ECONOMIC PAPER

Comparison between the financial structure of SMES and that of large enterprises (LES) using the BACH database

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Foreword

Accounting for more than 18 million enterprise units in the European Union and with an employment share of about 66%, SMES play an important role for the European economy and in particular for the development of new products and services, economic growth and, finally, job creation. Their specific contribution to the European economy, due to their flexibility, their innovation capacity and their employment potential, is also well acknowledged. However, the emergence and development of SMES are closely related to the financial sources they are able to access. In Europe, the main stream of external financing for SMES is still debt. Only very few of them are active in equity markets. The importance of finance, and particularly of own funds, for the growth of young and small enterprise with high innovation capacity, is also well recognised. But SMES traditionally have to cope with a series of hurdles in their search for external financing, compared with large companies. This is essentially due to the fact that they stand a higher risk of failure. Consequently, SMES have generally to bear higher costs of external financing, or even, in certain cases, financial rationing and therefore, a constraint on their growth potential.

From an academic point of view, after having been a neglected branch of economics for a long while in Europe, entrepreneurship and SMES have for several years enjoyed a clear-cut renewal of interest. Numerous factors explain this abrupt change such as the expansion of new technologies, the need for organisational flexibility, or the search for decision making at a micro-unit level. Consequently many studies have already been made in this field, especially on the financing of SMES in comparison with LES.

The objective of this study is to make a new analytical contribution to this debate. It notably stresses the need for financial flexibility for SMES, an issue that has been largely ignored. Making use of the BACH data base for the period 1990-1996 and dealing with manufacturing industry of 9 countries (Austria, Belgium, France, Germany, Italy, Portugal, Spain, Japan and the United States) it analyses the financial structures and the performances of small and medium-sized versus large enterprises. Its main conclusions are the following.

Regarding profitability, there are distinctive features of SMES compared to LES. SMES indeed show a higher efficiency of capital employed and a higher degree of product transformation. Consequently, the profitability of SMES as measured by gross profits over capital employed is larger than for LES.

Regarding financial patterns, there are less clear-cut differences according to size. SMES have less own funds in Austria, Germany, Portugal and Japan while this is not the case in France, Italy and Spain. However, in most countries, the importance of short-term financial debt is higher for SMES than for LES, a feature which is correlated with their higher working capital requirement. It is also noticeable that the smaller firms support a risk premium on their indebtedness, mainly because of a lack of information on the risk they represent.

There is no link between financial structure and profitability. Consequently, measures taken to improve the access of SMES to capital markets are not expected to increase their profitability but their solvency. However such measures are important to promote development of high-growth innovative SMES.

SMES maximise profitability by adapting quickly to the changing needs of the market, thus they give priority to short-term management and flexibility. SMES also need financial flexibility -defined as the capacity to mobilise rapidly and at reasonable cost the financing required to respond to contingencies which have an impact on the current assets- to cope with unexpected changes in their day-to-day economic activity.

As a result of this need for financial flexibility it is vital for SME to have good relationships with their banks and to be inserted in networks which contribute to improve these relationships. Indeed, banks are the main supplier of short-term credit and may provide a borrowing capacity which releases an enterprise from corporate financial constraints. The relationship between SMES and their banks can be improved in several ways (improve information on SMES, improve the functioning of the bank credit guarantees for SMES). A network of private actors as well as of public organisations which supply funds, provide financial guarantees and additional information, evaluate the quality of the borrower and thus help to reduce the costs of screening and rating, is also important for dealing with the issue of financial flexibility.

From a policy perspective, this last conclusion is fully in line with the initiatives of the European Commission in the field of SMES and access to external financing. Indeed, the European Commission has elaborated a two-handed approach in this area. Firstly, it has promoted the setting up of Round Tables of Bankers and SMES. Within the framework of such Round Tables representatives from both parties have tried to identify the main problems they face when they are in business relations and to highlight a range of best practices across the European Union. This has led to concrete results in the field of micro-credit, transfer of enterprises or the development of several banking products and services in favour of SMES among many other initiatives. Secondly, in response to the request of the Luxembourg European Council on Employment in 1997, the Commission proposed a Risk Capital Action Plan ("Risk Capital : a key to job creation" –SEC (98) 552-) comprising measures to remove barriers to the development of an efficient EU market for risk capital. The special Lisbon European Council (March 2000) identified the development of a pan-European market for risk capital as a important way of providing a source of equity financing for young and innovative firms, as they generally face difficulties to access credit. It also called for the implementation of the Risk Capital Action Plan by 2003.

Comparison between the financial structure of SMEs and that of large enterprises using the BACH database

SUMMARY

This study examines the financial structures and the performances of small and medium-sized enterprises (SMEs) as opposed to large enterprises (LEs) on the basis of the BACH database, which is the most advanced publicly available database for comparisons in this field.

It covers the period 1990-1996 and concerns 9 countries: Austria, Belgium, France, Germany, Italy, Portugal, Spain, Japan and the United States. It deals with manufacturing only since this industry provides the best-quality data.

The first point to consider is the role played by SMEs in Europe. SMEs are not merely a 'scale model' of a large corporation. Their specific contribution to the European economy, due to their flexibility, their innovativeness and their employment potential, is already firmly recognised,[1] as is the importance of finance, and particularly of own funds, for the growth of young and small enterprises with high innovative capacity. Conversely, the issue of financial flexibility is largely ignored. Flexibility is important because a company must be able to take advantages of customers' needs and also because in their day-to-day activity SMEs encounter uncertainty and need to react quickly to unexpected events. The need to have financing available in order to seize unexpected market opportunities or to react to external shocks is particularly important for the vitality of SMEs. New opportunities for selling products, for instance, affect current assets first but their growth may not be sustainable. It is assumed that there would be various ways of financing such assets, either internally via own funds or externally through banks in the main. Hence, the issue of flexibility is the point of departure for this report (Chapter I).

The descriptive study of the determinants of SME profitability versus LE profitability shows structural differences that transcend nationality (Chapter II.1). Small and medium-sized enterprises have the following advantages:

- a higher rate of value added as a proportion of fixed assets,

- a higher degree of product transformation.

Their comparative handicaps are:

- a higher rate of staff costs,

- a higher working capital requirement (stocks and net trade debtors).

The first three features can be related to a less capital-intensive orientation as they focus on products, technologies and types of organisation that encourage rapid capital rotation; this tendency favours

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[1] Task force report 'BEST', 9426/98 SOC255 ECO 223 MI 70.

profitability while handicapping labour productivity; the fourth feature results in part from inter-business relationships, which favour large enterprises. The last two features indicate how the behaviour of SMEs can be flexible.

As we turn to financial patterns (Chapter II.2), specific national features of the financial system have a strong impact on company behaviour so that there are few, if any, regularities according to size. In the European countries SMEs have an own funds ratio that is either lower than or equal to that of their larger counterparts. In most countries the importance of short-term (as opposed to long-term) financial debt is greater for SMEs than for LEs, a feature which correlates with their higher working capital requirement.

Principal component analysis and cluster analysis contribute to a more in-depth study of financial structures (Chapter III). The main results are the following:

– financial structure differs mostly according to country, with that of small enterprises being more typified than that of larger ones;

– the selected indicators of performance and profitability (mark-up, profitability of own funds, etc.) do not correlate with any specific pattern of financing; in other words, firms with above-average performance are not characterised by a higher level of own funds, and higher indebtedness does not correlate with lower profitability;

– the way in which current assets are financed does not depend on the level of own funds; therefore, a highly capitalised firm (a feature which correlates, of course, with a low level of long-term debt) may rely on short-term financial indebtedness, mainly from banks.

Chapter IV returns to the determinants of profitability on the assumption that SMEs do not behave like LEs and that a given rate of profit may be achieved using separate models. It is assumed that, in the 'market-based' profit formation model, the enterprise gives priority to short-term management and flexibility while, in the 'organisation-based' model, the enterprise prioritises maximisation of labour productivity and stability of growth. The 'market-based' model is well suited to SMEs.

Chapter V (Recommendations) focuses on the issue of financial flexibility, defined as the capacity to mobilise rapidly and at reasonable cost the financing required to respond to contingencies. Although the need for available financing may be covered by own funds or by any kind of long-term funds, a good relationship with banks matters. Banks are the main suppliers of short-term credit and may provide a borrowing capacity that eases corporate financial constraints. A network of private actors as well as of public organisations which supply funds, provide financial guarantees and evaluate the quality of the borrower is also important for dealing with the issue of financial flexibility.

CHAPTER I : SURVEY OF CAPITAL STRUCTURES AND INTERNATIONAL COMPARISON

Studies of financing systems traditionally distinguish between systems geared to the market and those geared to banks. The first section of this survey aims to highlight the lack of strong statistical evidence which would illustrate this distinction. The second section shows that the normal explanatory variables of this canonical distinction have low explanatory power. The framework we apply is described in the third section.

1. INTER-COUNTRY DESCRIPTIVE STATISTICAL ANALYSES OF CAPITAL STRUCTURES DO NOT PRODUCE RELIABLE RESULTS

One can hardly fail to notice that the results of international comparisons of capital structures yield conclusions which are not reliable. Those results are very much influenced by databases, the choice of capital structure indicators, data recalculation and the period of observation. If we look at European countries alone, the results of international comparisons give an image of non-financial companies there which lacks clarity; they are summarised in Table I.1, which lists publications since 1990 (source: European Committee of Central Balance Sheet Offices, Working Group on Net Equity). Studies based on specific samples of listed companies all show German companies as having low leverage. Conversely, studies based on broadly representative samples show French companies as being the most highly capitalised and the least leveraged in Europe. The situation of Italian companies also varies, and their level of net equity may come out as similar to that of French companies or, on the contrary, as the lowest of all the countries studied.

To sum up, differences are due mainly to the degree of representativeness of the sample. Large companies, through a structural effect, contribute in a very large measure to the computation of weighted average ratios; they have all the more impact on the results obtained from aggregate data since they tend to be overrepresented in the samples.

The results also depend on the way in which data is restated for harmonisation purposes. The Bundesbank shows that, once the main differences in method have been dealt with, the levels of net equity of German, Italian, Spanish and French companies are similar when aggregates (BACH) are used (Bundesbank, 1994). Rajan and Zingalez find that Germany and the United Kingdom have the least leverage and that the leverage figures for companies in the other G-7 nations are convergent; they justifiably underline the sensitivity of the results to the ratio chosen as the yardstick for leverage (Rajan and Zingalez, 1995; see also Table I.1 and, for the problems in measuring profitability, Bundesbank, 1997).

Table I.1 Overview of the main research results (studies since 1990)

Title of document	Databases used and countries compared	Chosen indicators	Period studied, scope and size of sample	Main results
C.E.V. Borio: "Leverage and financing of non-financial companies: An international perspective", Bank for International Settlements, Economic papers, No 27, May 1990.	- OECD financial statistics and national fund flow statistics. - United States, Canada, United Kingdom, Japan, Germany, France, Italy.	a) Debt (gross)/total assets; b) Debt (net)/real assets.	- 1970-1987; - all industrial or commercial companies and manufacturing industry; - representative national samples.	According to indicator (a), leverage higher in France than in Germany; according to (b), the reverse is true and Italy is similar to Germany.
E.M. Remolona: "Understanding international differences in leverage trends", FRBNY Quarterly Review, Spring 1990.	- BACH (old version) and Global Vantage Data; - France, Germany, Japan, United Kingdom, United States (Italy, Netherlands, Australia).	Debts/assets.	- 1982-1987 and 1983, 1987; - all companies; - representative national samples and limitation of corporations listed on the stock market to a small number: between 16 companies (France) and 31 (Germany).	Leverage higher in France than in Germany and Italy; Italy more leveraged than Germany. The results using Global Vantage Data confirm this observation but show greater differences between France and Germany.
L. Bloch and J. Laudy: "France, Allemagne et Belgique: des structures de bilans proches à la fin de la décennie quatre-vingt", Économie et Statistique Nos 268-269, August-September, 1993.	- BACH (old version); - France, Germany and Belgium.	a) Net equity (+ provisions)/balance- sheet total; b) Net equity (+ provisions) / fixed assets (historical costs and market value).	- 1985-1991; - manufacturing industry; - representative national samples.	If provisions in the accounts are included in net equity, France shows higher leverage than Germany; otherwise, leverage higher in Germany.
Deutsche Bundesbank: "Dotation en fonds propres des entreprises: comparaison dans quelques pays de la communauté européenne", Monthly Bulletin No 10, October 1994.	- BACH (old version) and national sources; - Germany, France, Spain, Italy.	Net equity/balance-sheet total.	- 1982-1991; - manufacturing industry; - national samples.	If no correction is applied for methodological differences between samples and for data processing, German firms are less financially autonomous than those in other countries; after correction, situation similar.
R.G. Rajan and L. Zingales: "What do we know about capital structure? Some evidence from international data", NBER WP No 4875, October 1994.	- Global Vantage Data; - United States, Japan, Germany, France, Italy, United Kingdom, Canada.	a) Debts + provisions/total assets; b) Debts /total assets; c) Debts/net total for assets; d) Debts/debts + net equity (median and mean values) (historical costs and market value).	- 1991; - all companies; - limitation to corporations quoted on the stock market, ranging from 118 companies (Italy) to 225 (France).	According to (a), leverage highest in Germany (historical costs), and Italy and France very similar; according to (b) (c) and (d), Italy more leveraged than France and Germany less than France (positive correlation between size and leverage with the exception of Germany).
J.T. Kneeshaw: "A survey of non-financial sector balance sheets in industrialised countries", Bank of International Settlements, Working Paper No 25, April 1995.	- National sources: INSEE for France, Statistisches Bundesamt for Germany, OECD and Banca d'Italia for Italy, OECD and Banco de España for Spain; - Australia, Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Spain, Sweden, Switzerland, United Kingdom, United States.	a) Financial debt/ total assets; b) Financial debt + provisions/GDP; c) Financial debt/GDP; d) Net equity/GDP, (market value).	- 1992; - all non-financial companies; - national samples and macro-economic data.	According to (a), leverage higher in Germany than in France; according to the other indicators, Italy has least leverage and Germany most; financial autonomy greatest in France.
J. Corbett, T. Jenkinson: "The financing of industry, 1970-1989: an international comparison", Journal of the Japanese and International Economies, 10, 71-96, 1996.	- Aggregate corporate data processed on the basis of the national accounting standards in each country; - Germany, Japan, United States, United Kingdom.	Net resource flows.	- 1970-1989.	- More use of internal finance in Germany; - More use of equity issues in the United Kingdom and United States; - Bank debt higher in Japan

L. Nayman: "Les structures de financement des entreprises en Europe", Économie Internationale No 66, second quarter, 1996.	- OECD and BACH; - Germany, France, Italy and the United Kingdom.	a) Credit/GDP; b) Balance-sheet structure; c) Profitability; d) Resource percentage.	- 1987-1993; - Non-financial companies.	- In 1994, credit/GDP higher in Germany and Italy, lower in France, very low in United Kingdom; - 1987-1992, share of external finance higher in Germany, in the United Kingdom (short term), Italy, lower in France.
M. Delbreil et al.: "Fonds propres et conditions de financement des entreprises en Europe", European Committee of Central Balance Sheet Offices, 1997.	- Balance Sheet Office; - Germany, Austria, Spain, France, Italy.	Net equity/financial resources.	- 1990-1993 (checked for 1995); - manufacturing industry.	- Least leverage in France and Spain; - Germany more leveraged on median values, less on aggregate data; - Austria ranked between these positions; - Least favourable position in Italy.

Sources: according to Delbreil et al

The choice, or rather the availability, of data and indicators is also of determining importance for assessing the effect of size on leverage. Rajan and Zingalez find that leverage correlates positively with size in all G-7 countries except Germany. When the database includes both listed and unlisted companies, tests often show the opposite: leverage declines along with size in the European countries studied (for Germany, see Bundesbank, 1994; for France, see Conseil national du crédit, 1994). The influence of size is also sensitive to the number of determinants selected for the econometric study. A test on French data shows that the effect of size on capital structure is less clear when other factors such as the age of the firms, usually aggregated within the single size variable, are introduced simultaneously (Bourdieu et al., 1993).The canonical distinction (market- or bank-oriented) assumes that capitalisation is relatively higher in market-based countries than in bank-based countries and that, in the first group, financial markets are an important, or at least a not insignificant, source of funds for companies while they may be an insignificant source in the second group.[2] Corbett and Jenkinson set out to demonstrate the difficulty of testing theories of corporate financing by using international aggregate data (OECD) (Corbett and Jenkinson, 1996). They compare net sources of finance for physical investment (net of depreciation and other financial flows reducing corporate resources), according to the method already used, notably by Mayer (Mayer, 1988). They observe that, in all the countries considered (United States, United Kingdom, Germany and Japan), recourse to internal resources predominates and that over the period of observation (1970-1989) it increases in the first three of the above countries, while the share of finance raised on securities markets falls. It is as if market finance were contributing almost exclusively to external growth. The authors conclude from this that the canonical distinction between systems of finance no longer accounts for modes of financing since these tend to converge towards internal financing, although the distinction remains useful in interpreting mechanisms for the control of corporate managers.

It is thus difficult to verify the intuitive view that the mix of equity and debt differs from country to country and from large firms to small ones. The consensus as to the existence of such differences is gradually being undermined by the accumulation of empirical studies. It is increasingly reduced to a recognition of the existence of different modes of corporate control, which is confirmed, unambiguously up to the present, by the statistics for takeovers.[3]

This departure from the intuitive view of national financial systems can be partly explained by empirical biases. Cross-country studies tend to refer implicitly to the hypothesis of a nationally representative firm, a firm which corresponds observationally to listed companies. This hypothesis is insufficiently refined given that, in principle, the constraints on access to financial resources affect small to medium-sized enterprises more than large listed corporations and that financial globalisation encourages the trend towards homogeneity in the capital structures of the latter. More representative samples and comparative corporate financing studies focused on SMEs are likely to lead to a better assessment of the impact of financial constraints.

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[2]   OECD financial statistics include a statement of sources of financing which allows for the evaluation of the flows coming from issuing shares (on the financial market and over the counter), an item which is not available in the balance sheet. But OECD national samples are more or less representative. Thus, in the OECD database, the sample of French companies comprises 800 firms, compared with 25 000 for Japan, but above all the sample is made up essentially of very large corporations, a fact which severely compromises its representativeness.

[3]   In the 1990s international comparisons of corporate finance turned towards the issue of the control of company managers (see, for example, Berglof, 1989, and Prowse, 1994).

2. EXPLANATIONS OF THE DETERMINANTS OF CAPITAL STRUCTURE TEND TO BE OVERSIMPLIFIED

Within the determinants of capital structure, institutions and, to be more precise, regulations play an important role. However, explanations tend to be oversimplified. To illustrate this critical comment, German SMEs are a suitable example. Countries with legislation along German lines are a case in point. Small German manufacturing companies and their very small Austrian counterparts have a low level of net equity which makes them different not only from companies of the same nationality but also from companies in the other countries (Spain, France and Italy) selected in the study by the European Committee of Central Balance Sheet Offices (Delbreil et al., 1997).

The high level of indebtedness of German SMEs confuses the 'corporate finance view', according to which capital structure may be related to an optimal choice, i.e. an equilibrium between the tax advantages of indebtedness and losses in the event of financial distress entailing the reorganisation of the firm. International comparisons admit that tax codes alone have very little explanatory power, so that distress costs deserve attention (Borio, 1990). Rajan and Zingales assume that financial distress costs increase when legislation favours bankruptcy and is thus not conducive to corporate reorganisation. They assume also that financial distress costs diminish with size, given that corporate reorganisation is less costly than bankruptcy and easier to implement in the case of large firms. Therefore leverage is expected to grow with size, particularly if the degree of legal protection of the lender is high. The German case is counter-intuitive from a 'corporate finance view'.

A network-type approach which embraces the 'bank view' may explain this puzzle. Indeed, the rate of indebtedness can be explained by the demand side **and** the supply side. Therefore the degree of protection which bankruptcy laws afford creditors may have a positive effect on the supply of credit. A high degree of protection for creditors, as provided notably by the speed with which companies in difficulty can be liquidated, this being the case for legislation based on the German model, encourages lenders to accept levels of debt which would be considered excessive in countries offering less protection. For example, bankruptcy laws focusing on the survival of companies in difficulty, as is the case in France, encourage lenders to demand higher levels of shareholders' equity (OECD, 1993).

There it is no doubt that high levels of creditor protection constitute a negative incentive for corporate managers and owners. However, in the final analysis, the guarantees enjoyed by creditors of both small and medium-sized German firms seem to help more than hinder the recourse to debt.

The problem posed by the effect of legislation on bankruptcy in Germany testifies to the limits of a unilateral approach focusing only on the credit demand side, as does the corporate finance view, which does not take bank behaviour adequately into account. The influence of regulatory controls on bankruptcy is not mechanical and cannot be defined unless the set incentive effects on lenders are taken into account. The impact of institutions cannot be explained by isolating regulatory controls from practice, and financial patterns are shaped by a complex set of determinants: bankruptcy regulations, the accounting and financing practices of each country, the relationships between banks and companies.

Some research on the possible link between capital structure and the nature of firms' economic activity has also focused on this same indicator, the cost of financial distress. As the anticipated cost

of financial distress correlates positively with the probability of bankruptcy and negatively with the probability of reorganisation, it may take different values according to the nature of the economic activity of the borrower. This approach has seen little development and is supported by very few observations (Harris and Raviv, pp. 315-319; Williamson, 1988; Titman, 1984; Titman and Wessels, 1988). It confirms that one isolated determinant of capital structure has low explanatory power; reduction of explanatory variables to just one (in our example, the theoretical cost of financial distress) may compromise the correct understanding of actual capital structure.

As a result, the German case testifies to the merits of :

– an approach which deals with the problems of coordination between non-financial and financial actors,

– a network-type approach towards the complex determinants of corporate finance, such an approach being only in its infancy.

Delbreil et al. propose the use of a network model in which corporate financing strategies and structure are the outcome of interactions within legal and economic contexts that influence, in a distinct way, the sources of finance as well as the borrowing requirements.

3. FRAMEWORK AND METHODOLOGY OF THIS STUDY

3.1. The information asymmetry hypothesis, which embraces the difficulties encountered in assessing corporate quality and explains credit rationing, cannot be ignored. Our framework deals with the problems raised by asymmetry of information by taking into consideration information and knowledge shared by the actors. It is assumed that coordination is successful only if the managers, on the one hand, and the investors and lenders, on the other, have common points of reference for the evaluation of firms' quality.

In the case of large firms producing, for instance, mass-consumption products, common points of reference are numerous, even if the banks keep them at arm's length and the investor's information is limited. For such firm, capital structure is viewed in relation to standardised ratios and the actors may reach agreement at a relatively low cost in terms of coordination.

In the case of certain firms - a small enterprise producing dedicated goods and using specialised assets being a very typical example - evaluation is a much harder task. Obtaining common points of reference requires more investigation on the part of the investor, so that the cost of coordination is relatively high, particularly at the beginning of the relationship. According to the 'commitment view' (Rivaud-Danset & Salais, 1992; Davis, 1996), long-term relationships between a bank and a company may reduce informational problems and thereby relax liquidity constraints for the borrower. This kind of relationship particularly suits such firms.

Using a sample of French small and medium-sized firms, B. Paranque, D. Rivaud-Danset and R. Salais have conducted a principal component analysis in which the first correlation component relates to the nature of the physical assets (standard versus specific) and the second to the intended market for the products (generic versus dedicated). Distinct modes of performance correspond to the types of company defined using this method. However, no specific capital structure is observed. The

"financing standard" towards which the companies in the sample converge seems to testify to the difficulties of lenders in evaluating companies' actual and qualitative characteristics. Assessment and, therefore, coordination difficulties could be higher for the smallest firms, as they are the most typified (Paranque et al., 1997).

3.2. The framework of this study forms part of the research agenda of convention-based economies, whose main aim is the coordination of actors in contexts characterised by uncertainty. Therefore, capital structure and requirements are better explained when dealing with the financing of a contingency, i.e. an unexpected event **(the usual classification does not explain how a firm behaves in the case of a contingency).**

The impact of a contingency first affects current income and current assets; in the case of recovery, the firms' financial requirements fundamentally stem from the growth of stock assets, while a decrease in GDP growth may entail a higher weight of trade debtors. Hence, the evaluation of financial requirements and performances of companies in the sample improves by taking into account 'capital employed', an item which includes fixed assets and net non-financial current assets.

The growth of non-financial current assets depends on the reserve financial current assets and/or the reserve borrowing power. These two types of reserves give **financial flexibility** to firms. Financial flexibility is useful in the case of a temporary variation of assets. Firms may lack financial flexibility because their cash balance and short-term borrowing capacity are low. A lack of the financial flexibility necessary to react to an unanticipated event (an exogeneous variation, such as an increase in trade debtors) is one of the possible factors in the bankruptcy of SMEs (ENSR, p. 181); at macroeconomic level, a lack of flexibility adversely influences the rate of accumulation and contributes to a deterioration in the situation.

3.3. The comparison of firms' financial structures and performance according to country and size implies dealing with **diversity**. As noted above, the canonical distinction for financial structure (market- versus bank-oriented) is not of sufficient relevance for empirical studies. The theoretical framework for this study is borrowed from Myers and Hicks. Following Myers and Hicks, we assume that balance-sheet structures may be viewed in relation to some 'preferred patterns'**.**

For Myers and Majluf, there is only one universal preferred pattern, which is commonly referred to as 'the pecking order' (Myers, 1984; Myers & Majluf, 1984). External financial sources are second-best; to finance the growth of physical fixed assets, managers give priority to retained earnings (rate of retained earnings allows for the financing of expected investment), then to borrowing and, eventually, to issuing shares.[4] Econometric tests which take into account only investment in fixed assets are used as evidence of the 'pecking order', as investment correlates strongly with cash-flow capacity.

Tests which embrace investment in current assets are infrequent. Demirgüc-Kunt and Maksimovic, using a sample of major listed companies in thirty developed and developing countries, compare

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[4]   The capital market, which tends to feel that managers issue shares in order to take advantage of share overvaluation, can
ration the supply of capital, even for profitable projects. External investors implicitly demand a premium to purchase
the shares of relatively high-quality firms, as they cannot distinguish good firms from lemons. This model, taken from
Akerlof (Akerlof, 1970), supplements that of the rationing of credit by quantity (Stiglitz and Weiss, 1981). As in the
case of agency theory, external finance is more costly than internal resources.

asset and liability structures, observing very similar patterns (Demirgüc-Kunt and Maksimovic, 1996). Most firms in their sample used internal funds to finance fixed investment and externally raised funds, especially short-term debt, to finance short-term assets. As a result, it can be seen that the 'pecking order' changes if current assets are taken into consideration. In spite of the predominance of internal resources to finance fixed assets, correlations within debt and current assets imply that differences in access to external financing may affect a firm's ability to exploit growth opportunities, as firms need to invest in both types of assets in order to grow.

Hicks is one of the few economists who explicitly deal with the ways of financing unexpected events (Hicks, 1975). Two 'preferred patterns' are possible:

– in an autonomy sector, the firms hold reserve financial assets;

– in an overdraft sector, the firms do not hold enough liquid assets and borrow, mainly from the banks.

Hicks emphasises the role of short-term credit as a means of financial flexibility. He suggests a methodological framework which sorts liabilities according to maturity, as does the balance sheet. He further suggests a framework for comparisons : in his essay, the two financing sectors are sustainable. Hicks admits that 'a firm (which has no liquid assets) is not illiquid, if it has a substitute in the form of assured borrowing power, usually from a bank' (1975, p. 50). An explicit or implicit reserve borrowing capacity may bring financial flexibility as does internal liquidity.

For a certain type of firm (characterised by country, size, age, the nature of economic activity, the link with the parent company), the financial pattern and the degree of financial flexibility depend on the relationship between the firm and the banks, on the organisation of the financial system and on the financing practices of each country. The 'preferred pattern' is shaped to suit financial actors. Certain presumed advantages of banking systems cannot easily be observed. They have undoubtedly been overestimated, notably where the advantages of the relationship between universal banking institutions and large corporations are concerned.[5] However, it cannot be ruled out that certain advantages in the bank/company relationship may be of potential importance. For example, the bank/company relationship may provide the latter with an implicit or explicit guarantee of access to funds in order to cover unexpected financing needs. This safety net, which allows the company to reduce its cash in hand and, hence, its capitalisation, is characteristic of an "overdraft" regime, to use the term proposed by Hicks. Where this "bank safety net" is missing, firms seek a higher rate of own funds.

To analyse firms' performances, we follow the same framework. It is assumed that there is not one but several distinct models of profitability, each one characterised by positive and negative determinants of profitability. Each possible model of profitability may be as good as the next. This last point will be developed below.

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[5] Edwards and Fischer challenge the widely held view (Cable, 1985; Frankel et al., 1991) according to which the presence of financial institutions as shareholders in companies ensures that creditors are better informed, thus reducing agency costs and allowing for higher leverage. They note that the presence of such shareholders is reflected neither in greater leverage in the firms concerned nor in any particular capability for corporate reorganisation in the event of financial distress (Edwards and Fischer, 1994).

CONCLUSIONS AND METHODOLOGICAL RECOMMENDATIONS

It has been shown that it is difficult to verify the view that patterns of corporate finance and the restrictions limiting access to financial resources differ according to size and/or country and the view that corporate performance can thus be affected. The consensus about the existence of such differences is gradually being undermined by the accumulation of empirical studies which often do not pay enough attention to the representativeness of the sample and the choice of indicators.

We consider that the study of the specific nature of patterns of finance should not be limited to the financing of investment. The effect that capital structure may have on corporate dynamism shifts to take into account the availability of liquidity or the need for external liquidity to finance short-term variations in circulating (current) assets. Thus, the quality of evidence is improved by using a set of ratios including:

– advanced capital, which is a broader item than fixed assets;

– indicators of financial flexibility;

– different indicators of economic and financial performance.

The survey of empirical studies shows that, in order to study financial structures and performances, it is necessary to use representative samples and comparable data. Although harmonisation of BACH data is not complete, BACH provides the information necessary to analyse the remaining differences (see Appendix II.1).

The survey of empirical studies and theoretical literature suggests that financial structures and performances are better explained:

– in an approach based on a network of their complex determinants,

– in an approach dealing with the issue of uncertainty in a firm's day-to-day existence.

It is assumed that this framework suits SMEs particularly well.

CHAPTER II : DESCRIPTIVE ANALYSIS OF RATIOS FOR BUSINESS ENTERPRISES IN EIGHT COUNTRIES SELECTED FROM THE BACH DATABASE (1990-96)

The ratios analysed below cover the period 1990-96 and concern only the eight countries for which complete or nearly complete data are available, namely: Austria, Belgium, France, Germany, Italy, Portugal, Spain and Japan. The United Kingdom and the United States are examined in separate sections. For each ratio, charts and graphs which are broken down by country and size show the mean value for the overall period. The ratios selected are presented in the boxes; a more accurate definition following the BACH scheme is shown in the appendix (p. XV).

1.   DETERMINANTS OF GROSS PROFITABILITY

In all the countries except Italy, the large firms show the lowest profitability (cf. Graph II.1). Economic differences are the main determinant here, although a sampling bias in favour of the most profitable small firms should not be excluded.

Apart from consideration of size, overall gross profitability (gross profit over capital employed) is roughly comparable between countries, the exception being France, where it is substantially higher. Within the other seven countries, differences are not very substantial; they may be due not only to economic differences but also to accounting differences, as well as to differences in statistical treatment.

The factors which favour profitability differentiate firms according to size in a relatively clear-cut manner.

Box II.1 Return on capital employed or gross profitability

The formation of profitability is based on a firm's assets and efficiency and on the markets identified by it. These effects are reflected in cost structures.

The self-financing it achieves over the medium to long term contributes to its financial resources.

