP for large multiples market share. These results are again consistent with our understanding of large-scale retailing in this period with its broadening scope of operations into new product markets as firms responded to limits on growth in turnover, margins or market share deriving from limits on scale increases in existing product markets.
- Retail employment is positive and significantly related to the dependent variable in the real turnover (Table 2) and real gross margins (Table 4) models and positive but insignificantly related in market share (Table 3) models. This again is consistent with explanations linked to the importance of labour for the golden age. Rising labour productivity played an important role in the development of large retailers' plans as firms became more capital intensive. That change in retail employment is consistently signed but insignificant in the case of market share (Table 3) in contrast to real turnover (Table 2) and real gross margins (Table 4) models suggests retail employment is not having a direct impact on market share.
- Of most significant for this study, however, are the differences in the relationships between changes in real turnover, changes in market share and changes in real gross margins with changes in real net capital expenditure. The regression results show that while real net capital expenditure is both negatively and significantly correlated with changes in real turnover (Table 2, Eqs 1-9) we find that when both changes in market share (Table 3, Eqs1-9) and

changes in real gross margins (Table 4, Eqs 1-9) are used as the dependent variable a positive and significant relationship emerges with changes in real net capital investment. Further, again consistently across all regressions in Tables 2-4, we find that varying our measure of capital investment does not significantly change these relationships.

That a positive and significant relationship exists between market share (Table 3) and real gross margins (Table 4) with real net capital investment, in contrast to the negative relationship with real turnover (Table 2), is positive evidence for both hypothesis 1; retailers' market share is positively related to capital investment and hypothesis 2; margins are positively linked with capital investment.

Capital investment leading to new store development ensured a spatial monopoly developed which allowed retailers to increase market share and provided an opportunity to maximise profits through the reduction of competitive pressures as suggested in hypotheses 1. Further, capital investment was indeed central to the development of new forms of supply-chain management. Increased margins derived from this investment reflected large retailers' success in maximising profits through the capture of value within the value chain. Thus large retailers were able to utilise capital investment, in the forms of supply-chain management, to consistently increase their market power as suggested in hypotheses 2.

## **Conclusions**

This paper has developed a more detailed quantitative approach to the golden age of British retailing than has previously been undertaken. Developing the themes raised by Morelli (2004) this paper has provided answers to the perplexing question of how capital investment was used during this key period of retail change in the UK. The paper has shown that large retailing firms proved very adept at utilising capital investment to effectively alter the retail environment. It has

demonstrated that the welfare and competition concerns raised over the impact of a more concentrated retail space were indeed valid and should not be under-estimated.

Capital investment led to both a new spatial geography of retailing and to major changes in the supply chain for consumer goods. Significant benefits of these changes, as this paper makes clear were captured by the larger retailers through rising market share and margins at the expense of both organisations lower down the supply chain and consumer prices at the end of the supply chain. The golden age then did not simply see the emergence of firm level efficient systems of retail distribution in which government interests in food safety and regulation could be devolved. Instead the paper suggests that the concerns raised over food safety, a spatially polarised society in which non-car owners were increasingly excluded from consumer markets and competition policy's increasingly failure to respond to the complexities of spatial monopoly power were justified.

The results of this paper suggest that our understanding of large-scale retailing needs to be understood within a context of profit maximisation developed through retailing firms' effective restructuring of spatial markets and network relationships (Wrigley 2000). As a result this paper reinforces the need for a political economy approach to retailing in our research.

Finally, it should be noted that this paper's examination of relationships between retail turnover, market share and margins with capital investment has been at an industry level. It does not include a disaggregation by retail sub-sector. However, given that the importance between sub-sectors has undergone significant changes through the golden age it may well be that these relationships do not hold for all sub-sectors. However, while such an examination is beyond the scope of this study this paper demonstrates that it is now feasible to examine these questions.

Table 2 Regression Results for Change in Real Turnover for Large Multiple Retailers

