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# The distress of Marks & Spencer PLC in 2001: A multidimensional scaling analysis

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**ABSTRACT**
Marks & Spencer PLC, one of the largest retail companies in the UK, went through a difficult period in 2001. Drastic measures were taken to turn the company around. This paper attempts to put the problems of the company within the context of its industry. The methodology used for the study is based on Multidimensional Scaling, a multivariate technique that serves to represent the main features of the data, and brings its most salient aspects to the fore.
It was found that Marks & Spencer PLC had been loosing ground with respect to other companies in the same industry. Management action appears to have been related to a loss of confidence on the part of the financial markets.

**Keywords:** Failure prediction models, company distress, multivariate statistics, multidimensional scaling, Marks & Spencer PLC.

## Los problemas de Marks & Spencer PLC en el 2001: Análisis de escalamiento multidimensional

**RESUMEN**
La compañía Marks & Spencer, tras un sorprendente período de dificultades, cerró sus tiendas no situadas en el Reino Unido. ¿Qué fue lo que le llevó a tomar tan drásticas medidas? En este trabajo se sitúa la crisis de la compañía en el contexto de los demás grandes almacenes en el Reino Unido y se demuestra que una política de no disminuir la distribución de dividendos, condujo a un pago excesivo de impuestos, y una bajada en la rentabilidad. Todo ello se reflejó en una caída del precio de las acciones. La decisión de cerrar sus tiendas en el extranjero fue un intento de retomar su imagen de empresa de calle mayor. Se usan técnicas de estadística multivariante, especialmente las que visualizan resultados estadísticos en forma de mapas que permiten añadir información cualitativa.

**Palabras clave:** predicción del fracaso empresarial, ratios financieros, estadística multivariante, escalas multidimensionales.



## 1. INTRODUCTION

Marks and Spencer PLC (M&S) has «long been regarded as one of the most spectacular corporate successes in the UK. It has also been widely recognized as one of the best-managed companies in Europe» (Tse, 1985). It has been described as a pioneer, innovator and market leader, but things have changed much in recent times. It has been on the decline since 1998. Newspaper headlines have included «M&S miss the party», «Now for some Christmas cheers amid M&S gloom» and «Suicide on the High Street». A question on many peoples lips is 'What's happened?'. This paper addresses this very question.

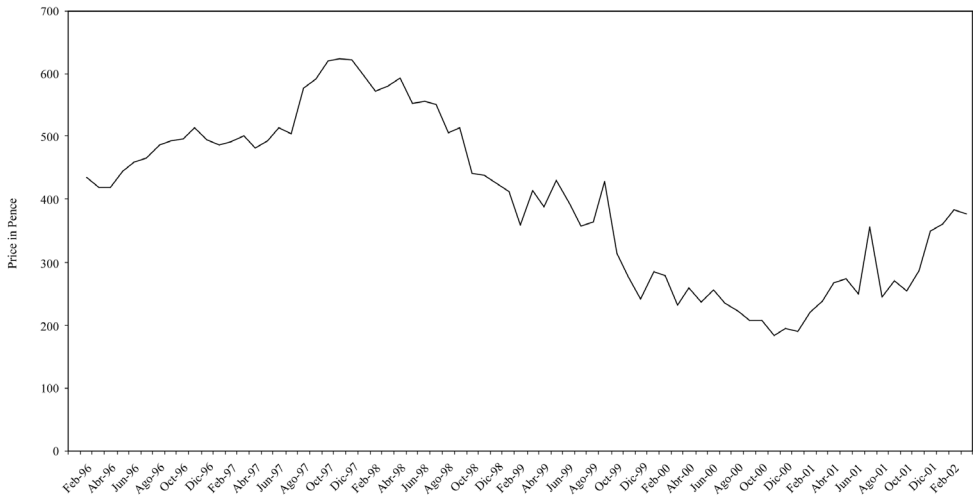
Throughout the 115 year history M&S has grown from a penny bazaar with the slogan 'don't ask the price - it's a penny' to a retailing giant with 310 stores as at 30 September 2001. Since memorably exceeding £1 billion profits in 1997 for the first time, then increasing further in 1998 to nearly £1.2 billion, M&S has not been performing well. Profits dropped sharply in 1999 to nearly half the 1998 level then fell further to £145.5 million in 2001, less than a tenth of the 1998 figure. Since this drop in profits M&S has been the topic of much speculation.

Share prices for M&S show a peak at the end of 1997 and a continual decline into 2001, as it is clear in Figure 1. This is consistent with changes in profit over this time, as can be seen in Table 1. But M&S is only one the companies that operate in the retail industry; it cannot be assessed in isolation. Are we seeing a company crisis or an industry crisis?

**Table 1. M&S profits**

| Year | Pre-tax Profits £m |
|---|---|
| 1995 | 924.3 |
| 1996 | 965.8 |
| 1997 | 1,102.0 |
| 1998 | 1,168.0 |
| 1999 | 546.1 |
| 2000 | 417.5 |
| 2001 | 145.5 |
| Interim 2002 | 213.3 (before exceptional items) |

**Figura 1: Share Price for Marks and Spencer from January 1996 to February 2002**




Thus, the issue is whether M&S was approaching bankruptcy, or whether the industry was experiencing a low moment in the economic cycle. If M&S was facing difficulties, is it because it was thought that its reservoir of liquid assets was not replenishing at the correct rate and the firm was unlikely to be able to pay its obligations in the future, as Beaver (1966) would have put it?

Have models of corporate failure prediction anything to say in this particular case? The study of corporate failure has a long pedigree. Ohlson (1980) identifies four basic factors that affect the probability of failure (within one year): size, financial structure, profitability, and liquidity. Rees (1990, p 394)) suggests that there are many possible causes of insolvency, including: low and declining real profitability; inappropriate diversification; deteriorating financial structures; inadequate control over working capital and failure to eliminate actual or potential loss-making activities.

The traditional way to study most of these characteristics of a firm is through the use of financial ratios; Argenti (1976). Financial ratios play a significant role as indicators of corporate 'success' or 'failure' in failure prediction models.
Ratio analysis has been a tool used in the interpretation and evaluation of financial statements for investment decision making since the late 1800's (Lev, 1974).