Profitability may be evaluated using a large set of indicators. Evidence is highly sensitive to the choice of indicators. In this study, overall gross profit over capital employed has been selected. It is the most basic ratio:

– Gross profit is the margin after paying the cost of materials and consumables, plus operating charges and staff costs. It enables the firm to create the necessary provisions to meet its financial charges and to pay tax on its results;

– The denominator is the capital employed or advanced, an item which takes into account all fixed assets, plus the working capital requirement and other non-financial and non-monetary current assets less other non-financial current liabilities. The working capital requirement is defined by operating assets (stocks and trade debtors) less operating liabilities (trade creditors and payments received on account of orders) (see also Box II.6).

Thus the financing pattern does not influence gross profitability as it affects neither the numerator nor the denominator.

The use of other indicators of profitability would yield other evidence. For instance, margin rates such as mark-up or 'gross operating profit ratio' relate gross profit to either value added or turnover and so do not take into account the assets used to generate turnover. Financial profitability, i.e. the profitability of own funds, would introduce other determinants since it depends not only on economic performances but also on the level and cost of indebtedness. For reasons explained in Box II.1, 'gross profitability', also referred to as 'return on capital employed', has been selected in this study.

Graph II.1: Gross profit / capital employed
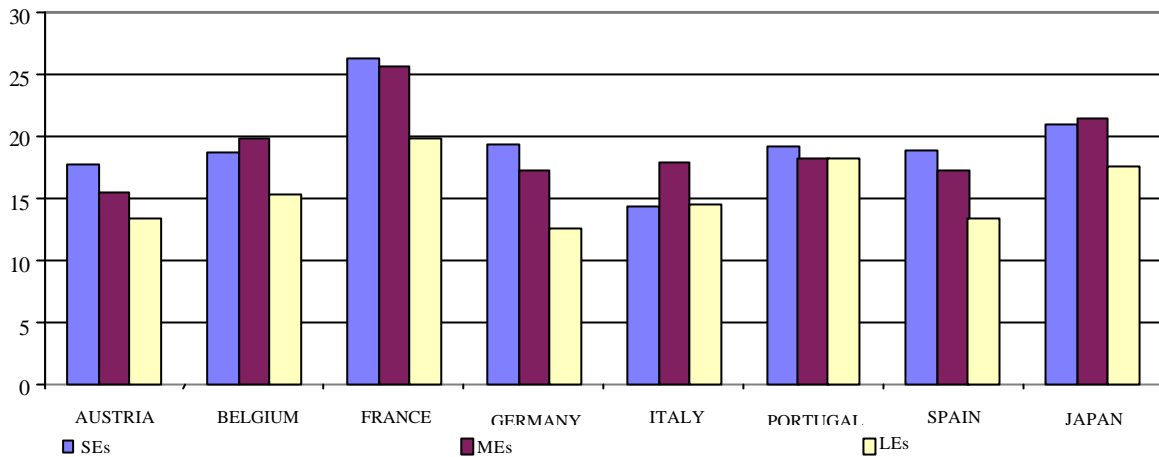
1.1. What are the positive determinants of SME profitability ?

Determinants which favour SME profitability can be divided into two groups:

- greater efficiency in the use of the capital employed;

- a higher degree of product transformation.

1.1.1. Greater efficiency in the use of the capital employed

This evidence is borne out by the following ratios:

- a higher *rate of value added over capital employed* (cf. Graph II.2): value added per unit of capital is systematically higher in the case of small firms. This ratio decreases along with size in the eight countries, this being a marked trend in all the countries except Italy;

Box II.2 Rate of value added over capital employed

This ratio is germane to overall gross profitability. It thus strongly influences gross profitability. Efficiency in the use of labour and capital can be evaluated by applying the following criteria:

– the apparent labour productivity (this ratio is not available, as BACH does not provide employment data);

– the efficiency of fixed assets (value added over fixed assets);

– the efficiency of capital employed relates value added to capital employed (the denominator takes into consideration almost the totality of assets, namely fixed and current non-financial and non-monetary assets, less trade and other non-financial creditors).

Substituting capital for labour has a positive effect on labour productivity and a rather negative effect on capital efficiency. The efficiency of fixed assets tends to decrease according to size (in two countries it is slightly higher for medium-sized enterprises). Differences between SEs and LEs can be dramatic, as in Germany and France.

- a lower *rate of fixed assets over turnover* (cf. Graph II.2): assets are here the numerator, so that a lower level indicates greater efficiency in their use (a lower level is required per unit of turnover). This ratio is approximately the same for small and medium-sized firms and is

<u>systematically higher in large firms.</u> Small and medium-sized firms in France and Germany show an asset turnover rate that is nearly twice as low as that of large firms.

The above ratios indicate indirectly that small and medium-sized firms are less capital-intensive than large ones. Thus efficiency in the use of fixed capital is greater.

Graphs II.2 : Value added / capital employed
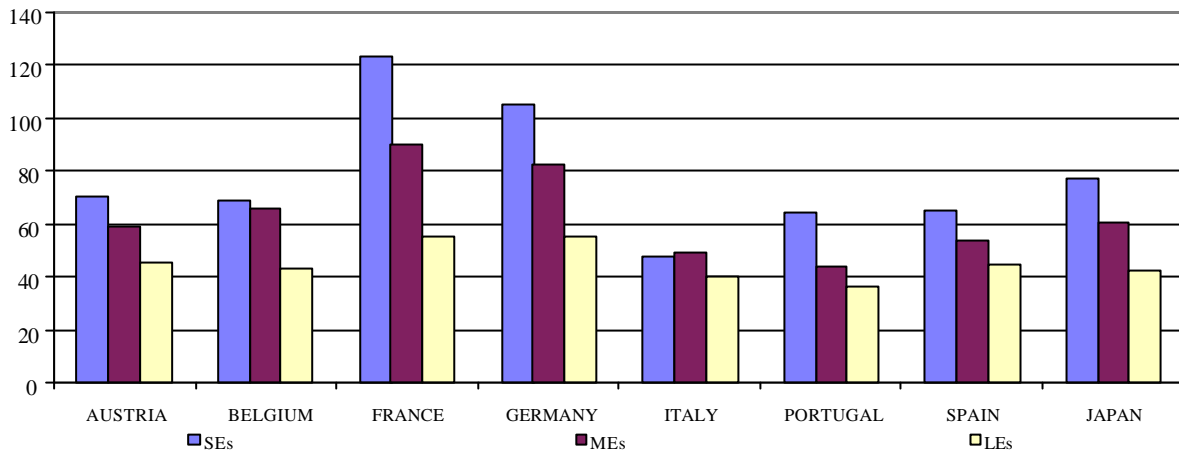
Fixed assets / turnover
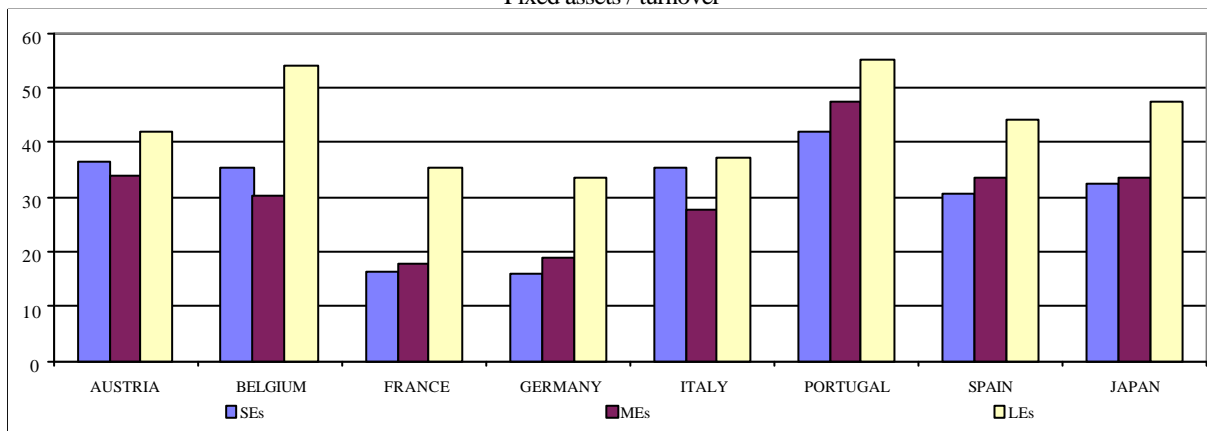
1.1.2. Higher degree of product transformation

This evidence is borne out by the following ratios:

– a higher *rate of value added over turnover* (cf. Graph II.3): the rate of value added per unit of turnover decreases with size;

– a lower *rate of intermediate consumables over turnover* (cf. Graph II.3): the proportion of intermediate consumables in turnover increases almost systematically with the size of the firm (see chart: costs of materials and consumables, in Appendix II). SMEs use less intermediate consumption in their manufacturing process than LEs.

These ratios confirm the higher capacity of SMEs to create value added.

Comparative handicaps of SMEs will be commented on below. Identifying the comparative advantages of profitability in large firms obviously leads to identification of the negative effects for SMEs.

Graphs II.3 : Value added / turnover
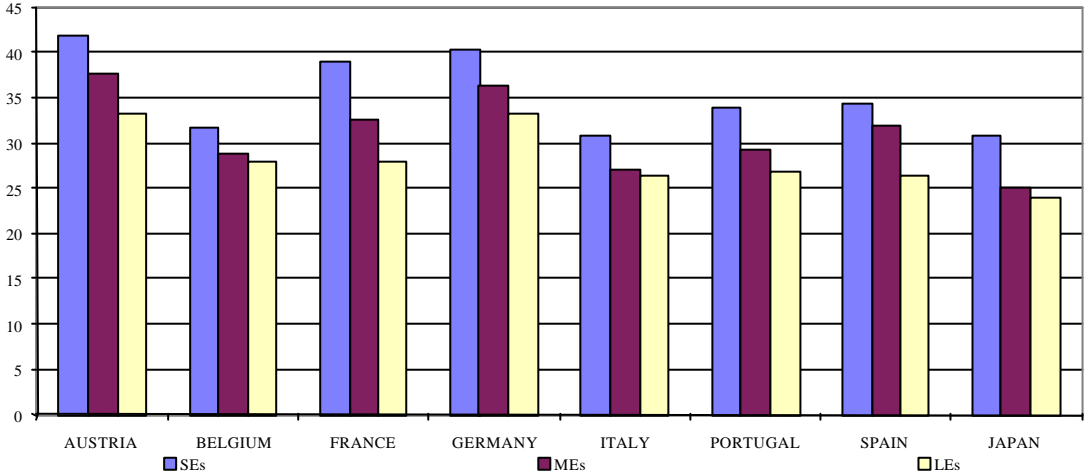
Costs of materials and consumables
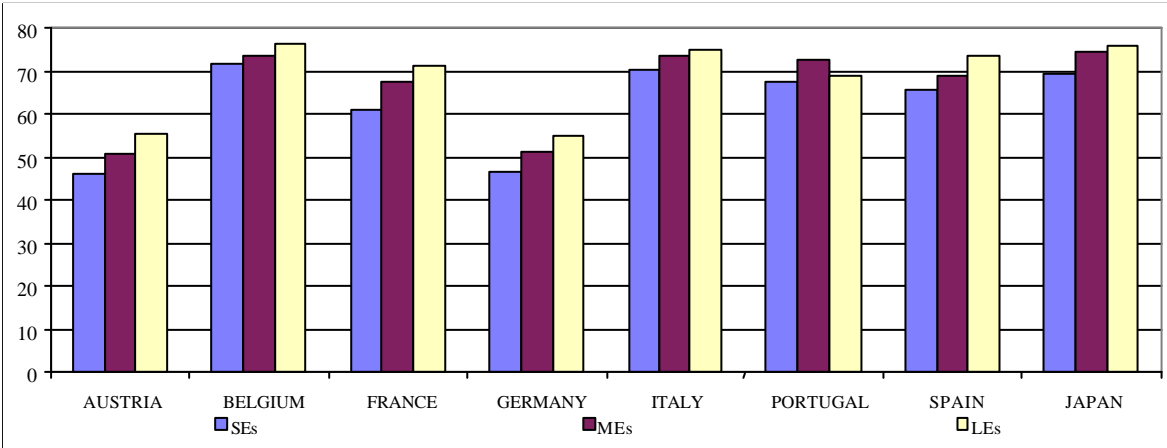
1.2. What are positive determinants of large firms's profitability ?

1.2.1. *The distribution of value added favours the profitability of large firms* over smaller ones. This evidence is borne out by the following ratios:

– the *mark-up ratio* (cf. Graph II.4) increases with firm size for Belgium, France, Portugal and Japan and the same is observable in Italy from 1994 (it decreases for Austria as from 1992 and the mark-up ratio remains the same in Germany, regardless of firm size);

Box II.3

The *mark-up* ratio is defined as gross operating profit over value added. As defined by BACH, value added is divided between staff costs and gross operating profit, with the result that the mark-up ratio is equal to unity less staff costs over value added.

It is interpreted as an expression of the power to negotiate prices in the market or with other firms. But it may also be simply the consequence of the cost structure.

– *staff costs per unit of turnover* is lower for LEs.

The proportion of staff costs in turnover (cf. Graph II.4) systematically decreases with the size of the firm. The difference in the distribution of staff costs may result from:

- a lower level of wages for equal qualifications, but we assume that LEs offer better wages than SMEs, something which is commonly acknowledged;

- a higher level of labour productivity which can be related to a more capital-intensive orientation of large firms, since substituting capital for labour is the normal way of increasing labour productivity.

The gap between LEs and SMEs has increased over the past six years. This growing difference in staff costs could also be explained by the higher propensity of LEs to use staff costs as an adjustment variable during periods of recession and therefore to maintain roughly the same level of labour productivity even in periods of recession (*European Economy*, No 7, July 1997, pp. 23-24).

Box II.4

Staff costs cover social charges, wages and salaries. Their level depends on the extent to which external labour is taken into account and on the existence of employee participation schemes.

The share of staff costs in value added or in turnover correlates positively with the level of wages and negatively with the level of labour productivity.

- cash-flow capacity

The capacity to extract higher cash flow from equal turnover increases with size in every country except Spain (cf. Graph II.5). Thus, large firms have the highest self-financing capacity. This higher capacity can be explained by the higher mark-up ratio, but it may also be caused by higher gross financial income and lower financial charges.

Box II.5

Cash flow is calculated by summing gross operating profit and financial income less charges and by deducting the tax on profits. The cash-flow capacity (cash flow per unit of turnover) enables the firm to create the provisions for depreciation on fixed assets. It will also be the source either of shareholder remuneration (dividends) or of self-financing through allocations to reserves. Clearly, cash-flow capacity influences a firm's investment potential since it is the source of internal finance.

In this study we assume that the productivity of labour is higher in large firms, as a consequence of their higher capital intensity; this is a commonly accepted hypothesis since this ratio cannot be evaluated. The BACH database does not give the number of employees, but *value added over staff costs* may be used as a proxy for labour productivity. This ratio increases with size in seven countries, the tendency being particularly strong in Portugal.

Graphs II.4 : Mark-up ratio
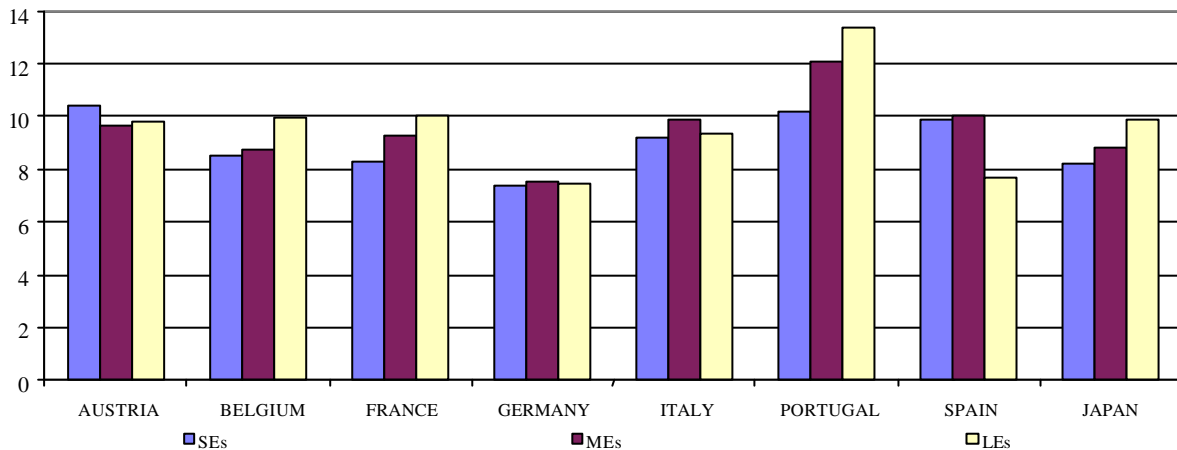
Staff costs
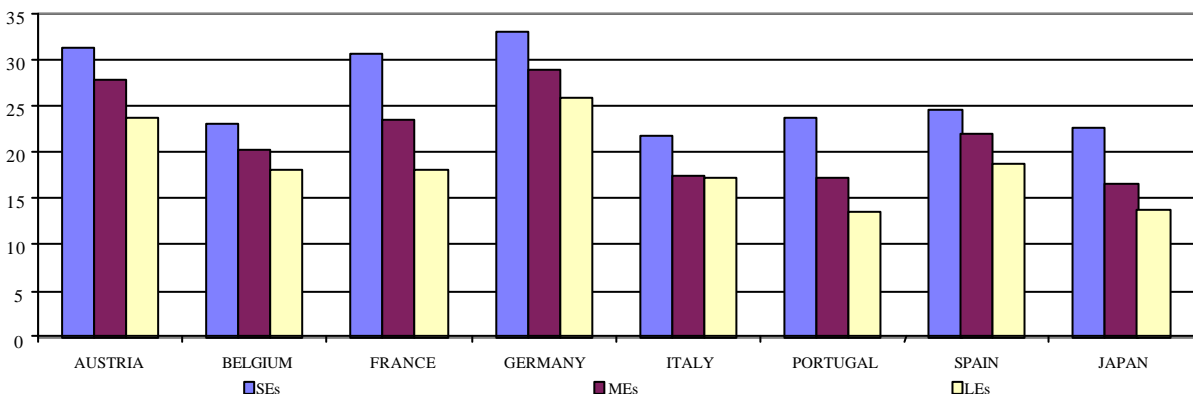
1.2.2. Another element benefiting large firms: the working capital requirement

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Box II.6

*The working capital requirement over turnover* measures the weight of short-term non-financial assets, these being stocks and trade debtors. Trade creditors must be deducted as they are a source of financing strongly correlated with trade debtors. Both are 'non-financial' items as they do not bear interest. Their levels depend on national and sectoral habits. The weight of these assets results from the firm's network of upstream-downstream relationships, i.e. the nature of its commercial relationships with suppliers and customers.

In most of the European countries selected, small and medium-sized firms showed a higher working capital requirement (cf. Graph II.6). The study of the major components of working capital shows some interesting regularities which will be explained below to support this observation.

Graph II.5 : Cash-flow capacity
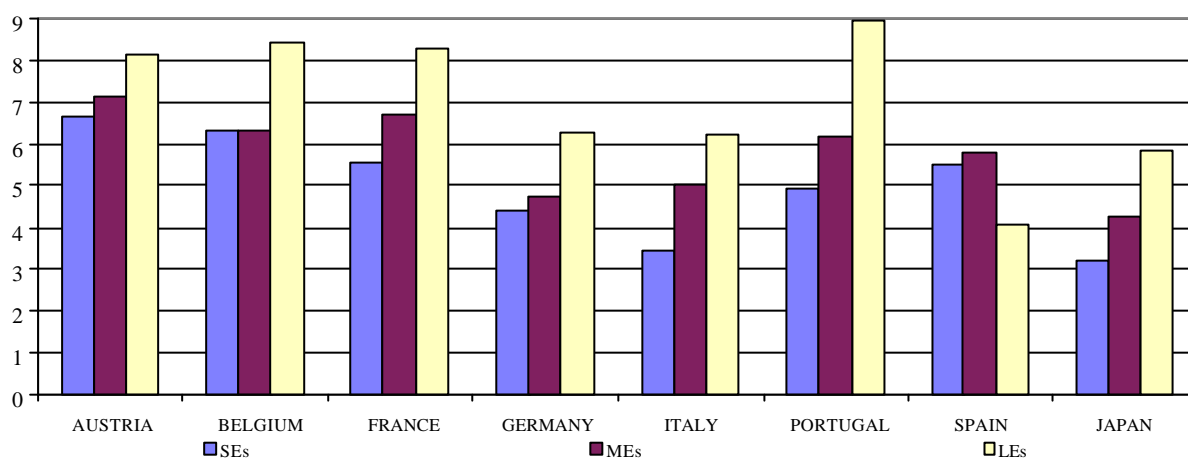
The ratio of stock to turnover, which is expressed as a number of days, when multiplied by 360, identifies firms according to size (cf. Graph II.6). In the European countries, its mean value varies within a rather narrow range from 45 days in Spain to 60 days in Portugal (all sizes included, in 1994, which is the last year when data was available for Germany). Nevertheless, this ratio remains higher in any European country than in Japan, where it is only 38 days for all sizes, a figure which testifies to Japanese business organisation, which aims to reduce stocks to a few days. The stock ratio decreases with size in the European countries covered by our study, apart from France. Differences according to size may be dramatic; in 1995, for instance, the difference between large and small Spanish firms was 20 days.

The fact that large firms have fewer days of stocks than smaller firms may be partly due to the growing tendency of large firms to subcontract stock management to small and medium-sized firms.

The rate of trade debtors over turnover displays a common feature in European countries, with large firms showing the lowest rate in any country expect Japan.

The trade creditors ratio is roughly comparable from one size to the next in five countries. The French case is worth noticing since large firms have both the highest level of trade creditors and the

lowest level of trade debtors. Hence, smaller French firms supply liquidity to the larger ones through non-interest-bearing trade credit.

Graphs II.6: Working capital requirement / turnover
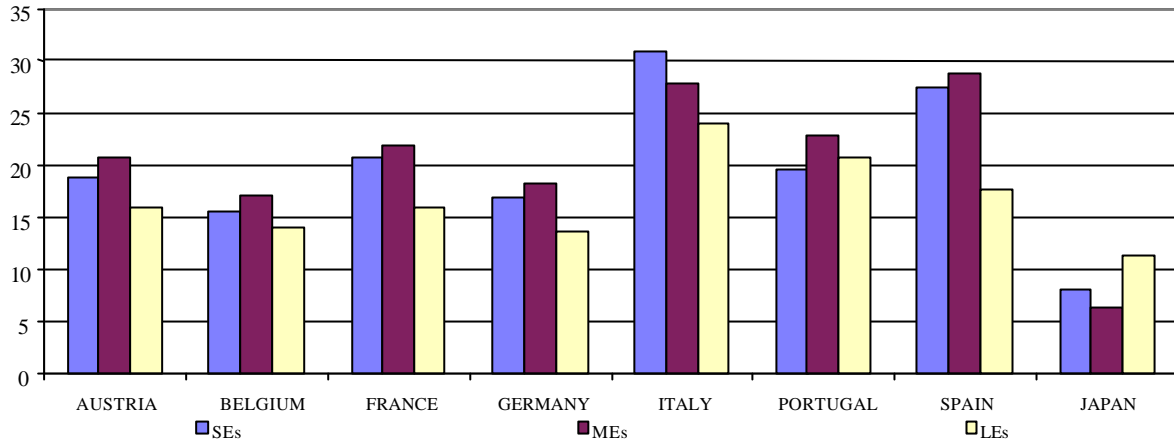
Stocks from 1990 to 1996 for European countries
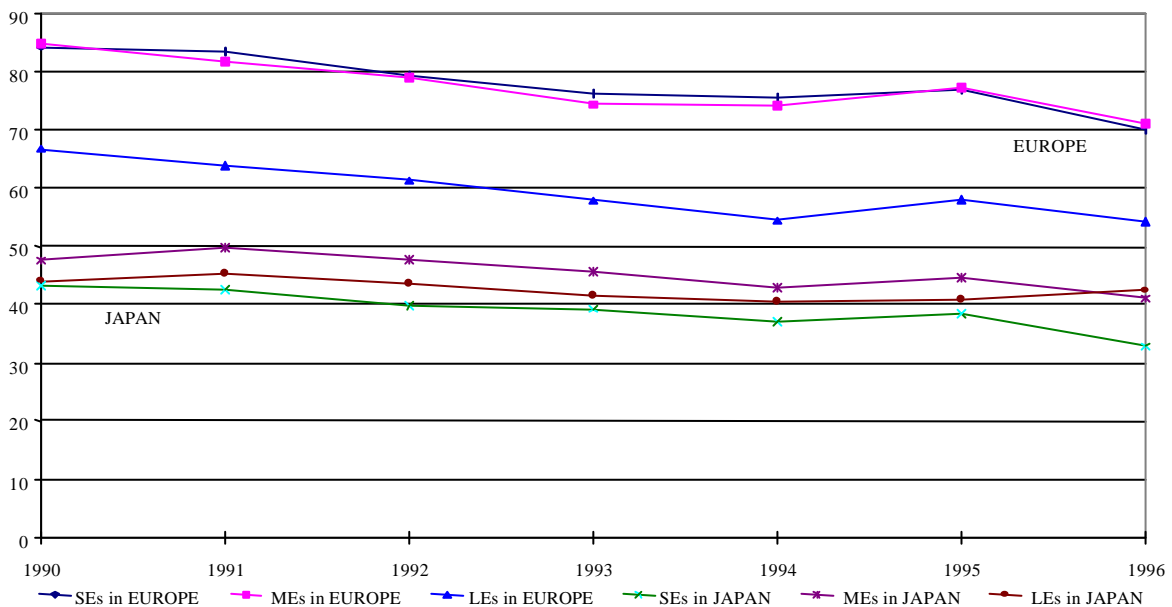
To sum up, the difference in the working capital requirement ratio may signify some power on the part of the large firms to manage short-term assets, along with the flexibility of SMEs. In the European countries, large firms manage stocks in such a way that they cover fewer days than in the case of smaller firms. They also benefit from trade credit since they are in a better negotiating position than smaller firms, regardless of other factors which influence trade credit (as is commonly accepted, the levels of trade creditors and debtors are much lower in Germany than in Italy). It suggests also that in the European countries SME flexibility, i.e. the capacity to react to unexpected demand, requires a higher rate of current assets.

SUMMARY AND PREMIMINARY CONCLUSIONS

This descriptive analysis shows that the ratios which have either a negative or a positive influence on profitability distinguish between firms according to size in a relatively clear-cut manner which transcends nationality (see Chart II.7). This evidence supports the idea that there are different patterns of profitability formation.

In small firms, profitability management is less 'sophisticated'.[6] Hence, it may be that some of the negative effects on large firms are exaggerated by the data. External growth through the acquisition of holdings makes it possible to centralise profit formed elsewhere and to locate it in a country selected for its tax advantages. The study of the determinants of profitability has shown that the efficiency of fixed assets is lower in large firms. It indicates indirectly the greater capital intensity of LEs, a handicap for profitability which is partly offset by the lower share of staff costs. But the weight of fixed assets and its negative effect on large firms' profitability cannot be reduced to tangible assets. To make this point clearer, it is necessary to take the financial component into consideration. The weight of financial fixed assets, which include shares and long-term loans in affiliated undertakings, arises from managing external growth. In all the countries selected, the proportion of financial fixed assets in the total amount of fixed assets increases with size (cf. Graph II.8). The proportion is particularly high for large firms in Belgium, France and Germany. The fixed assets over turnover ratio would be higher if financial assets were excluded from the denominator, and the gap between SMEs and LEs would be lessened.

Chart II.7 Indicator and determinants of profitability

	Large enterprises		Small and medium-sized enterprises	
Gross profit / capital employed	-		+	
Value added / capital employed	-	H	+	A
Value added / turnover	-	H	+	A
Fixed assets / turnover	+	H	-	A
Costs of consumables / turnover	+	H	-	A
Mark-up	+	A	-	H
Staff costs / turnover	-	A	+	H
Working capital requirement / turnover	-	A	+	H
Cash-flow capacity	+	A	-	H

- :   lesser value   A :   profitability advantage
+ :   higher value   H :   profitability handicap

Comparative advantages in favour of SMEs come from a higher rate of value added over fixed assets and a higher degree of product transformation. Both of these advantages can be related to greater labour intensity.

Hence, there are factors influencing profitability that work in opposite directions. On the one hand, lower capital intensity, which is a feature of SMEs, promotes their profitability. On the other, by

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[6]   For instance, the weight of other non-financial current assets less other non-financial current liabilities is lower in SMEs than in LEs, a ratio which promotes the former's profitability, these items being included in the capital employed.

reducing economies of scale and labour productivity, it can have a negative impact on profitability, at least on a static view.

Graph II.8: Financial fixed assets / fixed assets
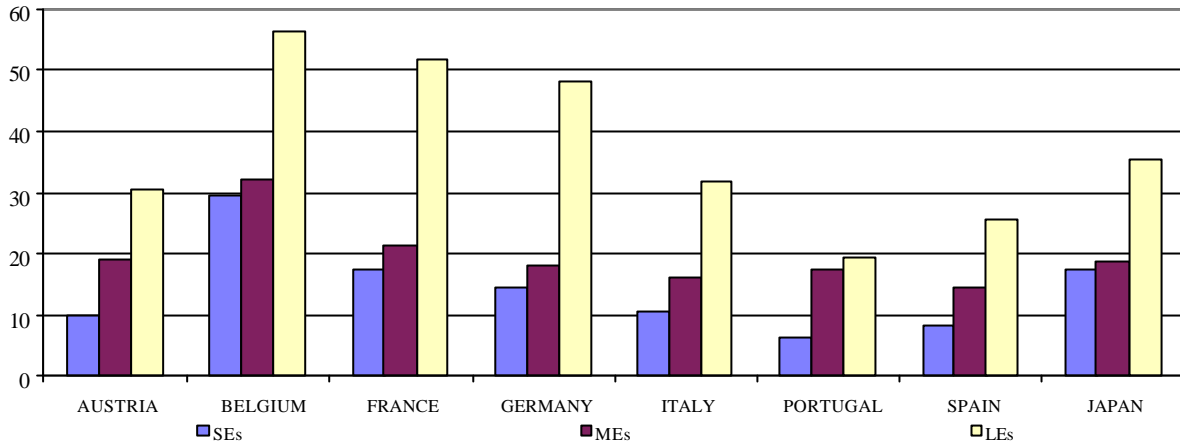
This interpretation suggests that an SME is not a large firm operating on a smaller scale and that SMEs and LEs may follow distinct patterns of profitability. This hypothesis is tested in the fourth chapter of this study.

Some observations indicate that differences are amplified by the relationships between large and small firms. Thus, the lower weight of staff costs (and the higher mark-up ratio) for LEs could be related to the use of subcontracting to SMEs. It is supposed that large firms can also subcontract stock management and benefit from trade credit; these advantages are reflected in the working capital requirement ratio. The network of business relationships would accentuate SMEs' comparative advantages (higher capacity to create value added) and handicaps (higher working capital requirement).

These observations obviously influence financial needs. SMEs' operating cycle (or business cycle) requires more financial resources per unit of turnover.

To conclude, SME financing:

– must not be related to lower performances (observations are highly sensitive to the ratio of profitability, and the ratio selected in this study indicates higher performances); in spite of a lower cash-flow capacity (i.e. capacity to create internal sources of finance per unit of turnover), SMEs need a lower level of capital employed per unit of turnover;

– must be related to the rate of investment in fixed assets;

– cannot ignore the higher working capital requirement of SMEs, a characteristic which can be related to greater flexibility.

2. FINANCIAL STRUCTURE AND CAPITAL

As we now turn our attention to financial structure, structural differences among small, medium-sized and large firms are no longer clearly discernible. Specific national features of financial systems affect firms' behaviour, so that regularities in size are more difficult to observe.

Three matters will be examined in this subsection:

– own funds, leverage and provisions, i.e. stable resources;

– short-term capital and liquidity requirement;

– financial charges.

