FINANCIAL FLEXIBILITY AND INVESTMENT DECISIONS: EVIDENCE FROM LOW-LEVERAGE FIRMS

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Abstract

This paper analyzes the effects of financial flexibility on firm investment. Taking as a starting point the recent survey evidence on the determinants of capital structure, we investigate the hypothesis that a low-leverage policy directed at maintaining flexibility can affect company investment. We classify flexible firms as those that follow a low-leverage policy for at least two or three years. Low leverage is defined according to deviations from target that are, in turn, modelled through a partial adjustment model and estimated via GMM-SYS. Our analysis reveals that the low-leverage policy is a transitory one. Following a period of low leverage, financially flexible firms are able to make significantly more capital expenditures. In addition, we also detect a considerable increase in abnormal investment (spikes). Further evidence indicates that the new investments are financed through new issues of debt that take companies closer to their estimated target leverage. There is no evidence to indicate that these investments are financed through equity issues. Finally, this strategy appears value enhancing, as indicated by an increasing market to book ratio. Numerous robustness checks are performed in several directions and corroborate the results. In particular, firms classified as financially flexible appear to be less exposed to financial constraints, as indicated by the lower estimated coefficient of cash flow in the investment equation.

JEL Classification: G31, G32
Keywords: financial flexibility, investment, low-leverage, cash flow sensitivity, endogeneity

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1. Introduction

Since the seminal work by Fazzari et al. (1988), the investment literature has mostly been concerned with the identification of different classes of firms that are more (or less) likely to face higher costs of capital, in the attempt to document how investment cash flow sensitivities change as the cost of external finance rises (see, e.g., Devereux and Schiantarelli, 1990; and Bond and Meghir, 1994, for the UK; Hoshi et al., 1991, for Japan; Chirinko and Schaller, 1995, for Canada; Elston, 1998, for Germany). Generally, the investment models supporting these empirical studies predict that, for firms with high agency and asymmetric information problems, changes in net worth affect investment. A significantly positive value of the estimated coefficient of cash flow would correspond to the suggestion that financing constraints are present (see Hubbard, 1998). Nonetheless, since Kaplan and Zingales' (1997) paper, an ongoing debate has raised doubts about and criticism of the validity of this approach, arguing that investment-cash flow sensitivity may be higher for firms that do not face greater costs of external funds (e.g., Cleary, 1999; Kaplan and Zingales, 2000).

On the other hand, the literature on financial choices generally considers investment as exogenously determined, and it focuses on the relative cost of debt to equity, testing the hypotheses of the pecking order versus the trade off theory (e.g., Shyam-Sunder and Myers, 1999; Fama and French, 2002; Frank and Goyal, 2003; Flannery and Rangan, 2005), as well as market timing (Baker and Wurgler, 2002) and the relevance of elements such as taxes and financial distress (Hovakimian et al., 2001).

Recently, several qualitative studies, including Graham and Harvey (2001) for the US, Bancel and Mitoo (2004) and Brounen et al. (2005) for Europe, have provided evidence of the interaction between financial and investment decisions, and maintain that financial flexibility, in the form of debt conservatism, is the principal driving force of leverage choices by CFOs. For instance, 59% of Graham and Harvey's (2001) respondents say that flexibility is important (rating of 3), or very important (rating of 4), in enabling them to undertake investment in the future, when asymmetric information and contracting problems might otherwise force firms to forego profitable growth opportunities.

This survey's evidence could be interpreted in the light of the arguments by Modigliani and Miller (1963) and Myers (1984), according to whom "real-world problems of financial strategy" (i.e., capital market imperfections) lead firms to "the need for preserving flexibility", implying "the maintenance by firms of a substantial reserve of untapped borrowing power" (Modigliani and Miller, 1963, p. 442). A further corroborating argument in the literature can be found in Myers' (1977) seminal paper. He shows how "too much" debt may induce firms to forego profitable investment opportunities, even when managers are fully aligned with shareholders' interests.

The aim of this work is to analyze more systematically the interaction between low-leverage policy and investment decisions. Taking the ideas set out above as a starting point, we investigate the hypothesis that firms that anticipate financial constraints in the future may respond to these potential constraints by accumulating reserve borrowing power. More specifically, by pursuing a policy of low-leverage for a certain number of years, firms may accumulate financial flexibility that allows them access to the external market, and so be able to raise funds to invest more than their internal resources would permit.

The first step of our analysis consists in the identification of those companies with reserves of borrowing power (RBP). To this end, we initially identify low-leverage firms by adopting a "target" approach. This entails the estimation of a leverage equation from which the predicted level of debt is calculated: this makes it possible to calculate the deviation between actual and predicted level of debt, and to define low-leverage firms as those that are below the estimated target. We then classify a firm as RBP if it shows a low-leverage policy for three consecutive years before the analyzed investment decision.