	Eq(1)	Eq(2)	Eq(3)	Eq(4)	Eq(5)	Eq(6)	Eq(7)	Eq(8)	Eq(9)
C	18.28 (7.168)	14.70 (7.40)	15.90 (5.996)	18.32 (7.011)	-8.66 (6.096)	4.32 (4.500)	13.446 (19.925)	6.595 (6.445)	14.43 (11.44)
Δ GDP	1.5266* (0.322)	1.670* (0.295)	1.949* (0.398)	1.248* (0.281)	1.601* (0.390)	1.540* (0.427)	1.615* (0.535)	2.431* (0.3875)	1.669* (0.478)
Δ Population Total	0.093* (0.030)				0.082* (0.032)	0.036 (0.032)	0.096* (0.040)	0.085* (0.026)	0.102* (0.046)
Δ Population Female		0.227* (0.055)	0.125* (0.050)	0.196* (0.061)					
Δ Expenditure Durables	-0.006* (0.003)	-0.008* (0.003)			-0.009* (0.003)	-0.007* (0.004)	-0.006* (0.003)	-0.005* (0.003)	-0.006* (0.003)
Δ Expenditure Food			-0.004* (0.001)						
Δ Expenditure as %GDP				-0.288 (0.201)					
Real Capital Investment	-0.790* (0.269)	-0.849* (0.241)	-0.758* (0.244)	-0.859* (0.309)			-0.779* (0.258)	-1.833* (0.347)	-0.893* (0.3666)
Δ in Stock Levels					2.268* (0.846)				
Δ in Capital Investment						-0.260** (0.658)			
Interest Rate							0.0357 (1.216)		
Δ Workforce Total		-0.015* (0.004)	-0.015* (0.003)	-0.012* (0.005)			-0.042* (0.019)		
Δ Workforce Female	-0.038* (0.009)				-0.056* (0.014)	-0.039* (0.010)		-0.052** (0.010)	-0.044* (0.018)
Δ Retail Employment	0.273* (0.059)	0.278* (0.050)	0.295* (0.040)	0.287* (0.059)	0.177* (0.090)	0.262* (0.077)	0.278* (0.054)	0.286* (0.041)	0.268* (0.056)
Δ Wages in Food Sector								1.283* (0.384)	
Δ Wages in Distribution									0.234 (0.462)
DW	2.03	1.94	2.61	2.37	1.96	1.61	2.02	2.63	1.96
Adj R <sup>2</sup>	0.87	0.89	0.90	0.86	0.89	0.82	0.86	0.92	0.86

Source Morelli (2004). Standard errors in parenthesis: \* significant at 5% level \*\* significant at 10% level N = 17 per variable

Table 3 Regression Results for Change in Market Share for Large Multiple Retailers

	Eq(1)	Eq(2)	Eq(3)	Eq(4)	Eq(5)	Eq(6)	Eq(7)	Eq(8)	Eq(9)
C	0.48 (0.017)	0.468 (0.019)	0.465 (0.019)	0.476 (0.014)	0.55 (0.02)	0.53 (0.011)	0.54 (0.03)	0.478 (0.02)	0.51 (0.02)
Δ GDP	0.001** (0.0008)	0.0017* (0.0009)	0.0018* (0.001)	0.001 (0.0006)	0.001 (0.001)	0.002** (0.001)	0.0003 (0.0006)	0.001 (0.001)	0.0002 (0.0005)
Δ Population Total	0.003* (0.0009)				0.0004* (0.0001)	0.0005* (7.7E-05)	0.0002* (7.8E-05)	0.0003* (9.6E-05)	0.0002* (7.4E-05)
Δ Population Female		0.0005* (0.0002)	0.0004* (0.0002)	0.0004** (0.0001)					
Δ Expenditure Durables	-7.7E-06 (6.8E-06)	-1.2E-05* (6.8E-06)			-5.3E-07 (8.6E-06)	-5.3E-06 (9.4E-06)	-5.3E-06 (6.3E-06)	-7.6E-06 (6.9E-06)	-5.6E-06 (4.8E-06)
Δ Expenditure Food			-4.2E-06 (3.8E-06)						
Δ Expenditure as %GDP				-0.001* (0.0004)					
Real Capital Investment	0.003* (0.001)	0.003* (0.0009)	0.003* (0.0008)	0.003* (0.0006)			0.003* (0.0008)	0.003** (0.002)	0.004* (0.0006)
Δ in Stock Levels					-0.004 (0.003)				
Δ in Capital Investment						-0.002 (0.002)			
Interest Rate							-0.005* (0.002)		
Δ Workforce Total		-4.0E-05* (1.2E-05)	-4.0E-05* (1.27E-05)	-3.0E-05* (8.9E-06)			-1.9E-05** (1.07E-05)		
Δ Workforce Female	-0.0001* (0.0003)				-6.97E-05** (4.06E-05)	-0.0001* (3.1E-05)		-0.0001* (3.4E-05)	-5.1E-05* (2.5E-05)
Δ Retail Employment	0.0001 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0001 (0.0002)	0.0003 (0.0003)	0.0001 (0.0002)	7.6E-05 (0.0001)	0.0001 (0.0001)	0.0002** (0.0001)
Δ Wages in Food Sector								3.0E-05 (0.002)	
Δ Wages in Distribution									-0.002* (0.0004)
DW	2.17	1.81	1.60	1.86	1.35	1.55	2.15	2.16	2.30
Adj R2	0.86	0.82	0.82	0.88	0.78	0.75	0.90	0.84	0.92