2.1. Own funds, leverage and provisions

The ratio *'financial debt over balance-sheet total'* relates all the debts that bear financial charges to the balance sheet (Box II.8 and Graph II.9). It decreases with size in four countries: Austria, Germany, Portugal and Japan. The large gap between SMEs and LEs is a peculiarity of the Germanic countries, already examined in the first chapter of this study. Differences according to size are small in France, Italy and Spain. Belgium stands out in that large firms there tend to be slightly more indebted than SMEs.

Graph II.9 : Financial debt / balance sheet total
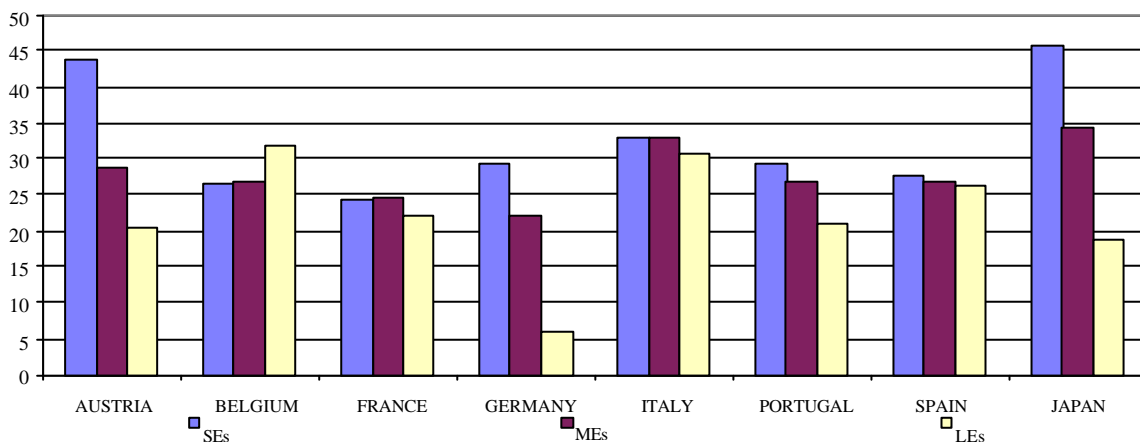
Own funds / balance sheet total
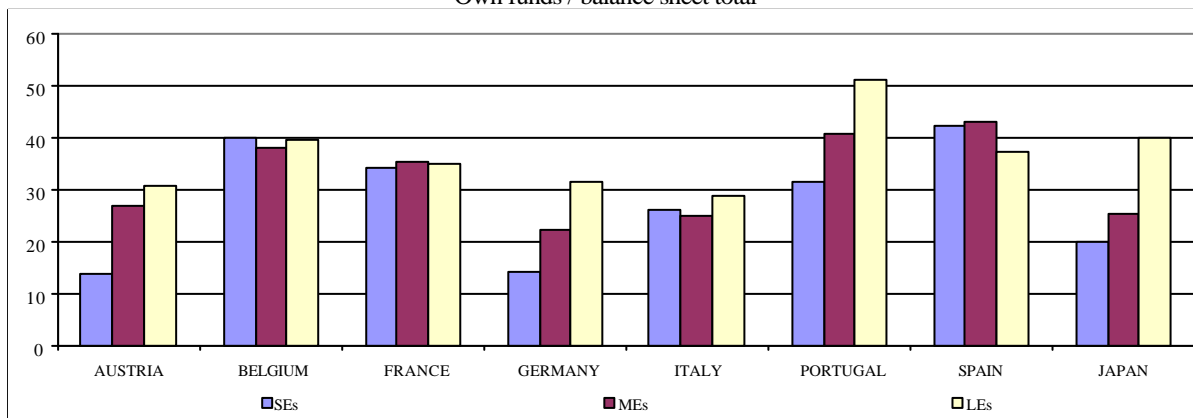
Box II.8

Components of financial indebtedness are mainly debenture loans, amounts owed to credit institutions and intra-group loans. Trade credit is not included as it does not generate financial charges. However, this is not the case in Germany, where trade credit is not always shown separately from financial credit.

It is difficult to interpret the differences in level between the countries because we cannot always distinguish whether they stem from accounting and statistical rules or from national lending relationships.

Analysis of the ratio *'own funds over balance-sheet total'* will support these observations (Graph II.9). SMEs are far less capitalised than large companies in the four above-mentioned countries. In the other four, differences according to size are not significant.

Graph II.10 : Reserves / capital and reserves
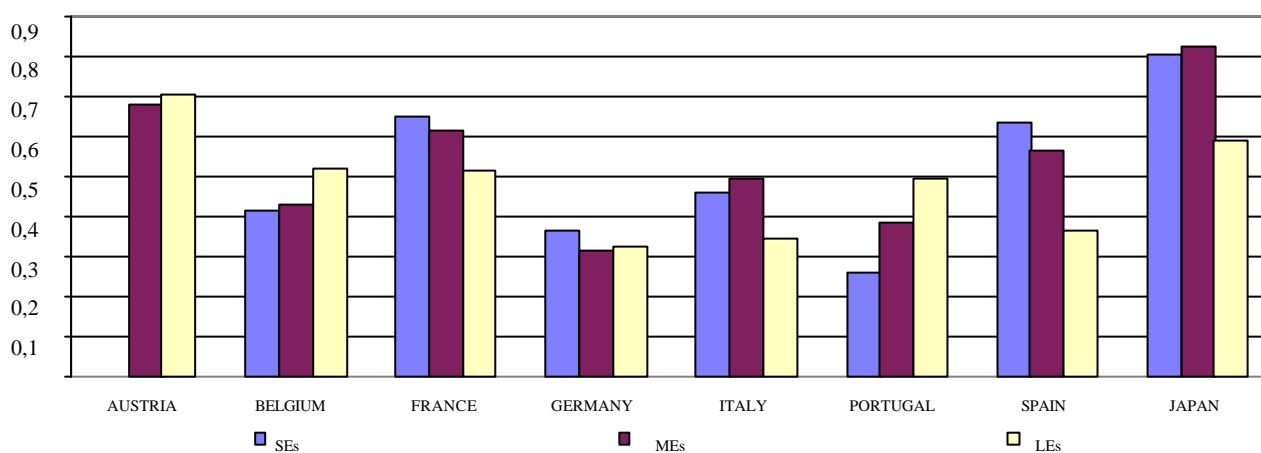
Leverage
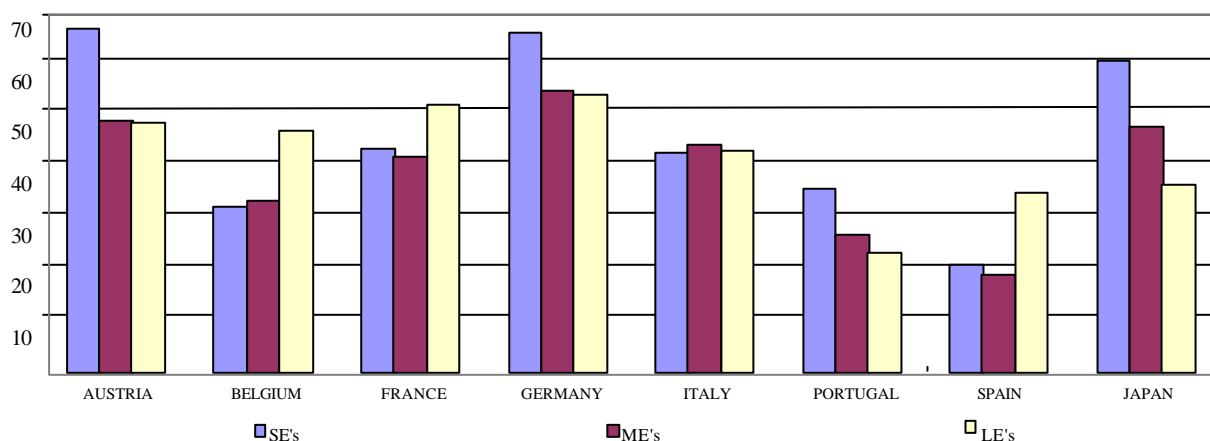
The ratio *'reserves over capital and reserves'* estimates the proportion of reserves in own funds (Graph II.10). Reserves are one source of own funds, the other one being external funds, which may come either from associates or from financial markets. It is commonly assumed that large firms can issue shares more easily than smaller ones, so that the proportion of reserves in own funds can be expected to decrease with size. In fact, this trend is not observed in any country.

The ratio referred to as 'leverage' in this study relates long-term financial debt to overall stable capital, i.e. long-term financial debt plus own funds and provisions (Graph II.10). In the four countries mentioned above, small firms are more leveraged than larger firms, possibly offsetting their lower capitalisation. The situation in France is different in that SMEs there have slightly lower capitalisation and lower leverage and, hence, less stable capital than LEs. This ratio provides confirmation that size does not have a significant impact on the capital structure of Italian firms.

The ratio 'provisions over own funds' (Graph II.11) shows that country has a powerful impact on financial structure while size has only a small impact. It is structurally very high in Austria and Germany notably because of the pension provisions that are managed by firms for their employees. These provisions should be considered virtually as 'own funds'. This item includes other types of provisions the size of which reflects accounting conventions and tax incentives.

Graph II.11 : Provisions / own funds
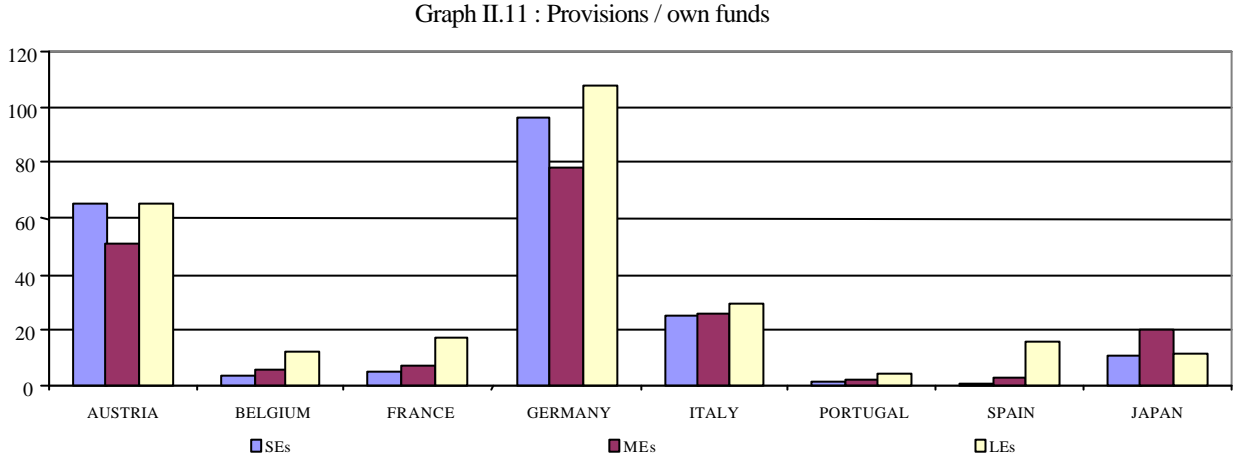
2.2. Short-term capital and liquidity

The ratio 'short-term financial debt over turnover' (Graph II.12) relates short-term financial debt (mainly from banks but also from the parent company) to turnover. Per unit of turnover, more short-term financial debt is required by SMEs in most of the selected countries. This observation can be associated with their financial debt structure and their higher working capital requirement.

'Financial debt structure' measures short-term financial debt as a proportion of overall financial debt.[7] In the countries of southern Europe, SMEs display a slightly higher rate of short-term financial debt while in all European countries medium-sized companies share the same feature. Japan is the only country in the sample where small enterprises have less recourse to short-term debt than large ones. This point will be discussed in the fifth chapter of this report.

The ratio 'cover rate of capital employed' is related to operating funds since it indicates the degree to which a firm's long-term or stable funds (own funds, long-term debt and provisions) cover fixed

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[7] *Short-term debt* includes long-term loans falling due within one year, but this is not the case for French firms since this class of loans is not deducted from the BACH item 'total amounts due and payable after more than one year'.

assets, the working capital requirement and other non-financial current assets (Graph II.13). The cover rate of capital employed increases with size in Austria, Germany, Portugal and Japan. It decreases in Belgium and France, where small firms have proportionately higher amounts of operating funds. There is no discernible size-related difference in Italy or Spain.

This ratio sums up two partly independent factors. The numerator, long-term financing, may grow with size in most of the selected countries as is components are the following items: capital and reserves, provisions and long-term financial loans. The denominator, capital employed, is relatively higher for large firms. In Italy and Spain the effects of these two factors cancel each other out; in France and Belgium SMEs take advantage of their lower capital employed per unit of turnover; in the other countries large firms take advantage of their higher proportion of long-term capital.

Graphs II.12 : Short-term financial debt / turnover
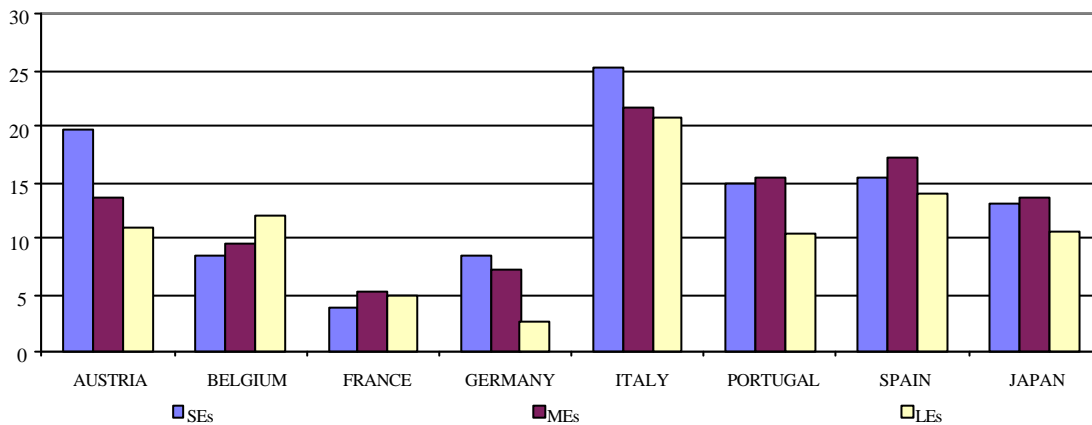
Financial debt structure
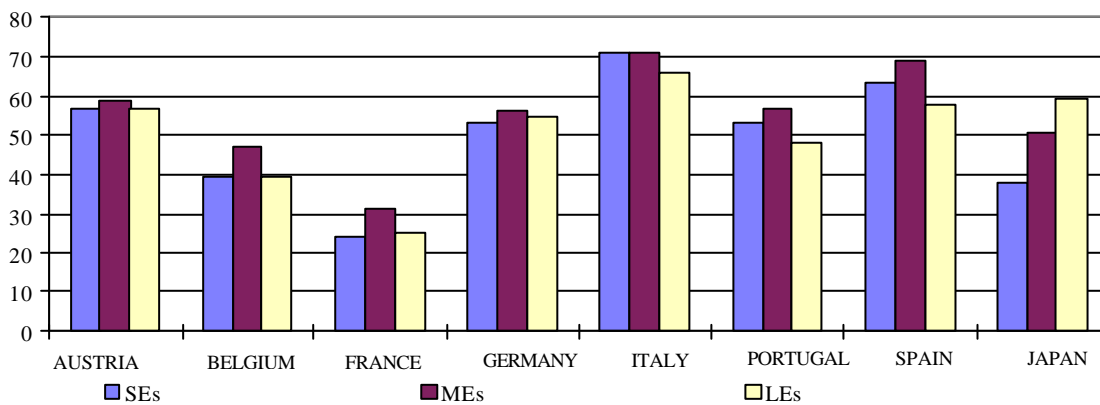
Graphs II.13 : Cover rate of capital employed
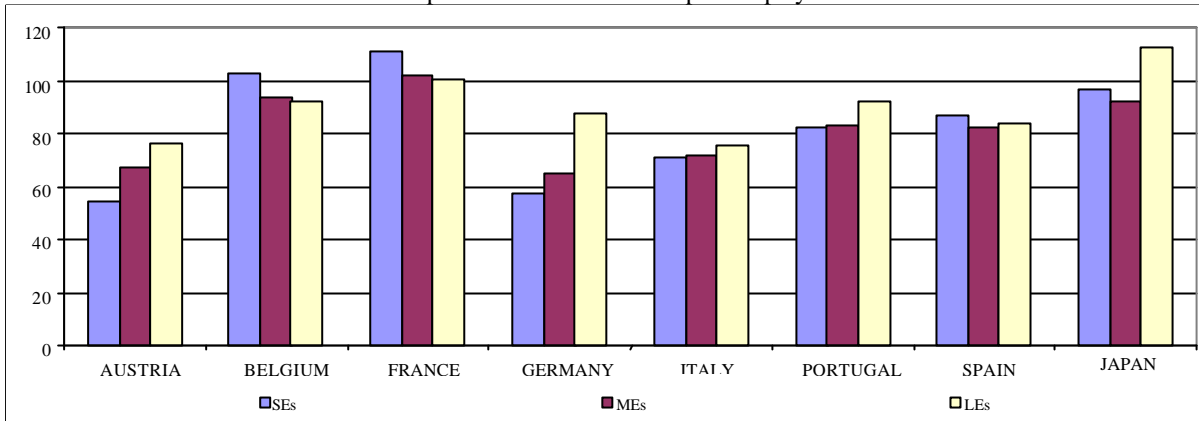
Liquid capital requirement
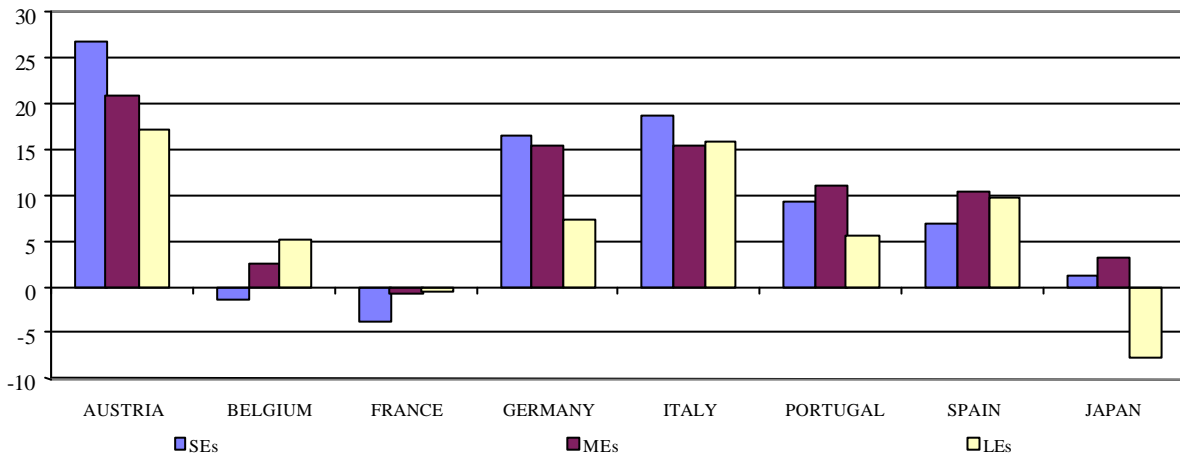
Box II.9 Liquid capital requirement

The liquid capital requirement depends on the way a firm covers the capital employed, which can be financed only by long-term or stable funds (own funds, long-term financial debt and provisions). In such a case, the liquid capital requirement is negative and, as a consequence, the current financial and monetary assets exceed short-term financial debt. In other words, the cash balance is positive and any growth of assets can initially be covered by current investment and cash. Such a case describes an 'autonomy sector', using Hicks' classification, to which this report has referred.

However, current investments might be considered not as reserves but as any investment generating profit. This behaviour was observed in the first part of this decade, when the interest rate on short-term investment was exceptionally attractive.

If the stable financial resources do not cover the total amount of capital employed, the gap is financed by short-term financial indebtedness, the cash balance being negative and the liquid capital requirement positive. In other words, the liquid capital requirement is positive when operating funds (i.e. stable funds less fixed assets) do not cover the total amount of non-financial current assets less non-financial current liabilities.

Obviously, in this second case, which typifies an 'overdraft sector', the banking relationship is important for business flexibility.

The ratio '*liquid capital requirement over turnover*' complements the previous one (Box II.9 and Graph II.13). Liquidity requirements, which stem from a lack of operating funds, decrease with firm size in Austria, Germany, Italy, Portugal and Japan because long-term fund cover tends to be better in large firms there (as indicated by the previous ratio). However, this trend is not always linear

relative to size. Generally speaking, whatever their size, firms in Austria, Germany, Italy, Portugal and Spain display a positive liquid capital requirement since their long-term funds do not cover total capital employed. For the other three countries, the cover is close to or above unity. Of course, a symmetrical result would be obtained by looking at the *'cash balance'*, which represents current investments and cash at bank and in hand less short-term loans owed to credit institutions and to other financial creditors.

2.3. Financial charges and risk

It is well known that the smallest firms carry a risk premium which is usually - and rather superficially- explained by their higher failure rate. With BACH data, it is possible to estimate the risk premium as the difference in the apparent interest rate according to size for the following countries: Belgium, France, Germany, Italy, Spain and Japan.[8] Risk premiums are roughly constant, except in Italy, where they decrease during the period under review. They are not high for medium-sized firms, ranging from 0 to 1 percentage point, but are substantial for small firms. Compared with large firms, small firms carry a risk premium that is 2 to 3 percentage points higher in all the above-mentioned European countries except Germany (because of an accounting peculiarity, this last result may be misleading). The situation in Japan is rather different as the risk premium is almost as high for medium-sized firms as for smaller ones.

3. COMMENTS ON THE UNITED STATES

The US data is not mentioned in the comparisons above and are analysed separately for three reasons. Firstly, the United States, like the Netherlands and the United Kingdom, provide data from consolidated accounts. The eight countries selected provide data from individual accounts only. Secondly, since harmonisation has so far been focused on the European countries, the comparability of the US data is limited and some important items are not available. Thirdly, there are only two size classes and 'SMEs' cover mostly medium-sized firms.

Only two determinants of profitability can be evaluated. In the United States, SMEs have the same comparative advantage as in the European countries. The rate of fixed assets per unit of turnover is far higher in SMEs than in LEs. However, the working capital requirement is similar in SMEs and LEs (a higher proportion of stock is offset by a higher proportion of trade creditors). Thus, per unit of turnover, SMEs need less capital employed.[9]

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[8] The available data are only averages. This reduces their informative value since marginal interest rates cannot be ascertained.

[9] Yet, comparisons with European firms are dubious as the item 'payment received on account from customer' is not included in 'trade creditors' and the non-available item tends to favour LEs.

Graph II.14
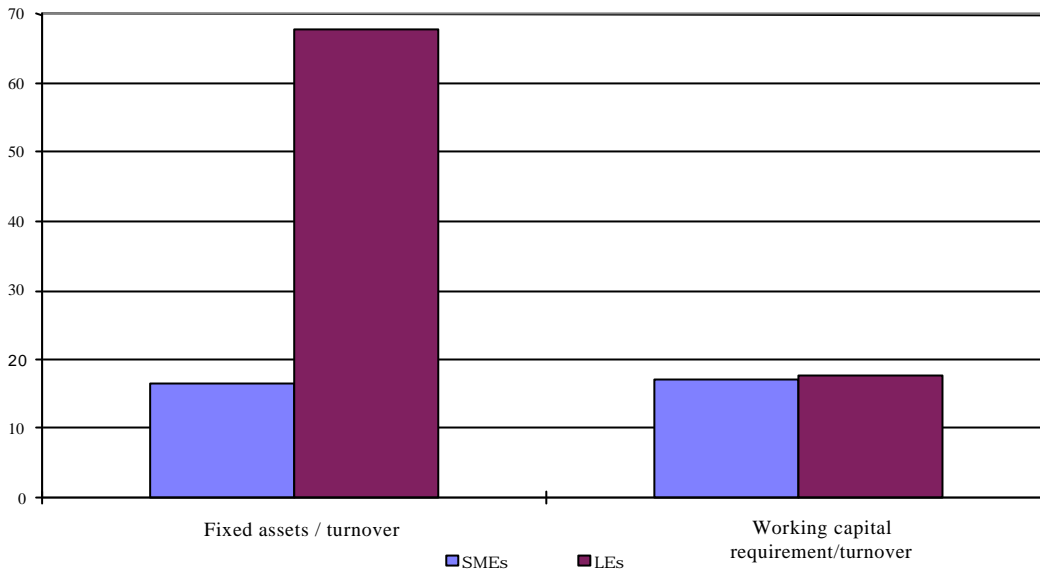
The financial structure is influenced by these features. The cover rate of capital employed (i.e. stable capital over capital employed) is higher for SMEs and the liquid capital requirement is negative. To sum up, the available determinants of profitability and the indicators of capital requirement suggest that SMEs show a pattern of profitability which requires relatively less capital.

Graph II.15
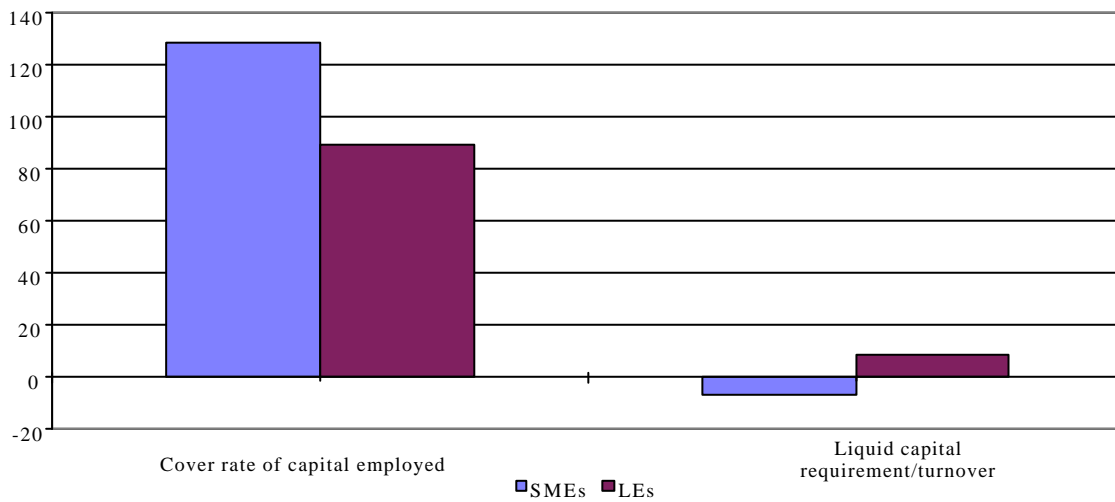
Some indicators of the capital structure also show that size distinguishes between firms in a clear-cut manner. First, the level of own funds is slightly higher for SMEs, a feature which is not observed in the selected European countries. Of course, this observation merits attention but, using the BACH database (like any balance-sheet data), it is not possible to distinguish between the sources of own funds (cash flow, shares issued privately or on the financial markets). Yet, this feature can be related to a second one, the level of provisions, which is quite low for SMEs but important for LEs (from 1992 to 1996, the ratio 'provisions over capital and reserves' fluctuated between 40% and 50%). The United States is the only country where the level of provisions identifies firms according to size

(this may be due to consolidated accounts). Finally, the proportion of short-term debt, which is very low in LEs, is a significant figure in the case of SMEs,[10] a feature which is also observed in the European countries. This last result suggests that the banking relationships might be more important for SMEs than for LEs, in spite of their higher capitalisation.

Graph II.16
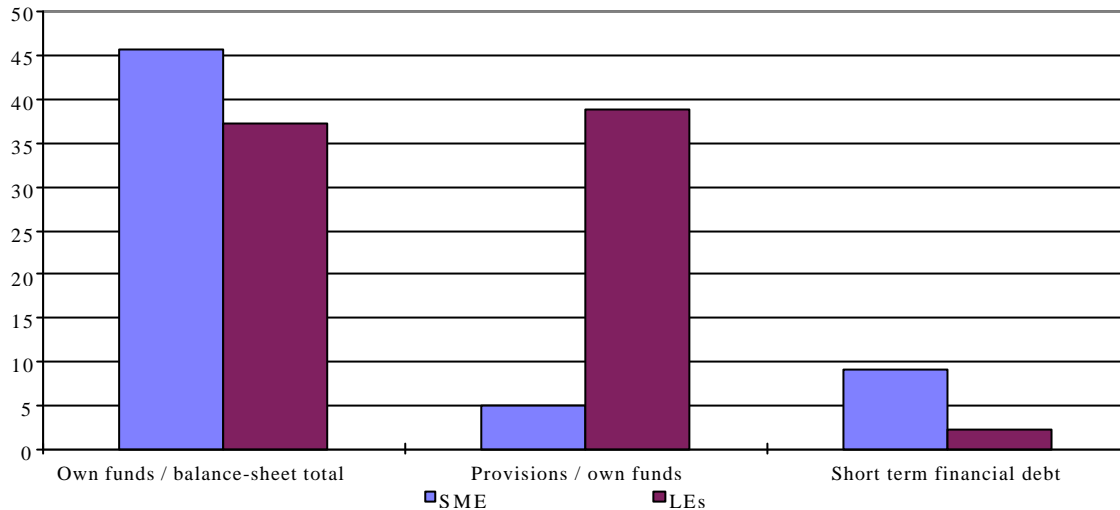
To sum up, the US data confirms the following. SMEs are less capital-intensive and more reliant on short-term financial debt than larger firms.

CONCLUSIONS

If we look at the determinants of profitability, structural differences appear among small, medium-sized and, above all, large firms that transcend their nationality. Two ratios which are germane to gross profitability sum up the advantages of small and medium-sized firms compared with large firms: their capital employed over turnover rate is higher, as is the value added per unit of capital employed. Comparative advantages in favour of SMEs come from a higher rate of value added over fixed assets and a higher degree of product transformation. Both of these advantages can be associated with greater labour intensity.

If we turn our attention to financial structures, the picture is less clear and regularities that transcend nationality are far from being so evident. Some widespread ideas about SMEs' financial handicaps are neither confirmed nor denied. This study suggests a new way of coming to terms with such ideas.

It is often said that, compared with larger firms, SMEs are much more dependent on internal sources of funds (owner's own capital and retained profits) than on external sources of finance (financial markets and indebtedness). This handicap is not easy to demonstrate since one cannot tell which part of subscribed capital comes from the owner and which part from financial markets. Leaving this aside, leverage (i.e. long-term financial debt) is higher for SMEs than for LEs in four of the eight

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[10]   It should be pointed out that these two ratios do not distinguish between European firms according to size.

selected countries (Austria, Germany, Portugal and Japan) while own funds have a smaller weighting. As a whole, SMEs do not seem to be more dependent on internal sources than larger firms since long-term debt can offset a lower rate of financial market funds.

It is commonly acknowledged that SMEs suffer from a lack of own funds. This study aims to challenge not the statistical observation but the usual interpretation given, as exemplified by the expression 'suffer from a lack of'. Using the BACH database, a gap can be accurately observed between SMEs and LEs in four countries, while no marked differences according to size are displayed in four others. Meanwhile, in the United States, SMEs are more highly capitalised than LEs (see Chart II.17). By qualifying this gap as 'a lack', economists wish to highlight the importance of own funds. The undercapitalisation of SMEs can restrict asset growth. It is also a key measure of solvency which indicates an enterprise's financial solidity to investors. However, *'own funds'* is a key factor which cannot be viewed in isolation as the following comments suggest. Own funds are an internal resource for funding investments and provide a signal which helps to increase external resources. The question of the adequate level of own funds cannot be discussed per se, without taking into consideration, firstly, the growth strategy of each individual firm and, secondly, the various sources of finance for each firm.

Chart II.17 Financial structure and capital requirement of SMEs (versus LEs)

	Number of countries		
	+	-	=
Own funds	2*	4	3
Financial debt / balance sheet	4	1	3
Reserves / capital and reserves	4	2	2
Leverage	4	3	1
Short-term financial debt /turnover	7*	1	1
Cover rate of capital employed	3*	4	2
Liquid capital requirement	5	4*	0
Financial debt structure	5	1	2

* Including the United States.