After classifying firms, the second step of our analysis investigates whether this borrowing power, accumulated in the previous three years, has an impact on current investment policy. The prediction is that RBP firms have enough debt capacity to be able to raise external funds and invest more in the years following the conservative financial policy. To investigate this hypothesis, we specify an investment model in which we introduce the RBP dummy. According to our "flexibility" hypothesis, the RBP dummy should have a positive and significant impact on capital expenditure. Furthermore, because RBP firms can, after a period of low leverage, raise external funds to finance projects larger than their internal resources, we would also expect the impact on the cash flow sensitivity of investment to be insignificant. It is important to underline that, in line with Modigliani and Miller (1963) and Myers (1984), RBP firms do not use only internal funds, but are also able to go to the external markets and exploit their reserve borrowing power when internal funds are insufficient to implement a new project.

Furthermore, in an attempt to assess the dynamics of firm choices in more detail, we also undertake an intertemporal descriptive study of a number of relevant firm characteristics. Using this perspective, we expect to detect the following: first, RBP firms should show an increase in the level and value of their investments around time t; second, in line with the hypothesis of higher ability to raise external funds after having accumulated borrowing power, RBP firms should show a sharp increase in leverage levels at time t and, accordingly, they should experience an increase in net debt issue; third, RBP firms should show a decrease in available liquid resources around t, because part of these resources may be invested in new projects.

Our study contributes to the literature in several ways. First, unlike previous works, our paper is an original attempt to investigate explicitly the impact of a distinct leverage *policy* on the investment decisions of firms. To the best of our knowledge, Devereux and Schiantarelli (1990), Bond and Meghir (1994), Lang et al. (1996) and, very recently, Aivazian et al. (2005), include debt variables in their investment models. However, their analyses focus on how the current availability of external finance, such as debt, may influence investment decisions. They do not take into account any intertemporal perspective on a specific financial strategy by firms. Further, Graham (2000) and Minton and Wruck (2001) observe that conservative firms stockpile financial slack or debt capacity in order to finance future discretionary expenditures. It should be noted, however, that the focus of these studies is very different from ours. Graham (2000) estimates the magnitude of the tax benefits of debt. Minton and Wruck (2001) investigate the determinants of financial conservatism behaviour. In contrast, the aim of the present work is to analyze explicitly the impact of certain financial strategies on investment, by explicitly including the leverage policy *status* in the investment model.

Second, in defining low-leverage firms we adopt a different methodology than previous studies. Graham (2000) infers how aggressively a firm uses debt by observing where it locates on its interest benefit functions; while Minton and Wruck (2001) classify a firm as being financially conservative (i.e., having low leverage) if its annual ratio of long-term debt to total assets is in the bottom 20% of all firms for five consecutive years. In our work, in contrast, we estimate the amount of leverage as predicted by the dominant capital structure theories. We then control how firms deviate from it, in order to identify the low-leverage firms. One advantage of our approach over previous ones is that, by estimating a leverage model, we consider a number of firm-specific characteristics that are likely to affect company demand for debt. In addition, unlike a fixed cut-off value approach, we account for possible changes in the firms' optimal leverage over time, and also the possibility of different optimal levels across firms, in line with the methodology adopted by Hovakimian and Titman (2001) for capital structure decisions and Iona et al., (2004). Furthermore, in estimating the amount of debt for each firm using the GMM-SYS methodology, we take into account the issue of the endogeneity and individual heterogeneity among variables. This may seriously bias estimations if not properly accounted for.

We conduct our analysis over a large sample of UK non-financial listed firms over the period 1991-2001. We hand-collected detailed information on ownership by directors and external shareholders, and board composition, on an annual basis for a sample of 1100 UK non-financial listed firms. Economic and market variables are from Datastream. Thanks to the availability of these data sets, we are able to estimate the influence of ownership characteristics in the optimal leverage model in a panel data framework, which represents our work's other original contribution to the literature. In addition, our study may shed more light on the relation between leverage policy and investment expenditures in the UK market, a question that has been the focus of a limited number of papers. To the best of our knowledge, Lasfer (1995), Ozkan (2001) and Bevan and Danbolt (2004) provide evidence on the determinants of capital structure for UK companies. On the other hand, Devereux and Schiantarelli (1990) and Bond and Meghir (1994) include debt variables in their investment models for the UK, but their main aim is to analyze investment-cash flow sensitivity as a proxy for financial constraints. In addition, they do not take into account the ownership effect.

Our analysis reveals that the low-leverage (LL) policy is a transitory one. Following a period of low leverage (two/three years), firms appear able to invest significantly more in capital expenditures. We investigate these results in more detail, and conduct several robustness checks in various directions. Our intertemporal analysis reveals how, consistent with our predictions, RBP firms sharply increase their capital investments after acquiring RBP status. They do so by issuing new debt and approaching their target leverage. A further interesting aspect is that we detect a significant increase of abnormal investment (spikes) by firms after acquiring RBP status. Finally, the results appear to indicate that this strategy is value enhancing: we document an increase in average market to book ratio for this group of firms over time.

