"Form of Ownership and Financial Constraints: Panel Data Evidence From Leverage and Investment Equations"

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Panel Data Evidence From Leverage and Investment Equations

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ABSTRACT

This paper analyzes the effects of the form of ownership on the substitutability between internal and external sources of finance. In particular, we test whether financial constraints are more severe for independent firms and whether there are differences between members of large national business groups and subsidiaries of foreign multinational corporations. The results obtained from leverage and investment equations estimated for a panel of Italian companies imply that independent firms face more severe financial constraints. Members of national groups and subsidiaries of multinational corporations do not display excess sensitivity to cash flow in their investment decisions. Leverage equations suggest however that there are interesting differences between the two latter categories of firms. In particular, agency costs arising from the conflict between managers and shareholders are more important for subsidiaries of multinational corporations.

JEL classification: E22, E44, G32

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1. Introduction

Italian private firms can be classified, in terms of form of ownership, either as independent firms or as members of larger organizations, such as national business groups or foreign multinational corporations. Business groups are a pervasive form of organization in several countries, including Italy. They exist in a variety of types, ranging from hierarchical groups with a pyramidal structure to associative groups pursuing their common interest through a more informal system of co-ordinated decision making. In this paper we plan to analyze the role of group membership in alleviating capital market imperfections faced by firms in Italy. In this perspective, business groups and indeed multinational corporations can be seen as organizational forms that allow a mitigation of the information and contract enforcement problems that arise in accessing external financial resources. On the one hand, business groups allow the formation of an internal capital market that may partially replace the capital allocation function of the external market. A group can pool funds from different affiliates and reallocate them to the most profitable uses[1]. On the other hand business groups may also improve access to external capital markets. In some countries (e.g. Japan and Germany) groups are organically linked with banks that play an important role in financing, monitoring, and co-ordinating activities of member firms. The association with banks can be seen as another way to minimize information problems and to more closely align the incentives of borrowers and lenders. Multinational corporations play a similar role in creating an internal capital market and in facilitating their subsidiaries' access to external funds. When trying to obtain external finance, subsidiaries are very likely to

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[1] Williamson (1975) discusses this issue in the context of conglomerates. For a theoretical analysis of costs and benefits of internal versus external capital markets in allocating financial funds see Gertner, Scharfstein and Stein (1994).

benefit from the financial strength, reputation, geographical and (often) product diversification of the parent company.

In Italy most private firms are owned and controlled by families. Sometimes control is exercised over several separate companies through complex pyramidal organizational structures (hierarchical business groups) that allow a retention of control rights, while at the same time minimizing financial requirements to do so.[2] In any case, controlling coalitions tend to own a large fraction of the shares of the company[3]. National business groups operate in a context of underdeveloped capital markets, in which bank loans are the most common form of external finance[4]. Contrary to the experience of other bank-based countries , such as Japan and Germany, the role of banks in equity financing is marginal and it is unusual for bankers to sit on the boards of directors of industrial firms or to play an active role in influencing industrial firms' strategic decisions. It is however true that, partly for historical reasons, large business groups have special informal relations with national financial institutions. Some of the latter are considered to play an important role not only in financing but also in acting as exclusive clubs where mutual shareholdings are organized and, more generally, decisions on corporate control are taken[5].

It is common wisdom in Italy that members of large national business groups are likely to face more favorable lending terms than independent firms. The existence of these informal links to financial institutions, together with the more diversified nature of business groups is perceived

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2 In the early eighties new groups were set up and existing groups were expanded by splitting single companies in several legally independent units because of fiscal benefits.

3 In 1990 the three main shareholders of quoted and unquoted joint stock companies owned on average respectively 71% and 91% of total equity (Cannari, Marchese and Pagnini, 1993).

4 See Mayer (1990) for comparative evidence on financing patterns across countries.

5 Mediobanca, by far the most important investment bank in Italy, is defined by the economic press as the "salon of Italian capitalism".

as a distinctive advantage in obtaining external funds for affiliated firms. Moreover, most firms quoted in the national stock market are members of the largest business groups, which enhances their advantage in obtaining funds from security markets[6]. Subsidiaries of foreign multinational corporations are also likely to enjoy favorable relations with domestic banking institutions, although perhaps not as good as affiliates to large national groups. Moreover they have a distinctive advantage in accessing international capital markets, either directly or indirectly through the parent company.

No systematic investigation has been conducted to date on the effect of the form of ownership on the substitutability between internal and external finance. The purpose of this paper is to fill this gap and to test whether financial constraints are more severe for independent firms vis-à-vis affiliated firms, and whether there are differences between members of national groups and subsidiaries of foreign multinational corporations. One standard approach to assessing the substitutability of internal and external sources has been to investigate the excess sensitivity of investment to cash flow for different categories of firms[7]. In our paper we address this issue by investigating the role of cash flow in both leverage and investment equations. The advantage of this approach is twofold. First, the effect of the availability of internal finance on capital structure decisions contains important information on the degree of substitutability between different sources of funds that should be exploited. Second, the joint empirical analysis of both decisions

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[6] Notice that the stock market plays on the whole a very limited role in Italy. For instance the ratio of the market value of quoted companies to GDP in 1991 was 102.3% in the UK, 61.4% in the US, but only 14.8% in Italy (FIBV - Fédération Internationale Bourses des Valeurs - Statistics, 1992). However, in the second half of the eighties some of the business groups members were able to use the stock market as a source of funds. See also section 2.

[7] See Fazzari, Hubbard and Petersen (1988) for a seminal contribution in this area. See also Hoshi, Kashyap and Scharfstein (1991) for an analysis of the implications of group membership in Japan.

acts as a stringent consistency check on the conclusions one reaches on the existence and severity of financial constraints for different firms. Finally, the econometric analysis of the role of cash flow in leverage equations also allow us to investigate whether agency costs associated with the conflicts between managers and shareholders differ between members of national groups and subsidiaries of multinational corporations.

In our empirical work we make use of a novel dataset of Italian firms constructed at CERIS by merging balance sheet information on firms, published yearly by Mediobanca, with qualitative information on firms' form of ownership taken directly from company reports that permits us to classify firms as members of a national business group, subsidiaries of a foreign multinational corporation, or other national firms. Section 2 of the paper discusses the nature of the data set and summarizes the relevant descriptive statistics. Section 3 presents an empirical analysis of the determinants of firms' leverage decisions, whereas in section 4 the effects of financial variables on fixed investment are tested. Concluding remarks are provided in section 5.