Different ratios study different aspects of the firm. Several classifications of financial ratios have been suggested in order to structure the financial analysis of a firm; see, for example, Elliott and Elliott (2001).

The limitations of financial ratio analysis are highlighted by Argenti (1976) as follows:

1. Ratios may show that something is wrong and a sequence over time may show that it is getting worse, but this may not be a symptom of failure;

2. since a ratio is the comparison of one figure to another, unless both the figures are subject to the same rate of inflation, any comparison over time is invalid; and
3. once it is clear to managers that all is not well within the company, managers may use creative accounting in order to hide such symptoms.

Despite all its limitations, it has long been claimed that the ratio structure of failed companies differs from the ratio structure of successful ones up to five years prior to failure; Mar Molinero and Ezzamel (1991). This study will, therefore, use financial ratio analysis in order to explore the M&S crisis.

In this paper we use Multidimensional Scaling (MDS) methods in order to trace the evolution of M&S within its industry. A good introduction to MDS is given in Kruskal and Wish (1984). A review of MDS in management is given by Mar Molinero and Serrano Cinca (2001). The next section contains a description of the data used for the study. It is followed by its statistical analysis, which results in the creation of multidimensional scaling maps of the industry. The maps are then interpreted using the technique of Property Fitting (ProFit). Once the information content of the MDS maps is fully understood, it is possible to explore the evolution of M&S within its industry. The paper ends with a concluding section.

## 2. THE DATA

Data was obtained on continuing and failed companies from the General Retailer sector. This sector encompasses Soft Goods, Hardware and Multi-departments. M&S is classified as a Multi-department store.

The list of continuing companies was taken from the London Stock Exchange (LSE) as at 31 July 2001. A DataStream search was used to find financial statement information. Only one year data was obtained for continuing companies, except for M&S, for which four year data was obtained.

Failed companies were also restricted to the General Retailer sector, and to the period commencing 1990. A failed company was classified either as gone into liquidation, receivership or administration. Companies located on DataStream were checked on www.insolvency.co.uk for validity, and then double-checked on DataStream for the correct failure date.

The final data set contained 69 firms, of which 63 were continuing firms and 6 were failed firms. The names of the companies can be seen in Tables 2 and 3.

**Table 2. List of continuing companies**

| | |
|---|---|
| 1 | Alexon Group |
| 2 | Allders |
| 3 | Arcadia Group |
| 4 | Ashley, Laura |
| 5 | Austin Reed Group |

**Table 2. List of continuing companies (Continue)**

| | |
|---|---|
| 6 | Beale |
| 7 | Beattie (James) |
| 8 | Blacks Leisure |
| 9 | Body Shop Intl. |
| 10 | Boots |
| 11 | Brown & Jackson |
| 12 | Brown (N) Group |
| 13 | Carpet Right |
| 14 | Carphone Warehouse Group |
| 15 | Clinton Cards |
| 16 | Courts |
| 17 | Debenhams |
| 18 | DFS Furniture Company |
| 19 | Dixons Group |
| 20 | Electronics Boutique |
| 21 | Findel |
| 22 | Flying Brands |
| 23 | Forminster |
| 24 | Fortnum & Mason |
| 25 | French Connection |
| 26 | Gieves & Hawkes |
| 27 | Grampian Holding |
| 28 | GUS |
| 29 | Hamleys |
| 30 | Harvey Nichols |
| 31 | Homestyle Group |
| 32 | House of Fraser |
| 33 | Hughes (TJ) |
| 34 | Jacques Vert |
| 35 | JJB Sports |
| 36 | John David Sports PLC |
| 37 | Kingfisher |
| 38 | Kleeneze |
| 39 | Lastminute.com |
| 40 | Mallett |
| 41 | Marks & Spencer PLC |
| 42 | Matalan |
| 43 | Merchant Retail |
| 44 | MFI Furniture |
| 45 | Monsoon |
| 46 | Moss Bros. Group |
| 47 | Mothercare |

**Table 2. List of continuing companies (Continue)**

| | |
|---|---|
| 48 | New Look |
| 49 | Next |
| 50 | Pacific Media |
| 51 | Partridge Fine |
| 52 | Peacock Group |
| 53 | QS Group |
| 54 | QXL Ricardo |
| 56 | Selfridges |
| 57 | Signet Group |
| 58 | Smith (WH) |
| 59 | Stylo |
| 60 | Swan (John) |
| 61 | Ted Baker |
| 62 | Topps Tiles |
| 63 | UA Group |
| 64 | Wyevale Garden Centres |

**Table 3. List of failed companies. Reason and year of failure**

| | | Reason for Failure | Year |
|---|---|---|---|
| | Bedford (William) PLC | Liquidation | 1997 |
| F1 | | | |
| F2 | Cadoro PLC | Administration | 1999 |
| F3 | Colorvision PLC | Liquidation | 1996 |
| F4 | Essex Furniture PLC | Administration | 1998 |
| F5 | Revelation Piccadilly Holding PLC | Receivership | 1999 |
| F6 | World of Leather PLC | Administration | 2000 |

An attempt was made to match failed and continuing companies by fiscal year, as well as by industry. Due to the small number of companies available, insolvent firms were not matched to healthy firms by asset size. Matching has long been debated in the literature. Jones (1987) states the advantages of matching «Bankrupt firms are often disproportionately small and concentrated in certain failing industries. If non-bankrupt firms were drawn at random, there would probably be substantial differences between the two groups in terms of size and industry. The result is that the model attempting to discriminate between failing and healthy firms may actually be distinguishing between large and small firms or between railroads and other industrials». A number of researchers, though, seem to disagree with this statement. Foster (1986) and Taffler (1982) argue that matching failed and non-failed firms by

industry, size or financial year end eliminates the predictive power of these variables, possibly resulting in a restricted, rather than a general, model of company failure.

Twenty-eight ratios were calculated from the DataStream data. The list was based on prior research and other financial accounting considerations and included ratios relating to profitability; liquidity; gearing; investment and shareholders returns. A list and description of the financial ratios used is in Table 4. Where these ratios have been found statistically significant in predicting failure in prior research this has been highlighted.