Standard errors in parenthesis

\* significant at 5% level

\*\* significant at 10% level

N = 17 per variable

Table 4 Regression Results for Changes in Gross Margins for Large Multiple Retailers

	Eq(1)	Eq(2)	Eq(3)	Eq(4)	Eq(5)	Eq(6)	Eq(7)	Eq(8)	Eq(9)
C	105.4 (11.97)	95.51 (12.48)	95.19 (11.82)	97.44 (12.48)	152.7 (10.287)	145.3 (8.19)	123.5 (28.45)	99.48 (10.72)	114.45 (14.70)
Δ GDP	0.363 (0.381)	0.424 (0.490)	0.485 (0.584)	0.338 (0.393)	0.763 (0.693)	0.951 (0.634)	-0.234 (0.614)	0.764 (0.687)	-0.250 (0.521)
Δ Population Total	0.161 (0.545)*				0.322* (0.056)	0.347* (0.043)	0.127* (0.057)	0.163* (0.060)	0.122* (0.049)
Δ Population Female		0.289 (0.127)*	0.270* (0.120)	0.294* (0.127)					
Δ Expenditure Durables	0.001 (0.004)	-0.002 (0.005)			0.003 (0.012)	0.002 (0.012)	0.003 (0.007)	0.001 (0.004)	0.003 (0.005)
Δ Expenditure Food			-0.0008 (0.0002)						
Δ Expenditure as %GDP				-0.224 (0.356)					
Real Capital Investment	2.400* (0.592)	2.683* (0.619)	2.713* (0.585)	2.646* (0.576)			2.510* (0.665)	1.920** (1.137)	2.917* (0.561)
Δ in Stock Levels					-1.131 (1.424)				
Δ in Capital Investment						-0.462 (1.359)			
Interest Rate							-1.915 (1.732)		
Δ Workforce Total	-0.066 (0.016)*	-0.026 (0.008)*	-0.025* (0.007)	-0.023* (0.007)			-0.015 (0.010)		
Δ Workforce Female					-0.06* (0.027)	-0.067* (0.022)		-0.070* (0.019)	-0.039** (0.020)
Δ Retail Employment	0.191 (0.075)*	0.209* (0.093)	0.210* (0.009)	0.197* (0.092)	0.228 (0.154)	0.169 (0.125)	0.172* (0.067)	0.186* (0.087)	0.205* (0.061)
Δ Wages in Food Sector								0.575 (0.915)	
Δ Wages in Distribution									-0.833** (0.442)
DW	1.48	1.36	1.33	1.29	1.07	1.04	1.46	1.40	1.54
Adj R <sup>2</sup>	0.94	0.91	0.91	0.92	0.80	0.80	0.93	0.93	0.94

Standard errors in parenthesis

\* significant at 5% level

\*\* significant at 10% level

N = 17 per variable

## Appendix 1

The following appendix outlines some of the data issues, variable selection and model specifications contained in the analysis above. The data is the same data set used in the original article (Morelli, 2004) and therefore is consistent with the earlier results. Below we repeat features outlined in the original article with additional points where necessary. For further details readers are encouraged to refer to the original paper and contact the author direct.

### Data Series.

#### Model Assumptions & Specification

*Business Monitor* provides data for large multiples, defined as businesses with ten or more outlets, on turnover, gross margins, number of businesses and outlets, number of persons engaged, net stock changes and net capital expenditure. This was combined with data derived from the official government publication *Annual Abstract of Statistics*, for the growth in total population, female population, total labour force, female labour force, household expenditure on goods and services, durable goods and food and the International Monetary Fund's *International Financial Statistics Yearbook* for data on the growth of GDP, changes in interest rates, changes in UK average earnings within the distributive trades, and the GDP deflator for calculating all prices at real 1990 levels.

Variables were examined in absolute, real, lagged and ratio forms. The most significant limitation, however, was the restriction placed on the analysis by the limited degrees of freedom available for the regression equations, due to the short

time-span of the data set. Autocorrelation problems also emerged once extra variables are included in the regressions. Tables 2-4 highlight a variety of regressions equations to illustrate the extent of substitutability of explanatory variables for one another.