2. Descriptive Statistics on Cash Flow and Financial Debt

In this section we provide both a brief description of the unbalanced sample of firms used in this paper and some descriptive evidence on the evolution of the financial variables which are used in the econometric analysis discussed in the following sections. Real and financial data are available for 1229 firms over the period 1977-1990. The number of consecutive observations for each firm ranges from a maximum of 14 to a minimum of 1. In each year, firms are allocated to one of these categories: members of large national business groups, foreign subsidiaries, or other

national firms[8]. Firms are classified as affiliates of large national groups if they are controlled, directly or indirectly, in the relevant year by the following 18 groups: Agnelli - Fiat, De Benedetti - Cir, Ferruzzi - Montedison, Fininvest - Mondadori, Pesenti - Italmobiliare, Pirelli, Barilla, Benetton, Cartiere Burgo, Falck, Ferrero, Gft, Lucchini, Marzotto, Merloni, Miroglio, Parmalat, and Smi. These groups represented the 'core' of the private national industrial sector in the eighties and most of them have been ranked in the top positions in terms of size since the first incomplete list of groups was published by Mediobanca in 1983. Furthermore, these groups are the only private groups with a consolidated turnover greater than 1,000 billion Lira in 1990. Firms are classified as foreign subsidiaries if the parent company is foreign. Finally, firms are classified as other national firms when they do not satisfy the requirements to be included in the first two categories. This category contains mainly independent companies, but firms affiliated to smaller and younger business groups are also included. We have grouped these two types of firms together for two reasons. First, information on the organizational structure of the smaller business groups is not very rich (especially in the first years of our sample period) and the decision to allocate some firms to a given business group (especially in the case of indirect control) would have been rather arbitrary. Second, the smaller business groups are more similar to the independent firms in our sample than to the large business groups in terms of size and diversification.

As can be seen from Table 1, out of a total of 7633 firm-year observations, 1489 pertain to large national groups, 2462 to subsidiaries of multinationals and 3682 to firms not associated

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[8] See the Data Appendix for additional information. In the econometric estimates firms with less than 4 consecutive observations have been excluded.

with either. The average number of employees is 1127 (1044 after excluding firms with fewer than 4 consecutive observations). However, this figure hides significant differences among our three sub-samples. In fact, the average size of firms that are members of large national business groups (2603 or 2350 employees, depending on the sample used) is much bigger than the average size of subsidiaries of multinationals (1057 or 1024 employees) and of other domestic companies (577 or 561 employees).

In the descriptive analysis that follows, we discuss the evolution of cash flow and indebtedness for the firms in each of the three categories. For both variables we compute and plot the median (Q2),the first decile (D1), the first quartile (Q1), the third quartile (Q3) and the ninth decile (D9)[9].

We start our analysis by focusing on the dynamics of internal finance over time. Pre-dividend cash flow divided by total assets (computed as the sum of the replacement value of fixed assets and the accounting value of gross working capital) is used as a proxy for internal finance[10]. Pre-dividend cash flow is computed by subtracting the sum of total labor costs, interest paid and taxes from value added. In Figures 1a, 1b and 1c percentiles are plotted for the sub-samples of members of large national business groups, affiliates to foreign multinationals, and other national firms respectively. The data show that internal finance moves procyclically for all firms. It declines in the 1981-82 recessionary period that follows the second oil shock and the tightening

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[9] The figures that follow are obtained using the unbalanced dataset. In order to check that our descriptive evidence is not contaminated by changes in the sample composition we have also calculated the percentiles for a balanced sample of firms. The results are very similar and are not reported here.

[10] Since we compute our measure of cash flow by subtracting nominal interests, it incorporates the component of interests which represents an advance on loan repayment. Since the data set does not contain information on dividend payments, we cannot calculate retentions.

of monetary policy. Then, following the economic recovery which started in 1983, we observe a steady increase in internal finance up to 1987. Finally, cash flow declines again in the most recent years, partly anticipating the recession that occurred at the beginning of the nineties. The comparison between our three figures does not suggest any striking difference in either the dynamics or the levels of cash flow, even if firms affiliated to large national business groups seem on the whole less profitable than the others (this is particularly true for the lower tail of the distribution). The fact that firms that do not belong to national or foreign groups are at least as profitable as the other firms in the sample is a useful result since it suggests that differences that we may discover in their leverage and investment choices are not due to independent firms' poor economic performance.

Figures 2a to 2c highlight some interesting aspects of the dynamics of total financial debt divided by total assets for the three sub-samples of companies[11]. Two remarks are in order. First, in Italy bank loans constitute the bulk of financial debt. Although our sample does not contain separate information for bank and non-bank debt, additional aggregate information on 779 large firms and 191 smaller firms suggest that bank loans represent 79.2 % of the total for the former and 85.4 % for the latter. Second, for affiliated firms the data do not allow us to distinguish the portion of debt obtained from the parent company or from other members of the group. There is a sense in which this is not fundamental for the object of our investigation. In fact belonging to a group relaxes financial constraints for member firms both because it creates an internal capital market and because it enhances the access to funds external to the group. Moreover, the additional Mediobanca data referred to above suggests that intra-group financial debt represents

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[11] Trade debt is not included in total financial debt.

an average of only 13.2 % of total debt, so that debt external to the group constitutes the vast majority of financial debt[12]. This means that the leverage equations we will estimate are very likely to provide information about the substitutability between internal funds and financial resources external not only to the individual firm, but also to the group (national or foreign multinational).

It is apparent from Figure 2 that both members of large national business groups and other domestic companies are characterized by a higher leverage compared to the sub-sample of affiliates to foreign multinationals. There are two interesting differences in the dynamics of leverage that distinguishes non-affiliated firms from the rest . First, we observe at the beginning of the 1981-82 recession an increase of leverage for the median firm of the sample of members of large national groups. Such an increase occurs for foreign subsidiaries (below the 3rd quartile) as well, but does not occur for non-affiliated firms. This suggests that, in the face of monetary tightening and recession, firms that are members of larger organizations can make up the shortfall in cash flow with access to external funds. This is consistent with the flight to quality hypothesis (Bernanke, Gertler and Gilchrist, 1992), whereby in bad times investors concentrate their funding on those firms with lower agency costs due to asymmetric information and contract enforcement problems. Affiliated firms with low debt are prime candidates for external funding. Second, following the recovery (1983-88), we observe a steady decline in leverage for affiliates to national groups and (although less pronounced) for subsidiaries of foreign multinationals whereas this trend is much less pronounced or absent in the sample of independent firms. A possible

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[12] See Mediobanca, Dati Cumulativi di 1790 Società Italiane (1992). Transfer of financial resources between associated firms could also occur through transfer prices. However there is no way, using our data, to quantify the importance of this channel.

explanation for this finding is that affiliated firms were able to issue new shares in the years of recovery, which were used partly to repay debt. Unfortunately our data set does not contain information on new share issues. Another possible explanation is that the degree of centralization of financial management increased in business groups over the eighties, possibly inducing a reduction in the level of debt of affiliated companies.