**Table 4. List of financial ratios with their definitions and details of previous use in research**

| | Ratio | Description | Used in Prior Research |
|---|---|---|---|
| **Profitability** | | | |
| **1** | Operating Profit Margin | operating profit (sales-COS)/sales * 100% | |
| **2** | Return on Capital Employed | operating profit (BIT)/ capital employed * 100% | Altman, 1968 |
| **3** | Net Asset Turnover | sales/capital employed | Altman, 1968 |
| **4** | Net Profit Margin | net profit/sales * 100% | |
| **5** | Operating Profit per Employee | operating profit/no. of employees | |
| **6** | Sales per Employee | sales/no. of employees | |
| **7** | Staff Costs Margin | wages/sales * 100% | |
| **8** | Stock Cost Margin | stock/sales * 100% | |
| **9** | Cost Margin | cost of sales/sales * 100% | |
| **10** | Profit Margin | profit before depreciation & provisions/ sales * 100% | |
| **Liquidity** | | | |
| **11** | Stock Turnover | cost of sales/closing stock | |
| **12** | Debtor Turnover | sales/total debtors | |
| **13** | Creditor Turnover | cost of sales/total creditors | |
| **14** | Current Ratio | current assets/current liabilities | Beaver, 1966 Deakin, 1972 |
| **15** | Acid Test Ratio | current assets - stock/current liabilities | Deakin, 1972 |
| **16** | Asset Utilisation | sales/working capital | Edmister, 1972 |
| **17** | Asset Utilisation II | sales/fixed assets | Neophytou & Molinero 2001 |
| **18** | Cash Flow Margin | cash earnings/sales * 100% | Deakin, 1972 |
| **19** | Cash Utilisation | cash/current liabilities | Deakin, 1972 |
| **Gearing** | | | |
| **20** | Gearing | total liabilities/capital employed | Beaver, 1966 |
| **21** | Interest Cover | profit (BIT)/interest payable | |

| | Ratio | Description | Used in Prior Research |
|---|---|---|---|
| **Shareholder Returns** | | | |
| **22** | Earnings per Share | earnings/no. of ordinary shares | |
| **23** | Tax Ratio | tax charge/profit before tax | |
| **24** | Dividend Pay-out Ratio | ordinary dividend/earnings | |
| **25** | Return on Equity | profit (BIT)/ shareholders' funds | Blum, 1974 |
| **26** | Primary Financing Ratio | shareholder's funds/ capital employed | Neophytou & Molinero 2001 |
| **27** | Return on Shareholders Capital | | |
| **28** | Return on Long-term Capital | | |

## 3. ANALYSIS

A standard problem when working with company accounts data is the presence of extreme values. MDS is robust to the presence of outliers, as calculations are based on relationships of order and not on actual values. Nevertheless, it was considered to be important to start by looking at outliers. In order to do this, all financial ratios were standardised to zero mean and unit variance, and those values that fell outside the -2.5 and +2.5 range were noted. As expected, there were some very extreme discordant observations, and this justified the use of the MDS approach.

As a first step, Factor Analysis was used in order to explore the structure of the financial ratios data set. Factors were extracted using the method of Principal Components in the SPSS package. Correlation between factors and ratios were noted in order to attach meanings to the factors. In common with other studies, eight main factors were identified. The first five —in order of the associated eigenvalue— were interpreted as follows:

— Profitability, since the highest loading financial ratios in this factor are operating profit and net profit margin;
— Working capital, since the highest loading financial ratios in this factor are current ratio, acid test ratio and cash utilisation ratio;
— Shareholders returns, since the highest loading financial ratios in this factor are return on equity and return on shareholder's capital;
— Sales, since the highest loading financial ratios are sales per employee and stock cost margin;
— Debt and capital, since the highest loading financial ratios in this factor are primary financing ratio and gearing.

No clear meaning could be found for the remaining three factors.

Factor analysis is closely related to MDS, and it offers some insights as to the structure of the financial ratios chosen, and the factors that they measure, but it is

not easy to follow the evolution of M&S just from the study of the factors involved. However, this is quite simple if we structure the situation within an MDS context.

MDS requires the calculation of a measure of proximity between companies on the basis of financial ratios. The measure chosen was Euclidean distance between standardised ratios. Given the results of factor analysis a representation in eight dimensions would have been appropriate, but this was not possible given the version of the package available, ALSCAL which only permitted a maximum of six dimensions. A representation in six dimensions was therefore created. The quality of the representation is assessed by means of goodness-of-fit statistic called stress.

MDS locates companies in the six dimensional space un such a way that if two companies have very similar ratio structures they are located next to each other in the space; and if their ratio structures are very different, they are located far apart. It is expected that the configuration derived in this way will reveal the hidden structure of the data. Sometimes a structure becomes apparent without any further analysis, but further analytical work is normally required.

A representation in a six dimensional space can only be comprehended mathematically. In this representation the location of a company in the space is given by a set of six co-ordinates. In order to visualise the representation it is necessary to project it on to pairs of dimensions. For example, the projection on to dimensions 1 and 2 can be seen in Figure 2; the projection on to dimensions 3 and 4 is shown in Figure 3; and the projection on dimensions 5 and 6, in Figure 4. In these figures, different symbols have been used for continuing companies, for failed companies, and for M&S.

The first attempt to interpret a MDS configuration is always visual inspection. We can see in Figure 2 that Dimension 1 (the horizontal axis) appears to be related to company failure, as failed companies tend to be located towards the left hand side (negative values of the co-ordinate), and continuing companies appear to be located towards the right hand side (positive values of the co-ordinate). M&S is located towards the centre of this dimension, although there was a slow drift from the right to the left hand side, a movement in the «wrong» direction. What this means will be studied below with the help of formal statistical tools.

If we concentrate on Dimension 2, the vertical axis in Figure 2, we see that all failed companies are situated on the lower half of this dimension. This has to be within the context that many continuing companies are also situated in the lower half of this dimension. M&S drifts from top to bottom in this dimension, something that appears to also be another drift in the «wrong» direction.