The rest of the work is organized as follows. In the next section, we develop the main hypotheses tested in the leverage and investment models, and we present the methodology adopted in our work. Section 3 is dedicated to the presentation of data. Section 4 reports the summary statistics and regressions results. Section 5 includes robustness checks. Conclusions are in Section 6.

2. Research Design

2.1 Definition of low-leverage firms

As discussed above, the first step is dedicated to the identification of the *low-leverage* firms that we use instrumentally to define RBP firms.[1] There are two main ways of proceeding.

One consists in setting a benchmark value that separates low leverage from high leverage. For example, Mikkelson and Partch (2003) consider as "high cash" those companies that hold more than 25% of their assets in cash and equivalents. Minton and Wruck (2001) use the statistical distribution across firms of the variable of interest. They classify firms as "leverage conservative" (i.e., having low leverage) when their leverage is in the bottom 20% of the distribution of all firms. We will refer to this in the text as the "percentile methodology".

The alternative specification, as we described in the introduction, starts from the idea that firms have a target capital structure that is firm-specific. In this view, low leverage is defined in terms of the deviation between the actual level of debt and the estimated target. To calculate the target and the potential deviations from it, a leverage model must be chosen. We will refer to this as the "target methodology".

This second methodology appears to be more reliable, for a number of reasons. For instance, it is reasonable to believe that the amount of debt in a firm depends on a series of firm-specific characteristics. Indeed, a preliminary inspection of the data reveals significant differences in total debt in different industries. Moreover, an

[1] All definitions of variables are provided in Table 2.

increasing number of studies in the literature corroborate the idea that firms do indeed have a target capital structure. According to the figures reported in Graham and Harvey (2001), 37% of firms have a "flexible" target debt ratio, while a further 35% have a stricter target. In their recent paper, Flannery and Rangan (2005) test the predictions of a static trade-off theory (TOT) model versus pecking order theory (POT), and the more recent Market Timing hypothesis. Their evidence substantiates the survey results of Graham and Harvey (2001), that firms do have a target leverage. Further, this approach seems more appropriate in assessing the evolution of the debt changes a firm realizes over time. For example, analysis of the data shows how the company "Bett Brothers" records a leverage of around 0.0137% in 1997, and 4.22% in 1998, which corresponds approximately to a 309% increase in debt ratio. These two values belong to the first and second deciles of the distribution, respectively. Therefore, despite the considerable increase in leverage, this firm is still classified as LL according to the percentile methodology. On the other hand, using the targeting approach, we find that while the 1997 observation corresponds to a negative deviation from target (i.e., LL status), in 1998 the firm is over the estimated target, and therefore loses LL status.

However, the second approach is not free from drawbacks. Possibly the most serious shortcoming lies in the fact that the choice of the leverage model affects the estimated target and deviation from it, and ultimately influences the classification of firms and the subsequent results of the investment equation. Misspecification of the leverage model may result in serious bias of the results that follow.

As a result of all these considerations, we proceed in the following way. First, to minimize the possibility that the results are affected by the choice of a specific leverage model, we test our results by using four different leverage model specifications. Second, to maintain a "neutral" approach with respect to the definition of LL firms, we will use both the target and the percentile methodology, and report all the results accordingly.

2.2 Definition of "reserve borrowing power" firms

In this setting, we start from the specification of a target leverage model. We use a partial adjustment model, and we include a widely accepted set of variables that have been identified in the literature as potential determinants of leverage. The estimated models, in turn, provide us with the fitted value for debt (see Opler et al., 1999 for an application to a cash model). In other words, from these estimations we work out what financial theory would predict the level of leverage of each company to be. At this point, the estimated (fitted) value is compared with the actual value and low/high leverage firms are distinguished, in terms of the deviation between the actual and the predicted level.

In this case, we adopt two different methods to assign LL status. The "simple" criterion assigns LL status to firms where the actual leverage is lower than the predicted one. For robustness purposes, we also utilize a more stringent definition, according to which firms are LL only if their (negative) deviation from the target is larger (in absolute terms) than at least 25% of all LL firms.

Finally, in line with our description above, we use two different criteria to identify firms with reserve borrowing power. In the first case, the dummy takes the value of 1 when we observe at least three consecutive periods in which the firm is classified as LL prior to the investment decision (*RBP3 and RBPpct3*). In the other case, we require only two consecutive periods (*RBP2 and RBPpct2*). [2]

For clarity, we now present a more detailed step-by-step description of the method followed to classify firms in Table 2 Panel A. For simplicity, this example describes the *RBP3* dummy. Because the leverage model is estimated in first difference, the first observation is "lost" (denoted as N/A in the table). Moreover, since to assign the RBP status we require at least three consecutive observations in which firms are LL, the first available observation to meaningfully discern RBP from NRBP firms is the 4th one (corresponding to the 1995 observation in the example). Therefore, in Table 2A, the observations corresponding to 1992, 1993, and 1994 are denoted as "not available". This explains how, for the investment model, we are left with 4006 observations and 613 firms available. It is worth underlining that, having defined the dummy in this way in the investment model, we will investigate the relationship between investment at time t and the dummy RBP, which defines a past behaviour.