3. Leverage Equations and the Relation between Internal and External Finance

In the presence of asymmetric information between insiders and outside investors and contract enforcement problems, internal and external finance are not perfect substitutes in the sense that firms will have to pay a premium to obtain outside funds or, in some cases, they may be completely rationed[13]. Abstracting from tax considerations, firms will have a preference to finance investment internally, then with debt. Only as debt becomes riskier, will firms finally issue equity. This is what Myers (1984) calls the "pecking order" theory of financing[14]. On the basis of this argument we would expect a negative association between debt and internal finance for given investment opportunities. Since the severity of asymmetric information and contract enforcement problems is likely to vary across firms, the degree of substitutability between internal and external sources is also expected to differ across firms. In the context of a leverage equation, this means that we would expect a negative and larger in absolute value coefficient on cash flow (used here as a proxy for internal finance) for firms less affected by capital market imperfections problems. This can be most easily understood if we assume that cash flow

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[13] On rationing, see Stiglitz and Weiss (1981).

[14] See also Myers and Majluf (1984).

decreases, while the expected profitability of investment remains constant. If a firm has to pay a premium for borrowing, it will replace cash flow with debt, but less than one for one. The greater the premium is, the smaller the increase in debt will be.

However, matters are more complicated than that. First, a change in cash flow may change expectations on future profitability and shift the demand for funds schedule. Second, a change in cash flow, if it is at least partly observed by outside investors and if it is thought to provide information about industry wide trends, may lead to a revised valuation of collateralizable assets. For instance a positive cash flow shock could increase their value and lead to a decreased premium on debt. Both these effects may weaken or even reverse the negative association between cash flow and leverage. It has also been suggested (Jensen and Meckling, 1976) that debt helps in mitigating the conflict that arises between managers and shareholders due to the fact that the former bear the cost but do not capture the entire gain from profit enhancement activities. In this situation managers may have an incentive in consuming perquisites and invest less efforts in managing firm's activities. Jensen (1986) suggests that debt constitutes a commitment to pay out cash, limits managers' discretion, and reduces the agency costs associated with the managers-shareholders conflict (the "free cash flow" hypothesis)[15]. Also for this reason, one may observe a positive association between cash flow and leverage (when cash flow is high the benefits of debt are also high), for a given level of investment opportunities. However, this last argument is unlikely to be important for independent Italian firms. Not only are most companies not quoted but top management positions are very often filled by members of the

[15] See also Stulz (1990) for a formal model of financial structure based on the disciplinary role of debt, in which debt payments reduce free cash flow.

family owning the company, reducing agency costs. This problem is likely to be more severe for large national business groups and, particularly, for foreign multinationals. It is in fact in these larger organizations where the standard agency problems between shareholders and managers are more likely to occur. However, the fact that controlling coalitions in domestic business groups usually hold a large fraction of shares (which somewhat mitigates the conflict) suggests that the problem is probably greater for subsidiaries of multinational corporations that tend to have a more diffuse ownership structure.

In the light of the above discussion the relationship between cash flow and financial debt is essentially an empirical matter. Summarizing, asymmetric information considerations would lead to a negative relationship, given the state of expectations and the severity of agency problems between managers and shareholders. The negative association should be stronger the greater the substitutability between internal and external sources. In the absence of managers - shareholders agency problems, we can test for cross-firm differences in substitutability by allowing the coefficients to differ in leverage equations between firms that are expected to suffer less (affiliated firms) or more (independent firms) from information problems. Although expectational considerations may mitigate or reverse the negative relationship between debt and cash flow, there is no obvious reason why this importance should vary systematically across firms. However, as already mentioned, it is possible that differences in the cash flow coefficient may also reflect the agency problems between managers and shareholders. Since such problems are likely to be more important when cash flow increases than when cash flow decreases, we will allow the cash flow coefficient to differ, depending which of these two cases occurs. The coefficient is more likely to be negative when cash flow decreases because in this case the

pecking order argument is more likely to dominate. Note that if we find in this case a coefficient which is negative and larger in absolute value for firms that are group members (or subsidiaries of multinationals), that is a clear indication that there is greater substitutability between internal and external sources of finance for those firms, compared to non-affiliated firms. Agency problems between managers and shareholders are surely more important for affiliates of national or foreign multinational groups (particularly the latter) than for independent firms. This would tend to make the cash flow coefficients less negative.

In this section we provide some econometric evidence on the relation between internal finance and firm's capital structure[16]. We use the following estimation strategy. As a benchmark, we start from a very simple leverage equation where the ratio of total financial debt to total assets, $(B/K)_t$ is explained in terms of the lagged dependent variable, $(B/K)_{t-1}$, the ratio between cash flow and total assets, $(C/K)_t$, and the contemporaneous and lagged changes in real sales, $DlogY_t$ and $DlogY_{t-1}$. In this section we have defined cash flow gross of interest payments in order to avoid introducing a spurious negative correlation between leverage and cash flow, which could result if the latter was defined net of interest payments. Using appropriate firm type dummies, all the coefficients are allowed to differ between affiliates to large national groups, foreign multinationals and independent firms. We then interact $(C/K)_t$ with a dummy variable, D_t which equals one if the ratio between cash flow and total assets increases between time t-1 and t, and zero otherwise.

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[16] The empirical literature on the determination of capital structure is vast. See for instance Titman and Wessel (1988) and the extensive references in Harris and Raviv (1991) for the US. There are few papers on Italy with the exceptions of Bonato and Faini (1990), and Faini, Galli and Giannini (1991). A good survey on both theoretical and institutional aspects in the Italian context is Bonato, Hamaui and Ratti (1993).