Turning our attention to Dimension 3, the horizontal axis in Figure 3, it is clear that all failed companies are located on the left hand side, where very few continuing companies can be found. M&S starts by taking positions towards the centre of this dimension, although more to the left than towards the right, and ends in 2001 clearly on the left, the area where failed companies are prominent.

Dimension 4, the vertical axis in Figure 3, appears not to be related to company failure or to the evolution of M&S, as the points associated with failed companies and with continuing companies do not appear to segregate into different sides of this dimension. No clear pattern emerges from M&S evolution either.

**Figure 2: Companies plotted on Dimension 1 and Dimension 2**

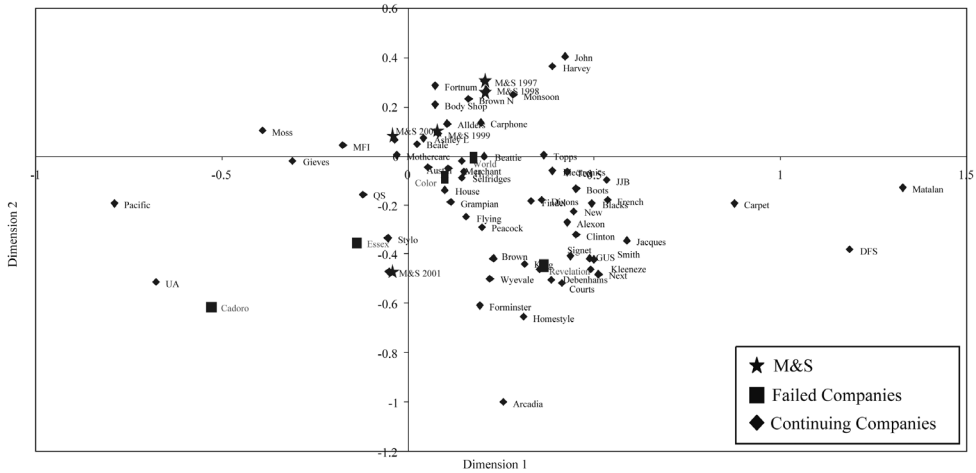
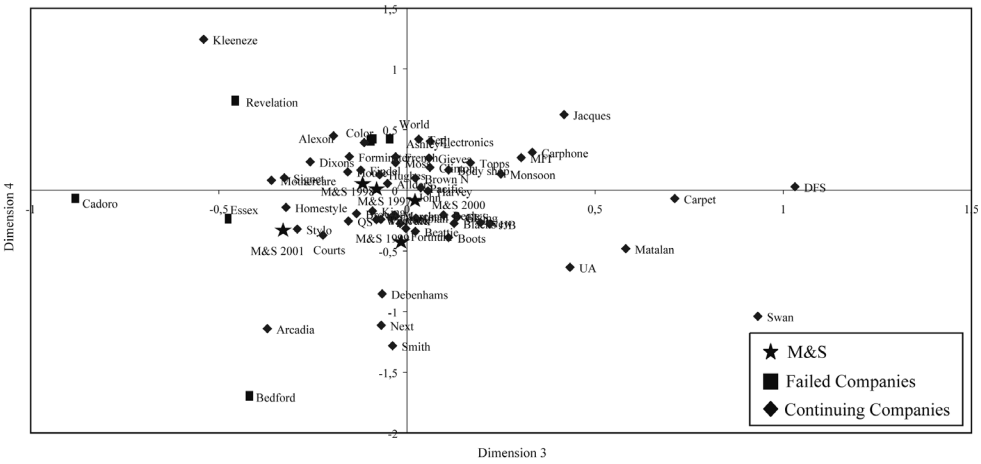


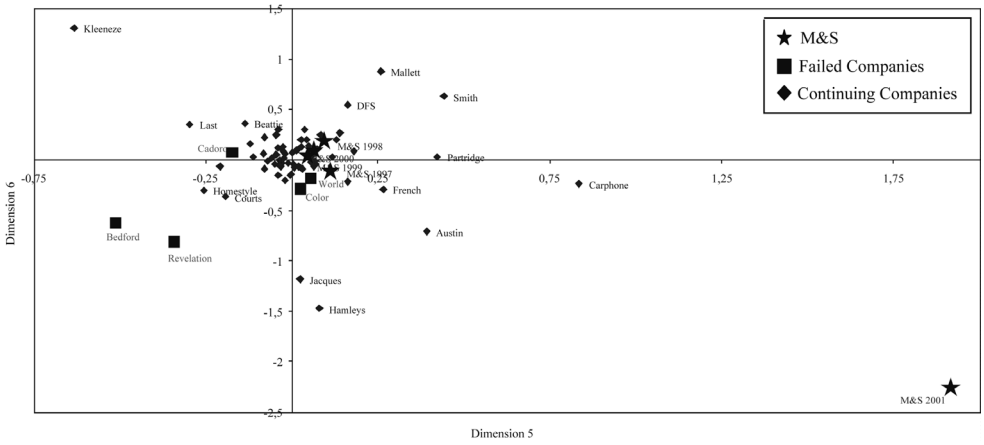

**Figure 3: Companies plotted on Dimension 3 and Dimension 4**




Dimension 5, in Figure 4, conveys a puzzling message. Not all the companies have been labelled in this figure in order not to clutter it with information; nevertheless it is clear that failed companies are situated towards the left hand side, and continuing companies towards the right hand side. M&S is located in the centre, except in 2001 when it is located towards the extreme right hand side, what is going on?

Finally, Dimension 6, also in Figure 4, also appears to have something to say about M&S. Failed companies are located at the bottom of this dimension. M&S drifts clearly from the top to the bottom, with a large jump downwards in 2001.

**Figure 4: Companies plotted on Dimension 5 and Dimension 6**




We will now proceed to explore the meaning of all these observations, and to interpret the movements of M&S in the configuration.

## 4. PROPERTY FITTING

Two questions have arisen in the previous section: «can we find out what is special about the different areas of the space where companies are located?» and «can we find out how the position of a company in the space is related to the value of its financial ratios?»