We report the descriptive classification of firms in Table 2B, which shows that 277 companies are classified as never having reserve borrowing power (NRBP). On the other hand, RBP firms account for a total of 270 companies, while 66 are always classified as RBP in all the time periods in which they are present in the dataset

[2] *RBP3 and RBP2* refer to LL firms classified using the simple deviation criteria and *RBPpct3* and RBPpct2 refer to firms being classified as LL if the deviation is larger than 25% of other LL firms.

(ARBP). Further, an analysis of the time series properties of the RBP status reveals that firms are classified as RBP for an average (median) of 2.64 (2) consecutive periods, which confirms the idea that this is a temporary strategy.

2.3 Leverage model hypotheses

In this section, we describe the hypotheses that provide the theoretical underpinning for the choice of variables included in the estimated capital structure models.

2.3.1 Specification 1

The base specification consists in the "classical" Rajan and Zingales (1995) four variable model, consisting of size, growth opportunities, profitability and tangible assets.

According to the asymmetric information hypothesis, small firms are considered more opaque by potential investors (Petersen and Rajan, 1994) and face larger costs in raising external capital. Larger firms, on the other hand, are less exposed to asymmetric information problems, and consequently are expected to have better access to capital markets. Moreover, these companies are less exposed to the probability of bankruptcy (Titman and Wessels, 1988; Rajan and Zingales, 1995). Most empirical studies report a positive sign for the relationship between size and leverage (Rajan and Zingales, 1995; Frank and Goyal, 2003). Less conclusive results are reported by other authors (Kremp et al., 1999; Ozkan, 2001). We proxy for size using the natural logarithm of total assets.

According to Myers' (1977) underinvestment argument, firms with high growth opportunities are expected to have lower levels of leverage. To avoid having to pass up profitable investment opportunities in the future, such firms can alleviate this problem by shortening the maturity of debt (Myers, 1977; Titman and Wessels, 1988), or by using convertible bonds (Jensen and Meckling, 1976; Smith and Warner, 1979). Titman and Wessels (1988) also point out that firms in growing industries incur higher agency costs, since they have more flexibility in making future investments. It is also suggested that, although growth opportunities are capital assets that add value to a firm, they cannot be collateralized and do not generate current income. They are intangible in nature, and valuable only as long as the firm is alive. Their value will fall significantly if the firm faces bankruptcy, which suggests that the expected bankruptcy costs for firms with greater growth opportunities will be higher (Myers, 1984; Williamson, 1988; Harris and Raviv, 1990). Larger expected bankruptcy costs would in turn imply lower financial leverage. Rajan and Zingales (1995) find a negative relationship between growth opportunities and leverage, and suggest that this may occur as a result of firms issuing equity when stock prices are high. As mentioned by Hovakimian et al. (2001), large stock price increases are usually associated with improved growth opportunities, and lead to a lower debt ratio. Similar to other studies (e.g., Smith and Watts, 1992; Whited, 1992; Barclay and Smith, 1995; and Rajan and Zingales, 1995), this proxy is defined as the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of total assets.

To the extent that firms first finance their investments by extinguishing their internal funds, as predicted by the pecking order theory, a larger profitability/cash flow will be negatively related to leverage. In contrast, according to the trade-off theory, a positive relationship would be expected, as a consequence of decreasing bankruptcy risks and increasing free-cash flow problems. Following Titman and Wessels (1988) and Whited (1992), we measure profitability as the ratio of the earnings before interest, tax and depreciation (EBITD) to total assets.

Tangible assets are likely to have an impact on the borrowing decisions of a firm, because they are less subject to informational asymmetries, and they usually have a greater value than intangible assets in the event of bankruptcy. Additionally, moral hazard risks are reduced when the firm offers tangible assets as collateral, because this constitutes a positive signal to creditors, who can request the selling of these assets in the case of default. As such, tangible assets constitute a good collateral for loans and are expected to be positively related to leverage. Moreover, as underlined above, it must be taken into account that a large presence of tangible assets may also be a proxy for relative low growth options. Most empirical studies conclude that there is a positive relation between collaterals and the level of debt (Rajan and Zingales, 1995; Kremp et al., 1999; Frank and Goyal, 2002). Inconclusive results are reached by Titman and Wessels (1988). Following Rajan and Zingales (1995), we define collateral as the ratio of total fixed assets to total assets.

2.3.2 Specification 2

In the second specification, the standard Rajan and Zingales (1995) regression is augmented with ownership control variables, under the hypothesis that agency conflicts between managers and shareholders may be important determinants of leverage choices. We include executive ownership, blockholding and the ratio of non-executives on total board.