In order to eliminate time invariant firm specific characteristics that affect capital structure choices we estimate all the equations in first differences. In order to allow for the endogeneity of the regressors, estimation is carried out by the Generalized Method of Moments technique, using appropriately lagged variables as instruments[17]. Cash flow and sales growth are likely to be correlated with the error term, as well as the dummy variables used to define the regime of increasing (decreasing) cash flow. Assuming that the idiosyncratic component of the error is serially uncorrelated in the level equations, this will generate an error with a moving average structure of order one in the equations in differences, so that also once-lagged variables are correlated with the error term. However, values of the regressors lagged twice or more will be legitimate instruments. In order to check the validity of the assumptions embedded in our model we calculate and report tests on both first and second order serial correlation on the residuals (M_1 and M_2 respectively) as well as the Hansen/Sargan test of the correlation of the instruments with the error term as a general test of mispecification. We also include three sets of year dummies (one for each sub-sample of firms) in all the equations, to allow for time effects common to each group of firms. Year dummies can be thought to capture, among other things, changes in expectations about demand or changes in the interest rate and in tax parameters that are common to all firms in each sub-sample.

In Table 2 we report the estimates of the specification of the leverage equation that does not allow for asymmetry on the cash flow coefficients. The Hansen/Sargan test is not suggestive of gross forms of mispecification. The M_1 and M_2 tests suggest that the error term has a moving average structure of order one, as one would expect in the differenced form of the equation, when

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[17] See Arellano and Bond (1988, 1991).

the idiosyncratic component of the error term in the level equation is serially uncorrelated. Both tests suggest that variables lagged twice or more are legitimate instruments[18]. The estimated cash flow coefficient is negative and significant only for the sub-sample of firms affiliated to large national business groups (-.387 with a t ratio of 4.61), suggesting a higher degree of substitutability between external and internal finance for this type of firms[19]. The cash flow coefficient is instead positive and significant both for independent firms and for subsidiaries of foreign multinationals. These results are consistent with a smaller degree of substitutability between internal and external finance for these firms. However, in the case of subsidiaries of multinational corporations, the positive sign of cash flow is likely to be due to the presence of agency problems between managers and shareholders, as well. The coefficient on lagged leverage is positive and less than one for all the sub-samples of firms. This implies that the change in the debt to capital ratio is negatively related to the initial degree of leverage, as one would expect since more highly indebted firms face greater risks of bankruptcy and greater agency problems[20]. The overall effect of firm's growth rate is negative for subsidiaries of foreign multinationals and positive for the other two sub-samples of firms. A negative effect is likely to capture the fact that the potential for managers to invest in value decreasing projects is greater when there are growth opportunities. Moreover, it is reasonable to assume that this particular agency problem is more severe for foreign multinationals than for nationally owned firms. This is certainly true in the case of non-affiliated firms where management and ownership basically coincide, but it is also true

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[18] These comments also apply to the equations in Tables 3 through 7.

[19] The cash flow coefficient for affiliated firms is significantly different at the conventional statistical level from those for both multinationals and independent firms.

[20] This can be seen by subtracting $(B/K)_{t-1}$ from both sides of the leverage equations.

(relative to foreign subsidiaries) for members of large national groups. As a result, the role of sales growth in capturing greater actual investment and hence a greater need for finance dominates in these cases.

In Table 3, the cash flow coefficient is allowed to differ depending whether cash flow increases ($D_t = 1$) or decreases ($D_t = 0$). The coefficients on cash flow are negative and significant in both regimes for the sample of affiliates to large national groups, although the coefficient is larger in absolute value when cash flow decreases. This is what we would expect, since it is when cash flow is abundant that manager-shareholder agency problems are likely to be more important. Both cash flow coefficients are positive for independent firms and of fairly similar size. For the subsidiaries of foreign multinationals the coefficient on cash flow is positive and significant in the regime of increasing cash flow but very small and insignificant in the regime of decreasing cash flow. The large positive coefficient for foreign subsidiaries, when cash flow increases, is consistent with the greater importance in that case of the agency problems outlined in the "free cash flow" hypothesis.

4. The Effects of Financial Factors on Investment

In the previous section we found evidence that is consistent with the idea that external finance is a very imperfect substitute for internal finance for independent firms while the degree of substitutability is higher for affiliated firms. The next step is to test whether imperfect substitutability has an impact on firms' real policies. We estimate a simple accelerator model of

company investment[21] with the ratio of investment to fixed capital stock, $(I/K^F)_t$ as the dependent variable[22]. In addition to the lagged investment rate and the contemporary and lagged changes in real sales, we also include the ratio of cash flow to fixed capital stock, $(C/K^F)_t$ and the ratio of total debt to fixed capital stock, $(B/K^F)_t$ as regressors. The cash flow variable in this section has been defined net of interest payments, as in most recent empirical papers on investment.[23]As suggested by Fazzari, Hubbard and Petersen (1988) differences in the size of the cash flow coefficients provide information on the importance of liquidity constraints. This approach has been used to assess the effects of group membership in Japan by Hoshi, Kashyap and Scharfstein (1991).They found that firms that are members of an industrial/financial group are less sensitive to cash flow fluctuations.

Obviously, a significant positive cash flow effect on investment does not necessarily reflect the presence of financing constraints, but may simply depend upon the fact that cash flow conveys information on expected profitability. However, as already mentioned, we minimize the risk of misinterpreting our empirical results by focusing on differences in the coefficients on cash flow among sub-samples of firms. In this case, if differences are found it is rather implausible to attribute them to differences in expectations formation[24].

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[21] The importance of capital market imperfections for investment decisions can be investigated using a different approach based on the Euler equation for the capital stock. See Whited (1992) for panel data evidence for the US, Bond and Meghir (1994) for the UK, and Galeotti, Schiantarelli and Jaramillo (1994), and Rondi, Sembenelli and Zanetti (1994) for Italy.

[22] Note that the median value of $(I/K^F)_t$ is .104 for the sample of affiliates to large national groups, .100 for the sample of foreign subsidiaries, and .102 for the other national firms.

[23] The results are very similar if cash flow is defined gross of interest payments.

[24] Gilchrist and Himmelberg (1994) present evidence that the mechanism of expectation formation does not differ significantly among US firms.

As in the previous section, all estimates are carried out in first differences to eliminate firm specific characteristics, using GMM estimation techniques to allow for the endogeneity of the regressors. In all the reported equations three sets of year dummies are included, to allow time specific effects to differ between the three sub-samples of firms.