A firm that relies too much on debt can suffer from an excess of financial charges that would jeopardise its future development. In contrast, a firm that relies too much on own funds may miss some opportunities to increase its assets because such an increase would have implied debt. Such a firm will certainly send good signals of sound finance to investors but these signals would be of little value if the managers planned to rely only on internal resources to fund asset growth. For such a firm, a high level of own funds may correlate with a low-investment strategy which can be detrimental to future competitiveness.

It is usually accepted that a low level of capitalisation testifies to the difficulties of SMEs in issuing shares on capital markets, so that their choices are reduced in comparison with LEs. Yet, in some cases, e.g. small firms in Austria and Germany, another interpretation fits better. Here, what may appear as a low level of capitalisation may also be seen as the result of managers' preference for other funds. As a matter of fact, the high leverage of small Austrian and German firms testifies to the ease of access to other external resources, mainly banks.

Finally, the main evidence of this descriptive analysis is summarised below.

The analysis of the determinants of profitability shows that SMEs enjoy comparative advantages. Both the efficiency of fixed assets and the degree of product transformation are higher than in the case of LEs. With their greater labour intensity, staff costs per unit of value added are higher and thus the mark-up is lower. An additional feature of SMEs is the higher rate of stock and trade credit per unit of turnover, this being partly a result of inter-business relationships, which in most countries favour large firms.

Observed capital structure does not lend itself to any straightforward interpretation because of the complexity of the determinants, including specific national features of financing systems. The composition of stable finance is highly sensitive to country. Nevertheless, some regularities are observed. In four countries, the same main features can be observed. SMEs are less highly capitalised but more highly leveraged ('leverage' in this study takes into consideration only long-term financial loans). Thus, the lack of stable funds due to the lack of own funds tends to be offset by long-term indebtedness. Therefore, SMEs display a far lower rate of stable capital over capital employed in only two of the four countries, Austria and Germany.

On the whole, SMEs tend to rely more on short-term (as opposed to long-term) financial debt than larger firms, while SMEs require more short-term financial debt per unit of turnover in most countries. This tendency may correlate with their higher working capital requirement and higher flexibility.

The ratios examined in this descriptive part of the study call for a focus not only on SMEs' handicaps but also on their advantages and specific financial needs.

CHAPTER III : EVIDENCE FROM PRINCIPAL COMPONENT ANALYSIS AND CLUSTER ANALYSIS

For a better understanding of the financial pattern and its assumed impact on the performances of firm, data analysis (i.e. principal component analysis) is used as a way of displaying a framework which embraces the financial structure and the most common indicators of profitability. Indeed, in order to test the view that the financial pattern:

– is better described by using a set of financial indicators so as to take into account the financing of flexibility (Chapter I),

– may differ not only according to country but also according to size and perhaps sector, and

– may be linked to a complex set of other 'real' variables, mainly profitability,

two statistical methods are suitable: principal component analysis (PCA) and cluster analysis (CA). Since a minimum of 8 and a maximum of 20 variables have been selected to highlight the capital structure of SMEs and large firms, it is impossible to plot all these variables simultaneously. Principal component analysis can be used to summarise the data in two or three dimensions and helps to visualise the data (Box III.1).

Box III.1

Principal component analysis (PCA) begins by calculating the correlation among corporate BACH data, broken down by size (3 sizes), sector (3), country (8) and year (6 or 7). It allows the number of selected variables - called 'active variables' – to be reduced to a few independent and hence orthogonal components (or factors). Principal components are plotted to illustrate that they represent orthogonal rotations of the original variables.

PCA is used mainly to sort individual data. However, the corporate data available from BACH is group data and not microdata, i.e. there is only one average figure for each size/sector category and balance-sheet item. Hence it is implicitly assumed that all enterprises in one category behave like the average within a given category. In other words, the average firm is assumed to be a representative one. Our sample contains 486 observations or 'average firms' which are grouped into clusters.

We then turn to **cluster analysis**, which sorts the output data set according to each of the large components and permits the grouping of data that is most similar (a standard iterated algorithm is used to minimize the sum of squared distances from the cluster means). The observations are divided into clusters so that every observation belongs to only one cluster. The number of clusters is chosen according to frequency so that the number of observations in each cluster is not too small. Principal components are plotted to illustrate how original observations are spread out. The most 'representative' firms of the sample (firms of the BACH data sample broken down by size, sector, country and year) are located near the intersection of the principal components.

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1. EVIDENCE FROM PRINCIPAL COMPONENT ANALYSIS

Variables have been selected following a theoretical approach which takes into account the financing of contingencies.

Active variables are mostly indicators of the financial pattern. They have been selected on the basis that:

– the impact of contingencies first affects current assets, so that financial debt has been broken down according to term, and

– the accumulation of capital must be widened and must include circulating or short-term non-financial assets, instead of focusing only on fixed assets.

Therefore, the ways of financing the operating cycle deserve special attention. Theoretical literature did not pay much attention to this topic. As explained in Chapter I, this research follows Hicks' idea of two financing sectors (one called 'autonomy' and the other called 'overdraft') which differ when it comes to obtaining liquidity should an unexpected opportunity result in a need for additional capital:

(i)   in an autonomy sector, the firm holds reserve financial assets (cash at bank and in hand, as well as liquid securities or current investment) as a counterpart to the high coverage of assets by long-term debt, provisions and stockholders' equity;

(ii)   in an overdraft sector, the firm does not hold enough reserve financial assets (or internal liquidity) and borrows, mainly from banks.

As this research also focuses on the standard structure of capital, i.e. on the usual distinction between instruments of ownership and debt securities, active variables have been selected so that firms can be distinguished:

– according to the way of financing total employed capital, the distinction being between firms with a high level of own funds (equity and 'own funds' are equivalent in this report) and those with a high level of long-term financial indebtedness (debt in excess of one year);

– according to the way of financing the operating cycle, with the previous distinction between those which hold net reserve financial assets (i.e. cash at bank and in hand, as well as current investments net of financial short-term debt) as a counterpart to a high coverage rate of capital employed and those with net short-term financial debts.

Selected 'active variables' which are listed in Box III.2 and in Appendix III also include cash-flow capacity as the major determinant of internal financial resources and the 'leverage impact', which measures the impact of debt on financial profitability.

In this research, the number of active variables is limited to 8. Thus, other ratios which are indicators or determinants of profitability or items which may help describe the corporate capital structure are treated as 'supplementary variables'. It means that their coordinates on components are calculated but they contribute neither to the definition of components nor to the grouping of data. The supplementary variables are divided into two groups, as indicated in Box III.2 and in Appendix III.

The PCA covers the period 1989-95 and concerns, firstly, the eight countries for which complete or nearly complete data is available and, secondly, four other countries for which more data is missing. As in the previous chapter, the analysis takes only manufacturing into account.

Box III.2 Selected variables of the principal component analysis

<u>**ACTIVE VARIABLES**</u>

Indicators of financial structures:
- own funds / total = capital and reserves / balance-sheet total
- leverage = provisions and medium- and long-term liabilities / (provisions and medium- and long-term liabilities + capital and reserves)
- reserves rate = reserves / capital and reserves
- short term fin. debt /*= short-term financial debt/total financial debt
- cover rate of K emp. = (capital and reserves + medium- and long-term debt) / (fixed assets + working capital requirement)
- liquid capital requirement = [(fixed assets + working capital requirement) – (provisions and medium- and long-term liabilities + capital and reserves)] / turnover

Indicator of profitability and of internal financial resources:

cash flow capacity = cash flow/ turnover

Indicator of leverage impact:
- leverage impact = 'financial profitability less gross profitability' = (cash flow / capital and reserves) - (gross operating profit over capital employed)

<u>**SUPPLEMENTARY VARIABLES**</u>

Indicators and determinants of profitability:
- gross profitability = gross operating profit / capital employed
- profit / own funds = profit or loss on ordinary activities after taxes / capital and reserves
- mark-up ratio
- fixed assets / t.o. = fixed assets / turnover
- working cap. require. = working capital requirement / turnover
- fin. charges / t.o. = financial charges over turnover

Financial structure and capital requirement:
- provisions/own funds
- solvency = cash flow/financial debt
- trade creditors / t.o.= trade creditors over turnover
- current assets /st d = current assets over short-term non-financial debt
- sh fin. debt /t.o. = short-term financial debt over turnover
- wcr + current invest&c = working capital requirement + current investments and cash
- over short-term financial loans

* In the PCA, short-term financial debt is related to total financial debt; it is similar to the 'financial debt structure' ratio in Chapter II.

Graph III.1 First plot: active variables and components 1 and 2
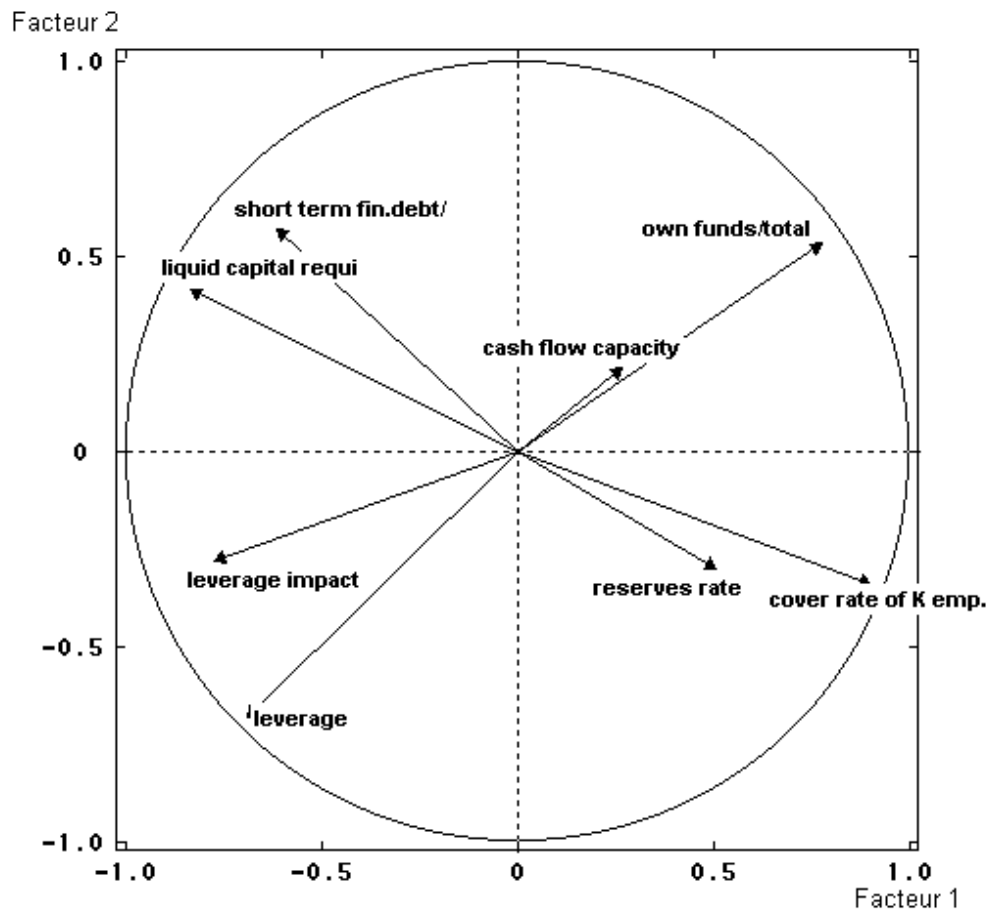
Three components provide a good summary of the data as they explain 84% of the total variance (Appendix III). Graph III.1 is obtained by projecting the first two components, which are always orthogonal (see Box III.1).

The first component accounts for 48.6% of the total variance and the second for 19.7%. The main variables correlated with the first component are the cover rate of capital employed, the rate of own funds and the rate of reserves (positively), the leverage impact, leverage and (the rate of) short-term financial debt (negatively) (Appendix III). The coordinates of the first component seem to suggest that firms with a high level of equity and liquid assets would contrast with firms with high leverage and few liquid assets. Yet, the study of the second component shows that this view is oversimplified. The second component depicts a contrast between the rate of own funds, the debt structure and the liquid capital requirement (with a positive correlation), on the one hand, and leverage (with a negative correlation), on the other. 'Liquid capital requirement' is, by definition, the opposite of 'cover rate of capital employed' and, not surprisingly, strongly correlated with 'short-term financial debt', which indicates the composition of financial debt. In contrast, 'liquid capital requirement' is not linked to 'leverage', which in this study takes into account only long-term liabilities. It indicates that a firm may finance its need for stable funds through own funds and its need for short-term funds by borrowing from the bank or from partners. Conversely, the 'overdraft sector' does not entail a high 'leverage'. It indicates that a firm may be characterised by a high level of long-term indebtedness and, consequently, a low level of own funds, whereas its level of financial current assets may be relatively high, with short-term financial debt not being important.

To sum up, the most striking feature of the plot of the first and second principal components is the independence of the following two pairs of variables:

– cover rate of capital employed versus liquid capital requirement,

– own funds versus leverage.

The plot of the first and the third components (component 3 accounts for 15.6% of the total variance) shows an interesting feature (Graph III.2). The third component is defined by a negative correlation with cash-flow capacity and a rather low positive correlation with the rate of short-term financial debt (Appendix III). None of the indicators of the financial pattern is strongly correlated with cash-flow capacity, which is the explanatory variable of internal financial resources. For instance, we do not observe a strong link between cash-flow capacity and a high rate of own funds or, to be more accurate, we do not observe that the firms with the highest cash-flow capacity show the highest rate of own funds. Correlation between 'cash-flow capacity' and rate of 'own funds' is equal to 0.47. Between 'cash flow' and 'rate of reserves' (which indicates the structure of own funds) correlation approximates to zero.

Graph III.2 Second plot: active variables and components 1 and 3
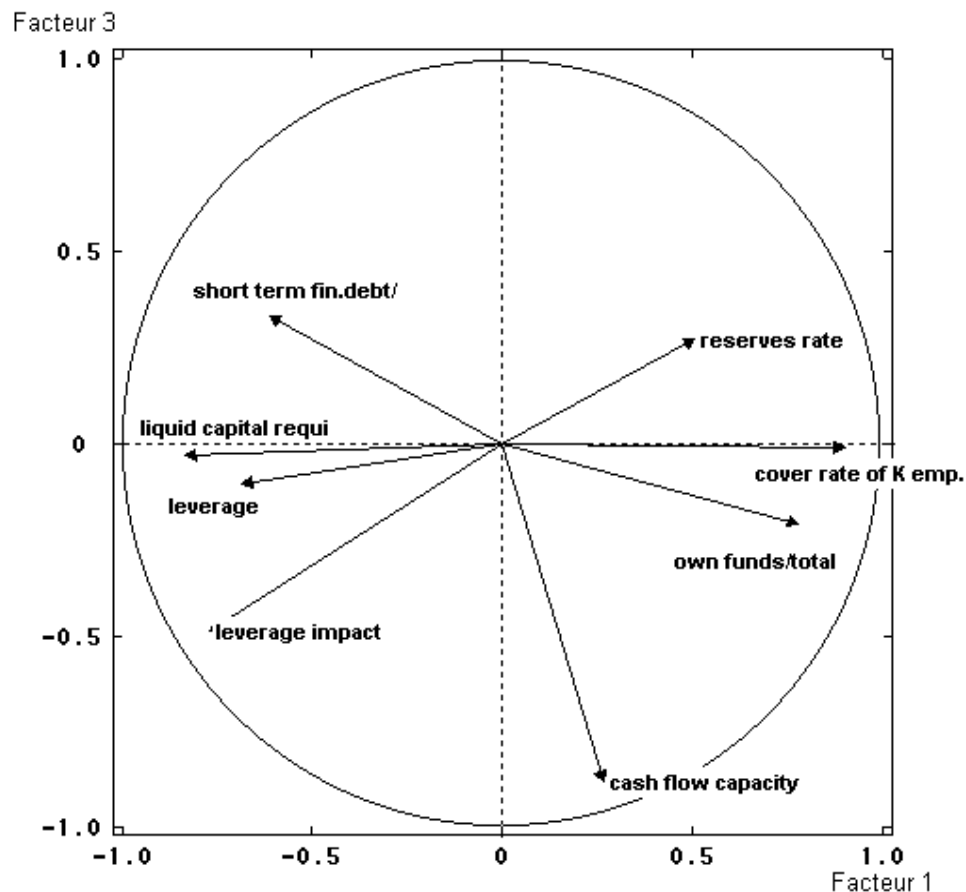
Graph III.3 Supplementary variables and components 1 and 2
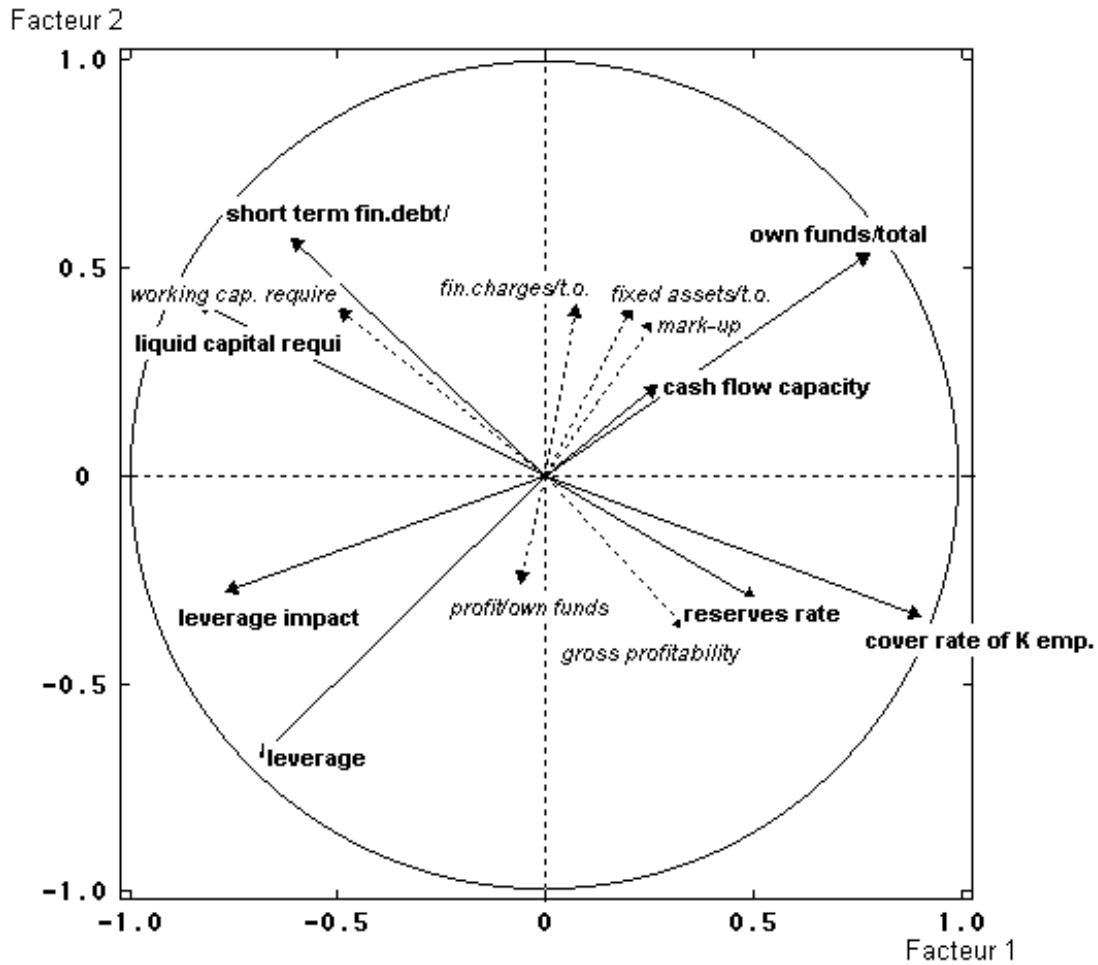
Key
leverage = active variable
gross profitability = supplementary variable

This result is borne out by taking into account among the supplementary variables those which indicate profitability and are calculated from the profit and loss account. They are plotted on the first plot (components 1 and 2) to illustrate how indicators of profitability correlate with indicators of financial pattern (Graph III.3). Graph III.3 shows the following interesting features.

Firstly, gross profitability (i.e. return on capital employed, as defined in Chapter II) is located not far from the barycentre (the intersection of the two first components) and does not correlate with any financial pattern. This suggests that the firms in the BACH database have distinct modes of financing which are sustainable. Although the absence of any link between the level of profitability and the level of own funds is not surprising,[11] it may be necessary to make this point clear. Higher profitability is not linked to a higher rate of own funds because the best-performing firms are usually those which have the highest rate of accumulation; this implies that, in spite of their capacity for generating internal

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[11]   The same evidence is produced by a study using individual data from a large sample of French firms (Rivaud-Danset et al., 1998).

resources, they need external funds which come mainly from borrowing, since the issuing of additional shares is normally a very minor source of funds. This evidence also indicates that a higher level of own funds does not automatically entail better performances. More facilities for issuing shares on financial markets may be used, for instance, to reduce a firm's indebtedness; in such a case, gross profitability remains unchanged.

Secondly, financial profitability (i.e. profitability of own funds), the most synthetic indicator from a financial point of view and the most important for shareholders, is located near the barycentre; this means that there is no discrimination between classes of the cluster analysis, i.e. groups of firms aggregated according to their financial pattern.

Thirdly, higher leverage (i.e. long-term financial debt) does not correlate with lower profitability - as a consequence of the first point - but correlates with the leverage impact. This variable measures the impact of leverage on the profitability of own funds. The most highly leveraged firms in the BACH database take advantage of their recourse to debt; long-term indebtedness favours the growth of turnover so that it exceeds the growth of financial charges, the difference between the selected indicators being positive.

Fourthly, the two ratios of profitability, gross or financial profitability, are located in the southern quadrants and are not correlated with 'mark-up' and 'cash-flow capacity', which are located in the north-east quadrant. In the first set, ratios are indicators of efficiency. In the second set, they are indicators of margin; mark-up indicates the distribution of value added (a higher mark-up, by definition, correlates with a lower rate of staff costs) and influences cash-flow capacity. The distance between these two set of ratios indicates that most of the firms in the sample do not combine a higher efficiency of capital employed and a higher mark-up. It confirms one result of the previous descriptive analysis: indicators of margin favour LEs whereas indicators of efficiency favour SMEs.

Fifthly, gross profitability correlates with the reserve rate and cover rate of capital employed; in other words, firms with a high level of profitability are in a better position as regards own reserves and, of course, stable financial resources. To some extent, this evidence would corroborate the 'pecking order' (Chapter I); higher profitability makes it possible to limit the use of external financial resources, whatever they are.

To sum up, Graphs III.1, III.2 and III.3 support the following:

– the absence of any link between the margin or profitability level and the financial structure, and

– the view that a given level of profitability can be reached using distinct patterns or models, namely higher efficiency of capital employed or lower unit wage cost.

Some other supplementary indicators of financial structures and capital requirement, when projected on the first plot (Graph III.4), show correlations with active variables:

– a high rate of short-term financial debt over turnover correlates with higher use of short-term financial debt, as expected;

– solvency correlates with own funds, as expected, because the solvency ratio relates cash-flow capacity to long-term financial loans, with the result that this ratio is high when long-term indebtedness is low;

– a high rate of provisioning correlates with leverage; this unexpected result is explained by the cluster analysis.

Graph III.4 Other supplementary variables and components 1 and 2
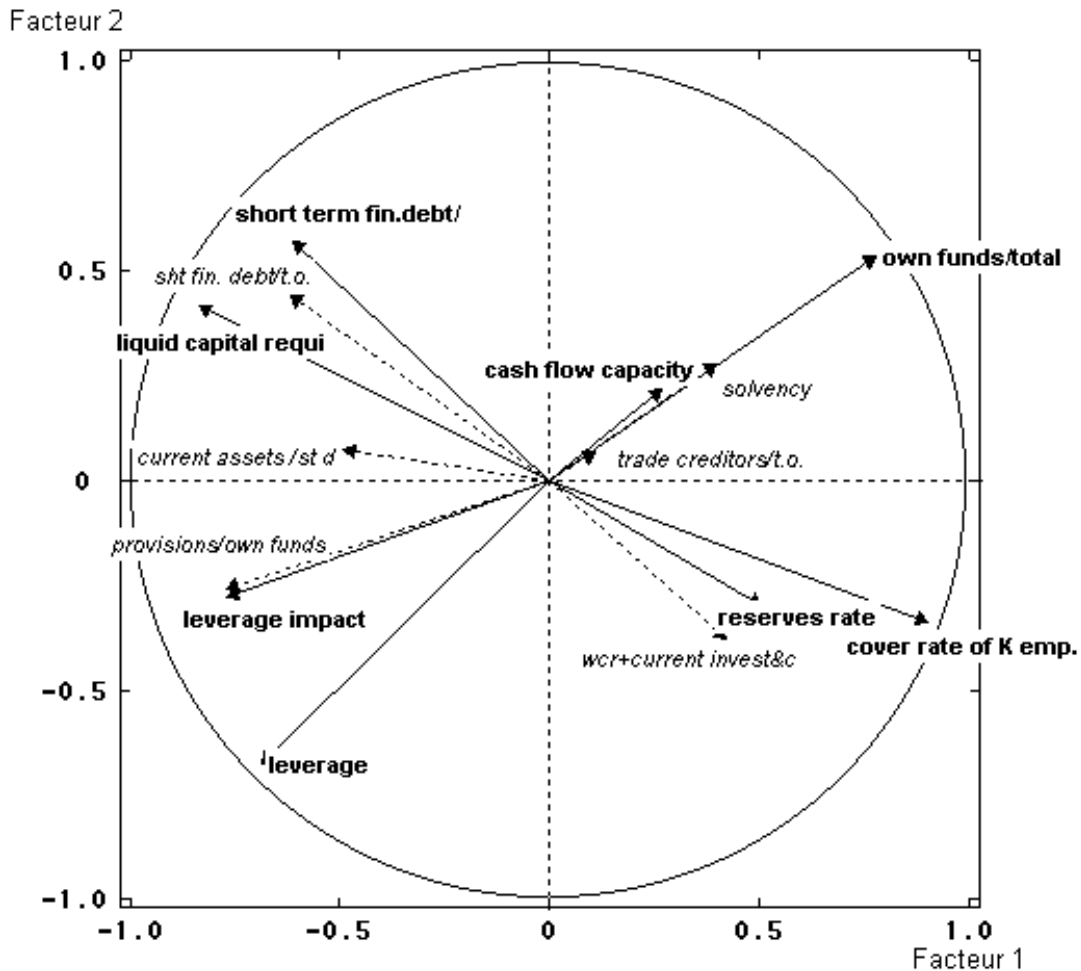
Key
leverage = active variable
solvency = supplementary variable

2.   EVIDENCE FROM THE CLUSTER

Cluster analysis groups together similar data. It uses the coordinates on components given by PCA and allows the linking of the most similar firms and their grouping into quite homogeneous classes **according to their financial structure**. Graph III.5 is obtained by projection of the first two components and cluster analysis suggests a division of the sample firms into four clusters along the east-west and north-south dimensions.

Graph III.5 Active data and components 1 and 2

Facteur 2

199121POR3
199021POR3
3.0
199321POR3
199223ESP2
199023ESP2
199221POR2
199521POR3
199421ESP3
199522POR2
199521AUT1
199421POR3
199421ITA1
199121ESP1
1.5
199321ITA3
199321ITA1
199521ESP1
198921BEL3
199522AUT1
199421BEL1
198921AUT1
199121BEL1
199122AUT1
199222AUT1
199021BEL3
0
199222ITA3
198921GER3
199523JAP3
199422AUT1
199423JAP3
198923AUT1
199022JAP3
199021GER1
198922JAP3
199123AUT1
199122GER1
198922GER3
-1.5
199022AUT3
199421FRA1
199023AUT1
198922GER1
199322JAP2
199321FRA1
199023JAP2
199221FRA1
199322FRA3
199323AUT1
199423GER1
199223JAP1
199322FRA3
199121FRA1
199123JAP1
198921FRA1
-3.0
199323JAP1
199222JAP1
199021FRA1

−5.0   −2.5   0   2.5   Facteur 1

Key:
198923AUT1 = the small (1) Austrian average firm observed in 1989 producing non-durable consumption goods (sector 23)

●	=	Austria (AUT)	1	= small firm
■	=	Belgium (BEL)	2	= medium-sized firm
	=	France (FR)	3	= large firm
▼	=	Germany (GER)		
◆	=	Japan (JAP	1	= intermediate products
	=	Italy (ITA)	22	= investment goods and consumer durables
○	=	Portugal (POR)	23	= consumption goods
▲	=	Spain (ESP)		

Symbol size is related to the contribution of the observation to the definition of the components.

It is not surprising to find that **'country' has an overwhelming effect**. Most firms from the same country in our sample belong to only two clusters out of the four, while French and Italian firms actually belong to only one cluster. Belgian firms are the only ones to be broken down into three clusters (this may be due to the population covered by the Belgian data). The country effect can be illustrated by the following example: the average small Italian firm producing consumer goods in 1989 is more similar to the average large Italian firm producing investment goods in 1995 than to its Japanese counterpart. Similarities, even among large firms, transcend nationality with difficulty. As suggested in the survey (Chapter I), this evidence has not one but numerous explanations: specific accounting methods in spite of methodological work in this field, legal contexts, trade relations, banking practices, development of the domestic capital market. This last determinant varies significantly from one country to another according to the degree of liberalisation of financial markets.

For each of them, the average mean and standard deviations are calculated . The main results appear in the tables in Appendix III, which gives the characteristics of each cluster. The main cluster characteristics are displayed in Boxes III.3 to III.6. The presentation of the main results starts with

clusters 2 and 4 because they illustrate the distinction between an 'overdraft' and an 'autonomy' sector.

Cluster 2 is the most cosmopolitan and can be described as a 'typical overdraft sector' because, in spite of the weight of short-term financial debt, the rate of own funds is only slightly below the general mean value (Box III.3).

Box III.3

Cluster 2 (154 observations; in the north-west quadrant and in the centre of the plot, Graph III.5) is the most 'cosmopolitan', i.e. is determined least by specific national features; it groups firms from various European countries (Austria, Belgium, Germany, Italy, Portugal and Spain) and one Japanese firm. With the exception of Portugal, large firms are overrepresented whereas small firms are underrepresented. The Italian case is different as Cluster 2 groups together all Italian firms, whatever their size or sector; (in Chapter II it was observed that, for many ratios of capital structure, size is of no relevance in the case of Italian firms).[12]

The main features of Cluster 2 are:

– a lower cover rate of capital employed;

– a higher liquid capital requirement, as a consequence of the lower cover rate of capital employed;

– higher values of the other indicators of dependence on short-term credit (short-term amount due to credit institutions over turnover and overall financial debt);

– the less rapid working capital requirement turnover rate.

For any given turnover, the firms in this subgroup hold more stock and/or offer higher trade credit to their customers and try to accumulate external current funds from their suppliers but also from banks and probably other financial creditors, such as the group to which they belong and affiliated companies. In other words, their greater need for liquidity for financing the operating cycle is covered by more external short-term resources.

This stylised behaviour suits Italian firms, particularly small ones, which are characterised by a high level of stocks (80 days) and of trade debtors (130 days), only partly offset by trade creditors (94 days) (1995 data). Therefore, the cover rate of capital employed is relatively low (68.5%) and the liquid capital requirement high (20%). The Italian firms' financial pattern might be described as risky by comparison with the others (particularly if we take into consideration overall debt, i.e. bank debt, commercial debt and intra-group debt, regardless of trade debtors). However, if the Italian firms' pattern of commercial performance and its effect on the structure of assets do not deserve attention, their capital structure might be described by comparison with the others (particularly if we take into consideration overall debt, i.e. bank debt, commercial debt and intra-group debt, regardless of trade debtors). But if the less rapid working capital requirement turnover rate is treated as a means of achieving competitiveness, the picture changes; the level of overall indebtedness and the share of short-term debt can be interpreted as a response to the size of current assets.