Following Jensen and Meckling (1976), the influence of managerial incentives and discretion on capital structure choices has attracted considerable attention, and different and contrasting views have been proposed. On the one hand, some authors have proposed theories under which managers prefer to keep debt ratios low, to reduce risk and protect their undiversified human capital (Fama, 1980), or to alleviate the pressure that comes with interest payment commitments (e.g., Jensen, 1986). On the other hand, according to Harris and Raviv (1988) and Stulz (1988)), managers may actually prefer higher leverage, in order to inflate their voting power and reduce the possibility of a takeover. Furthermore, according to Leland and Pyle's (1977) signalling hypothesis, managers may actually choose higher leverage, to convince investors of their ability to generate sufficient earnings to repay their debt. Research on this issue provides some evidence that entrenched managers, i.e., managers who are able to act in their own self-interest, prefer lower leverage ratios. Friend and Lang (1988) and Mehran (1992) find that managers with discretion tend to choose lower leverage. Consistent with this, Berger et al. (1997) show that leverage levels are lower when managers do not face pressure from disciplining mechanisms. However, given the contrasting theoretical views on the relation between the extent of manager shareholder agency conflicts and the choice of capital structure, it is difficult to predict a priori the direction of the relationship.[3]

Increasing emphasis has recently been placed on the role of board composition, as a possible corporate governance tool that could help to regulate managerial discretion. It is a general view that the board of directors is more independent as the number of non-executives increases. Non-executive directors should be independent "advisors" and act as "delegated monitors" by the shareholders of the actions of executive managers. To the extent that non-executive directors perform a monitoring and disciplining function over executives, we may expect to

[3] In line with other studies (Kim and Sorensen, 1986; Crutchley et al., 1999), and to account for the possibility that the relationship may be a non-linear one, in an unreported test we also specify a quadratic relationship. Results in the estimated target and deviations and following investment models are virtually unaltered.

detect an impact on leverage decisions. It is difficult, however, to predict exactly the direction of causality. It could be argued that firms with more outside-dominated boards may have lower manager-shareholder conflicts. This, in turn, may counterbalance the managers' preference for lower debt, and result in higher levels of leverage. However, if non-executive owners are exercising an effective degree of monitoring of executives, we may also expect a negative relationship under the hypothesis that, as we also discuss below, managers use leverage as a signal to the market. To the extent that the market perceives an outsider-dominated board as a signal of reduced agency conflicts, then managers do not need to use (high) leverage as a signal of their commitment to the market. We approximate board composition by the fraction of non-executive directors on total board.

As Stiglitz (1985) and Shleifer and Vishny (1997) argue, large shareholders may have greater incentives to be involved in the control process than smaller ones, because they can more easily bear the high fixed costs of collecting information on management behaviour, given the large proportion of resources invested in the firm. In general, when control rights are concentrated in the hands of few investors with extensive cash flow rights, a concerted action is easier than when control rights are dispersed. Similar conclusions are reached by Zeckhauser and Pound (1990), who argue that the mere presence of a large shareholder often acts as a signal to the market that managers are less able to expropriate the firm's resources, thus avoiding the need for managers to increase debt level as a signal. For example, Sudarsanam (1996) provides evidence that large block acquisitions in the UK market are value-enhancing events, consistent with the hypothesis of the market's expectations of reduced agency costs. In line with these arguments, we would expect higher ownership by non-managerial shareholders to result in a lower proportion of debt in the capital structure of firms. In our work, we use the sum of all large external shareholders that hold more than 5% of the shares in each company as a proxy for blockholding.

2.3.3 Specification 3

As indicated above, in a third specification we also include other potential control variables, to take into account the "financial status" of firms. We include dividend payments, debt maturity, cash holding and non-debt tax shield. These variables have been linked to capital structure decisions in different works.

According to Easterbrook (1984), dividend policy is also an instrument that firms can use to reduce managerial discretion. It is argued that dividend payouts play a role in mitigating equity agency costs, by facilitating capital market monitoring of the firm's activities and performance. Higher dividend payouts increase the likelihood that the firm will have to sell common stock in primary capital markets. This, in turn, will induce scrutiny of management by investment banks, securities exchanges and capital suppliers. Also, dividends commit the firm's management to pay out cash to shareholders, and cutting dividends may, in turn, provide a negative signal to the market. A negative sign could then be predicted, to the extent that different control mechanisms are alternated to reduce manager shareholder conflicts (Agrawal and Knoeber, 1996).

A number of studies have also underlined the interdependence of the leverage and maturity mechanisms, and have reached opposite conclusions on the direction of this relationship. On the one hand, Barclay et al. (2003) argue that, as short debt maturity can reduce the cost of underinvestment problems, it may allow firms to increase optimal leverage. On the other hand, Johnson (2003) argues that shortening the maturity of debt can also increase liquidity risk, and may therefore constitute an incentive for firms to reduce optimal leverage. It is then difficult ex ante to predict the sign of this relationship. In our study, maturity is defined as the ratio of total loans repayable after one year to total debt.