We start from a specification which includes the lagged dependent variable, $(I/K^F)_{t-1}$, the contemporaneous and lagged ratios of cash flow to fixed capital, and the contemporaneous and lagged rates of change in output (Table 4). The coefficients on contemporary cash flow are positive and significant for both affiliated and independent national firms. However, the coefficient is about twenty times larger for the sub-sample of independent firms (.41 versus .02). In contrast, the coefficient on contemporary cash flow for the sub-sample of foreign multinationals is instead negative and significant, although very small (-.06). The coefficient on lagged cash flow is positive for multinational firms (.06) so that the sum of the coefficients on contemporaneous and lagged cash flow is virtually zero. It is negative for the sub-samples of affiliated and independent national firms (-.01 and -.20 respectively). The sum of the coefficients for independent firms is positive and still about twenty times larger than that of affiliates to large national groups. This indicates that the availability of internal funds for firms that are either group members or subsidiaries of foreign multinationals is less important for investment decisions, since their group association makes it easier to tap the external capital market, as well as the capital market internal to the group. As expected, the coefficients on the rates of growth in sales are positive and significant in most cases. Interestingly the sales coefficients are larger for multinational firms, suggesting that they respond more strongly to demand stimuli, whereas the point estimates for affiliated and independent national firms are remarkably similar.

To check the robustness of these results we rerun the equation in Table 4, after omitting the lagged cash flow variable (Table 5). The coefficients on cash flow for non-affiliated and affiliated national firms are both positive and significant but the former is ten times bigger than the latter. The coefficient for multinationals does not differ significantly from zero[25]. We have performed other experiments by allowing more dynamics in our basic equation with the introduction of twice lagged regressors for all the variables in the model. We do not report these results for reasons of space. The basic conclusions do not change and, in any case, the coefficients on the additional lags do not differ significantly from zero. We have also replaced the rates of change in output either with the levels of output or with the ratios of the change in output to fixed capital, and we have also added the rates of change in industry output to the equation. Our basic findings were not altered in any of these alternative specifications.

In Table 6, we expand our basic equation with the introduction of the ratio between total financial debt and fixed capital as a regressor. The inclusion of this variable is meant to capture the concept that the premium on external finance is an increasing function of leverage. We would therefore expect a negative relationship between the degree of leverage and investment. What is more important in our framework however, is that the coefficient should be more negative for those types of firms characterized by more severe asymmetric information or contract enforcement problems. In fact the coefficient of leverage is negative, large in absolute value and significant for non-affiliated firms. For instance, when $(B/K^F)_t$ increases from the first quartile (.265) to the third quartile (.875), the investment to fixed capital ratio decreases by .018, which

[25] The cash flow coefficient for non-affiliated firms is significantly different, at conventional levels, from the one for members of national business groups (t = 8.15) and for foreign subsidiaries (t = 8.60).

corresponds to a 14.6% decrease relative to the average value over the period (.123). The coefficient on leverage is not significantly different from zero for subsidiaries of multinational corporations. Although we can reject the hypothesis that the coefficient is zero for firms affiliated to large national groups, it is so minuscule (-.0003) that it is not economically significant.

Finally, as we have done for the leverage equations, we allow the cash flow coefficient to vary depending whether cash flow increases ($D_t = 1$) or decreases ($D_t = 0$). The dummy, D_t can be interpreted as a discrete and firm specific indicator of business cycle conditions, signalling respectively their improvement or worsening[26]. If asymmetric information or contract enforcement problems are more likely to occur in bad times, we would expect a positive and greater in absolute value coefficient on cash flow when $D_t = 0$. As can be seen from Table 7, this indeed occurs for independent firms that are neither members of national large groups nor foreign affiliates. In fact, not only the coefficients for independent companies are both significantly greater in absolute value than the coefficients for the other types of firms but also the coefficient for the cases when cash flow decreases is 2.7 times greater (and significantly so) that the coefficient for the cases when cash flow increases (.41 versus .15). The effect of cash flow is very small in both regimes (although statistically different from zero) for subsidiaries of multinational corporations and members of domestic groups[27].

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[26] The hypothesis that financial constraints are more likely to affect fixed investment decisions in a recession is tested for US firms in Gertler and Hubbard (1988) and Oliner and Rudebusch (1994) using aggregate indicators of business cycle conditions.

[27] The hypothesis that the cash flow coefficients are different in the two regimes cannot be rejected at conventional levels for these two types of firms, but this is of little economic significance, given the small size of the coefficients.

5. Conclusions

In this paper we provide an integrated approach to the analysis of capital market imperfections at the firm level by analyzing the role of cash flow both in investment and in leverage equations. We apply our methodology to a large unbalanced panel of Italian private companies, categorized by form of ownership. We find strong empirical evidence from the leverage equations to support the hypothesis that being part of a national business alleviates capital market imperfections. Domestic firms that are not part of large national business groups have more difficulty in substituting internal with external finance. The results for subsidiaries of multinational corporations are more ambigous because in their case they reflect the importance of agency problems in the relationship between managers and shareholders as well. The large and positive value of the cash flow coefficient, when cash flow is increasing, and the negative sales growth coefficient suggest that such problems are more important for subsidiaries of foreign multinational corporations than for affiliates of large national business groups. This is to be expected, given the fact that controlling coalitions in domestic groups usually hold a large fraction of shares, while multinational corporations tend to have a more diffuse ownership structure. This particular agency problem does not arise for non-affiliated firms since management and ownership basically coincide.

The different degree of substitutability between cash flow and debt has implications on firms' real choices. In fact we find that investment decisions of non-affiliated firms are much more sensitive to the availability of cash flow, confirming the crucial role that internal finance plays for them. Moreover, there is evidence of an interesting asymmetry, in the sense that the effect of cash flow is greater when the latter decreases than when it increases. Finally, members

of domestic groups and subsidiaries of multinational corporations show little or no excess sensitivity to cash flow. The results obtained from the investment equations are consistent with those from the leverage equations for members of large national groups and for non-affiliated firms. Subsidiaries of multinational corporations represent an intermediate and less clear cut case, since the lack of sizeable excess cash flow sensitivity in the investment equations is not matched by strong evidence of substitutability between internal and external finance in the leverage equations.

The overall pattern of results emphasizes the problems of the financial system in making external finance accessible to non-affiliated firms throughout the eighties. Moreover, it is also possible that our results actually underestimate the problem since firms that make our sample of non-affiliated companies represent the upper tail of the size distribution of the total population of non-affiliated firms and are less likely to face unfavorable lending terms than do even smaller firms. Finally, the evidence we have presented lends support to the idea that business cycle shocks may have important distributional consequences across various types of firms, characterized in our case by different forms of ownership.