The answer to these questions is «yes». For this we will use a regression-based technique called Property Fitting. The idea is that the value of a financial ratio is related to the position of the company on the map. This statement can be written in mathematical terms:

$$\text{Value of Financial Ratio} = f\ (\text{position on the configuration})$$

But the position on the configuration is given by the coordinates. If we write as $D_i$ the value of co-ordinate i for a given company, this can be rewritten as:

$$\text{Value of Financial Ratio} = f\ (D_1, D_2, \ldots D_6, \text{residual})$$

where a residual term has been added to account for influences other than location that may affect the value of the financial ratio of a company situated in a particular point in the configuration.

In the absence of any other knowledge on functional form, we assume linearity:

$$\text{Value of Financial Ratio} = \beta_1 + \beta_1 D_1 + \beta_2 D_2 + ... + \beta_6 D_6 + \text{Error}$$

This is just a regression in which the value of the ratio for a given company is the dependent variable, and the co-ordinates of the company in the configuration are the independent variables. The results of the regression can be represented by means of a directional vector in the configuration. The end point of this vector is determined by the value of the β's; i.e., the values of the regression coefficients. For a full account of Property Fitting see Schiffman et al. (1981).

Being regression-based, the values of the regression coefficients, the β's, are influenced by the presence of extreme values. For this reason when, for a given company, the ratio took a standardised value outside the range between +2.5 and -2.5, the company was excluded from the regression. This means that a company may contribute to the calculation of some Property Fitting vectors but not to the calculation of others.

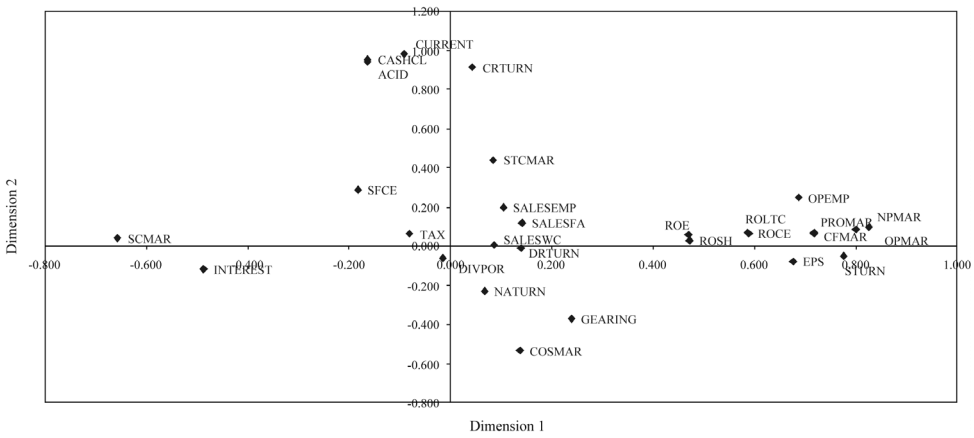
The length of the Property Fitting vector has no particular significance, only the direction in which it points is relevant, for this reason they have been normalised to unit length by making sure that:

$$\beta^2_1 + \beta^2_2 + \beta^2_3 + \beta^2_4 + \beta^2_5 + \beta^2_6 = 1$$

Since the directional vectors are located in a six dimensional space and we need to work with projections, the normalisation emphasises the contribution that a directional vector has on the interpretation of a configuration. If the end point of a directional vector is located at the origin of co-ordinates, this vector is orthogonal to the projection under examination and has no part in its interpretation. If the end point of the directional vector is located far apart from the origin, then this vector is important in the interpretation of the configuration.

All the financial ratios used in the calculation of the MDS configuration were treated as properties and the end point of the associated directional vector was cal-

**Figure 5: ProFit analysis. Projection of end points of directional vectors on Dimension 1 and Dimension 2**



culated. These end points were projected on Figures 2, 3, and 4. Figure 5 gives the projection of the end points associated with the financial ratios in Dimensions 1 and 2. Figure 5 gives the wind rose that helps to interpret Figure 2.

We will now proceed to attach meanings to the various dimensions. Given the close relationship that exists between Principal Components Analysis, Factor Analysis, and MDS it is to be expected that dimensions in MDS will take similar meanings as factors in Factor Analysis. Interpretation is based on the quality of the Property Fitting results, as given by the statistic $R^2$, and on the financial ratios whose end points project far from the origin of co-ordinates. Full statistical results for Property Fitting are given in Table 5.