In the literature on cash holding policy, it is argued that one motive for holding cash arises because raising funds from the external market can be very costly for firms that need prompt liquidity. As a consequence, cash may be used as a buffer against the possibility of having inadequate funds to implement valuable projects. In this sense, leverage can be seen as a substitute to cash (Opler et al., 1999), and therefore a negative link could be predicted. We define cash as the ratio of total cash and equivalents to total assets.

Finally, DeAngelo and Masulis (1980) show that if non-debt tax shields exist, then firms are likely not to use fully debt tax shields. In other words, firms with large non-debt tax shields have a lower incentive to use debt from a tax shield point of view, and thus may use less debt. Nonetheless, a large non-debt tax shield may indicate a relatively large presence of fixed assets. This variable may also be a proxy for low growth options, and this may imply a positive relationship. Following Titman and Wessels (1988), we use the ratio of annual depreciation expense to total assets as a proxy for non-debt tax shields.

2.4 Estimation methodology: Leverage

All leverage models are estimated using the GMM-SYS methodology, which allows us to control for a number of econometric issues simultaneously. First, it allows us to control for the potential endogeneity of regressors. Endogeneity arises because shocks that affect corporate gearing are also likely to affect regressors such as cash holding, maturity or dividend choices. Moreover, endogeneity may arise from cross causality. For example, it may be argued that it is leverage decisions that affect the company's cash holding or dividend policy, rather than the other way around.

A further reason for endogeneity arises from the possibility that firm-specific characteristics may be correlated with the explanatory variables.[4]

As a consequence, in this work we estimate the following model:

$$LEV_{it} = \alpha_1 LEV_{it-1} + \sum_{k=1}^{k} \beta_k X_{it} + \eta_i + \eta_t + u_{it} \qquad (1)$$

where η_i is a proper fixed effect that accounts for the correlation existing between firm-specific characteristics and regressors, and η_t represents a firm-invariant time effect which is able to account for macro-economic factors (such as market shocks). For the moment, we assume the idiosyncratic term u_{it} to be homoschedastic and serially uncorrelated.

Following the seminal work of Arellano and Bond (1991), we take the first differences of the model and then use suitable lagged levels of the dependent variables as instruments. If we first difference model 1, we obtain

$$\Delta LEV_{it} = \Delta\alpha_1 LEV_{it-1} + \sum_{k=1}^{k} \Delta\beta_k X_{it} + \Delta\eta_t + \Delta u_{it} \qquad (2)$$

Because the validity of the GMM relies heavily on the absence of serial correlation of higher order, two tests of correlation in the error term of order one and two are included in the results (m1 and m2).

The choice of an appropriate set of instruments is tested via the Sargan test of over-identifying restrictions, which tests the null hypothesis of the absence of correlation between the instruments and the error term. Rejection by the Sargan test would cast doubt on the validity of the instruments.

[4] Preliminary diagnostic checks confirm that firm fixed effects appear to be important in explaining leverage ratios.

Another concern arises when there is a high degree of persistence in the data.[5] Under such conditions, Arellano and Bover (1995) propose an estimator that considers the equation in levels, with both lagged first-differenced and lagged level terms as instruments in the first-difference equation. This procedure is examined in detail by Blundell and Bond (1998), who illustrate significant asymptotic efficiency gains in this GMM-SYS estimator. They also emphasize that, when weak instruments are present, the finite sample bias of the GMM-DIFF is likely to be in the direction of the WG estimator.

In the light of all the issues described above, we used the GMM-SYS methodology for this analysis. Unreported tests confirm how, in line with this econometric theory, the autoregressive parameter's coefficient for the GMM-SYS lies between the OLS and Within Group ones, while the GMM-DIFF one seems affected by the weak instrument problem, as the coefficient is close to the WG one.

2.5 Investment model hypotheses

In their seminal paper, Modigliani and Miller (1963) noted that, despite the existence of some tax advantages for debt financing, firms tend not "to use the maximum possible amount of debt in their capital structure" because of limitations from lenders, which lead to "the need for preserving flexibility". Graham (2000) reports corroborating evidence that firms do not fully exploit the potential tax benefits of leverage. In 1984, Myers proposed a modified version of the pecking order theory, in which he maintains that firms, even if they cover part of normal investment with new borrowing, have two main reasons to restrain themselves from issuing debt: to avoid the costs of financial distress and to maintain financial slack.

Taking these ideas as a starting point for our analysis, we test empirically the hypothesis that, in imperfect capital markets, firms may anticipate potential financial constraints from creditors in the future by accumulating reserve borrowing power at present. As in Myers (1984), reserve borrowing power means that they are able to issue debt if they need more funds than the accumulated internal ones to implement positive growth opportunities.