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[12]   The grouping of large German firms in this cluster is rather unexpected. To explain this, we need to consider two points. Firstly, they are located near the centre, so that the above-listed characteristics of Cluster 2 are weaker and do not contribute significantly to the definition of this cluster (through the definition of the components). Secondly, their proximity to other European firms is due to a complex set of variables which indicates the capital structure; the high proportion of short-term financial indebtedness of large German firms is probably the major determinant of their grouping. Therefore, they do not share all the characteristics of the cluster, particularly those related to the operating cycle and the level of indebtedness.

Cluster 4 can be described as an 'autonomy sector' (Box III.4).

Looking at the archetypal firm in Cluster 4, which is the average medium-sized firm in France in 1992, is less interesting than looking at small firms in Japan (debt structure in France is biased because of the specific nature of national accounting methods, which increase the proportion of debt in excess of one year, but this does not adversely affect the data analysis).

Box III.4

Cluster 4 (149 observations) groups together small and large Belgian firms, one single category of Spanish firms, all French firms and nearly all Japanese firms. Being located in the south-east quadrant of Graph III.5, many of their distinctive features are different to those for Cluster 2.

The main features are:
- a higher cover rate of capital employed;
- a slightly higher rate of gross profit over capital employed;[13]
- a higher rate of reserves;
- a more rapid working capital requirement turnover rate;
- a lower rate of short-term financial debt (as proportion of turnover and overall financial debt).

The average small Japanese firm is organised so that its working capital requirement turnover rate is more rapid, the number of days of stocks being the lowest (only 30 days); it favours return on capital employed, but cash-flow capacity is slightly lower because of financial charges and/or taxes. This firm has the highest reserve ratio; the level of overall financial debt is high and the debt ratio indicates a certain preference for long-term financing (debt with a maturity of over one year); as own funds and financial debt in excess of one year cover capital employed, the cash balance is roughly equal to zero (the liquid capital requirement is zero, hence cash and current investments equal financial short-term debt). Therefore, for this firm, the merits of long-term banking relationships, with banks granting current credit when an unexpected event occurs, are fewer than for the firms in the other clusters whose cash balance is negative. A certain preference for long-term indebtedness may be related to interest rates, long-term debt traditionally being less expensive; this preference, which is customary in the United States, is new in Japan.[14]

Clusters 1 and 3 complement the study of the determinants of profitability. **Cluster 1** groups together a few medium-sized and all small Austrian and German firms (Box III.5).

Looking at the paragon or archetype, i.e. the data which is closest to the gravity centre of the cluster, helps in understanding Cluster 1. The paragon is the small German firm in 1993. A comparison with the other data of the sample for the same year shows that, as expected, its capital structure duplicates the features listed in Box III.5, but it also shows that many determinants of profitability display extreme values: the level of staff costs is the highest and is offset by the highest rates of value added over capital employed and turnover over capital employed. The working capital requirement turnover rate is slightly less rapid than the sample's overall mean because of stocks. The cover rate of capital employed is relatively low, with the result that the liquid capital requirement is high and the cash balance shows the highest negative figure.

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[13]   It has been noticed that the overall profitability level is roughly comparable from one country to another, apart from France (Part II).

[14]   The proportion of long-term debt has increased over the last ten years in Japan, while it has decreased slightly in Europe (European Economy, Supplement A, No 7, July 1997, pp. 15-16).

Box III.5

> **Cluster 1** (46 observations) groups together firms which are located in the south-west quadrant of plot 3.5 and are most distant from the barycentre of the first plot. It means that this cluster is the most typical.
>
> Its main characteristics are:
>
> . a higher 'leverage' and a higher value for 'leverage impact';
>
> . a higher level of provisions;
>
> . a higher value of the indicators of dependence on short-term credit and a slightly less rapid working capital requirement turnover rate.
>
> As a consequence, the rate of own funds is lower (the mean value of this cluster is half the mean value of the entire sample).

The low share of own funds has no link with the level of margins and profitability, as indicated previously. Therefore, this low capitalisation can be explained by the weight of the other methods of financing:

– the level of provisions is structurally very high in Austria and Germany, partly because of pension provisions but also because of accounting customs;

– the high level of indebtedness corroborates the positive effect of Germanic law on the borrowing capacity of small and medium-sized firms. The higher leverage may also be explained by the German tax system which disadvantages retained benefit.

Cluster 3 groups together firms which appear to be the opposite of the firms which characterise Cluster 1 (Box III.6).

Box III.6

> **Cluster 3** (137 observations) groups together Belgian, Spanish and Portuguese firms which are located in the north-eastern part of plot 3.4. Medium-sized firms are overrepresented. Many features of this class are the opposite of the first one. It is characterised by:
>
> - a higher rate of own funds;
>
> - a higher rate of financial charges;
>
> - a higher rate of fixed assets;
>
> - a higher rate of solvency.

The higher capitalisation of firms grouped in Cluster 3 is slightly related to mark-up but not to a higher rate of return on own funds, as displayed in Graph III.3, where profitability of own funds is projected near the centre of the first plot but on the southern side. Capitalisation cannot be related to the development of financial markets in the Iberian countries. Financial charges may be an explanatory variable of this self-financing structure of capital; it seems that the archetype of Cluster 3, namely the medium-sized Spanish firm at the beginning of this decade, chose a self-financing model to prevent a higher, undesirable rate of financial charges. The relative low share of financial fixed assets might be another explanatory variable; this ratio is found to be low in large Spanish and Portuguese firms. A lower rate of growth of physical investment (a datum which is not available) might provide a third explanation.

Looking at the large Portuguese firms in 1990-91 which are furthest from the gravity centre of the cluster adds something because these observations are, by definition, more typified.[15] Many indicators of profitability have extreme values: the highest cash-flow capacity is correlated with the lowest level and rate of staff costs (staff costs over value added), on the one hand, and the lowest efficiency of fixed assets, on the other. As for the structure of capital, the large Portuguese firms displayed the highest rate of own funds.

Comments on Clusters 1 and 3 confirm the view that no direct link can be easily established between the share of own funds (as opposed to leverage) and the indicators of profitability. Small German firms and large Portuguese firms at the beginning of this decade provide an interesting comparison in that they:

– contrast with each other as regards the proportion of own funds;

– contrast with each other as regards the determinants of profitability (low as opposed to high staff costs; low as opposed to high efficiency of capital employed);

– do not contrast with each other as regards the level of profitability.

As suggested by the comments in the cluster analysis, components of the national financial system, including bankruptcy regulations, relationships between banks and companies, and the accounting and the financing practices in each country, seem to be the most relevant determinants of financial patterns.

3.   SUPPLEMENTARY EVIDENCE

3.1   Because of the country effect, **the size effect is limited but its influence on the grouping of firms in the BACH database is not inconsiderable.** Average small firms covered by BACH are often close to average large firms of the same nationality. Yet, Cluster 1 does not include any large firms; this last category is overrepresented in Cluster 2, small firms being underrepresented (Appendix III). When firms of the same nationality are broken down into two or three clusters, it is usually according to size.

It is interesting to observe that small firms are those which contribute most to the definition of the components (see Graph III.5). As small Austrian firms have a higher standard deviation than larger firms, they receive a higher loading in the first component.[16] If class 2 is taken as another example, the higher standard deviation that characterises the smaller firms in this class means that these firms are more typified. The weight of smaller firms in the principal component analysis has two main implications.

---

[15]   Most of the countries allow asset revaluation to take account of inflation but have very different regulations. The effect can be seen in the revaluation reserves, a liabilities-side item. In most countries the revaluation reserves are of minor importance. Only Portuguese manufacturing has revaluation reserves of more than 10% of total assets (compared with around 1% in most of the other countries); accordingly, fixed assets over total assets are higher in Portugal than in all the other countries.

[16]   Principal component coordinates may be biased by a few unrepresentative sample data. Therefore a test has been conducted. When the highest loading observations are not taken into account, no significant change is observed.

First, it improves the statistical quality of the data analysis. If the main contributions to the components had come from the large firms, the results might have been unstable. Thus, in the large firm category, a few firms might have an overwhelming effect, and so a sample which excluded them would give a different result. When the main contributions come from small firms, this bias cannot be so important.

The second comment is economic. If small firms contribute more to the definition of the components, it means that their financial patterns are more typified than larger ones. The national financial features are commonly assumed to have a greater influence on small firms than on large multinationals. The data analysis bears this out. Yet, the financial behaviour of small firms is quite distinct from one country to another. A complementary piece of evidence must be underlined: large firms, apart from those in Portugal, are closer to the barycentre than SMEs. This means that their capital structures tend to be more homogeneous than those of SMEs. This result is linked to globalisation, which reduces the effect of national financing systems.

3.2   The influence of manufacturing is not obvious because no single sector is over- or underrepresented in any cluster but the fact of belonging to a sector can make a greater contribution to the definition of the components and hence to the definition of the clusters (these sectors are non-durable consumer goods for Clusters 1 and 4, investment and durable consumer goods for Cluster 2, and intermediate products for Cluster 3).

Graph III.6 Supplementary data and components 1 and 2

52
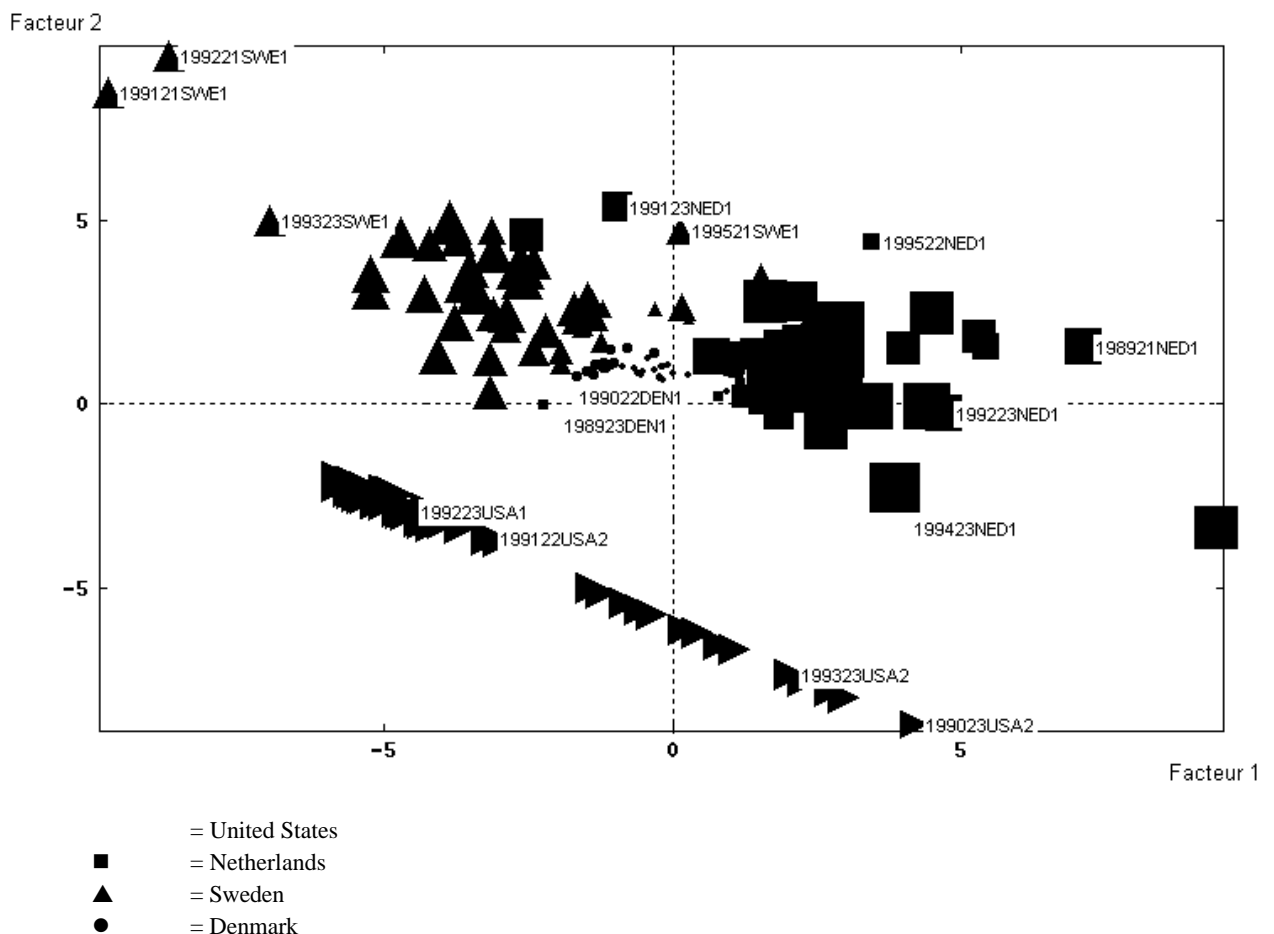
3.3   The same data analysis was conducted using BACH data for four other countries, namely Denmark, the Netherlands, Sweden and the United States. These data was excluded from the central data analysis because some active variables are not available and/or because accounts are consolidated, as in the Netherlands and the United States. Hence, they have contributed neither to the definition of the components nor to the definition of the clusters. They are treated as illustrative - not active - data and projected on the plot shaped by the first two components. In the case of the United States, only two size categories are available (small and medium-sized as opposed to large) and evidence is of limited interest because many ratios used for the cluster analysis are not available. Graph III.6 shows that a great deal of data tends to be concentrated near the centre. Nevertheless, data is spread throughout the four clusters, thus corroborating the relevance of the components. In the case of Sweden and the Netherlands, small firms are furthest away from the centre. This last observation supports the idea of greater diversity among SMEs.

3.4   The same data analysis was conducted using BACH data in 1975-85 (Rivaud -Danset and Salais, 1992). The 'active variables' were the same, and the sample included France, Germany, Japan, Italy, the United Kingdom and the United States. As the sample changed and as BACH data quality improved greatly between 1985 and 1989, comparisons have to be made very cautiously. Nevertheless, the main results are similar: the prominent influence of country, the not-inconsiderable influence of size and the insignificant influence of sector.

Comparison of the results of the principal component analysis in 1985 and in 1989-95 leads to the following observations*:* Italian firms seem to retain roughly the same features, which characterise an 'overdraft sector'. In 1985 German firms contrasted with Italian ones, unlike in the 1990s. Yet, in 1985 'leverage' was already higher in Germany than in the other countries. The features of French firms observed in 1985 were high 'leverage' and a rather high rate of liquidity requirement; these comparative features also evolved strongly. Japanese firms showed a high diversity of capital structure reflecting distinct sectoral performances, and this contrasts with the relative homogeneity observed in the 1990s. These two last developments may be related to the liberalisation of financial markets, a much more active tendency in Japan and in France than in Italy and Germany. In the first two countries many large firms, followed by smaller ones, have sought to reduce indebtedness in the wake of financial liberalisation. At the same time, Japanese and French banks have been reluctant to lend to borrowers offering weak guarantees because of their poor results in the 1990s. The comparative analysis indicates that this problem primarily concerns short-term loans.

4.   CONCLUSION

PCA and cluster analysis are used to provide a framework for studying differences in corporate finance according to country and size and their possible effects on corporate performance. Its main findings are the following:

4.1. Financial structure does not influence profitability

The selected indicators of profitability do not correlate with any financial pattern (own funds as opposed to leverage), for the following reasons:

- profitability can be achieved following distinct methods (see Parts II and IV);

- the financial pattern is very sensitive to country, whereas indicators of profitability and margin are very sensitive to size;

- higher profitability is an incentive to invest more than the average firm and, hence, to borrow when retained earnings do not cover the additional amount of capital employed.

Indicators of profitability do not discriminate among the clusters of firms which group together similar data according to their financial structure. In other words, the diversity of financial structures does not entail any hierarchy. The two financing sectors 'overdraft' and 'autonomy' seem sustainable, as does the high level of long-term indebtedness of Austrian and German SMEs.

4.2. Ways of financing current assets are independent of the level of own funds

Theoretical and empirical work usually focuses on the weight of equity versus financial debt. But the level of own funds or of overall indebtedness does not provide enough information. In this study, financial debt has been broken down according to term. Understanding of the capital structure improves when the liabilities are broken down by date of maturity. It also improves by taking into account the totality of assets, i.e. fixed and current assets.

The principal component analysis shows the independence (orthogonality) of:

- the axis which contrasts firms which have a high rate of equity and those which have a high rate of long-term indebtedness, and

- the axis which contrasts the autonomy sector (high cover rate of capital employed) and the overdraft sector (liquid capital requirement).

These axes are separate from components 1 and 2 and, in this case, a certain orthogonality is an empirical result which was expected and is not a statistical artefact. This result is reliable in the following cases:

- 1975, 1979 and 1985 for five or six countries,

- 1989-96 for eight countries,

- 1989-95 for twelve countries (the above eight, plus Denmark, the Netherlands, Sweden and the United States).

Orthogonality of the axes means that the way in which current assets are financed is independent of the level of own funds; therefore, a highly capitalised firm (a feature which correlates, of course, with a low level of long-term debt) may rely on short-term financial indebtedness, mainly from banks. It indicates the interest that corporate finance has in taking into account the independence of long-term financial structure, on the one hand, and short-term financial structure, on the other. A more accurate view of the capital structure is therefore available.

The financing requirements reflected in the working capital requirement turnover may have a certain impact on financial structure (own funds group, p. 51). The greater (lesser) need for liquidity to finance a less (more) rapid working capital requirement rate is correlated with more (fewer) external short-term resources, as exemplified by Cluster 2 (versus Cluster 4). Nevertheless, such an impact is

not observed in the case of firms grouped in Cluster 3: a less rapid working capital requirement rate is correlated with a high level of own funds, while financial short-term resources do not play any particular role. This last case confirms the view that the observed financial structure does not lend itself to any straightforward interpretation.

4.3. Financial structure differs mostly according to the firm's country

The capital structure differs according to country, **the financial structures of SMEs being more typified than those of larger firms**. National financial features have, as expected, a greater influence on small firms than on large multinationals, and data analysis shows that large firms' capital structures tend to be more homogeneous than those of SMEs.

In spite of financial globalisation, levels of own funds show not-inconsiderable differences from one country to another. As methodological differences remain in BACH data, a comparison of the level of ratios is limited. Yet, data differences are quite large: in 1994 the capital and reserves ratio was 15.5% in the case of small Austrian firms, 12.3% in the case of small German firms and 51.4% in the case of large Portuguese firms. Thus, German and Austrian SMEs will probably appear highly undercapitalised and risky to a foreign investor, although the level of profitability does not differ significantly.

4.4. How to evaluate SMEs

Usually, an investor's judgement focuses on the level of performance and on the financial structures observed from the balance sheet before he relates the observed ratios to standardised assessment norms.

As a result of our study, the evaluation of SMEs' quality and financing requirements must allow for:

– the diversity of financial structures from one country to another;

– their 'real' dynamic, i.e. rate of accumulation, which includes growth of fixed and short-term assets;

– the type of financing requirement, which may differ according to asset type;

– the level of performance and the different means of achieving performance (see Chapter IV).

Box III.7 Intangible assets and valuation difficulties

It should be borne in mind that some 'assets' are not accounted for in the balance sheet and hence are covered by current income. This is often the case with training and organisational expenditure. To this extent, the balance sheet gives only a limited view of firms' assets and is not very suitable for evaluating intangible assets. Difficulties of valuing intangible fixed assets, in spite of their considerable importance in explaining competitiveness, are well known. Restrictions on showing this expenditure with assets differ between countries, with the German and Austrian standards being the most restrictive.

Restrictions may also differ according to size, but this effect is hardly discernible. It may be suggested as an hypothesis that the lesser use of valued fixed assets per unit of turnover, which characterised SMEs, can be offset by greater use of non-valued (in the balance sheet) intangible fixed assets.

Taking the diversity of financial structures into account is more important for SMEs than for large firms. International financial markets may ration capital for 'sound' firms that would appear undercapitalised in terms of international standards. For such firms, bank relationships are more suitable (see Chapter V).

CHAPTER IV : FORMATION OF PROFITABILITY

1. THEORETICAL FOUNDATINS : A BRIEF PRESENTATION

Chapter II shows that in all the countries studied, with the exception of Portugal, large firms display lower levels of profitability than small to medium-sized firms. Conversely, Chapter III shows that there is a degree of independence between financial structure (i.e. the structure and manner in which assets are financed) and profitability. An examination of the formation of profitability is therefore of some interest.

Firms do not directly choose a particular production process or market; they choose the products (and/or services) which they believe will yield profits. In doing so, they are led to implement what can be called different models of production, i.e. different sets of routines, organisational structures and operational principles which guide the firm from day to day (Storper and Salais (1997)). The products are defined both by the type of demand (and use for consumers) and by the way they are produced. Firstly, dedicated products are differentiated from generic products. A product is dedicated when the firm makes a particular product for each individual demand. It is generic when the product does not take into account individual peculiarities but aims to satisfy a large and anonymous market. Secondly, specialised products are differentiated from standardised products. A product is specialised when its production mobilises specific know-how and knowledge that are more or less unique and irreplaceable. It is standardised when its production relies on standard and widespread technologies and know-how that eliminate the idiosyncratic nature of activity.

Thus, the characteristics of the products and assets needed must be suited to two different sites, the 'market' and the 'organisation of the production process'. The 'market' is where flows of short-term assets are optimised; the 'production process' is the site where fixed assets are coordinated over the medium term. Firms attempt to increase their profitability by selecting products and assets adapted to these constraints. But the forces operating on the two sites often pull in opposite directions. These are not simple, "formal" quantitative forces; they are strains that the firm actually encounters, and it must strive to achieve a satisfactory balance between them. For instance, production of customised products suited to a market undergoing perpetual change – one of the features of modern markets – makes it possible to seek higher prices and more substantial margins, but it requires in return a high degree of internal flexibility and specific investment in labour skills. Conversely, serial manufacture of products suited to mass markets allows labour productivity to be increased and unit costs to be reduced, but it also requires higher capital expenditure on fixed long- and short-term tangible assets and acceptance of tighter margins. For the firm, the primary question is not maximisation of profit *per se*, but the coherence of its choices in order to secure profitability. Not everything is possible. For instance, it is difficult, if not impossible, to obtain high levels of labour productivity with low wages.

We propose to test in this chapter the assumptions that firms have therefore two distinct "real-world" models for the formation of profitability, one of which assigns highest priority to optimising the firm's relationship with the market while the other prioritises the firm's internal organisation. We also suppose that corporate organisation is shaped today by the search for compromises in this area. In fact, there are solutions based on the possibilities created by rapid technological change, networked production, development of subcontracting, and so on. Do the

differences in profitability result purely from corporate size? Or do they make different choices, based on their products, between a market-based and an organisation-based model of profitability? On this hypothesis, differences in profitability between large firms and SMEs would stem from two factors: (i) different uses of one or other of the models of profitability, and (ii) differences in their capacity to implement the models successfully. Profitability would no longer be a ratio from which recommendations for action could immediately be deduced. It must be seen in the broader context of the way in which it is formed.

We describe below in turn the formalisation used for the present study and the results.

2.   FORMALISATION

Theoretically, we need to take account of a spectrum of gradations at two levels: between the "real world" and finance, and between microeconomics and macroeconomics. The ideal would be to start out from individual company data – qualitative data for their products, their markets and their organisation, and quantitative data from their financial statements (management ratios). It is only at this level that one can hope to capture the diverse ways in which profitability is formed. Such a study has been made for France, using the highly detailed data provided by the Banque de France's Balance Sheet Data Centre and the SESAME survey of the strategies of a sample of 2 000 firms (Paranque et al., 1997; 1998). This study is conclusive but cannot be replicated here.

Our formalisation of the issue is constrained by the difficulties of formulation and estimation imposed by the BACH database. It is limited to the manufacturing sector, for which the BACH database is more representative. The BACH database supplies information aggregated into three size bands, three sectors and six years, that is to say, with exceptions, 3 x 3 x 6 = 54 observations per country only. No access to qualitative information (i.e. descriptions of products, markets, organisational structures, contracts or relationships with customers/suppliers or banks) is available. We must use account ratios. So the results suffer from limitations which have to be taken into account.

The first step consists in defining two decompositions of the ratio "gross profit over capital employed", which can be related to the two models of formation of profitability described above (paragraph 2.1). We then develop an econometric model which can be estimated with the available data (paragraph 2.2).

2.1. Decompossotions of the ratio "Gross profit over capital employed".

The two sites, market and organisation, may be expressed in quantitative terms as variables which compose the measurement of profitability. As in previous chapters, we measure profitability using the ratio "gross profit over capital employed". Box IV.1 displays two formulae for analysing this ratio : one in terms of the organisation of the production process and one in terms of the market.

2.1.1. *Profitability guided by the organisation (formula 1)*

Following formula 1, the firm's behaviour can be described as prioritising the maximisation of labour productivity. It presupposes an acceptance of higher permanent investment in fixed assets and greater capital intensity. The emphasis here is on optimal medium-term management. The firm's objective is **stability** of its growth path. This can be achieved in a number of ways, e.g. by

standardising production tasks and technologies or by seeking high volume or reducing to the strict minimum the workforce and the various labour-related costs, such as social charges. But these endeavours are mutually contradictory. Any increase in labour productivity will entail substitution of capital for labour, which increases the level of capital tied up in fixed assets which need to be made profitable.

All other things being equal, greater stability of supply, outlets and production technology will lessen uncertainty and hence the need for financial flexibility. It will facilitate the provision of collateral when seeking loans. But, on the other hand, the technological constraints increase the need for capital and hence the requirement for external finance.

2.1.2. *Profitability guided by the market (formula 2)*

Following formula 2, the firm's behaviour can be described as seeking profitability by maximising the mark-up ratio and by minimising the capital employed per unit of turnover. The firm prioritises short-term management. Its objective is **flexibility**. This can be achieved in a number of ways, e.g. by managing stock or payment times or by specialising in specific goods or services. These endeavours may contradict each other: for example, the provision of high-quality service (maintenance, variety of supply, negotiation with customers) that permits higher margins may mean that fixed assets are not always used to the full.

All other things being equal, lower capital intensity and/or tighter control of the operating cycle reduce the need for external finance and improve corporate liquidity. The other side of the coin is that the firm often holds specific assets (e.g. expertise, skilled labour, innovations) which are difficult to value.

2.1.3. *Taking account of efficiency of capital (VA/K)*

It is possible to imagine a third model for the formation of profitability which assigns highest priority to maximising capital efficiency rather than labour productivity. This would be part of an overall system targeting maximisation of product value added: highly skilled labour, extensive internal processing of the product and reduction of intermediate consumption to a minimum. Unfortunately, given the low level of detail of the data available, this third model cannot be translated into a usable decomposition of the ratio "gross profit over capital employed".

Box IV.1 From the profitability determinants to the ratio "gross profit over capital employed"

<u>Decomposition 1: Profitability based on organisation</u>

The following analytical formula (1) looks at the ratio "gross profit over capital employed" by emphasising the organisation of the production process:

$$\frac{\text{Gross profit}}{\text{Capital employed}} = \left(1 - \frac{SC}{VA}\right) \times \frac{\frac{VA}{N}}{\frac{K + WCR}{N}}$$

where :

$\frac{SC}{VA}$ is the proportion of staff costs to value added,

$\frac{VA}{N}$ is the productivity of labour, and

$\frac{K + WCR}{N}$ is the capital employed divided by the number of workers.

<u>Decomposition 2: Profitability based on the market</u>

The following analytical formula (2) looks at the ratio "gross profit over capital employed" by emphasising the marked-based model of profitability:

$$\frac{\text{Gross profit}}{\text{Capital employed}} = \frac{GP}{TO} \times \frac{1}{\frac{WCR}{TO} + \frac{K}{TO}}$$

where :

$\frac{GP}{TO}$ is the gross profit par unit of turnover (mark-up ratio),

$\frac{WCR}{TO}$ is the working capital requirement per unit of turnover, and

$\frac{K}{TO}$ is the rate of fixed assets over turnover.

<u>The absence of a workforce variable (N)</u>

The absence of any workforce variable (N) in the BACH database is particularly prejudicial to the use of the first decomposition. We have been obliged to use an approximated formula in which N is replaced by staff costs (SC), both for labour productivity (estimated by VA/SC) and for the degree to which capital substitutes for labour (estimated by K/SC). The respective contributions of real productivity and the cost of labour (wages plus social charges) cannot be separated out.

Formula 1 is therefore approximated by formula 1 below:

$$\frac{\text{Gross profit}}{\text{Capital employed}} = \left(1 - \frac{SC}{VA}\right) \times \frac{\frac{VA}{SC}}{\frac{K + WCR}{SC}}$$

2.2. Econometric model

Let R be the profitability of a firm i (here, an observation is one year and one sector in a given size class). This is assumed to be the result of a specific compromise arrived at between the two models of formation of profitability discussed above. Let us call these two models R_O and R_M:

$$R = p_O R_O + p_M R_M \qquad (3)$$

Parameters p_O and p_M must be interpreted as expressing the "mean" compromise arrived at by the companies concerned between organisation-based and market-based formation of profitability. This compromise may vary, in the present case given the nature of the BACH data, by country, size and sector. The ultimate aim is to estimate for each country coefficients p_O and p_M in equation (3) in such a manner as to assess their specific size-related features and then to proceed to an inter-country comparison.

By decomposing the ratio "gross profit over capital employed", it is easy to deduce from the above formulae (1') and (2) (Box IV.1) those variables which are correlated with the models R_O and R_M as well as the expected sign for their coefficients:

for R_O $\qquad \dfrac{VA}{SC}$ (+) $\qquad\qquad \dfrac{K}{SC}$ (-)

for R_M $\qquad \dfrac{GP}{TO}$ (+) $\qquad \dfrac{TO}{K}$ (+) $\qquad \dfrac{WCR}{TO}$ (-)

Two technical problems arise at this point, one relating to the impossibility of estimating all theoretically possible coefficients and the other to the dominant influence of the variables (VA/SC and GP/TO in both cases). It can be seen that in both cases one variable plays a pivotal role and explains a large part of the variance: this is labour productivity (estimated by VA/SC) in breakdown (1') for the organisation-based model and the mark-up ratio GP/TO in breakdown (2) for the market-based model. Lastly, we treat each country separately.

Firstly, therefore, we used the following approximated formulae for R_O and R_M:

$$(4) \qquad R_O = a \left[\frac{VA}{SC} + \frac{\beta K}{SC} \right]$$

$$(5) \qquad R_M = d \left[\frac{GP}{TO} + \varepsilon \frac{TO}{K} + \varphi \frac{WCR}{TO} \right]$$

in which one variable plays a pivotal role.

Secondly, we assumed that, when using a given model of profitability, the various corporate size classes would differ between themselves only where coefficients a and d were concerned. Coefficients a and d can thus be seen to be statistical normalisation parameters for each country's size classes.

Coefficients β, ε and φ are, on the other hand, general parameters identical in all size classes. They permit identification of the ratio systems to be optimised in managing profitability based on

organisation of production, R_O (formula 4), or based on the market, R_M (formula 5). This assumption that coefficients β, ε and φ are independent of corporate size appears acceptable in the light of the first step in the estimation process.

Details of the estimation method are provided in Appendix IV.1.

3. RESULTS

We present below all the results obtained before going on to discuss them country by country.

3.1. Results in general

Table 4.1 contains the estimated values of the variables present in the explanatory equations for the two profitability formation models R_O et R_M.

In general, the results are satisfactory in econometric terms although some problems remain. The R-square and coefficients are usually significant and have the expected sign. Iterative estimation usually produces convergence in a reasonable number of iterations. However, in a few instances, there is no convergence or the convergence is towards minimum local likelihood. We carried out a number of tests, modifying the initialisation or using data for the most detailed sector breakdown possible (10 subsectors). The outcome was useful in some cases and fruitless in others. We could not obtain results for Japan. France raises a problem which appears paradoxical in the light of the results obtained in our studies based on individual data: it proved impossible to arrive at an econometrically satisfactory estimation. Nevertheless, we give the initial estimations in Table 4.1, but we could not estimate parameters p_O and p_M for France (see below).

Comparing the estimated coefficients between countries, it is apparent that, where the effect of a given variable is concerned, the values are quite comparable, and this gives the equations some degree of general applicability.