**Table 5. Property Fitting results. Values in brackets are significance levels**

| Variable Name | $R^2$ | Dim 1 | Dim 2 | Dim 3 | Dim 4 | Dim 5 | Dim 6 |
|---|---|---|---|---|---|---|---|
| **ROE** | **72,8%** | 0,470 | 0,057 | 0,810 | -0,155 | 0,157 | -0,266 |
| | | (0.000) | (0.411) | (0.000) | (0.122) | (0.237) | (0.047) |
| **ROSH** | **82,4%** | 0,472 | 0,029 | 0,763 | -0,066 | 0,096 | -0,426 |
| | | (0.000) | (0.560) | (0.000) | (0.364) | (0.323) | (0.000) |
| **ROLTC** | **82,0%** | 0,589 | 0,061 | 0,687 | 0,061 | 0,014 | 0,416 |
| | | (0.000) | (0.305) | (0.000) | (0.473) | (0.899) | (0.000) |
| **ROCE** | **83,5%** | 0,586 | 0,065 | 0,693 | 0,069 | 0,017 | 0,408 |
| | | (0.000) | (0.249) | (0.000) | (0.398) | (0.872) | (0.000) |
| **PROMAR** | **95,9%** | 0,717 | 0,064 | -0,610 | -0,320 | 0,023 | 0,081 |
| | | (0.000) | (0.034) | (0.000) | (0.000) | (0.692) | (0.158) |
| **OPMAR** | **96,1%** | 0,800 | 0,085 | -0,504 | -0,302 | 0,048 | -0,065 |
| | | (0.000) | (0.006) | (0.000) | (0.000) | (0.414) | (0.267) |
| **NPMAR** | **95,9%** | 0,826 | 0,096 | -0,461 | -0,301 | 0,054 | -0,058 |
| | | (0.000) | (0.004) | (0.000) | (0.000) | (0.377) | (0.341) |
| **CFMAR** | **95,7%** | 0,718 | 0,068 | -0,605 | -0,325 | 0,023 | -0,078 |
| | | (0.000) | (0.027 | (0.000) | (0.000) | (0.699) | (0.182) |
| **SALESFA** | **58,9%** | 0,141 | 0,119 | -0,187 | 0,959 | -0,024 | -0,101 |
| | | (0.013) | (0.115) | (0.052) | (0.000) | (0.865) | (0.482) |
| **SALESWC** | **44,9%** | 0,086 | 0,006 | 0,149 | 0,073 | -0,932 | -0,522 |
| | | (0.105) | (0.931) | (0.102) | (0.478) | (0.000) | (0.000) |
| **STURN** | **43,4%** | 0,775 | -0,052 | 0,503 | -0,332 | 0,171 | 0,071 |
| | | (0.000) | (0.758) | (0.022) | (0.180) | (0.600) | (0.827) |
| **DRTURN** | **42,1%** | 0,139 | -0,011 | 0,095 | -0,189 | -0,448 | 0,857 |
| | | (0.021) | (0.891) | (0.351) | (0.106) | (0.005) | (0.000) |
| **CRTURN** | **80,6%** | 0,044 | 0,915 | -0,039 | -0,365 | -0,003 | -0,162 |
| | | (0.325) | (0.000) | (0.609) | (0.000) | (0.976) | (0.163) |
| **GEARING** | **16,9%** | 0,239 | -0,374 | -0,021 | 0,150 | -0,507 | -0,723 |
| | | (0.069) | (0.037) | (0.926) | (0.559) | (0.140) | (0.036) |
| **CURRENT** | **95,4%** | -0,092 | 0,979 | -0,040 | -0,158 | -0,046 | -0,063 |
| | | (0.000) | (0.000) | (0.258) | (0.000) | (0.389) | (0.234) |
| **ACID** | **95,8%** | -0,162 | 0,942 | 0,130 | -0,275 | -0,013 | -0,108 |
| | | (0.000) | (0.000) | (0.700) | (0.000) | (0.794) | (0.034) |

| Variable Name | $R^2$ | Dim 1 | Dim 2 | Dim 3 | Dim 4 | Dim 5 | Dim 6 |
|---|---|---|---|---|---|---|---|
| **CASHCL** | **94,7%** | -0,164 | 0,951 | 0,010 | -0,248 | -0,088 | -0,020 |
| | | (0.000) | (0.000) | (0.788) | (0.000) | (0.130) | (0.727) |
| **TAX** | **42,2%** | -0,080 | 0,060 | -0,049 | -0,079 | 0,959 | 0,251 |
| | | (0.154) | (0.430) | (0.606) | (0.469) | (0.000) | (0.085) |
| **SALESEMP** | **75,0%** | 0,104 | 0,199 | -0,186 | 0,926 | 0,205 | 0,121 |
| | | (0.007) | (0.000) | (0.006) | (0.000) | (0.042) | (0.224) |
| **OPEMP** | **90,2%** | 0,686 | 0,249 | 0,040 | 0,637 | 0,200 | 0,137 |
| | | (0.000) | (0.000) | (0.499) | (0.000) | (0.027) | (0.124) |
| **EPS** | **26,0%** | 0,677 | -0,080 | 0,156 | -0,667 | 0,132 | 0,218 |
| | | (0.000) | (0.714) | (0.576) | (0.039) | (0.753) | (0.603) |
| **NATURN** | **14,3%** | 0,068 | -0,231 | -0,114 | -0,762 | 0,411 | 0,424 |
| | | (0.633) | (0.235) | (0.644) | (0.008) | (0.272) | (0.255) |
| **SCMAR** | **96,1%** | -0,656 | 0,040 | 0,682 | 0,301 | -0,105 | 0,042 |
| | | (0.000) | (0.151) | (0.000) | (0.000) | (0.049) | (0.429) |
| **STCMAR** | **74,9%** | 0,084 | 0,439 | -0,185 | 0,875 | 0,002 | 0,027 |
| | | (0.038) | (0.000) | (0.009) | (0.000) | (0.985) | (0.798) |
| **COSMAR** | **45,9%** | 0,138 | -0,534 | -0,598 | -0,148 | -0,127 | 0,548 |
| | | (0.086) | (0.000) | (0.000) | (0.341) | (0.538) | (0.009) |
| **INTEREST** | **79,1%** | -0,486 | -0,120 | -0,839 | -0,085 | -0,152 | -0,125 |
| | | (0.000) | (0.054) | (0.000) | (0.341) | (0.198) | (0.287) |
| **DIVPOR** | **41,0%** | -0,016 | -0,063 | -0,030 | -0,038 | 0,629 | -0,773 |
| | | (0.777) | (0.412) | (0.763) | (0.736) | (0.000) | (0.000) |
| **SFCE** | **37,4%** | -0,183 | 0,287 | -0,189 | -0,187 | 0,199 | 0,880 |
| | | (0.011) | (0.003) | (0.120) | (0.177) | (0.279) | (0.000) |

Vectors whose extreme points are far from the origin in Figure 5 are, on the right hand side of Dimension 1, Operating Profit per Employee (OPEMP), Net Profit Margin (NPMAR) and Stock Turnover (STURN). These are measures of profitability. On the left hand side of Dimension 1 one finds Stock Cost Margin (SCMAR) and Interest Cover (INTEREST). These imply costs, which reduces profitability. Thus Dimension 1 can be labelled «profitability».

Also in Figure 5, if we concentrate on the vertical axis, Dimension 2, we find towards the top such ratios as Current Ratio (CURRENT), Acid Test Ratio (ACID), Cash Utilisation (CASHCL) and Creditor Turnover (CRTURN). These are measures of working capital. At the other extreme of Dimension 2 we find Cost of Sales Margin (COSMAR) and Gearing (GEARING). We label Dimension 2 as short term debt, or «liquidity».