The model does not however include variables for spatial and urbanisation effects unlike Hall, et.al., (1961). However, the high levels of urbanisation in Britain by the late 20<sup>th</sup> century suggests that urbanisation effects, where they exist, may be less significant than for earlier studies.

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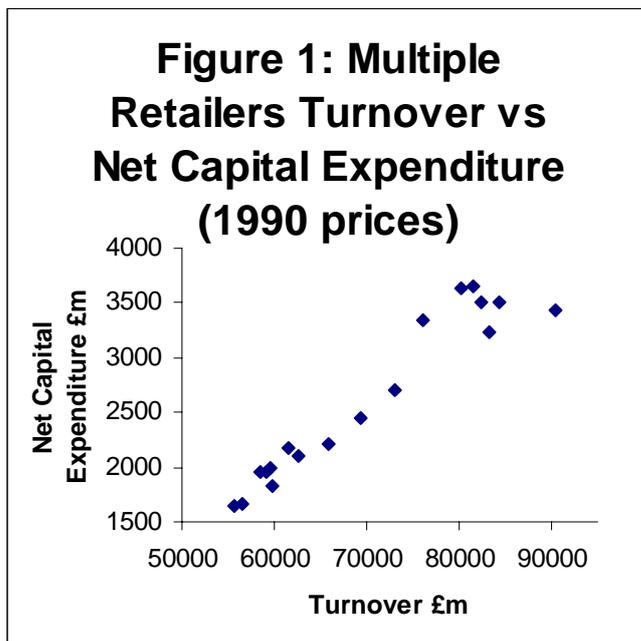
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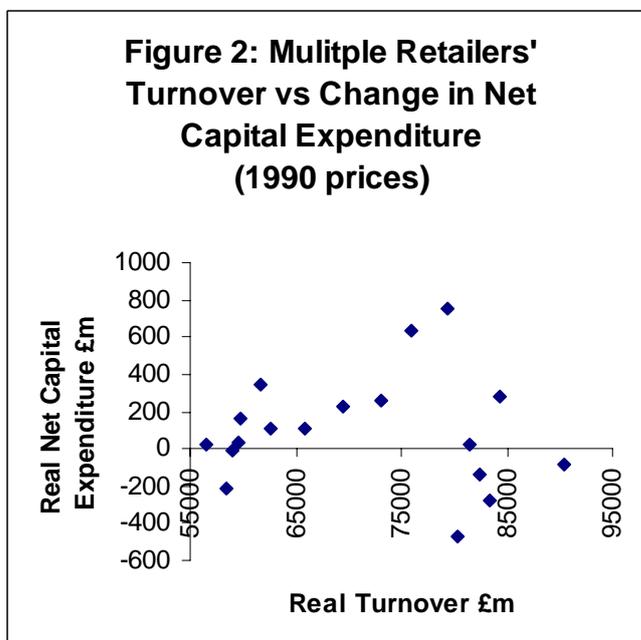
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Figure 1



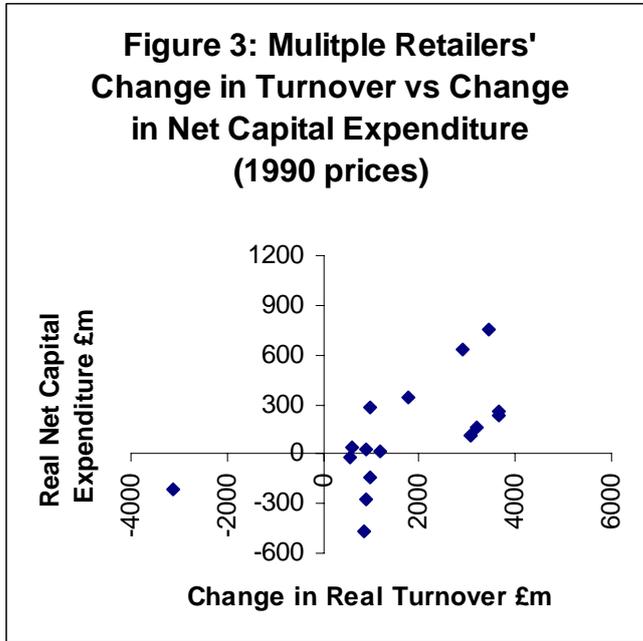
Source: Business Monitor 1976-1994

Figure 2



Source: Business Monitor 1976-1994

Figure 3



Source: Business Monitor 1976-1994