The following are therefore verified for all countries for which estimation was possible:

1. Organisation-based formation of profitability : the positive pivotal role of the variable VA/SC (combined labour productivity and control of labour costs) and the negative influence of capital-labour substitution (approximated by K/SC).

2. Market-based formation of profitability : the positive pivotal role of the mark-up ratio GP/TO and two influences, that of capital turnover (TO/K), which is positive, and that of the level of net circulating assets (WCR/TO), which is negative.

Table 4.2 contains by country and by corporate size the estimations obtained for parameters p_M and p_O . The sum $p_M + p_O$ has been constrained to be equal to unity. Such estimation proved possible, except for large firms in France and Spain, and was generally significant. We can now proceed to interpret them.

3.2. Use of the profitability formation models varies by country and corporate size

The advantages described at the beginning of this chapter as regards SMEs and large firms can be found in each of the models. Thus there is no straightforward correlation to be found such as those often mentioned as existing between SMEs, flexibility and the R_M market-based profitability model, or between large corporations, rigidity and the R_O organisation-based profitability model. In the R_M model we can find the capital turnover ratio, which is, in the light of empirical studies, favourable to SMEs, in addition to the mark-up ratio and the level of working capital requirement, which are favourable to large firms. In the R_O model the VA/SC ratio is favourable to large companies and the K/SC ratio to SMEs. Corporate size does not strictly distinguish between firms in relation to their mode of formation of profitability

Nevertheless, the econometric estimation is useful in three ways. Firstly, it highlights the predominant choice of model according to size and country. Secondly, it shows that these models are equally profitable (while some countries or corporate categories fail to use a model effectively, others manage to do so). Lastly, it confirms what are the main causes of size-based differences in profitability.

(a) More frequent use of the R_M model on average; systematic use of this model by small firms

Generally speaking, the R_M model for the formation of profitability based on the market is encountered more frequently than the R_O organisation-based model. Those who use it are small (pM=0.9) and medium-sized (0.8) German firms, small Portuguese firms (0.8), and small (0.7) and medium-sized (0.9) Spanish firms, plus large Austrian, Portuguese and Spanish firms. Conversely, the R_O model seems to predominate only for large German firms (0.7) and their medium-sized Austrian (0.7) and Belgian (0.8) counterparts. The importance of such results is weakened by the difficulties in arriving at a good specification for R_O owing to a lack of data on workforce size. However, the outcome does tally with the observation – frequent in sector- or company-based studies – of a move toward flexibility in the organisation of production. **In actual fact, small firms assign highest priority to the R_M market-based model in all the countries studied.**

(b) Tighter targeting of differences in profitability between SMEs and large firms

It is possible, using Table 4.2 and Appendix IV, which contains the mean values of ratios by detailed sector, to focus on the main differences in profitability by corporate size in the countries under consideration. It is sufficient to refer to the dominant model and the mean value of the corresponding explanatory values. But a precise explanation would call for closer investigation of each country using other data. The remarks which follow are therefore qualified.

<u>Germany</u>

Large enterprises use the R_O model, and their low profitability can be attributed to the pivotal variable VA/SC. Despite a much more capital-intensive organisation, the ratio VA/SC is not higher in the larger companies, especially where manufacturers of intermediate and capital goods are concerned. It is not possible to discern any inadequacy of labour productivity or excessive wage costs. On the other hand, German SMEs (R_M model) have a high capital turnover.

Austria

Large Austrian firms use the R_M model. Their low relative profitability is due to their mark-up ratio.

Belgium

Medium-sized enterprises are the most profitable. They use the R_O model. Their strengths are their good VA/SC ratio and relatively low capital-labour substitution.

Italy

There is a balanced compromise between the two models in all size bands. There is little distinction between firms on the basis of profitability. Medium-sized companies seem to win out marginally in both tables.

Portugal

Large firms, exceptionally, are significantly more profitable than small ones. Both use the R_M model. It is the mark-up ratio which makes the difference between companies, in favour of the larger firms.

Spain

The situation is the opposite of that in Portugal. All sizes of company use the R_M model, but the mark-up ratio is lower in large companies, as is capital turnover.

Table 4.1 The two models for profitability formation, by country and corporate size

	R_O organisation-based formation of profitability				R_M market-based formation of profitability				
Coefficient (standard deviation)	$\dfrac{VA}{SC}$ a			$\dfrac{K}{SC}$ β	$\dfrac{GP}{TO}$ d			$\dfrac{TO}{K}$ ε	$\dfrac{WCR}{TO}$ φ
Country	Small	Medium	Large		Small	Medium	Large		
Germany (14)	0.61 (0.07)	0.61 (0.04)	0.44 (0.04)	-0.12 (0.01)	3.01 (0.11)	2.64 (0.08)	2.62 (0.31)	0.009 (0.001)	-0.21 (0.004)
Austria (16)	0.47 (0.03)	0.50 (0.01)	0.45 (0.03)	-0.16 (0.01)	1.54 (0.09)	1.58 (0.08)	1.69 (0.07)	0.030 (0.001)	-0.16 (0.02)
Belgium (7)	0.25 (0.01)	0.35 (0.02)	0.28 (0.02)	-0.14 (0.01)	1.02 (0.05)	0.73 (0.02)	1.18 (0.08)	0.038 (0.017)	-0.10 (0.06)
France*	0.27 (0.02)		0.32 (0.02)	-0.18	2.48 (0.10		1.57 (0.62)	0.019	-0.23
Italy (8)	0.28 (0.01)		0.23 (0.01)	-0.11 (0.01)	1.68 (0.07)		1.84 (0.09)	0.017 (0.001)	-0.08 (0.02)
Portugal (7)	0.16 (0.01)	0.22 (0.01)	0.09 (0.01)	-0.11 (0.01)	0.78 (0.03)	0.78 (0.04)	0.74 (0.06)	0.072 (0.003)	-0.12 (0.02)
Spain (21)	0.34 (0.03)	0.30 (0.03)	0.27 (0.02)	-0.10 (0.01)	1.46 (0.06)	1.48 (0.03)	1.44 (0.09)	0.021 (0.001)	-0.18 (0.02)

NB. The number of iterations required for convergence is given in brackets after the country.

* Estimation convergence problematic in the case of France. The figure given is the initial estimation.

Table 4.2 Estimation of parameters P_O and P_M by country and corporate size

Coefficient (standard deviation)	Gross profit/Capital employed			P_O (pivotal variable VA) SC			P_M (pivotal variable GP) TO		
	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Germany	24.7	21.9	17.0 (*/SME)	0.09 (0.08)	0.18 (0.10)	0.73 (0.21)	0.91 (0.08)	0.82 (0.10)	0.27 (0.21)
Austria	18.8	18.3	17.6	0.35	0.69	-0.02	0.65	0.31	1.02
Belgium	16.1 (*/ME)	18.5	16.6	0.44	0.82	0.52	0.56	0.18	0.48
France	23.5		19.3 (*/SME)						
Italy	15.9		15.4	0.47		0.51	0.58		0.51
Portugal	15.9	16.8	17.8	0.19 (0.06)	0.45 (0.10)	0.08 (0.15)	0.81 (0.06)	0.55 (0.10)	0.93 (0.15)
Spain	17.0	15.8	12.6 (*/SME)	0.26 (0.04)	0.14 (0.04)	-0.26 (0.31)	0.74 (0.04)	0.86 (0.04)	1.25 (0.3)

NB. An asterisk under a figure indicates that the coefficient is significantly different from that indicated by an abbreviation - small (S) medium-sized (M) or large (L) enterprises

CHAPTER V : RECOMMENDATIONS

The point of departure must be the type of financing required by European SMEs, with their various nationalities and specific features, to expand their businesses. There is increasing awareness in every field that access to financing and guarantees are central to the future of European construction (level of employment, occupational integration and training of young people, regional development in the EU) and, above all, are necessary in order to create an efficient, innovative economic network without which European groups cannot remain competitive on global markets.

The financing of SMEs must not be viewed strictly from the standpoint of the need for wider access to financial markets and the need for security on the part of external investors, markets and financial institutions, although these needs must obviously be given adequate attention. There are four reasons for this:

– The share capital of SMEs is often in the hands of the founders and/or their families, for whom controlling ownership is more important than opening up to outside investors.

– Taken by itself, risk assessment of SMEs requires an investment in information that is country-specific and costly when it is individualised. The standard instruments and screening methods do not take into account the characteristic advantages of SMEs (skills, specific assets, etc.).

– SMEs have specific financing requirements that are due to their role in the economy, mainly their flexibility, their innovativeness and their employment potential. It is well known that it is difficult to satisfy the financial needs of highly innovative SMEs using traditional screening and guarantee procedures. The need to have financing available in order to react quickly to unexpected events is particularly important for the vitality of SMEs ; there are different ways of financing such a need, financial markets being rather inadequate.

– Using the BACH database, the data analysis shows that a high level of profitability can be achieved by firms whose financial patterns are distinct. A higher level of own funds does not automatically result in better performances and higher gross profitability. For instance, supplementary funds may be used as a substitute for debt and such a change in the composition of financial resources may be the proper answer to a rise in the interest rate but, of course, it will have no impact on the efficiency of the production process or on the growth of the enterprise. This evidence moderates the arguments advanced in favour of wider access by SMEs to financial markets.

1. SPECIFIC FEATURES OF THE FINANCING REQUIREMENTS OF SMES

Taking the type of financing required by SMEs as the point of departure presupposes taking a new look at financing based on the specific economic features of the financing requirements of SMEs. The study of these features underlies the entire report.

The primary point to consider is the role played by SMEs in the European economy from the standpoint of the products and services they provide. The vast majority of their products and services are produced on a small or medium scale. They are aimed at specific, changing needs whose specifications, development and delivery lead times and quantities are often controlled by the major contractors (such as automobile makers, leading building and public works contractors, large

public service providers) or large intermediaries (such as supermarket purchasing groups). In order to remain in these markets and to expand, the required assets must be flexible and qualitatively redeployable for new orders. At identical or nearly identical prices, it is skills, responsiveness, reputation, experience and innovation that become the principal competitive advantages differentiating one SME from another. This means that the specific organisational system adapted to each firm must be continually adjusted.[17] The unforeseeable human element predominates in management over the stable physical element.

There are three features defining this position: market uncertainty; insertion in networks; priority given to financing the operating cycle.

1.1. Market uncertainty

Uncertainty, more than foreseeable risk, marks the external environment and internal management of SMEs. Their production systems are less capital-intensive than LEs. SMEs correspond to the model of 'market-based' profit formation (explained in Chapter IV), in which three main variables have to be either maximised (+) or minimised (-) : margin rate over turnover (+); rate of rotation of capital employed (+); working capital requirement in relation to turnover (-). This model follows the broad view of investment selected for this study. Although the margin rate over turnover is lower for SMEs than for LEs, their lower capital intensity entails higher profitability. As they are not very capital-intensive and focus on products, technologies and types of organisation that encourage rapid capital rotation, they require fewer fixed assets but more current assets and short-term debt, a feature observed in all the selected countries. This data indicates how SMEs manage flexibility, along with their financial constraints.

Intangible investments and the quality and amount of current assets available at the time and place desired by the other side are of primary concern since, at a given fixed asset level, they are the ones that will or will not allow firms to win market share and expand. With the notion of venture capital, the literature on financing innovation stresses radical innovation (the use of a scientific discovery, for example). Yet, aside from start-ups by researchers or in the high-tech sector (which naturally must not be underestimated), most SMEs, whether they belong to a mature sector or not, rely on gradual product and process innovation to maintain their competitive edge. Gradual innovation presupposes an ongoing flow of small (and sometimes large) expenditures in various parts of the organisation at the right moment. Its content is mostly developed internally. These are investments, but the expenditures are incorporated into those of the operating cycle. Only rarely are they subject to the formal procedures of external financing or to specific internal accounting.

1.2. Insertion in networks

No entrepreneur in isolation can survive for long in an environment that is *a priori* so hostile. Thus, one of the essential characteristics of every dynamic SME is to belong to a network of actors in which it must play an active role in order to reap any benefits. There are many such networks. First,

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[17]   A study for which 500 of Europe's most dynamic entrepreneurs were interviewed indicates that flexibility in the production process and knowledge of technological developments are considered equally important, efficiency of production being the more important aspect of the production process for the future growth of their company (EFER, p. 52).

there are those that circulate information and experience: trade organisations, consultants in various subjects (technology, management, markets) and training systems. Then there are those that make valuations, define quality standards and assess the quality of a firm's products (public and professional agencies, contractors' own departments and commercial intermediaries). Finally, there are those that form the lasting structure of markets and production systems. These networks are set up by intra-firm buying and selling relationships and various types of cooperation. They can be vertical owing to increasingly frequent inclusion of SMEs in groups or horizontal, as in the case of regional economic networks specialising in certain products. The study has shown that, at the end of the period, SMEs are generally more burdened by inventories and/or commercial loans than large firms. This is partly due to vertical relationships with contractors and purchasing groups.

These networks stem from the current pattern of division of labour, which is gaining hold in every field of activity, with each firm trying to establish its identity (and its existence) on the basis of recognised products and skills. The common feature is that firms operate without any public intervention except in a subsidiary sense, through the profession, group or region. Their common feature also lies in the fact that these networks all generate information. Thus, the «right» assessment of the future of the firm and the degree of financial risk it represents may be found by gathering and comparing information.

1.3. Priority to financing the operating

Given the characteristics of their markets, small and medium-sized enterprises fall within the scope of the case study we have highlighted in the theoretical literature: the need to have financing available in order to seize unexpected investment opportunities. This need for readily available funds appears to be a structural characteristic: to be in a position to satisfy a new customer; to adjust to sudden changes of scale and lead time; to innovate when and where is specifically necessary. But while the literature maintains the standard notion of investment (long-term investment which should guarantee an anticipated return over several years), here the concept of investment has been broadened to include operating cycle expenditures. The uncertainty of the expected return remains but, instead of long-term uncertainty, it is focused on the operating cycle (which is itself shorter than for a mass production process) and more specifically on the extent of the market risks that will have to be covered during the cycle. What becomes the guiding factor is the expected margin rate on turnover generated during an operating cycle by the new market opportunities that the firm has the capacity to seize. The firm can rather easily arrive at a reasonable estimate of this margin rate in the light of past experience, whereas the chronicle of future annual returns is far more uncertain.

In order to finance and guarantee the economic development of SMEs, they must be assured of the availability of funds during the operating cycle. This assurance will give them the ability, in day-to-day operations, to make the «right» development decisions in an uncertain context. Access to available financing poses two problems:

1. This access may take several forms: self-financing through available reserves (on condition that the firm produces a sufficient cash-flow margin) or building up a borrowing capacity that is readily available if need be. Recourse to the securities market seems less of a priority in so far as the latter's role is not to offer such assurance.

2. This access is subject to a reliable assessment of the firm's «quality» by external investors and lenders. Yet such screening is a delicate operation since it concerns specific assets whose proper use and returns depend significantly on the ability of the firm's managers to distinguish good opportunities from bad ones and to form adequate action plans. Scoring methods are ill-adapted in this instance.

2.   ECONOMIC AND FINANCIAL FLEXIBILITY OF SMEs

The difficulties related to financing are one of the main obstacles to the start-up and expansion of firms. They handicap the everyday financial security of firms, particularly SMEs. Yet such security is the prerequisite for SMEs placing their advantages in the service of economic development. Economic flexibility is one of their major advantages.

2.1. From economy flexibility…

This study has stressed a particular aspect of the financing problem which is relatively neglected, namely economic and financial flexibility. The emphasis placed on the problem of financing intangible assets which are particularly costly for high-tech firms tends to overshadow the question of financing reversible assets, i.e. asset amounts that vary during the period. By definition, they cannot be accurately captured in the balance sheet. The amount of reversible assets fluctuates, of course, according to seasonable needs linked to the firm's business activity, but it may also fluctuate in a random fashion. In their day-to-day existence, firms must cope with economic contingencies that are analysed either as accidents or as favourable opportunities for business growth. Problems of internal organisation, difficulties facing suppliers or customers that modify commercial credit terms, and unexpected orders initially translate into an increase in operating assets which may subsequently lead to a lasting increase in short-term or even long-term assets. **The economic flexibility of a firm expresses its ability to react to unanticipated internal and external events which may lead to a variation in the growth of so-called «reversible» assets, thereby raising the question of its financial flexibility.**

The question of economic flexibility is even more acute for SMEs than for large firms. Indeed, the fact that small firms depend on a limited number of customers makes the pace of orders particularly irregular and increases the impact of late payment by customers. Moreover, intra-firm ties involving inventories and commercial loans have differing effects on them depending on their size. Within the framework of a subcontracting relationship, small firms may be led to keep products in stock that have been developed at the request of the contractor. This practice, which enables the latter to keep inventories as low as possible, turns the subcontractor into an unpaid lender.

In other words, a firm's ability to handle economic contingencies depends on the extent of its safety net, which may be economic and/or financial. The expression "safety net" is illustrated by local, often informal SME networks which encourage the transfer of redeployable assets and business activities and therefore improve the return on capital employed. The security and profitability of SMEs may improve when their activity fits into a network of firms of the same size engaged in complementary, or even competing, business.

2.2. ... to financial flexibility and security

The survival and development of these firms presupposes that they enjoy a certain degree of **financial flexibility**, defined as **the capacity to mobilise rapidly and at reasonable cost the financing required to respond to contingencies**. In the absence of financial flexibility, a firm's survival will, in the event of a recession, depend mainly on an adjustment of wage costs whereas, in the event of an economic upturn, certain growth opportunities will not be seized. At the macroeconomic level, this question is particularly important for countries suffering from high unemployment rates. Indeed, many SMEs tend to avoid passing on quickly into workforce management the effects of a downturn in business. A lack of financial flexibility will prevent a firm from financing the growth of raw materials and work in progress in the event of a recovery. If such behaviour becomes widespread among small and medium-sized firms, economic recovery may well be stifled.

The sources of a firm's financial flexibility are:

(i)   internal liquidity arising from own funds and, more generally, from all stable capital, i.e. own funds and medium- to long-term debt, which the firm has available at the time the contingency arises;

(ii)   assured borrowing power at reasonable terms.

External liquidity may come from financial markets, but in Europe commercial paper markets are a recent phenomenon and concern only a limited number of large corporations; consequently, the external liquidity required to finance a reversible asset variation comes mainly from borrowing, either from banks or possibly from companies within the same group.

For a small firm, a long-standing relationship with a bank may encourage certain types of short-term loan guarantees in the form of authorised credit lines. This formula provides the firm with a financial safety net by allowing it to borrow, if necessary, at contractually predetermined terms (amount, interest rate, guarantee).

3.   INTERNAL LIQUIDITY: ADVANTAGES, ROLES AND SOURCES OF OWN FUNDS

The emphasis placed on the role of own funds in financing firms stems from their nature and function, but this emphasis tends to overshadow the fundamental obstacles to increasing the equity of small firms.

3.1. Own funds have two advantages :

1. They consist of capital that does not have to be reimbursed.

2. Capital remuneration is not pre-fixed according to a contractual schedule since dividend distribution will vary according to income and investment projects.

3.2. The main role of own funds is to guarantee the firm's solvency, in other words, its ability to honour its financial commitments. It acts as a safety reserve for the firm and its economic agents, allowing it to cope with contingencies. It encourages the firm to invest. Its ultimate purpose is to cover financial risk since it will enable the lender to cover all or some of the debts contracted by the company in the event of the latter's inability to do so. It is a sign of the firm's financial soundness**.**

In short, the emphasis on the role of own funds arises partly from the inherent advantages of these resources, which are not contractual in origin, and partly from their role as a sign which influences the terms (amount, interest rate, length, guarantees) of access to the loans required for the firm's growth. The importance that lenders, especially banks, assign to own funds varies widely from one country to the next, as demonstrated by the wide disparity in capitalisation rates.

3.3. There are three different sources of own

1.   Cash flow and earnings not distributed to shareholders make up an essential source of own funds (between 26% and 70% on average for the firms in the BACH database);

2.   Shares issued to partners;

3.   Shares floated on the financial market (by making calls on the public's savings).

By definition, the first two methods run up against limits in any given firm. The cash flow requirements of a small firm are by nature limited. Certainly, the ability to issue shares to non-public shareholders, i.e. to make a direct subscription call without going through the financial market, can be extended. Thus, the European Commission made a proposal to the Council of Ministers to expand employee shareholding opportunities and issued a call for 'business angels' (COM (1998) 222, p. 10 and COM (1998) 255). In both cases, investment with a long maturity provides firms with stable resources.

The only way firms can raise very high amounts of capital is by calling on financial markets. This latter source of capital is not, however, available to the vast majority of small and medium-sized firms. Only innovating firms that are developing a project which is likely to generate an unusually high rate of turnover growth and profitability can hope to interest venture-capital companies and raise funds on financial markets. The obstacles impeding the expansion of venture-capital companies in continental Europe are due not so much to specific national features of the supply of venture capital, such as a lack of national pension funds, as to the particular characteristics of this form of financing. Indeed, the cost of studying applications and the rather high risk of project failure lead venture-capital investors to select only a very small percentage of firms in any country.

It is unlikely that the globalisation of financial markets will perceptibly change these terms of access for the vast majority of SMEs. This study has underscored the diversity of financial structures and confirmed that the financial structures of small firms are more sensitive to specific national features than those of large corporations. This diversity is a handicap as regards the acquisition of shares by foreign investors, who must indeed ascertain to what extent the indicators taken from a small firm's balance sheet reflect particular national features or a genuine lack of solvency.

Thus, when it comes to external financing, the vast majority of SMEs depend mainly on banks and secondarily on the parent company, when they belong to a group. This situation is unlikely to change in the future.

The difficulties involved in the screening of companies by external investors and the requirement of a high return on assets which they impose affect firms of all sizes, but especially small firms, and explain why this type of own funds can be more costly than indebtedness.

4. EXTERNAL LIQUIDITY: BANKING RELATIONSHIPS

The role of banks must be underlined for the following reasons:

– evidence from data analysis shows, firstly, that short-term debt is relatively more important for SMEs than for LEs and, secondly, that in some selected countries a low level of own funds is offset by a high level of long-term financial debt provided mainly by banks;

– not only are banks the traditional suppliers of short-term resources but they are also in a particularly good position to offer borrowing power to SMEs in response to their need for financial flexibility.

Yet, there is nothing to indicate that financial changes which occurred during the last two decades have improved the relationship between banks and SMEs in most European countries. Recommendations must take into account the impact of specific national features on this relationship. Among the propositions of general validity regarding banking relationships, this study aims to emphasise two points:

– the advantages of bank credit guarantees,

– the difficulty of assessment.

4.1. Guaranteeing borrowing capacity

Large firms are used to negotiating guarantees, e.g. back-up liquidity lines from banks, which supplement their issues of short-term securities on the financial market. However, bank credit guarantees are also important for firms that cannot issue securities on the markets but need a safety net for the financing of contingencies. SMEs are particularly concerned as their liquid capital requirements are higher than those of large corporations in four out of the eight countries (lower in only two countries) selected in this study and because the proportion of short-term (versus long-term) financial debt tends to be higher than in LEs. Credit guarantees – provided at reasonable cost - can ease financial constraints and help to respond to a shock (for instance, an unexpected rise in trade debtors), to ward off bankruptcy and to react to an opportunity of expanding into new markets.

Nevertheless, the contribution of banks to SME financing poses the question of their screening and monitoring.

4.2. Dealing with the question of SME screening and monitoring

In most countries SMEs are subject to substantial risk premiums which add to their debt load. Moreover, it is common knowledge that in many countries they are significantly more affected by the risk of credit rationing, which here refers to the volume of funds made available by banks and not to interest rates.

The risk premium borne by SMEs and the credit rationing are generally explained by the greater danger of bankruptcy.[18] The cost of bankruptcy depends on regulations and this study has strengthened the view that regulations favourable to banks allow the cost of bankruptcy to be reduced and encourage the granting of loans to small firms on more favourable terms, with respect to both amounts and rates. Regulations allowing banks to obtain loan guarantees for a reasonable period and encouraging them to monitor the asset quality of customer firms help SMEs to obtain loans at reasonable interest rates.

It is also quite likely that the risk premium borne by small firms includes a surcharge for screening and monitoring them. The unit cost of screening and monitoring is high for several reasons: as a general rule, the amount at stake is rather limited; small firms have more specific features and hence the assessment of their quality is poorly adapted to standardised risk analysis.

To evaluate the risk attaching to a small firm, banks and credit institutions such as those specialised in finance leasing often rely on information provided by external organisations. Thus, in some countries, the central bank provides banks with company ratings. Gaining access to assessments supplied by external organisations is a very important means of reducing the cost of bank screening of small loan applications. This information can play a decisive role, in particular when a firm contacts a bank for the first time. Information on the quality of the borrower is, however, likely to present several disadvantages; it tends to focus on the financial elements taken from the balance sheet, especially the level of own funds, which gives an overly static vision of the firm. This study has called attention to the fact that the level of own funds is, of course, a good indicator of immediate solvency, but an imperfect indicator of future solvency. Any assessment of a firm's ability to reimburse its medium- and long-term debt must include its ability to maintain its markets and organisation and therefore take into account its investment strategy in the broad sense of the term. A high own funds contribution level may well encourage investment, but it may also be the simple result of an insufficiently dynamic investment policy.

Banks and organisations that provide financial quality assessments of firms would do well to examine the financing terms by mobilising several performance indicators that account for the firm's own dynamism. This study has shown that these indicators must be interpreted in relation to the diversity of profitability determinants and the existence of comparative advantages (and handicaps) of SMEs.

Monitoring company risk is also a source of expense for the bank. The cost of monitoring may be reduced by the existence of privileged relations between the small firm and a bank, viz. the German *Hausbank* model. Concentrating the firm's financial services and bank account management within a single credit organisation makes it possible to reduce the unit cost of loan monitoring.

Banks are accustomed to asking firms applying for loans to provide guarantees the amounts of which vary according to national procedures, the degree of long-standing relationship between the bank and the customer, the quality of the firm, the type of loan, etc. An insufficient ability to offer guarantees, particularly when the firm's assets are primarily intangible and therefore difficult to redeploy, can be an obstacle to receiving a loan. Belonging to a more or less formalised network

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[18] This argument does not take into account the cost of restructuring the firm, which allows it to avoid bankruptcy. Reorganisation costs are assumed to be higher for large corporations than for SMEs since this is the normal way of resolving the difficulties they face.

constitutes an advantage for SMEs. The expansion of the system of guarantees provided by external organisations particularly able to assess the quality of the firm may, on the other hand, help SMEs to obtain loans.

A certain upward trend of medium- to long-term bank loans can be observed in several countries in the sample, particularly Japan. This trend may have a favourable impact for non-financial firms, allowing them to gain access to stable capital at a stable rate of interest (nevertheless, maturity may be long but interest rates may be reviewable at any time or renegotiable at fixed intervals so that the rate may move in line with short-term rates; hence, the advantages of long-term loans are reduced; this practice is common in most countries selected in this study). By granting long-term loans, however, banks run a particular risk of transforming short-term deposit liabilities into long-term assets. This additional risk may encourage banks to be particularly selective in granting loans and may favour the financing of projects that require relatively large amounts of capital. This may be to the detriment of small enterprises with no major projects but which need mostly short-term financing at reasonable cost.

To summarise, the question of screening small firms implies that recognition be given to their specific features, which are an obstacle to developing standardised methods of analysis. Data analysis shows that, in most of the countries, the financial pattern of SMEs is more typified than that of LEs. This difference may be a handicap if the financial pattern of large enterprises is considered to be better. Screening costs may be reduced by developing the client relationship and/or by relying on a network that provides banks with information - signals - concerning their quality.

CONCLUSION

1. The economic flexibility of a firm expresses its ability to react adequately to unanticipated internal or external events. The firm's trajectory – its dynamics – is built on the basis of these responses. They may lead to an increase in "reversible" assets, thereby raising the question of its financial flexibility, defined as the capacity to mobilise rapidly and at reasonable cost the capital required to respond to an economic contingency.

2. The existence of good relationships with one bank or a small number of banks fosters the firm's ability:

– to acquire the stable capital that will supplement the contributions to own funds required to finance an investment project,

– to obtain the liquidity necessary to finance an increase in its reversible assets, defined as an unexpected increase in its assets which is unlikely to last.

Good relationships with banks that give firms borrowing power allow them to ease the actual as well as potential financial constraint and therefore contribute to their dynamism.

3. More generally, the actors in a SME need an economic and financial safety net. For SMEs that are independent of a financial group, this comprises **a network** of other SMEs, banks with which it has a good relationship as well as **private and/or public organisations that may provide a relevant assessment of their quality** and, if need be, contribute to their financial guarantee. **This safety net meets their need for economic and/or financial flexibility.**

APPENDIX I

1. BACH PRESENTATION

Bank for the Accounts of Companies Harmonised (BACH)

The BACH project was started in 1985 in order to supplement or replace information sources already used within DG II for its analyses of the financial structure and performance of European companies as well their US and Japanese competitors. Prior to 1985 data was not broken down by size, and a lack of harmonised data permitted few comparisons between countries. The Commission thus initiated the BACH project, in particular in order to make comparisons between different sizes of enterprises. BACH is the result of a close cooperation between both the European Commission and the European Committee of Central Balance-sheet Data Offices.

Harmonisation was at the centre of this revision, with comparability as the main objective. To make comparative analyses possible, the basic accounts are harmonised according to a single layout consistent with the Fourth European Accounting Directive. The Directive does not aim to achieve complex standardisation of accounting rules but instead comparability and equivalence of financial information. It allows the preservation of the different accounting traditions. The specific nature of national accounting methods and the difficulty of drawing up accounting documents *a posteriori* using a common layout thus restrict the degree of data harmonisation. Harmonisation is therefore still incomplete at international level and even at European level. Nevertheless, BACH is the most advanced publicly available database for comparisons between the financial structures and performances of SMEs and those of LEs.

Although the lack of harmonisation is a problem to be resolved, it may be due to some accounting customs that reflect organisational features. In Germany, for instance, the amounts owed by a firm to the parent company cannot be apportioned between financial and trade creditors. The likelihood is that, if German bankers had judged this distinction to be important, they would have prompted managers to introduce it in their accounts.

Comparisons in terms of level are more difficult than trend comparisons. They call for knowledge of the particular characteristics of the national accounting methods and of the financial environment of each country. This report will draw attention to the most important differences in accounting practices that may distort results.

Representativeness

The national bodies responsible for centralising balance-sheet data supply the Commission with aggregated information. The Commission assumes that the samples used are representative as the data is published and analysed by those bodies.

In one country, Belgium, data is exhaustive, while in most of the other countries representativeness is good although, in some of them, it is better for large firms than for SMEs.

Countries

The BACH database covers 13 countries: Austria, Belgium, Denmark, Finland, France, Germany, Italy, Japan, the Netherlands, Portugal, Spain, Sweden and the United States.

Finland is not taken into account in the present analysis owing to lack of data; other countries are taken into account in the data analysis only (Chapter III of the report), and this for different reasons: Denmark owing to missing data, the Netherlands owing to consolidated data (see accounting data) and Sweden owing to inexplicable observations. The United States and the United Kingdom deserve special treatment as, in their case, the analysis is of particular interest. But the US sample suffers from a lack of data. The United Kingdom is a special case as data is supplied by a private national body and not included in BACH. Moreover, the data quality of the UK sample is low on account of a lack of representativeness as regards small companies.

Years

Chronological series are available which vary in length from one country to another. This report covers the period from 1990 to 1996. It starts in 1990 because until then some participating countries did not supply data broken down according to the common size criterion, namely turnover.

Size

A distinction is made between three categories of company:

- small companies with a turnover of less than ECU 7 million,

- medium-sized companies with a turnover of between ECU 7 million and ECU 40 million,

- large companies with a turnover in excess of ECU 40 million.

Sectors

Data has been grouped together in an aggregate common nomenclature based on the new NACE to three digits.