To interpret Dimensions 3 and 4 we turn to Figure 6, which shows the projection of the end points of the directional vectors on these dimensions. Examining this figure, it can be seen that on the right hand side ratios including Return on Equity (ROE), Return on Shareholders Capital (ROSH), Return on Capital Employed (ROCE) and Return on Long Term Capital (ROLTC) are located. These characterise «market profitability» in terms of shareholder returns and stock market opinion of the company, and describe Dimension 3.

Also in Figure 6, when the vertical axis is examined, the financial ratios Asset Utilisation (SALESFA), Sales per Employee (SALESEMP) and Stock Cost Margin (STCMAR) can be seen at the top of the chart, while Net Asset Turnover (NATURN) is on the bottom. These characteristics represent effects on «sales and capital employed», where a larger investment in stock and subsequent increase in sales would increase the Asset Utilisation ratio and the Sales per Employee ratio but the rise in capital employed would lead to either a static or decreasing Net Asset Turnover. These depict Dimension 4.

**Figure 6: ProFit analysis. Projection of end points of directional vectors on Dimension 3 and Dimension 4**

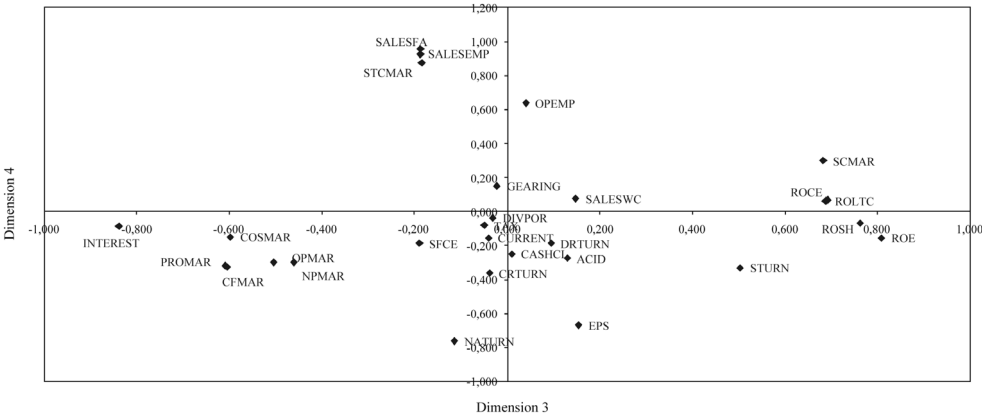
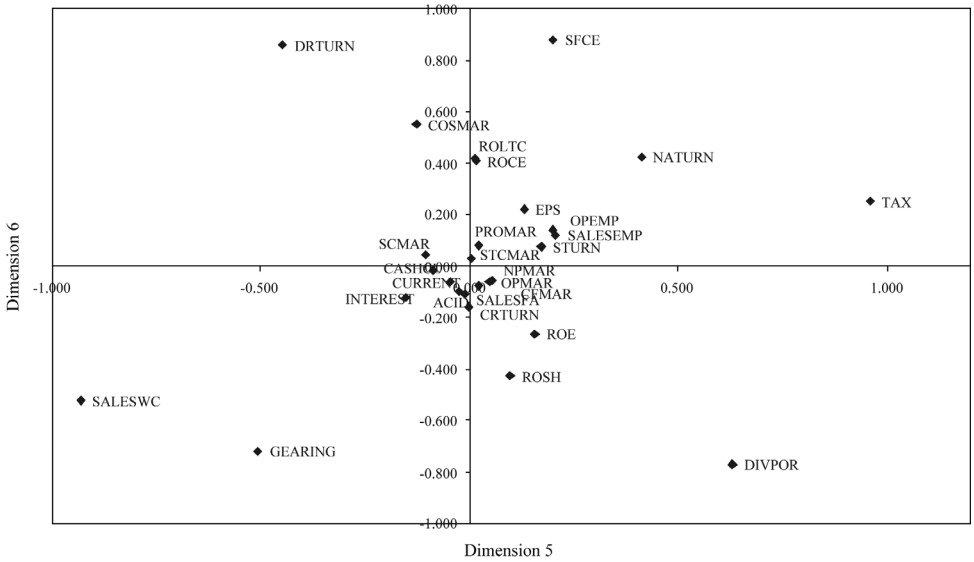



Figure 7, shows projections on Dimensions 5 and 6. Financial ratios Tax Ratio (TAX) and Dividend Pay Out Ratio (DIVPOR) fall on the right hand side of this figure. These are «appropriations of profit» or payments to outside interests in the company. This would be the way to interpret Dimension 5. High figures for these would show disproportionate amounts of tax payable in relation to profit, and high dividend payments in relation to profit in comparison to other companies in the same industry.

At the top of Figure 7 the financial ratios Primary Financing Ratio, also known as Shareholder's Funds divided by Capital Employed, (SFCE) and Debtors Turnover (DRTURN) are located. Then at the bottom of the figure lie the Asset Utilisation ratio, also known as sales over working capital, (SALESWC) and Gearing (GEARING). A large shareholder's funds figure implies that the company is primarily funded through equity funding, whereas a high gearing ratio would suggest that the company is highly funded through debt. This description of «debt and equity» would explain Dimension 6.

**Figure 7: ProFit analysis. Projection of end points of directional vectors on Dimension 5 and Dimension 6**




These results, are very much in line with the results of Factor Analysis above, and are in line with those obtained by other researchers. Taffler (1982) suggests the six components are: profitability; liquidity; financial leverage; ready assets position; quick assets position and level of activity. However, Jones (1987), Libby (1975) and Zavgren (1983) identify five elements to this classification: profitability; activity; liquidity; asset balance and cash position. While Pinches, Mingo and Caruthers (1973) identify seven: return on investment; capital turnover; financial leverage; short-term liquidity; cash position; inventory turnover and receivables turnover.

The implications of these dimensional characteristics will be related to the companies in our sample and described for Marks and Spencer PLC in the next section.