Data Appendix

The primary source used to build the database is "Le Società Italiane" directory, published yearly by Mediobanca. It contains condensed balance sheets and profits and loss accounts together with other information (number of employees, main industrial sector, etc.) for two consecutive years for a variable number of companies. In the first column of Table A.1 the number of companies available in each year is listed. The lower size limit for a firm to be included in the directory is 10 billion lire of sales in the 1977-1984 period, 20 billion lire in the 1985-86 period, and 25 billion lire in the 1987-90 period. The number of observations for the whole period is 18,081. As in each directory data are available only for two years, time series have been obtained by merging data coming from several editions of the Mediobanca directory. Firms' names have been used as the main variable in merging. Firms whose main activity is outside the manufacturing sector, State owned firms, and manufacturing firms with less than 6 consecutive observations have been excluded from the sample. After these selections the number of observations was reduced to 8,298. The number of observations per year is reported in the third column of Table A.1.

Each firm has been allocated to its primary activity as defined in the three-digits NACE-CLIO classification. This has been done by using the MEDIOBANCA classification, other available information and company reports. For each firm the stock of capital at replacement cost has been computed following the perpetual inventory technique. From Mediobanca directories it is also possible to know whether firms have been involved in mergers, acquisitions or other extraordinary operations in a given year. Since in this case balance sheet and profits and loss account data are unlikely to be comparable with data from either the previous or the following year, observations in years when an extraordinary operation occurred are also excluded from the sample. The total number of observations excluded for this reason is 607. Finally, after excluding observations with negative capital stock, we are left with an unbalanced panel of 7,633 firm-observations and 1,229 firms (see last column of Table A.1). Tables A.2, A. 3 and A.4 give further information on the characteristics of the sample. In Table A.2 firms are ranked in descending order according to the number of consecutive observations. In Table A.3 observations are classified by industry, using the two-digit Nace Clio classification. Finally, in Table A.4 observations are classified by firm's form of ownership as affiliates of large national groups, subsidiaries of foreign multinational corporations, or other national firms.

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Table A.1 - Number of observations by year

	(a)	*(b)*	*(c)*	*(d)*	*(e)*	*(f)*
1977	858	445	368	0	24	344
1978	862	447	370	1	19	350
1979	948	512	426	12	8	406
1980	1091	599	507	62	5	440
1981	1100	652	558	85	1	472
1982	1127	714	611	41	1	569
1983	1182	757	655	36	1	619
1984	1241	791	687	65	0	622
1985	1342	867	765	51	0	714
1986	1486	836	744	43	0	701
1987	1535	784	702	56	0	646
1988	1655	755	675	49	0	626
1989	1779	716	640	61	0	579
1990	1875	655	590	45	0	545
	18081	9530	8298	607	59	7633

(a) Number of observations in original files

(b) Number of observations after excluding non-manufacturing firms and manufacturing firms with less than 6 consecutive observations

(c) Number of observations after excluding state-owned firms from (b)

(d) Extraordinary operation cases

(e) Negative capital stock cases

(f) Number of observations after excluding (d) and (e) from (c)

Table A.2 - Number of firms by observations

Observations	*Firms*
14	77
13	17
12	40
11	57
10	56
9	78
8	101
7	89
6	177
5	71
4	99
3	123
2	108
1	136

Table A.3 - Number of observations by industry (Nace-Clio 2 digits)

Nace Code		*Number of firm-year observations*
22	Production and preliminary processing of metals	410
24	Manufacture of non-metallic mineral products	517
25	Chemical Industry	1129
26	Man-made fibres industry	78
31	Manufacture of metal articles	406
32	Mechanical Engineering	842
33	Manufacture of office machinery and data processing machinery	46
34	Electrical engineering	873
35	Manufacture of motor vehicles and of motor vehicle parts	256
36	Manufacture of other means of transport	152
37	Instrument Engineering	123
41/42	Food, drink and tobacco industry	1042
43	Textile industry	533
44	Leather and leather goods industry	17
45	Footwear and clothing industry	280
46	Timber and wooden furniture industries	67
47	Manufactuer of paper and paper products; printing and publishing	519
48	Processing of rubber and plastics	264
49	Other manufacturing industries	79
		7633

Table A.4 - Number of observations by type of control

	National Large Groups	*Foreign Subsidiaries*	*National Independent Firms*	*Total*
1977	80	107	157	344
1978	80	108	162	350
1979	96	122	188	406
1980	92	139	209	440
1981	97	146	229	472
1982	122	178	269	569
1983	140	190	289	619
1984	134	204	284	622
1985	132	232	350	714
1986	128	225	348	701
1987	110	217	319	646
1988	104	213	309	626
1989	89	195	295	579
1990	85	186	274	545
Total	1489	2462	3682	7633

Table 1 - Descriptive statistics on size (number of employees)

Full sample		
	Mean	*Number of firm-year observations*
Full sample	1127.0	7633
Members of large national business group	2602.9	1489
Foreign subsidiaries	1057.0	2462
Other national firms	577.0	3682
Only firms with more than 3 consecutive observations		
	Mean	*Number of firm-year observations*
Full sample	1043.6	6912
Members of large national business groups	2349.5	1278
Foreign subsidiaries	1023.9	2268
Other national firms	561.0	3366

Table 2 - Leverage equation: basic model; dependent variable: $(B/K)_t$; sample period: 1980-1990; GMM estimates in first differences

	Members of large national business groups		*Foreign subsidiaries*		*Other national firms*	
$(B/K)_{t-1}$	.4713	*(.0352)*	.4411	*(.0091)*	.4270	*(.0427)*
$(C/K)_t$	-.3872	*(.0840)*	.2162	*(.0415)*	.2178	*(.0784)*
$\Delta \log Y_t$	.0387	*(.0202)*	-.1870	*(.0324)*	.0346	*(.0137)*
$\Delta \log Y_{t-1}$	.0166	*(.0102)*	-.0013	*(.0095)*	-.0065	*(.0037)*
M_1	-4.219	[763]				
M_2	-0.927	[692]				
Sargan	195.90	[177]				

Footnotes:

(1) Instrument list: All included variables lagged twice and three times.

(2) Sub-sample specific time dummies included.

Table 3 - Leverage equation: model with asymmetric effect of cash flow; dependent variable: $(B/K)_t$; sample period: 1980-1990; GMM estimates in first differences

	Members of large national business groups		*Foreign subsidiaries*		*Other national firms*	
$(B/K)_{t-1}$	.4242	*(.0304)*	.4218	*(.0088)*	.4341	*(.0348)*
$D_t(C/K)_t$	-.1865	*(.0833)*	.3036	*(.0396)*	.1958	*(.0671)*
$(1-D_t)\,(C/K)_t$	-.4142	*(.0914)*	.0131	*(.634)*	.1464	*(.0871)*
$\Delta \log Y_t$	-.0084	*(.0255)*	-.1621	*(.0280)*	.0462	*(.0142)*
$\Delta \log Y_{t-1}$	.0218	*(.0086)*	.0007	*(.0091)*	-.0042	*(.0030)*
M_1	-5.101	[763]				
M_2	-1.012	[692]				
Sargan	262.12	[237]				

Footnotes:

(1) $D_t = 1$ if $(C/K)_t > (C/K)_{t-1}$; $D_t = 0$ otherwise.