This study covers manufacturing only as this industry provides the best-quality data. Coverage of services is poorer and may not always be representative. Manufacturing can be broken down into three sectors:

- intermediate products,
- investment goods and consumer durables,
- non-durable consumption goods.

Accounting data

The BACH accounting layout comprises a balance sheet and a profit and loss account, enabling not only basic items but also some financial balances considered particularly useful for financial purposes to be shown.

Some countries publish consolidated data, an accounting practice which disregards debt and loans within companies belonging to the same group. Therefore, the overall level of indebtedness is lower when data is consolidated and comparisons with unconsolidated data are not possible.

2. REPRESENTATIVENESS OF SAMPLES

Country	Source	Number of companies	Cover rate (% of turnover)	Remark
Representativeness of samples for countries studied in the report				
Austria	Oesterreichische Nationalbank	2554* (in 1992)	54%*	Data for 1996 is not available
Belgium	National Bank of Belgium	19238* (in 1993)	99.6%*	
France	Centrale des Bilans de la Banque de France	26860* (in 1992)	63.8%*	
Germany	Deutsche Bank	11046* (in 1992)	50.1%*	Data for 1996 is not available
Italy	Centrale dei Bilanci	19870* (in 1993)	54.6%*	
Portugal	Banco de Portugal	13133** (in 1994)	56%*	
Spain	Banco de Espana	7500** (since 1988)	45%**	Representativeness of firms is very low for small enterprises
Japan	Ministry of Finance	20000**		Representative sample (based on a comparison with an exhaustive file)
Representativeness of samples for countries included in the report but studied separately				
US	Department of Commerce	9300 (industry and distributive trades)		Consolidated data Two sizes available
UK		574*	86%*	Consolidated data Representativness of firms is very low for small enterprises
Representativeness of samples for countries not included in the report				
Denmark	Statistics Denmark	3000*		
Finland	Statistics Finland	1464* (in 1993)	86%*	
Netherlands	Centraal Bureau voor de Statistiek	9500**	75%** of balance-sheet total	Consolidated data
Sweden	Statistics Sweden	15900**		

Note :   ** All sectors included.
     * Only manufacturing.

3. BACH SCHEME

SCHEME BACH

Code	Intitulé	Description
	BILAN - ACTIF	BALANCE SHEET - ASSETS
A.	Capital souscrit non versé	Subscribed capital unpaid
C.	Actifs immobilisés	Fixed assets
C.1	Immobilisations incorporelles	Intangible fixed assets
C.1.1	Frais d'établissement	Formation (preliminary) expenses
C.1.5*	Autres immobilisations incorporelles	Other intangible fixed assets
C.2	Immobilisations corporelles	Tangible fixed assets
C.2.1	Terrains et constructions	Land and buildings
C.2.2	Installations techniques et machines	Plant and machinery
C.2.3	Autres installations, outillage, mobilier	Other fixtures
C.2.4	Acomptes versés et immobilisations en cours	Payments on account and assets in construction
C.3	Immobilisations financières	Financial fixed assets
C.3.1/3	Parts dans des entreprises liées et participations	Shares in affiliated undertakings and participating interests
C.3.8*	Autres immobilisations financières	Other financial fixed assets
D.	Actifs circulants	Current assets
D.1	Stocks	Stocks
D.1.1	Matières premières et consommables	Raw materials and consumables
D.1.4.	Acomptes versés	Payments on account
D.1.5*	Autres stocks	Other stocks
D.2	Créances	Debtors
D.2.1	Créances résultant de ventes et de services	Trade debtors
D.2.7*	Autres créances	Other debtors
D.3	Valeurs mobilières	Current investments
D.4	Avoirs en banque, chèques et encaisse	Cash at bank and in hand
E.	Comptes de régularisation	Prepayments and accrued income
AE.*	Total de l'actif	Total assets

(*) Rubrique non conforme à la 4ème directive européenne / Item not in conformity with the 4th european directive.

Code	Intitulé	Description
	BILAN - PASSIF	**BALANCE SHEET - LIABILITIES**
F .	**Dettes dont la durée résiduelle n'est pas supérieure à un an**	**Creditors : amounts becoming due and payable within one year**
F.2	Dettes envers des établissements de crédit	Amounts owed to credit institutions
F.3	Acomptes reçus sur commandes	Payments received on accounts of orders
F.4	Dettes sur achats et prestations de services	Trade creditors
F.10*	Autres dettes	Other creditors
F.101*	Autres dettes financières	Other financial creditors
F.102*	Autres dettes non financières	Other non financial creditors
I.	**Dettes dont la durée résiduelle est supérieure à un an**	**Creditors : amounts becoming due and payable after more than one year**
I.1	Emprunts obligataires	Debenture loans
I.2	Dettes envers des établissements de crédit	Amounts owed to credit institutions
I.4	Dettes sur achats et prestations de services	Trade creditors
I.10*	Autres dettes	Other creditors
I.101*	Autres dettes financières	Other financial creditors
I.102*	Autres dettes non financières	Other non financial creditors
J .	**Provisions pour risques et charges**	**Provisions for liabilities and charges**
J.1*	Provisions pour fonds de pension et oblig. similaires	Provisions for pensions and similar obligations
J.4*	Autres provisions	Other provisions
K .	**Comptes de régularisation**	**Accruals and deferred income**
L .	**Capitaux propres**	**Capital and reserves**
L.1	Capital souscrit	Subscribed capital
L.2	Primes d'émission	Share premium account
L.3	Réserve de réévaluation	Revaluation reserve
L.4	Réserves	Reserves
L.5	Résultats reportés	Profit or loss brought forward
L.6	Résultat de l'exercice	Profit or loss for the financial year
F L *	**Total du passif**	**Total liabilities**

(*) Non conforme à la 4ème directive / Not in conformity with the 4th directive.

Code		Intitulé		Description	

COMPTE DE RESULTATS — **PROFIT AND LOSS ACCOUNT**

Code	Intitulé	Description
1.	Montant net du chiffre d'affaires	Net turnover
2.	Variation du stock produits finis et en cours fabrication	Variation in stocks finished goods and work in progr.
3.	Travaux portés à l'actif	Capitalised production
4.	Autres produits d'exploitation	Other operating income
S.*	**Produits d'exploitation**	**Total operating income**
5.	Consommation de biens et de services	Costs of materials and consumables
5.a	Charges des matières premières et consommables	Raw materials and consumables
5.b	Autres charges externes	Other external charges
8.	Autres charges et impôts d'exploitation	Other operating charges and taxes
T.*	**Valeur ajoutée BACH (S - 5 - 8)**	**Added value BACH (S - 5 - 8)**
6.	Frais de personnel	Staff costs
6.a	Salaires et traitements	Wages and salaries
6.b	Charges sociales	Social security costs
U.*	**Résultat brut d'exploitation (T - 6)**	**Gross operating profit (T - 6)**
7.	Corrections de valeur sur actifs non financiers	Value adjustments on non financial assets
7.a	Amortissements sur immob. incorporelles et corporelles	Depreciation on intangible and tangible fixed assets
7.c*	Autres corrections de valeur et provisions	Other value adjustments and provisions
V.*	**Résultat net d'exploitation (U - 7)**	**Net operating profit (U - 7)**
9/11	Produits financiers	Financial income
12.	Corrections de valeur sur actifs financiers	Value adjustements on financial assets
13.	Intérêts et charges similaires	Interest and similar charges
13.a*	Intérêts versés sur dettes financières	Interest paid on financial debts
13.b*	Autres charges financières	Other financial charges
W.*	Résultat financier	Financial income net of charges
X.*	**Résultat net des activités ordinaires avant impôts**	**Profit or loss on ordinary activities before taxes**
16.	Produits exceptionnels	Extraordinary income
17.	Charges exceptionnelles	Extraordinary charges
Y.	Impôts sur les résultats	Taxes on profits
21.	**Résultat net après impôts**	**Profit or loss for the financial year**

Code	Intitulé	Description
	DONNEES DE L'ANNEXE	**INFORMATION ON THE NOTES**
	- Etat des investissements -	*- Statement of investment -*
251.*	Acquisitions d'immobilisations incorporelles	Acquisitions of intangible fixed assets
252.*	Cessions d'immobilisations incorporelles	Sales and disposals of intangible fixed assets
253.*	Acquisitions - cessions	Acquisitions - sales and disposals
261.*	Acquisitions d'immobilisations corporelles	Acquisitions of tangible fixed assets
262.*	Cessions d'immobilisations corporelles	Sales and disposals of tangible fixed assets
263.*	Acquisitions - cessions	Acquisitions - sales and disposals
271.*	Acquisitions d'immobilisations financières	Acquisitions of financial fixed assets
272.*	Cessions d'immobilisations financières	Sales and diposals of financial fixed assets
273.*	Acquisitions - cessions	Acquisitions - sales and disposals
	- Etat des amortissements -	*- Statement of depreciation -*
28.*	Amortissements cumulés sur immob. incorporelles	Accumulated depreciation on intangible assets
29.*	Amortissements cumulés sur immob. corporelles	Accumulated depreciation on tangible assets
30.*	Amortissements cumulés sur immob. financières	Accumulated depreciation on financial assets
311.*	Bénéfices distribués pour l'exercice clôturé	Distribution of profit for the current year
312.*	Bénéfices distribués pour l'exercice précédent	Distribution of profit for the previous year
32.*	Nombre d'entreprises	Number of enterprises

(*) Non conforme à la 4ème directive / Not in conformity with the 4th directive.

APPENDIX II

1. DETAILED CALCULATION OF RATIOS BY COUNTRY OR BY GROUP OF COUNTRIES

List of ratios calculated for European countries

Indicators of financial structures:

- financial fixed assets / fixed assets = **C3/C**
- financial debt / balance-sheet total = **F2+F101+I4+I2+I101/balance-sheet total**
- own funds = capital and reserves / balance-sheet total = **L/FL**
- reserves rate = reserves / capital and reserves = **(L3+L4+L5+L6) / L**
- leverage = provisions and medium- and long-term liabilities / (provisions and medium- and long-term liabilities + capital and reserves) = **(J+I101+I2+I1)/ (L-A+I1+I2+I1O1+J)**
- short-term financial debt over turnover = **(F2+F101) / 1**
- cover rate of capital employed =(capital and reserves + medium- and long-term debt)/fixed assets + working capital requirement + other current non-financial items = **(L-A+I1+I2+I101+J) / [(C+D1+D2+E) - (F3+F4+F102+I4+I102+K)]**
- liquid capital requirement / turnover =[(fixed assets + working capital requirement +
- other current non-financial items) - (provisions and medium- and long-term liabilities + capital and reserves)] / turnover = **[C+D1+D2+E - (F3+F4+F102+I4+I102+K) - (L-A+I1+I2+I1O1+J)] / 1**
- financial debt structure = financial short-term debt/total financial debt = **(F2+F101) / (F2+F101+I1+I2+I1O1**)
- provisions over own funds = **J/L**

Indicators of profitability:

- cash-flow capacity = cash flow/ turnover = **(T-6+W-Y) / 1**
- working capital requirement over turnover = **[(D1+D2.1+E-(F3+F4+I4)] / 1**
- gross profitability = gross operating profit / capital employed = **T-6/ [C+D1+D2+E - (F3+F4+F102+I4+I102+K])**
- value added over capital employed = **T/[C+D1+D2+E-(F3+F4+F102+I4+I102+K)]**
- fixed assets over turnover = **C/1**
- value added over turnover **= T/1**
- costs of materials and consumables over turnover = **5/1**
- mark-up ratio = **T-6/1**
- staff costs = **6/1**
- stocks over turnover =D.1/1

List of ratios calculated for the US

Indicators of financial structures:

- own funds = capital and reserves / balance-sheet total (**L/FL**)
- financial debt structure = financial short-term debt/total financial debt
  (**F2/F2+I2+I10[19]**)
- cover rate of capital employed = (capital and reserves + medium - and long-term debt) / fixed assets + working capital requirement
  [**L+I10+I2+J/ C+D1+D2.1-(F3+F4[20])**]
- liquid capital requirement / turnover =[(fixed assets + working capital requirement) – (provisions and medium- and long-term liabilities + capital and reserves)] / turnover
  [**C+D1+D2.1-(F3+F4^2)-(L+I10+I2+J)] / 1**

Indicators and determinants of profitability:

- fixed assets over turnover (**C/1**)
- working capital requirement over turnover [**D1+D2.1+ E - (F3+F4^2 + K)]/1**

Capital structure and capital requirement:

- provisions over own funds (**J/L**)
- financial charges over turnover (**13/1**)
- trade creditors over turnover (**F3+F4/1**)
- current assets over non-financial debt (**D1+D2/F3+F4^2**)
- short-term financial debt over turnover (**F2/1**)
- working capital requirement + current investments & cash over financial short-term loans
  [**D1+D2-(F3+F4)+D3+D4/F2**]

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[19] I10 is chosen as a substitute for I1.
      The main consequence is that the only item taken into account is "debenture and other fixed-interest-rate instruments in circulation"; the item "participating loans" is not included under I10.
[20] F4 is chosen as a sustitute for I4.
      The main consequence is that the only item taken into account is " trade creditors " ; the item " payment received on account from customers " is not included under F4.

2. VARIABLES AVAILABLE AND MISSING IN THE REPORT FOR EACH COUNTRY

Table of missing Bach items used in the calculation of variables

	AUSTRIA	BELGIUM	FRANCE	GERMANY	ITALY	PORTUGAL	SPAIN	JAPAN
Debtors (D2)								
Current investments (D3)	X (in 90 and 91)							
Cash at bank and in hand (D4)								
Prepayments and accrued income (E)	X							X
Amounts owed to credit institutions (due and payable within one year) (F2)								
Payments received on account of orders (due and payable within one year) (F3)							X (in 90)	X
Trade creditors(due and payable within one year) (F4)								
Other financial creditors (due and payable within one year) (F101)	X							
Other non-financial creditors (due and payable within one year) (F102)	X			X				
Debenture loans (I1)								
Amount owed to credit institutions (due and payable after more than one year) (I2)								
Trade creditors (due and payable after more than one year) (I4)	X (included in F4)		X (included in F4)	X (included in F4)	X (included in I102)		X (in 90 included in F4)	X (included in F4)

Note: X denotes missing item.

	AUSTRIA	BELGIUM	FRANCE	GERMANY	ITALY	PORTUGAL	SPAIN	JAPAN
Other financial creditors (due and payable after more than one year) (I101)	X							X
Other non-financial creditors (due and payable after more than one year) (I102)	X			X				X
Accruals and deferred income (K)	X							
Revaluation reserves (L3)	X			X				X
Reserves (L4)								
Profit or loss brought forward (L5)					X			
Profit or loss for the financial year (L6)	X (included in L5)							
Added value BACH (T)								
Staff costs (6)								
Interest paid on financial debts (13a)	X					X		

Note: X denotes missing item.

The main consequences of these items being missing are:

- the impossibility of calculating the variable " apparent interest rate on financial debt " for Portugal and Austria;
- an undervaluation for the variable " reserve rate " for Austria, Germany and Japan;
- an undervaluation for all the variables which included the items " other financial and non-financial creditors " for Austria;
- an undervaluation for all the variables which included the item " other non-financial creditors " for Germany;
- an undervaluation for all the variables which included the item "other financial or non-financial creditors due and payable after more than one year" for Japan.

Table of missing Bach items for the United States

	US
Debtors **(D2)**	
Current investments **(D3)**	
Cash at bank and in hand **(D4)**	
Prepayments and accrued income **(E)**	X
Amounts owed to credit institutions **(due and payable within one year)** **(F2)**	
Payments received on account of orders **(due and payable within one year)** **(F3)**	
Trade creditors (due and payable **within one year)** **(F4)**	
Other financial creditors (due and payable within **one year)** **(F101)**	X
Other non-financial creditors (due and **payable within one year)** **(F102)**	X
Debenture loans **(I1)**	X (included in I10)
Amount owed to credit institutions (due **and payable after more than one year)** **(I2)**	
Trade creditors (due and payable after **more than one year)** **(I4)**	X (included in F4)

Note: X denotes missing item.

	US
Other financial creditors (due and payable **after more than one year)** **(I101)**	X
Other non-financial creditors (due and payable **after more than one year)** **(I102)**	X
Accruals and deferred income **(K)**	X
Subscribed capital **(L1)**	
Revaluation reserves **(L3)**	X
Reserves **(L4)**	
Profit or loss brought forward **(L5)**	X
Profit or loss for the financial year **(L6)**	
Added value BACH **(T)**	X

Staff costs **(6)**	X
Interest paid on financial debts **(13a)**	X

Table of missing Bach items for countries excluded from our analysis

	DENMARK	NETHERLANDS	SWEDEN
Debtors (D2)	X		
Current investments (D3)	X		
Cash at bank and in hand (D4)	X		
Prepayments and accrued income (E)	X	X	
Amounts owed to credit institutions (due and payable within one year) (F2)	X		
Payments received on account of orders (due and payable within one year) (F3)	X		
Trade creditors (due and payable within one year) (F4)	X		
Other financial creditors (due and payable within one year) (F101)	X	X	
Other non-financial creditors (due and payable within one year) (F102)	X		
Debenture loans (I1)	X		X
Amount owed to credit institutions (due and payable after more than one year) (I2)	X		X
Trade creditors (due and payable after more than one year) (I4)	X	X	X

	DENMARK	NETHERLANDS	SWEDEN
Other financial creditors (due and payable after more than one year) (I101)	X	X	X
Other non-financial creditors (due and payable after more than one year) (I102)	X		X
Accruals and deferred income (K)	X	X	
Subscribed capital (L1)	X		
Share premium account (L2)	X		X
Revaluation reserves (L3)	X		X
Reserves (L4)	X		
Profit or loss brought forward (L5)	X	X	
Profit or loss for the financial year (L6)			

Added value BACH **(T)**			
Staff costs **(6)**			
Interest paid on financial debts **(13a)**	X		

3. COMMENT CONCERNING THE UNITED KINGDOM

Given the limits of the sample, which is not included in the BACH database, the analysis of UK SMEs cannot yield reliable results. First, only a few ratios can be estimated as many items are missing. Second, the representativeness of SMEs is very low and the sample is not constant, so that the inclusion of some new firms may introduce erratic changes from one year to the next. Third, the estimated value of some ratios may be abnormal (for instance, the cash flow capacity gives –90% in 1994 for SMEs). Finally, differences between medium-sized and large firms tend to be very small or non-existent. Hence, only one ratio is commented on in this study. The own funds ratio tends to decrease with size and small firms in the United Kingdom seem to be highly capitalised.

Own funds / balance sheet total
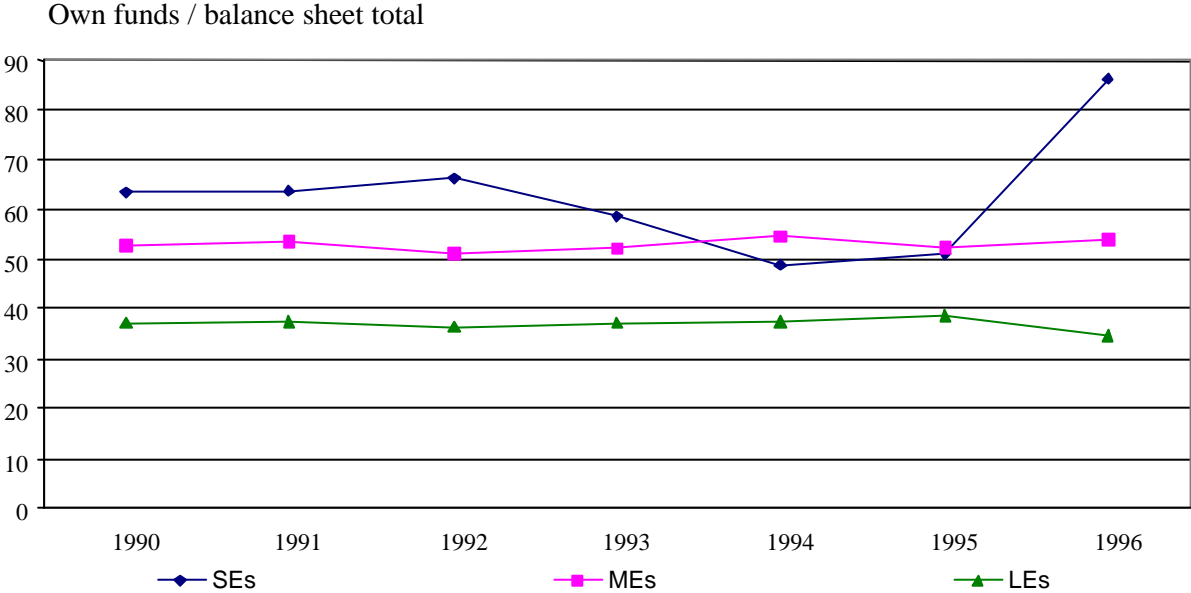
APPENDIX III

1. LIST OF RATIOS USED IN THE DATA

Active variables following the Bach scheme

- 'own funds' = capital and reserves / balance-sheet total = **L / FL**

- 'leverage' = provisions and medium- and long-term liabilities / (provisions and medium- and long-term liabilities + capital and reserves) =
(J+I101+I2+I1) / (L-A+I1+I2+I1O1+J)

- 'reserve rate' = reserves / capital and reserves = **(L3+L4+L5+L6) / L**

- 'financial debt structure' = financial short-term debt/total financial debt =
(F2+F101) / (F2+F101+I1+I2+I1O1)

- 'cover rate of capital employed' = (capital and reserves +medium- and long-term debt)/ fixed assets + working capital requirement + other non-financial current items =
(L-A+I1+I2+I101+J) / [(C+D1+D2+E) - (F3+F4+F102+I4+I102+K)]

- 'liquid capital requirement' / turnover =[(fixed assets + working capital requirement + other non-financial current items) – (provisions and medium- and long-term liabilities + capital and reserves)] / turnover =
[(C+D1+D2+E - (F3+F4+F102+I4+I102+K) - (L-A+I1+I2+I1O1+J)] / 1

- 'cash flow capacity' = cash flow/ turnover = **(T-6+W-Y) / 1**

- leverage impact = financial profitability less gross profitability = (cash flow / capital and reserves) - (gross operating profit over capital employed) =
[T-6+W-Y/L] – [T-6 / (C+D1+D2+E) - (F3+F4+F102+I4+I102+K)]

Supplementary variables following the Bach scheme

Indicators and determinants of profitability:

- gross profitability = gross operating profit / capital employed =
(T-6) / [(C+D1+D2+E) - (F3+F4+F102+I4+I102+K)]

- profitability of own funds = profit or loss on ordinary activities after taxes / capital and reserves =
(T-6-7+W-Y) / L

- mark-up ratio = **(T-6) / 1**

- fixed assets over turnover = **C / 1**

- working capital requirement and other current non-financial items over turnover =
[(D1+D2+E)-(F3+F4+F102+I4+I102+K)]/1

- financial charges over turnover =**13 / 1**

Financial structure and capital requirement:

- provisions over own funds = **J / L**

- solvency = cash flow/financial debt = **(T-6-7+W-Y) / (F2+F101+I1+I2+I1O1)**

- trade creditors over turnover = **(F3+F4) / 1**

- current assets over non-financial debt = **(D1+D2+E) / (F3+F4+F102+I4+I102+K)**

- short-term financial debt over turnover = **(F2+F101) / 1**
- working capital requirement + current investments and cash over financial short-term loans = **[(D1+D2+E) -(F3+F4+F102+I4+I102+K)+D3+D4] / (F2+F101)**

2. SOME DETAILS OF THE DATA

Contents of cluster according to size

	Cluster 1	Cluster 2	Cluster 3	Cluster 4
SMALL	39	28	40	55
MEDIUM	7	58	55	42
LARGE	0	68	42	52
ALL SIZES	46	154	137	149

The firms which contribute most to the definition of the components are:

- on the negative part of the first component: almost only small companies

- on the positive part of the first component: all sizes

- on the negative part of the second component: mainly small companies

- on the positive part of the second component: all sizes, with a majority of medium-sized companies.

Principal component analysis

<u>ACTIVE AND SUPPLEMENTARY VARIABLES (mean and standard deviation)</u>

TOTAL NUMBER : 486   TOTAL WEIGHT : 486.00

NUM . IDEN - NAME	SIZE	WEIGHT	MEAN	STANDARD DEVIATION	MINIMUM	MAXIMUM
1 . PDSK - own funds/total	486	486.00	32.81	9.98	8.16	66.36
2 . TXEN - leverage	486	486.00	39.62	14.08	6.48	79.12
3 . TXRE - reserves rate	486	486.00	49.52	19.18	0.00	89.53
4 . TXCO - cover rate of K. emp	486	486.00	86.61	15.86	42.46	141.24
5 . BESL - liquid capital requi	486	486.00	8.07	9.26	-17.43	43.48
6 . CAFC - cash flow capacity	486	486.00	6.25	2.39	-5.19	18.37
7 . RFIM - leverage impact	486	486.00	6.29	13.49	-14.56	89.75
8 . DFIC - short term fin.debt/	486	486.00	52.12	15.08	11.82	82.31
9 . PROV - provisions/own funds	486	486.00	17.19	15.34	0.37	61.25
10 . SOLV - solvency	486	486.00	23.07	13.77	-14.36	155.94
11 . ACTC - current assets /std	486	486.00	2.13	1.08	1.10	7.42
12 . LIQU - wcr+current invest&c	486	486.00	2.37	1.34	0.72	8.98
13 . CBCC - sh fin. debt/t.o.	486	486.00	13.58	5.67	3.11	35.68
14 . RBE - gross profit/capital	486	486.00	18.87	4.93	3.53	38.46
15 . RESU - profit/own funds	486	486.00	4.67	6.91	-40.06	26.45
16 . EBEC - mark-up	486	486.00	9.92	2.59	2.10	24.48
17 . FRSF - fin. charges/t.o.	486	486.00	3.65	1.40	1.51	9.16
18 . AICC - fixed assets/t.o.	486	486.00	35.82	14.91	12.63	97.35
19 . BFRC - working cap. requi	486	486.00	19.49	8.02	3.14	45.75
20 . DETT - trade creditors/t.o.	486	486.00	16.41	5.33	4.81	32.13

```
CORRELATION  MATRIX
      |    PDSK    TXEN    TXRE    TXCO    BESL    CAFC    RFIM    DFIC-----+-----------------------
-------------------------------PDSK |    1.00TXEN |   -0.85    1.00TXRE |    0.18   -0.14
1.00
TXCO |    0.52   -0.38    0.43    1.00
BESL |   -0.42    0.30   -0.42   -0.95    1.00
CAFC |    0.47   -0.21    0.02    0.15   -0.08    1.00
RFIM |   -0.62    0.74   -0.40   -0.59    0.49    0.14    1.00
DFIC |   -0.24    0.04   -0.28   -0.71    0.65   -0.26    0.20    1.00
-----+------------------------------------------------------
      |    PDSK    TXEN    TXRE    TXCO    BESL    CAFC    RFIM    DFIC


EIGENVALUES OF THE CORRELATION MATRIX
      |    PDSK    TXEN    TXRE    TXCO    BESL    CAFC    RFIM    DFIC-----+-----------------------
---------------------------------
PDSK |   99.99
TXEN |  -27.83   99.99
TXRE |    3.96   -3.20   99.99
TXCO |   12.83   -8.87   10.11   99.99
BESL |   -9.83    6.86   -9.81  -40.01   99.99
CAFC |   11.28   -4.77    0.52    3.24   -1.67   99.99
RFIM |  -15.97   20.80   -9.43  -14.94   11.83    3.04   99.99
DFIC |   -5.47    0.87   -6.39  -19.63   17.08   -5.75    4.52   99.99
-----+------------------------------------------------------
      |    PDSK    TXEN    TXRE    TXCO    BESL    CAFC    RFIM    DFIC


CHART OF THE FIRST 8 EIGENVALUES

+--------+-----------+----------+----------+-----------------------------------------------------------------------
+|   No                        |        EIGENVALUE    |                        %              |    CUMULA.        |
|        |           |          |          |                                                                       |
+--------+-----------+----------+----------+-----------------------------------------------------------------------+
|        |           |          |    %     |                                                                       |
|    1   |   3.8845  |   48.56  |   48.56  | ***********************************************************************|
|    2   |   1.5721  |   19.65  |   68.21  | ********************************                                       |
|    3   |   1.2489  |   15.61  |   83.82  | *************************                                              |
|    4   |   0.7333  |    9.17  |   92.98  | ****************                                                       |
|    5   |   0.3012  |    3.77  |   96.75  | *******                                                               |
|    6   |   0.1400  |    1.75  |   98.50  | ***                                                                   |
|    7   |   0.0914  |    1.14  |   99.64  | **                                                                    |
|    8   |   0.0286  |    0.36  |  100.00  | *                                                                     |
+--------+-----------+----------+----------+-----------------------------------------------------------------------
-


ANDERSON'S INTERVALS
CONFIDENCE = 0.95
+--------+--------------------------------------------------------------+
| NUMBER | LOWER CONFIDENCE      EIGENVALUE      UPPER CONFIDENCE   |
|        |       LIMIT                              LIMIT           |+--------+--------------
--------------------------------------------+|   1   |        3.4251              3.8845
4.4055      |
|    2   |      1.3862           1.5721             1.7830      |
|    3   |      1.1012           1.2489             1.4164      |
|    4   |      0.6465           0.7333             0.8316      |
|    5   |      0.2656           0.3012             0.3416      |
+--------+--------------------------------------------------------------+


POSITION OF INTERVALS
1 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .*-------------+-------------
--*
2 . . . . . . . . . . . . . . . . . . . . . *-----+-----* . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
. .
3 . . . . . . . . . . . . . .*----+----*. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
. .
4 . . . . . .*--+--*. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
. .
5 *+* . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
. .
```
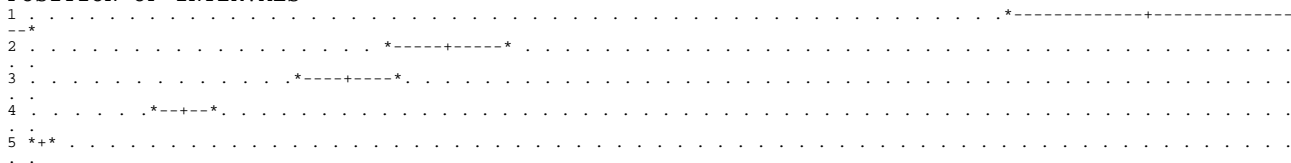
```
VARIABLE COORDINATES ON COMPONENTS  1 TO 5
ACTIVE VARIABLES  --------------------------------+--------------------------------------+--------
-----------------------+           VARIABLES            |                COORDINATES
|CORRELATIONS VARIABLE-COMPONENT|
--------------------------------+--------------------------------------+-----------------------
------+
IDEN - NAME                     |   1      2      3      4      5  |    1      2      3      4
5   |
PDSK - own funds/total          |  0.78   0.54  -0.21  -0.01   0.01 |   0.78   0.54  -0.21  -0.01
0.01 |
TXEN - leverage                 | -0.69  -0.68  -0.10   0.05   0.05 |  -0.69  -0.68  -0.10   0.05
0.05 |
TXRE - reserves rate            |  0.51  -0.30   0.27   0.76  -0.01 |   0.51  -0.30   0.27   0.76
-0.01 |
TXCO - cover rate of K.emp      |  0.90  -0.34  -0.01  -0.16   0.14 |   0.90  -0.34  -0.01  -0.16
0.14 |
BESL - liquid capital requi     | -0.83   0.42  -0.03   0.18  -0.30 |  -0.83   0.42  -0.03   0.18
-0.30 |
CAFC - cash flow capacity/      |  0.27   0.22  -0.88   0.27   0.06 |   0.27   0.22  -0.88   0.27
0.06 |
RFIM - leverage impact          | -0.77  -0.28  -0.48   0.03   0.16 |  -0.77  -0.28  -0.48   0.03
0.16 |
DFIC - short term fin.debt/     | -0.61   0.57   0.33   0.15   0.40 |  -0.61   0.57   0.33   0.15
0.40 |
--------------------------------+--------------------------------------+-----------------------
------+

SUPPLEMENTARY  VARIABLES--------------------------------+--------------------------------------+--
------------------------------+
          VARIABLES             |             COORDINATES              |CORRELATIONS VARIABLE-
COMPONENT|
--------------------------------+--------------------------------------+-----------------------
------+
IDEN - NAME                     |   1      2      3      4      5  |    1      2      3      4
5   |
--------------------------------+--------------------------------------+-----------------------
------+
PROV - provisions/own funds     | -0.77  -0.26  -0.16   0.14   0.31 |  -0.77  -0.26  -0.16   0.14
0.31 |
SOLV - solvency                 |  0.39   0.28  -0.67   0.25   0.17 |   0.39   0.28  -0.67   0.25
0.17 |
ACTC - current assets /std      | -0.49   0.07  -0.27   0.31   0.11 |  -0.49   0.07  -0.27   0.31
0.11 |
LIQU - wcr+current invest&c     |  0.42  -0.38  -0.30   0.05  -0.08 |   0.42  -0.38  -0.30   0.05
-0.08 |
CBCC - sh fin. debt/t.o.        | -0.62   0.44   0.33   0.01  -0.09 |  -0.62   0.44   0.33   0.01
-0.09 |
RBE  - gross profit/capital     |  0.34  -0.37  -0.17   0.11   0.14 |   0.34  -0.37  -0.17   0.11
0.14 |
RESU - profit/own funds         | -0.06  -0.26  -0.57   0.47   0.27 |  -0.06  -0.26  -0.57   0.47
0.27 |
EBEC - mark-up                  |  0.26   0.37  -0.60   0.25  -0.10 |   0.26   0.37  -0.60   0.25
-0.10 |
FRSF - fin. charges/t.o.        |  0.07   0.41   0.27  -0.17  -0.34 |   0.07   0.41   0.27  -0.17
-0.34 |
AICC - fixed assets/t.o.        |  0.21   0.41  -0.29  -0.04  -0.31 |   0.21   0.41  -0.29  -0.04
-0.31 |
BFRC - working cap. require     | -0.50   0.40  -0.10   0.30  -0.06 |  -0.50   0.40  -0.10   0.30
-0.06 |
DETT - trade creditors/t.o.     |  0.11   0.07   0.42  -0.16  -0.10 |   0.11   0.07   0.42  -0.16
-0.10 |
--------------------------------+--------------------------------------+-----------------------
------+
```