To evaluate whether a low leverage is the result of a corporate policy rather than a temporary shock, we require firms to be classified as RBP on the basis of the definitions provided above. Therefore, through a *policy* of LL for a certain number of

[5] A preliminary analysis of the data confirms the presence of persistency.

years, firms may accumulate financial flexibility that allows them to have access to the external markets, and to raise the necessary funds to invest in valuable projects in the future. As a consequence, we predict that the RBP dummy should have a positive and significant impact on the capital expenditure of firms.

Furthermore, in the earlier investment literature, the sensitivity of investments to cash flow was used to assess the degree of capital market imperfections (Fazzari et al., 1988; Hoshi et al., 1991; Devereux and Schiantarelli, 1990; amongst many others). However, there is an ongoing debate about the interpretation of this sensitivity parameter. As we argued earlier, the underpinning idea is that imperfections introduce a wedge between the costs of external and internal funds. Firms facing higher informational imperfections experience a wider wedge, and therefore they are more financially constrained. On the one hand, Fazzari et al., (1988) argue that, for more financially constrained firms, investment is more sensitive to cash flow. Kaplan and Zingales (1997) provide an opposing perspective. They screen a set of annual reports for a sub-sample of low-dividend payout firms, and conclude that investment-cash flow sensitivity can be higher for unconstrained firms. Moreover, Gilchrist and Himmelberg (1995), Cleary (1999), Erickson and Whited (2000), and Alti (2003) present evidence indicating that measurement problems associated with Tobin’s q may affect the sensitivity of investments to the availability of internal funds.

To the extent that investment-cash flow sensitivity indeed contains information about financial imperfections and, thus, the accessibility of firms to external markets, then this sensitivity should be insignificant for RBP firms. This is because these companies can raise external funds at time t to finance projects larger than their internal resources, thanks to the borrowing power accumulated in the previous years.

In addition, to corroborate our predictions, we may expect to find evidence of the following characteristics in an intertemporal perspective. First, RBP firms are expected to show an increase in the level and value of their investments around time t. Second, in line with the hypothesis of higher ability to raise external funds after having accumulated borrowing power, RBP firms should show a sharp increase in leverage levels at time t and, accordingly, they should experience an increase in net debt issue. Third, RBP firms should show a decrease in available liquid resources around t, because part of these resources may be invested in new projects.

2.6 Estimation methodology: investment model

Four broad classes of investment model can be identified in the literature: the neoclassical model, the sales accelerator model, the Tobin's q model and the Euler-equation model. Each of these approaches is subject to criticism. However, most testing has been conducted in the context of q-models, in which average Tobin's q is used to control for the investment opportunities available to firms.

For the purposes of comparison with previous work, we decided to adopt the investment model used in Devereux and Schiantarelli (1990), augmented by leverage *status* variables. Therefore, capital expenditures are regressed on Tobin's q and cash flow. Moreover, instead of partitioning the sample into different groups of firms, and running separate regressions for each of them, we include the leverage *status* dummy, both as a regressor on its own and interacted with cash flow, in the attempt to investigate whether RBP firms have indeed different investment expenditures.

We are aware that estimating q-models is not without problems. A potentially serious issue is that Tobin's q will only include future expectations if the conditions indicated by Hayashi (1982) to approximate marginal q with average q hold: firms are price takers in perfectly competitive industries, there are constant returns to scale, and the stock market value correctly measures the fundamental expected present value of the firm's future net cash flows. In practice, these conditions may not be fulfilled. For instance, in the presence of a stock market bubble, Tobin's q would not capture all relevant information about the expected future profitability of current investment. Therefore, cash flow would be positive because of the expectations that are not captured by Tobin's q. We try to control for this problem by including time dummies.

As above, we employ the GMM-DIFF technique in a dynamic framework, similar to that proposed by Devereux and Schiantarelli (1990) and Bond et al. (2004) to control for endogeneity and individual heterogeneity. The estimated model is as follows:

$$IK_{it} = \delta IK_{it-1} + \gamma_1 CFK_{it-1} + \gamma_2 Q_{it} + \gamma_3 RBP_{it-1} + \gamma_4 CFK_{it-1} \times RBP_{it} + \eta_i + \eta_t + v_{it} \qquad (3)$$

η_i is an unobserved firm-specific time-invariant effect, η_t is a time-specific firm-invariant effect and, finally, v_{it} is a disturbance term which is assumed to be serially uncorrelated with mean equal to zero.

In line with the vast majority of works on this issue, all variables in the investment model are standardized on capital stock, which is measured on a replacement cost basis. For the first observation, replacement cost is assumed equal to the historic cost of total net fixed assets, adjusted for inflation. For the following observations, a standard perpetual inventory method process is adopted as follows: $K_{it} = K_{it-1}\left(1-\delta\right)+I_{it}$, where δ is the rate of depreciation, assumed to be 0.08.[6]

A further reason for standardizing on capital stock, rather than total assets, as the proxy for Q, is to attempt to mitigate the potential endogeneity between the leverage and investment models that may occur as a consequence of the leverage *status* variable having been obtained by regressing leverage on *mtbv*.