(2) Instrument list: All included variables lagged twice and three times.

(3) Sub-sample specific time dummies included.

Table 4 - Investment equation: basic model; dependent variable: $(I/K^F)_t$; sample period: 1980-1990; GMM estimates in first differences

	Members of large national business groups		*Foreign subsidiaries*		*Other national firms*	
$(I/K^F)_{t-1}$	.0058	*(.0003)*	.2685	*(.0146)*	.0639	*(.0155)*
$(C/K^F)_t$	.0199	*(.0003)*	-.0649	*(.0077)*	.4074	*(.0349)*
$(C/K^F)_{t-1}$	-.0130	*(.0003)*	.0592	*(.0013)*	-.2042	*(.0222)*
$\Delta \log Y_t$	.0252	*(.0230)*	.1509	*(.0349)*	.0300	*(.0099)*
$\Delta \log Y_{t-1}$	.0016	*(.0086)*	*.0176*	*(.0092)*	.0019	*(.0037)*
M_1	-6.040	[763]				
M_2	-0.885	[692]				
Sargan	185.60	[174]				

Footnotes:

(1) Instrument list: All included variables lagged twice and three times.

(2) Sub-sample specific time dummies included.

Table 5 - Investment equation: basic model without lagged cash flow; dependent variable: $(I/K^F)_t$; sample period: 1980-1990; GMM estimates in first differences

	Members of large national business groups		*Foreign subsidiaries*		*Other national firms*	
$(I/K^F)_{t-1}$	.0054	*(.0004)*	.2505	*(.0157)*	.0428	*(.0148)*
$(C/K^F)_t$	.0277	*(.0003)*	-.0014	*(.0055)*	.2619	*(.0302)*
$(C/K^F)_{t-1}$	-		-		-	
$\Delta \log Y_t$	.0522	*(.0228)*	.1049	*(.0239)*	.0180	*(.0144)*
$\Delta \log Y_{t-1}$	.0052	*(.0078)*	.0185	*(.0083)*	-.0021	*(.0042)*
M_1	-4.239	[763]				
M_2	-0.779	[692]				
Sargan	194.21	[177]				

Footnotes:

(1) Instrument list: All included variables lagged twice and three times.

(2) Sub-sample specific time dummies included.

Table 6 - Investment equation: model with debt; dependent variable: $(I/K^F)_t$; sample period: 1980-1990; GMM estimates in first differences

	Members of large national business groups		*Foreign subsidiaries*		*Other national firms*	
$(I/K^F)_{t-1}$	.0055	*(.0003)*	.2296	*(.0118)*	.0276	*(.0135)*
$(C/K^F)_t$	.0206	*(.0002)*	.0089	*(.0046)*	.3081	*(.0244)*
$(C/K^F)_{t-1}$		-		-		-
$\Delta \log Y_t$	.0043	*(.0130)*	.0852	*(.0165)*	.0079	*(.0123)*
$\Delta \log Y_{t-1}$	.0014	*(.0069)*	.0145	*(.0076)*	-.0046	*(.0046)*
$(B/K^F)_t$	-.0003	*(.0000)*	.0003	*(.0004)*	-.0291	*(.0054)*
M_1	-4.404	[763]				
M_2	-0.776	[692]				
Sargan	251.14	[237]				

Footnotes:
(1) Instrument list: All included variables lagged twice and three times.
(2) Sub-sample specific time dummies included.

Table 7 - Investment equation: model with asymmetric effect of cash flow; dependent variable: $(I/K^F)_t$; sample period: 1980-1990; GMM estimates in first differences

	Members of large national business groups		*Foreign subsidiaries*		*Other national firms*	
$(I/K^F)_{t-1}$	.0089	*(.0003)*	.2300	*(.0104)*	-.0056	*(.0077)*
$D_t(C/K^F)_t$	.0702	*(.0003)*	.0086	*(.0034)*	.1491	*(.0259)*
$(1-D_t)(C/K^F)_t$	.0250	*(.0002)*	.0185	*(.0032)*	.4088	*(.0174)*
$\Delta \log Y_t$	-.0061	*(.0116)*	.1076	*(.0141)*	.0373	*(.0051)*
$\Delta \log Y_{t-1}$	.0008	*(.0040)*	.0124	*(.0060)*	-.0015	*(.0031)*
$(B/K^F)_t$	-.0006	*(.0001)*	.0007	*(.0004)*	-.0238	*(.0041)*
M_1	-5.269	[763]				
M_2	-1.168	[692]				
Sargan	337.79	[297]				

Footnotes:

(1) $D_t = 1$ if $(C/K^F)_t > (C/K^F)_{t-1}$; $D_t = 0$ otherwise.

(2) Instrument list: All included variables lagged twice and three times.

(3) Sub-sample specific time dummies included.