CHARACTERISTICS OF COMPONENT 1

WEIGHT		DESIGNATION	AVERAGE	STANDARD DEV	NO	COORD.
-0.83	486.00	liquid capital requirement/turnover	8.07	9.26	1	
-0.77	486.00	provisions/own funds	17.19	15.34	2	
0.78	486.00	own funds/balance sheet total	32.81	9.98	19	
0.90	486.00	cover rate of capital employed	86.61	15.86	20	

COORD.	WEIGHT	DESIGNATION	AVERAGE	STANDARD DEV	NO
-0.77	486.00	provisions/own funds	17.19	15.34	1
0.42	486.00	wcr+current invest&cash/st fin. debt	2.37	1.34	12

CHARACTERISTICS OF COMPONENT 2

COORD.	WEIGHT	DESIGNATION	AVERAGE	STANDARD DEV	NO
-0.68	486.00	leverage	39.62	14.08	1
-0.38	486.00	wcr+current invest&cash/st fin. debt	2.37	1.34	2
0.54	486.00	own funds/balance sheet total	32.81	9.98	19
0.57	486.00	short term fin.debt/financial debt	52.12	15.08	20

COORD.	WEIGHT	DESIGNATION	AVERAGE	STANDARD DEV	NO
-0.38	486.00	wcr+current invest&cash/st fin. debt	2.37	1.34	1
0.44	486.00	sh financial debt/turnover	13.58	5.67	12

CHARACTERISTICS OF COMPONENT 3

WEIGHT		DESIGNATION	AVERAGE	STANDARD DEV	NO	COORD.
-0.88	486.00	cash flow capacity/turnover	6.25	2.39	1	
-0.67	486.00	solvency	23.07	13.77	2	
0.33	486.00	short term fin.debt/financial debt	52.12	15.08	19	
0.42	486.00	trade creditors/turnover	16.41	5.33	20	

BY ILLUSTRATIVE CONTINUOUS VARIABLES

COORD.	WEIGHT	DESIGNATION	AVERAGE	STANDARD DEV	NO
-0.67	486.00	solvency	23.07	13.77	1
0.42	486.00	trade creditors/turnover	16.41	5.33	12

Cluster analysis

DESCRIPTION OF PARTITIONS
DESCRIPTION FROM THE CUT 'a' OF THE TREE IN 4 CLUSTERS

CLUSTER 1 / 4

V.TEST	PROBA	MEAN		STANDARD DEVIATION		VARIABLES	
		CLUSTER	GENERAL	CLUSTER	GENERAL		IDEN
				CLUSTER 1 / 4	(WEIGHT = 46.00	SIZE = 46)	
16.91	0.000	38.34	6.29	15.55	13.49	7.leverage impact	RFIM
12.43	0.000	64.21	39.62	7.64	14.08	2.leverage	TXEN
11.27	0.000	41.49	17.19	7.48	15.34	9.provisions/own funds	PROV
9.10	0.000	19.91	8.07	8.16	9.26	5.liquid capital requirement / turnover	BESL
5.82	0.000	3.01	2.13	0.38	1.08	11.current assets /st non fin. debt	ACTC
5.43	0.000	17.90	13.58	2.63	5.67	13.sh financial debt/turnover	CBCC
4.63	0.000	9.16	4.67	6.79	6.91	15.profit/own funds	RESU
3.92	0.000	60.42	52.12	4.43	15.08	8.short term fin.debt/financial debt	DFIC
3.44	0.000	23.36	19.49	3.98	8.02	19.working cap. requirement(wcr)/turnover	BFRC
-3.63	0.000	2.93	3.65	0.66	1.40	17.financial charges/turnover	FRSF
-3.93	0.000	27.60	35.82	11.92	14.91	18.fixed assets/turnover	AICC
-4.04	0.000	1.61	2.37	0.31	1.34	12.wcr+current invest&cash/st fin. debt	LIQU
-4.58	0.000	14.22	23.07	6.17	13.77	10.solvency	SOLV
-6.00	0.000	11.92	16.41	2.40	5.33	20.trade creditors/turnover	DETT
-10.69	0.000	20.73	49.52	19.74	19.18	3.reserves rate	TXRE
-11.08	0.000	61.94	86.61	7.86	15.86	4.cover rate of capital employed	TXCO
-11.52	0.000	16.67	32.81	4.79	9.98	1.own funds/ balance sheet total	PDSK

CLUSTER 2 / 4

V.TEST	PROBA	MEAN		STANDARD DEVIATION		VARIABLES	
		CLUSTER	GENERAL	CLUSTER	GENERAL		IDEN
		CLUSTER 2 / 4	(WEIGHT = 154.00	SIZE = 154)			aa2a
11.99	0.000	25.90	19.49	6.58	8.02	19.working cap. requirement(wcr)/turnover	BFRC
11.60	0.000	63.77	52.12	7.64	15.08	8.short term fin.debt/financial debt	DFIC
11.31	0.000	15.06	8.07	5.92	9.26	5.liquid capital requirement / turnover	BESL
10.93	0.000	28.38	17.19	13.67	15.34	9.provisions/own funds	PROV
10.18	0.000	2.86	2.13	1.47	1.08	11. current assets /st non fin. debt	ACTC
9.27	0.000	17.09	13.58	5.50	5.67	13.sh financial debt/turnover	CBCC
5.43	0.000	44.72	39.62	8.14	14.08	2.leverage	TXEN
-2.53	0.006	46.28	49.52	16.80	19.18	3.reserves rate	TXRE
-2.69	0.004	20.60	23.07	12.21	13.77	10.solvency	SOLV
-3.33	0.000	2.07	2.37	0.99	1.34	12.wcr+current invest&cash/st fin. debt	LIQU
-3.98	0.000	5.62	6.25	2.38	2.39	6.cash flow capacity / turnover	CAFC
-4.06	0.000	9.22	9.92	2.00	2.59	16.mark-up	EBEC
-6.86	0.000	28.24	32.81	4.61	9.98	1.own funds/ balance sheet total	PDSK
-9.40	0.000	15.78	18.87	3.99	4.93	14.gross profit/capital employed	RBE
-10.67	0.000	75.33	86.61	7.62	15.86	4.cover rate of capital employed	TXCO

CLUSTER 3 / 4

V.TEST	PROBA	MEAN	STANDARD DEVIATION	VARIABLES

		CLUSTER	GENERAL	CLUSTER	GENERAL		IDEN

CLUSTER 3 / 4   (WEIGHT =   137.00   SIZE = 137)   aa3a

		CLUSTER	GENERAL	CLUSTER	GENERAL		IDEN
14.38	0.000	43.21	32.81	6.67	9.98	1.own funds/ balance sheet total	PDSK
8.35	0.000	4.49	3.65	1.54	1.40	17.financial charges/turnover	FRSF
7.59	0.000	44.02	35.82	17.28	14.91	18.fixed assets/turnover	AICC
7.47	0.000	11.33	9.92	3.50	2.59	16.mark-up	EBEC
6.69	0.000	29.75	23.07	17.70	13.77	10.solvency	SOLV
5.78	0.000	7.25	6.25	2.82	2.39	6.cash flow capacity / turnover	CAFC
2.37	0.009	89.33	86.61	6.31	15.86	4.cover rate of capital employed	TXCO
2.37	0.009	54.70	52.12	11.28	15.08	8.short term fin.debt/financial debt	DFIC
-3.51	0.000	2.91	4.67	4.63	6.91	15.profit/own funds	RESU
-4.20	0.000	1.96	2.37	0.51	1.34	12.wcr+current invest&cash/st fin. debt	LIQU
-5.27	0.000	1.72	2.13	0.28	1.08	11.current assets /st non fin. debt	ACTC
-7.63	0.000	-1.17	6.29	3.39	13.49	7.leverage impact	RFIM
-11.81	0.000	4.06	17.19	3.37	15.34	9.provisions/own funds	PROV
-15.48	0.000	23.82	39.62	6.15	14.08	2.leverage	TXEN

```
CLUSTER  4 / 4
+--------+-------+-------------------+------------------+----------------------------------------------------------------
-+| V.TEST |  PROBA |                   MEAN           |STANDARD  DEVIATION |                                          VARIABLES
 |        |       | CLUSTER  GENERAL |CLUSTER   GENERAL |                                                             IDEN
 |        |       |        |          |        |         |                                                             |
+--------+-------+-------------------+------------------+----------------------------------------------------------------
-+
 |                  CLUSTER  4 / 4    ( POIDS =   149.00    EFFECTIF =  149 )                                       aa4a

  15.49 | 0.000 |  103.38    86.61 |    9.85    15.86 |  4.cover rate of capital employed                             TXCO
  10.70 | 0.000 |   22.48    18.87 |    4.91     4.93 | 14.gross profit/capital employed                               RBE
  10.02 | 0.000 |    3.28     2.37 |    1.81     1.34 | 12.wcr+current invest&cash/st fin. debt                        LIQU
   9.62 | 0.000 |   62.13    49.52 |   15.42    19.18 |  3.reserves rate                                              TXRE
   2.82 | 0.002 |    6.00     4.67 |    4.34     6.91 | 15.profit/own funds                                           RESU
        |       |        |          |        |         |                                                             |
  -2.36 | 0.009 |    9.51     9.92 |    1.64     2.59 | 16.mark-up                                                    EBEC
  -3.88 | 0.000 |   31.87    35.82 |   12.12    14.91 | 18.fixed assets/turnover                                      AICC
  -5.00 | 0.000 |    3.17     3.65 |    0.93     1.40 | 17.financial charges/turnover                                 FRSF
  -5.50 | 0.000 |    1.22     6.29 |    4.97    13.49 |  7. leverage impact                                           RFIM
  -6.67 | 0.000 |   10.20    17.19 |    5.31    15.34 |  9.provisions/own funds                                       PROV
  -8.81 | 0.000 |    1.48     2.13 |    0.23     1.08 | 11. current assets /st non fin. debt                          ACTC
 -12.66 | 0.000 |    8.69    13.58 |    4.18     5.67 | 13.sh financial debt/turnover                                 CBCC
 -13.25 | 0.000 |   12.24    19.49 |    5.21     8.02 | 19.working cap. requirement(wcr)/turnover                     BFRC
 -15.19 | 0.000 |   -1.54     8.07 |    4.52     9.26 |  5.liquid capital requirement / turnover                      BESL
 -16.50 | 0.000 |   35.13    52.12 |   10.07    15.08 |  8.short term fin.debt/financial debt                         DFIC
+--------+-------+-------------------+------------------+----------------------------------------------------------------
-+
```

APPENDIX IV

1. ESTIMATION METHOD

Estimation was carried out in three stages.

Stage one

This serves to initialise the iteration procedure. Equations (4) and (5) are estimated independently for each size class, and from this the initial values for coefficients a, d, β, δ, ε and φ are deduced for each class.

The mean values are calculated for all classes β_1, ε_1 and φ_1 (1 for the first estimation).

Stage two

The purpose of this stage is to start out from the assumption that β, δ, ε and φ are identical in all the size classes and to obtain by iteration a convergent estimation of parameters a, d, β, ε,

$$\hat{} \quad \hat{} \quad \hat{} \quad \hat{} \qquad \hat{}$$

and φ , or a_i, d_i, β, φ and ε.

This was done using equations (4) and (5), slightly modified as follows:

(4') $\dfrac{(R - VA)}{\hat{a}_i \; SC} = \beta \; \dfrac{K}{N}$

(5') $\dfrac{R - GP}{d_i \; TO} = \varepsilon \; \dfrac{TO}{TO} + \varphi \; \dfrac{WCR}{TO}$
         $\phantom{\dfrac{R - GP}{d_i \; TO} = \varepsilon \dfrac{TO}{}} K TO$

The iteration was carried out as follows:

Input	Estimation
	$\hat{} \quad \hat{}$
$\bar{\beta}_1$, ε_1, φ_1	a_{i1}, d_{i1}
in (4) and (5) by size class	
$\hat{} \; \hat{}$	
a_{i1}, d_{i1}	β_2, ε_2, φ_2
in (4') and (5') for all classes	
	$\hat{} \quad \hat{}$
β_2, ε_2, φ_2	a_{i2}, d_{i2}
in (4) and (5) by size class	
$\hat{} \; \hat{}$	
a_{i2}, d_{i2}	β_3, ε_3, φ_3
in (4') and (5') for all classes	

and so on, continuing until the estimations converged.

The required number of iterations is indicated in the tables.

Stage three

Once convergence has been obtained, and with the values for $\hat{R}_M$ and $\hat{R}_O$ for each observation as derived from equations (4) and (5), we return to equation (3):

$$R = p_M \hat{R}_M + p_O \hat{R}_O,$$

to estimate parameters p_M and p_O by class.

This method of estimation appears robust, despite its "rule of thumb" character.

If we term ε_j, ε_{Oj} and ε_{Mj} (j is the observation index) the random variables of equations (3), (4) and (5) respectively, this method amounts to assuming that the random variables are linked by the following relation:

$$(6) \qquad \varepsilon_j = p_O \varepsilon_{Oj} + p_M \varepsilon_{Mj} + \eta_j$$

in which:

- η_j is a random variable providing a measure of the residual variability of ε_j, once that of ε_{Oj} and ε_{Mj} has been taken into account,

- variables ε_{Oj}, ε_{Mj} and η_j are independent.

These assumptions flow naturally from our theoretical model for the formation of profitability.

2. MEANS VALUES OF THE DETERMINANTS OF PROFIT

Explanation of the following tables

The tables display the mean values per size of enterprises for the ratios which influence the formation of profitability.

The results are displayed for manufacturing as a whole and then the results are broken down by subsector, namely : 'intermediate product', 'investment goods and consumer durables' and 'non-durable consumption goods'.

The significance of the difference of mean value is econometrically tested. An asterix means that the difference is significant with an confidence interval of 95%.

Summary of results for Austria

Overall results (for all sectors)

All sectors	Organisation				Market		
	Real gross profit/ capital employed	Value added/ staff costs	Capital employed/ staff costs	Real gross profit/ capital employed	Mark-up	Turnover/ fixed assets	Working capital requirements/ turnover
Small	18.77	135.53	189.048	18.77	11.0783	262.457	19.67
Medium	18.27	136.74	202.083	18.27	10.087	289.89	20.316
Large	17.597	143.47 (*/sme)	256.216 (*/sme)	17.597	10.262	247.535 (*/sme)	17.129 (*/sme)

Results by sector

	Organisation				Market		
	Real gross profit/ capital employed	Value added/ staff costs	Capital employed/ staff costs	Real gross profit/ capital employed	Mark-up	Turnover/ fixed assets	Working capital requirements/ turnover
Intermediate Products							
Small	19.505	143.972	226.126	19.505	12.821 (*/me)	217.843	19.0833
Medium	17.72	138.793	221.538	17.72	10.646	236.586	18.131
Large	15.541 (*/se)	144.873	289.973 (*/sme)	15.541 (*/se)	11.658	194.216 (*/me)	23.683 (*/sme)
Investment goods and consumer durables							
Small	17.328	127.545	160.17	17.328	10.13	284.10 (*/mle)	22.283
Medium	17.606	130.353	172.891	17.606	9.746	325.105	24.660
Large	20.548	135.595 (*/se)	175.70	20.548	8.9433	337.618	14.066 (*/sme)
Non-durable consumption goods							
Small	19.476	135.10	180.848	19.476	10.283	285.43	17.643
Medium	19.485	141.073	211.821	19.485	9.87	307.978	18.158
Large	16.703	149.963 (*/sme)	302.975 (*/sme)	16.703	10.185	210.77 (*/sme)	13.638 (*/sme)

Note: An asterisk under a figure means that the coefficient is significantly different from that indicated by an abbreviation - small (s), medium-sized (m) and large (l) enterprises.

Summary of results for Belgium

Overall results (for all sectors)

All sectors	Organisation				Market		
	Real gross profit/ capital employed	Value added/ staff costs	Capital employed/ staff costs	Real gross profit/ capital employed	Mark-up	Turnover/ fixed assets	Working capital requirements/ turnover
Small	16.110 (*/me)	139.839	259.354	16.110 (*/me)	8.2146	279.247	15.423
Medium	18.448	145.0288	243.135	18.448	8.0313	329.695	17.0613
Large	16.568	154.442 (*/sme)	361.981 (*/sme)	16.568	7.906	246.201	13.938 (*/se)

Results by sector

	Organisation				Market		
	Real gross profit/ capital	Value added/ staff	Capital employed/ staff	Real gross profit/ capital employed	Mark-up	Turnover/ fixed	Working capital requirements/
Intermediate Products							
Small	13.278	152.66	398.03	13.378	9.27	180.848	14.38
Medium	18.495 (*sle)	157.67	312.51	18.495 (*/sle)	11.531	222.118	17.228
Large	12.203	163.09 (*/se)	516.75 (*/sme)	12.203	12.611 (*/sme)	119.238 (*/sme)	20.03 (*/sme)
Investment goods and consumer durables							
Small	16.53	129.036	175.745	16.53	7.678	328.715	16.028
Medium	17.423	129.69	171.076	17.423	8.03	383.802	19.915
Large	21.753 (/sme)	139.01 (*/sme)	179.37	21.753 (/sme)	8.443	355.52 (*/se)	10.47 (*/sme)
Non-durable consumption goods							
Small	18.523	137.82	204.288	18.523	8.45	328.178	14.848
Medium	19.426	147.72	245.81	19.426	8.226	383.166	16.243
Large	15.748 (*/sme)	161.22 (*/sme)	389.813 (*/sme)	15.748 (*/sme)	7.983 (*/sme)	263.846 (*/sme)	12.646 (*/sme)

Note: An asterisk under a figure means that the coefficient is significantly different from that indicated by an abbreviation - small (s), medium-sized (m) and large (l) enterprises.

Overall results (for all sectors)

All sectors	Organisation				Market		
	Real gross profit/ capital employed	Value added/ staff costs	Capital employed/ staff costs	Real gross profit/ capital employed	Mark-up	Turnover/ fixed assets	Working capital requirements/ turnover
Small	22.81	130.592	134.552	22.81	9.001	569.465	20.106
Medium	24.20	142.37	174.89	24.20	9.8794	541.572	21.785
Large	19.27 (*/sme)	157.97 (*/sme)	304.631 (*/sme)	19.27 (*/sme)	10.205 (*/se)	280.087 (*/sme)	16.679

Results by sector

	Organisation				Market		
	Real gross profit/ capital employed	Value added/ staff costs	Capital employed/ staff costs	Real gross profit/ capital employed	Mark-up	Turnover/fix ed assets	Working capital requirements/ turnover
Intermediate Products							
Small	22.485	140.093	178.54	22.485	10.925	346.628	19.68
Medium	25.006	149.82	199.35	25.006	11.115	424.54	20.836
Large	17.7816 (*/sme)	161.35 (*/sme)	345.08 (*/sme)	17.7816 (*/sme)	11.605	223.25 (*/sme)	20.581
Investment goods and consumer durables							
Small	23.23	123.48	101.073	23.23	8.052 (*/mle)	713.62	20.755
Medium	23.931	149.82	140.65	23.931	9.736	597.246	23.973
Large	21.511 (*/me)	161.35 (*/sme)	238.621 (*/sme)	21.511 (*/me)	10.04	278.756 (*/sme)	10.702 (*/sme)
Non-durable consumption goods							
Small	22.733	128.2	124.045	22.733	8.027	648.148	19.883
Medium	23.668	143.64	184.686	23.668	8.786	602.92	20.546
Large	18.542 (/sme)	161.19 (*/sme)	330.19 (*/sme)	18.542 (/sme)	8.97 (*/se)	338.255 (*/sme)	18.755 (*/me)

Note: An asterisk under a figure means that the coefficient is significantly different from that indicated by an abbreviation - small (s), medium-sized (m) and large (l) enterprises.

Summary of results for Germany

Overall results (for all sectors)

All sectors	Organisation				Market		
	Real gross profit/ capital employed	Value added/ staff costs	Capital employed/ staff costs	Real gross profit/ capital employed	Mark-up	Turnover/ fixed assets	Working capital requirements/ turnover
Small	24.75	127.088	108.155	24.75	8.215	583.870	15.423
Medium	21.89	130.27	136.926	21.89	8.031	510.053	17.061
Large	16.96 (*/sme)	135.04 (*/se)	207.535 (*/sme)	16.96 (*/sme)	7.906 (*/sme)	313.941 (*/sme)	13.938 (*/me)

Results by sector

	Organisation				Market		
	Real gross profit/ capital employed	Value added/ staff costs	Capital employed/ staff costs	Real gross profit/ capital employed	Mark-up	Turnover/fix ed assets	Working capital requirements/ turnover
Intermediate Products							
Small	27.886	136.57	131.78	27.886	10.026	443.932	13.424
Medium	23.664	136.142	153.118	23.664	8.958	443.196	15.252
Large	13.816 (*/sme)	135.74	256.348 (*/sme)	13.816 (*/sme)	8.93	203.862 (*/sme)	15.96 (*/se)
Investment goods and consumer durables							
Small	22.162	120.158	91.282	22.162	7.244	649.956	17.77
Medium	18.522	121.684	117.184	18.522	7.174	566.608	21.228
Large	15.94 (*/se)	122.306	140.962 (*/sme)	15.94 (*/se)	6.396	361.87 (*/sme)	12.78 (*/sme)
Non-durable consumption goods							
Small	24.206	124.538	101.394	24.206	7.374	649.956	15.076
Medium	23.488	133.002	140.478	23.488	7.962	520.356	14.704
Large	21.15	144.648 (*/sme)	225.296 (*/sme)	21.15	8.394	376.092 (*/sme)	13.076 (*/sme)

Note: An asterisk under a figure means that the coefficient is significantly different from that indicated by an abbreviation - small (s), medium-sized (m) and large (l) enterprises.

Summary of results for Italy

Overall results (for all sectors)

All sectors	Organisation				Market		
	Real gross profit/ capital employed	Value added/ staff costs	Capital employed/ staff costs	Real gross profit/ capital employed	Mark-up	Turnover/ fixed assets	Working capital requirements/ turnover
Small	14.40	146.64	319.844	14.40	9.4527	292.396	29.476
Medium	17.44 (*/sle)	158.79	336.604	17.44	9.6733	369.067	27.3238
Large	15.35	158.45 (*/se)	374.570 (*/sme)	15.35 (*/me)	8.8822	296.389 (*/me)	22.5855 (*/sme)

Results by sector

	Organisation				Market		
	Real gross profit/ capital employed	Value added/ staff costs	Capital employed/ staff costs	Real gross profit/ capital employed	Mark-up	Turnover/ fixed assets	Working capital requirements/ turnover
Intermediate Products							
Small	15.05 (*/me)	154.683	371.466	15.05 (*/me)	11.556	204.333	28.826
Medium	17.998	165.445	364.908	17.998	11.316	282.001 (*/sle)	27.371
Large	15.211	164.906 (*/se)	423.086 (*/sme)	15.211	10.283 (*/sme)	224.566	23.655 (*/sme)
Investment goods and consumer durables							
Small	14.08 (*/me)	136.615 (*/me)	262.795	14.08 (*/me)	8.0883	362.561	29.89
Medium	16.696	148.191	289.346	16.696	8.521	445.601 (*/sle)	28.91
Large	13.026 (*/me)	139.725	304.496 (*/se)	13.026	6.353 (*/sme)	364.388	21.37 (*/sme)
Non-durable consumption goods							
Small	14.076 (*/mle)	145.626 (*/mle)	325.272	14.076 (*/mle)	8.713	310.295	29.712
Medium	17.648	162.755	355.558	17.648	9.181	379.59 (*/sle)	25.69
Large	17.836	170.722	396.128 (*/sme)	17.836	10.01 (*/se)	300.213	22.731 (*/sme)

Note: An asterisk under a figure means that the coefficient is significantly different from that indicated by an abbreviation - small (s), medium-sized (m) and large (l) enterprises.

Summary of results for Portugal

Overall results (for all sectors)

All sectors	Organisation				Market		
	Real gross profit/ capital employed	Value added/ staff costs	Capital employed/ staff costs	Real gross profit/ capital employed	Mark-up	Turnover/ fixed assets	Working capital requirements/ turnover
Small	15.866	145.386	288.503	15.866	11.235	228.499	24.435
Medium	16.803	168.974	412.129	16.803	13.073	207.605	30.308
Large	17.820	215.831 (*/sme)	622.897 (*/sme)	17.820	15.004 (*/se)	196.175	24.160 (*/me)

Results by sector

	Organisation				Market		
	Real gross profit/	Value added/ staff	Capital employed/	Real gross profit/ capital employed	Mark-up	Turnover/fi xed assets	Working capital requirements/
Intermediate Products							
Small	15.825	156.80	362.775	15.825	13.91	158.273	24.691
Medium	21.42	182.18	385.066	21.42	16.468	206.203	28.466
Large	24.35 (*/sme)	275.473 (*/sme)	730.503 (*/sme)	24.35 (*/sme)	22.873 (*/sme)	132.586 (*/sme)	18.361 (*/sme)
Investment goods and consumer durables							
Small	16.3633	137.589	231.81	16.3633	10.605	255.12	25.718
Medium	13.193	148.878	371.05	13.193	11.55	203.761	38.555 (*/mle)
Large	12.863 (*/se)	146.456	363.091 (*/se)	12.863 (*/se)	8.17 (*/sme)	292.323 (*/sme)	29.056
Non-durable consumption goods							
Small	15.411 **15.9841**	141.773	270.925	15.411 **16.388**	9.19	272.105	22.896
Medium	15.796 **16.695**	175.865	480.271	15.796 **15.670**	11.201	212.851	23.905
Large	16.248 **16.5062**	225.565 (*/sme)	776.098 (*/sme)	16.248 **14.986**	13.97 (*/sme)	163.616 (*/sme)	25.0633

Note: An asterisk under a figure means that the coefficient is significantly different from that indicated by an abbreviation - small (s), medium-sized (m) and large (l) enterprises.

Overall results (for all sectors)

All sectors	Organisation				Market		
	Real gross profit/ capital employed	Value added/ staff costs	Capital employed/ staff costs	Real gross profit/ capital employed	Mark-up	Turnover/ fixed assets	Working capital requirements/ turnover
Small	17.024	140.821	236.983	17.024	10.20	324.533	27.854
Medium	15.829	145.942	286.191	15.829	10.133	296.899	29.558
Large	12.611 (*/sme)	142.190	356.588 (*/sme)	12.611 (*/sme)	7.831	236.616 (*/sme)	20.162 (*/sme)

Results by sector

	Organisation				Market		
	Real gross profit/ capital employed	Value added/ staff costs	Capital employed/ staff costs	Real gross profit/ capital employed	Mark-up	Turnover/fix ed assets	Working capital requirements/ turnover
Intermediate Products							
Small	18.538	149.731	267.575	18.538	12.313	247.981	26.0916
Medium	16.985	152.156	307.22	16.985	12.035	232.243	28.333
Large	8.918 (*/sme)	144.413	496.736 (*/sme)	8.918 (*/sme)	8.382 (*/sme)	134.25 (*/sme)	24.983 (*/me)
Investment goods and consumer durables							
Small	15.47	127.728	179.413	15.47	8.66	382.733 (*/mle)	30.316
Medium	14.035	130.496	217.06	14.035	8.558	342.13	35.528
Large	14.585	132.446	227.22 (*/sme)	14.585	6.011 (*/sme)	335.815	24.983 (*/sme)
Non-durable consumption goods							
Small	17.065	145.005	263.961	17.065	9.6266	342.885	27.155
Medium	16.498	155.175	334.293	16.498	9.8066	316.325	27.813
Large	14.331	149.711	345.808 (*/sme)	14.331	9.10	239.781 (*/sme)	22.005 (*/sme)

Note: An asterisk under a figure means that the coefficient is significantly different from that indicated by an abbreviation - small (s), medium-sized (m) and large (l) enterprises.

Overall results (for all sectors)

	Organisation				Market		
All sectors	Real gross profit/ capital employed	Value added/ staff costs	Capital employed/ staff costs	Real gross profit/ capital employed	Mark-up	Turnover/ fixed assets	Working capital requirements/ turnover
Small	20.84277	140.834	197.648	20.84277	8.591	303.595	8.564
Medium	22.915	160.992	272.243	22.915	9.316	302.496	7.854
Large	16.515	180.944 (*/sme)	495.395 (*/sme)	16.515	10.733 (*/sme)	199.727 (*/sme)	13.832 (*/sme)

Results by sector

	Organisation				Market		
	Real gross profit/ capital employed	Value added/ staff costs	Capital employed/ staff costs	Real gross profit/ capital employed	Mark-up	Turnover/fix ed assets	Working capital requirements/ turnover
Intermediate Products							
Small	21.656	149.211	228.251	21.656	9.485	275.475	7.776
Medium	22.431	174.023	332.443	22.431	10.623	268.185	10.603
Large	15.641 (*/sme)	195.011 (*/sme)	609.828 (*/sme)	15.641 (*/sme)	13.160 (*/sme)	152.458	18.855 (*/sme)
Investment goods and consumer durables							
Small	21.833	135.838	165.525	21.833	8.553	322.00	8.755
Medium	26.693	153.565	201.95	26.693	8.753	364.05	5.60
Large	17.273 (*/sme)	164.0516 (*/sme)	371.985 (*/sme)	17.273 (*/sme)	8.936	239.29	10.165 (*/sme)
Non-durable consumption goods							
Small	19.038	137.453	199.168	19.038	7.736	313.305	9.1616
Medium	19.621	155.388	282.338	19.621	8.571	275.25	7.36
Large	16.631	183.77 (*/sme)	504.373 (*/sme)	16.631	10.105 (*/sme)	207.435	12.478 (*/sme)

Note: An asterisk under a figure means that the coefficient is significantly different from that indicated by an abbreviation - small (s), medium-sized (m) and large (l) enterprises.

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