## 5. M&S IN CONTEXT

Having attached meaning to the various dimensions in the MDS configuration, we can now focus on the performance of individual companies, and particularly on how performance has changed for Marks and Spencer PLC over the sample period 1997 to 2001 inclusive.

Figure 2 shows where the companies located in Dimension 1 and Dimension 2 lie, and from the analysis of the ratio locations it can be interpreted that firms lying on the right hand side are more profitable than firms located on the left hand side of

this figure. It is also noted that the firms that lie at the top of the figure make efficient use of working capital and have positive liquidity. While many of the failed firms in this sample were located among the main cluster of healthy firms, they all lied below the x-axis suggesting low liquidity. Lack of profitability —as measured by operating profit per employee, net profit margin, or stock turnover— appears not to have been an issue in their failure.

Although the MDS configuration and, therefore, the position of the companies relative to each other, was calculated using the full data set, some companies were removed from Figure 2 in order to improve its visual appearance. These were: Bedford (William) PLC; Hamleys; Lastminute.com (Last); Mallett; Partridge; Swan (John) and QXL Ricardo. It is noted that Bedford is a failed company. The characteristics of those removed were:

1. Bedford had a high position on Dimension 2, locating it at the extreme top of the graph highlighting its short term liquidity;
2. Hamleys and Mallett showed a higher than average co-ordinate in Dimension 1, placing it on the left side of the cluster of firms indicating low profitability;
3. Last and QXL demonstrated very high Dimension 1 one values placing them on the far left of the chart, suggesting poor profitability; and
4. Partridge and Swan had high figures for both Dimension 1 one Dimension 2, locating them in the top left quartile of the chart.

It is apparent from this description by looking at figure 2 that Marks and Spencer PLC has moved from the upper right quartile of the map, implying profitability and liquidity, in 1997 to the lower left quartile in 2001, implying that both profitability and liquidity have deteriorated with respect to other firms in the industry. In both 1998 and 1999 the move was minimal and Marks and Spencer PLC remained in the top right quartile, and then moved to the top left quartile in 2000, suggesting a reduction in profits. The move in 2001 demonstrates a large decrease in liquidity.

Figure 3 shows company locations within Dimensions 3 and 4, where those companies lying far along the right of the map demonstrate high market profitability and those at the top of the map reflect positive sales (and capital employed). It can be seen that of the failed companies included none lie to the right of the y-axis, implying low market profitability. This gives us a clearer indication of potential factors that are important in the classification of bankrupt companies. However, not much can be said about differences between failed and continuing companies in terms of ratios related to levels of sales.

In dimensions 3 and 4 there were five outlying companies that were causing distortion to the visual representation and were removed from the Figure (although this did not affect the relative position of the remaining companies). The companies removed were: Hamleys; Last; Mallett; Partridge; and QXL. These are all continuing companies at the time of the data collection. Their characteristics were as follows:

1. Hamleys had a high value for Dimension 3, its extreme position on the right of the chart suggesting high market profitability;

2. Last showed a significantly positive value in Dimension 3 also placing it on the far right of the x-axis suggesting a very high market profitability;
3. Mallett and Partridge, on the other hand, showed high figures in Dimension 4 locating them top and extreme top respectively in the chart, indicating high values of sales ratios; and
4. QXL with a large negative figure in Dimension 3, located far left of the chart highlighted low market profitability.

In Figure 3, Marks and Spencer PLC lies to the left of Dimension 3 throughout the sample period suggesting low market profitability. The large 2001 shift towards to the left, appears to imply that the markets had lost confidence in its future performance, and were thinking of it as a failed company.

Figure 4 looks at Dimensions 5 and 6. Four companies were removed from Figure 4 because of their outlying positions. These were: Essex Furniture PLC (Essex), Forminster, Matalan, and QXL. Essex was noted as being a failed company. Financial characteristics for these companies were:

1. Essex with large positive values in both Dimension 5 and Dimension 6 was placed in the top right quartile of the chart showing both high appropriations of profit and high debt to equity;
2. Forminster and QXL demonstrated high negative figures in Dimension 5 and were, therefore, placed left and far left respectively on the chart suggesting low appropriations of profit; and
3. Matalan, with a high positive value in Dimension 6, was located at the top of the chart.

As it is immediately apparent from the chart, M&S 2001 is an outlier for these dimensions; implying spectacular changes have taken place within this company. While the majority of the failed companies lie within the main cluster of the sample, they all tend to be placed towards the left hand side of the chart. Since Dimension 5 has been interpreted to be related to appropriations of profits, this suggests that Marks and Spencer PLC made large tax and dividends payments in 2001, quite considerable for its level of earnings. This might have been an attempt to keep shareholders satisfied, something that it failed to do considering its deteriorating position in Dimension 3 (market profitability), and something that resulted in large tax payments for its level of profits. In addition to this, since the lower half of Dimension 6 is related to gearing, and since M&S has taken a very low position in this dimension, it appears that the company became highly geared in 2001.

The picture that emerges for M&S is one of a company that is loosing profitability and liquidity with respect to other companies in the industry, but trying to keep its dividend payments, and that does it by borrowing money and increasing the level of gearing. The markets are aware of this situation, and the company looses market profitability. But was M&S approaching failure? The examination of Figures 2, 3, and 4 suggests that M&S was not very different from other continuing companies and that, although it was on the lower side of the league table, it appeared not to be in the relegation zone.

## 6. CONCLUSION

This paper has concentrated on the financial difficulties of Marks and Spencer PLC. An attempt has been made to place them within the context of the industry to which it belongs. The question addressed is whether this company was facing problems that were shared by all the firms in the industry, or whether it was loosing standing with respect to other firms that engaged in similar activities. The second situation appears to have been the case, although one would be reluctant to say that M&S was approaching failure. Was this a case of a death announced and avoided, or a case of an over-reaction to a transient problem? It is impossible to say. What can be said is that keeping market profitability appears to have been a prime objective of the management.

The techniques used —Multidimensional Scaling, and Property Fitting— are based on graphical representation of multivariate data. They have a strong statistical basis, but they also make it possible to use judgement and outside information in order to complement the statistical analysis. They show that a picture is worth one thousand equations.

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