Figure 1 - Pre dividend cash flow/total capital at replacement value: C/K

Fig. 1a - Affiliates to large national business groups

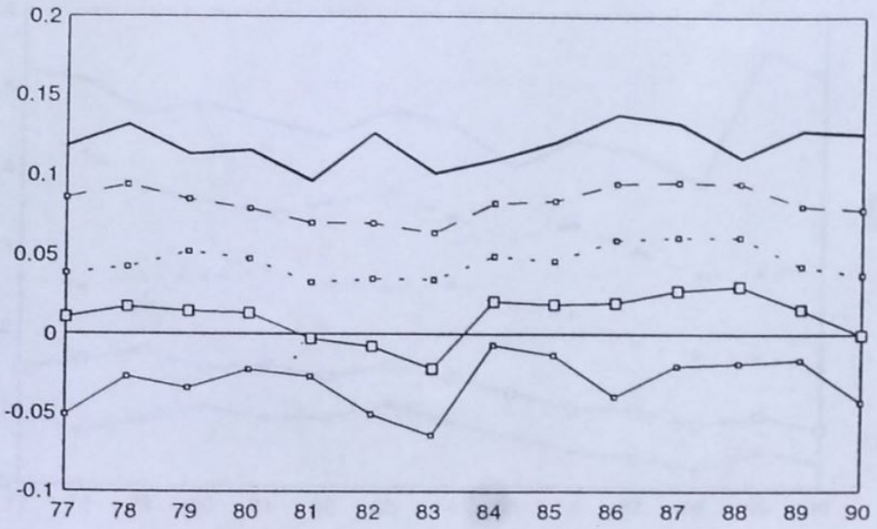


Fig. 1b - Multinational firms

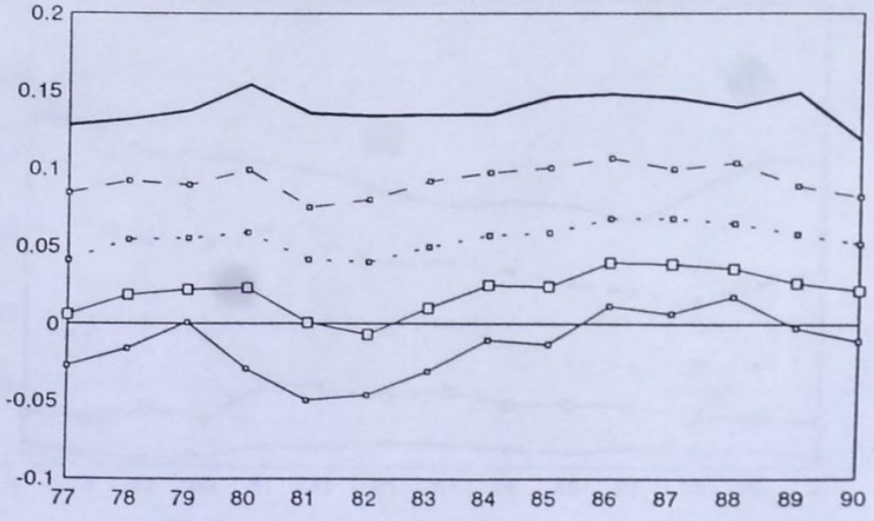


Fig. 1c - Other national firms

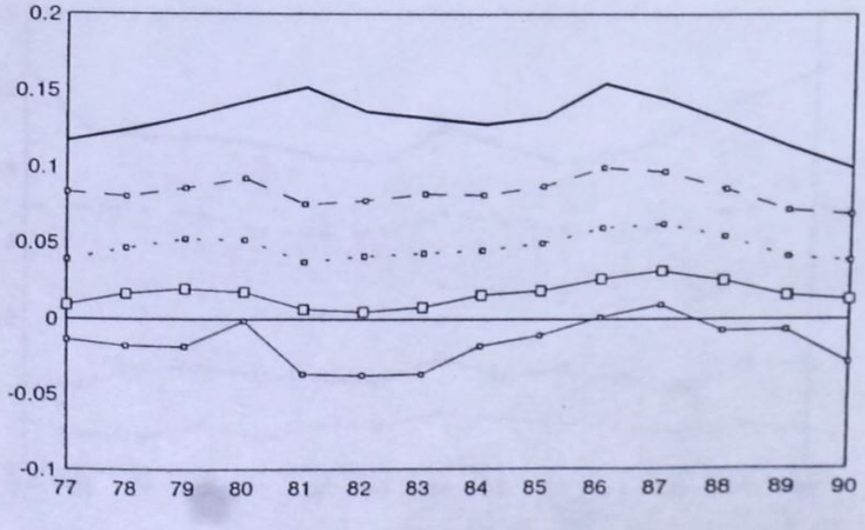


Figure 2 - Total financial debt/total capital at replacement value: B/K

Fig. 2a - Affiliates to large national business groups

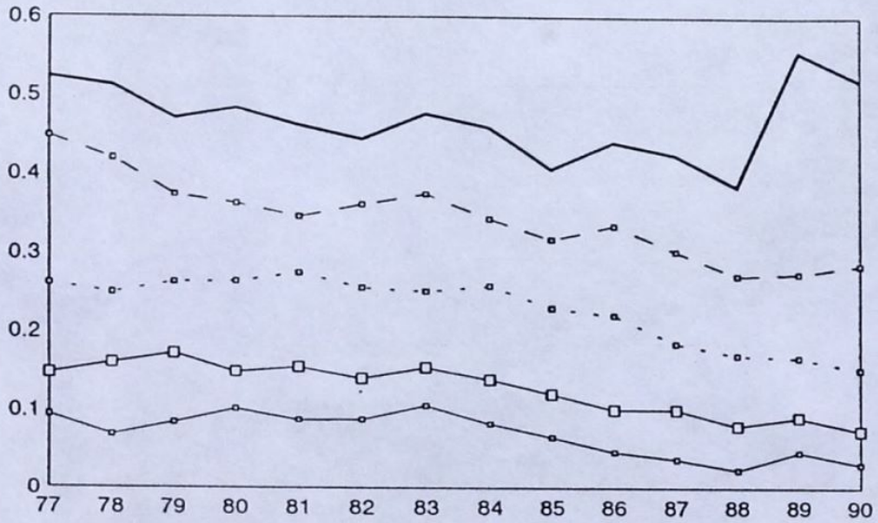


Fig. 2b - Multinational firms

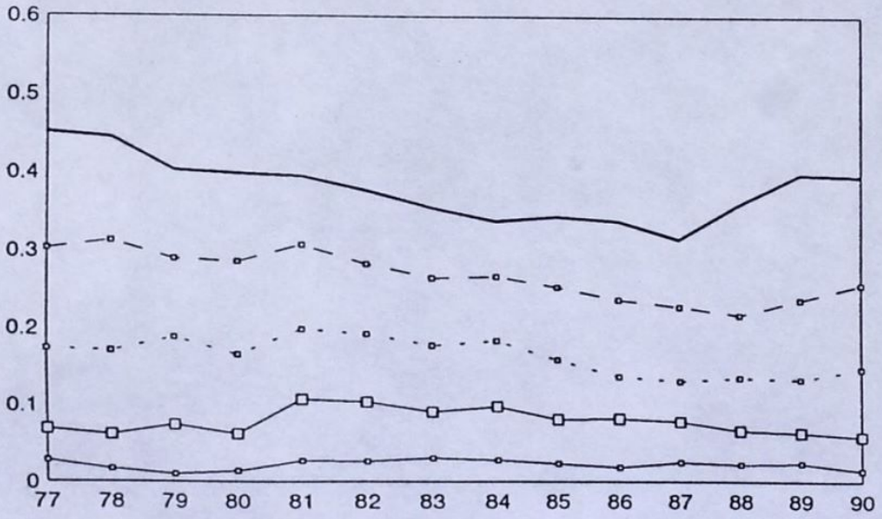


Fig. 2c - Other national firms