3. Data

The sample used in this analysis is constructed as follows. In the initial stage, a random sample of around 1100 listed non-financial firms was selected from Datastream constituent lists. Ownership data were hand-collected from the Price Waterhouse Corporate Register (December issue) for the period 1991-2001 (Marchica and Mura, 2005). Economic and market data were downloaded from Datastream. However, in order to compute the capital stock on a replacement cost basis, we needed to collect information even before 1991. This is because we employed a standard perpetual inventory method that requires the first available information in each time series of total net fixed assets as a proxy for the starting replacement value of capital stock.

To be able to follow companies over time from two different datasets, a considerable effort went into tracking all the name changes (and also defunct companies) in the period. This information was collected mainly from the London Stock Exchange Yearbook, which reports systematic information on name changes, entries removed from the companies section, companies in liquidation, and companies in receivership and in administration. Moreover, as a further check, the Companies House website was used. This is an online facility that provides various types of information on companies (including name changes).

To run the empirical analysis, we undertook a number of steps. First, the dataset was cleaned of outliers. The ownership part of the dataset was thoroughly

[6] For this purpose data from Datastream from 1968 were employed.

inspected in several directions. For example, we double-checked that the sum of all the shares collected did not sum to more than 100. In cases where they did, we tried to crosscheck the information with other issues of the Hemscott volumes (using either the September edition of the same year or the March edition of the following year), and/or with the London Stock Exchange Yearbook, which also contains some ownership information. When it proved impossible to find coherent information from the different sources of data, this observation was dropped from the sample. After running these tests for the ownership side of the dataset, we also checked for outliers in the "economic" variables, as reported in Datastream. As there is no fixed rule for dealing with outliers, data were trimmed to the 99% percentile, as a general rule of thumb. The trimmed data were then always benchmarked with descriptive statistics reported in other established papers.[7]

When the issue of outliers had been addressed, firms in the broadcasting sector and public utilities were excluded because of the peculiarities in their operational and regulatory conditions. Firms with dual class shares were also excluded, because they violate the "one share one vote" rule. Furthermore, missing firm-year observations for economic variables were dropped. Finally, in line with the indications specified by Arellano and Bond (1991), only firms with at least five consecutive years of observations were kept. This left us with an unbalanced panel of 677 firms and 5660 observations for the leverage model. Descriptive statistics are reported in Table 3.

4. Empirical Results

4.1 Leverage model

We start our analysis by estimating the leverage models, in order to identify the LL firms through the target methodology. As we discussed above, for robustness purposes, we analyze three alternative models, using a set of variables that have been identified in the literature as potential determinants of leverage. Table 4 shows the results for each model. The adopted methodology is the GMM-SYS. Results for OLS, WG and GMM-DIFF, unreported for brevity reasons, show that the estimates of the lagged dependent variable are upward biased, downward biased and close to the fixed

[7] Particular care was placed in benchmarking the variables in the investment model. As Table 3 shows, our figures are in line with Bond et al. (2004) and Benito and Young (2002).

effect regression, respectively, for each model.[8] In line with Bond's (2002) and Arellano and Bover's (1995) arguments, the GMM-SYS is the preferred methodology. The estimation period is between 1991 and 2001. We report three test statistics: (1) Sargan test of overidentifying restrictions, which is asymptotically distributed as chi-square under the null of instrument validity; (2) First order autocorrelation of residuals, which is asymptotically distributed as standard normal N(0,1) under the null of no serial correlation; and (3) Second order autocorrelation of residuals, which is distributed as standard normal N(0,1) under the null of no serial correlation. GMM estimation reveals that the coefficient of the lagged cash holding in all the specifications is positive and significantly different from zero. The reported adjustment coefficient λ (i.e., $(1-\delta)$) is about 0.317, which seems to provide evidence that the dynamic nature of our model is not rejected. Moreover, it indicates that companies take, on average, about three years to close the gap with their target. This would corroborate our choice of examining the leverage behaviour of firms in our sample for three consecutive years before analyzing their investment decisions. This result is similar to that reported recently by Flannery and Rangan 2005) for US firms, and is lower than that reported by Ozkan (2001) for the UK, possibly due to the difference in the methodology.[9]

As far as the interpretation of the other coefficients is concerned, most of the results in all models seem in line with the predictions. We detect a positive and significant impact of size. Larger firms are less exposed to asymmetric information and expected bankruptcy problems and, consequently, they seem to have better access to external capital markets. This is in line with the majority of findings in the capital structure literature (Rajan and Zingales, 1995; Frank and Goyal, 2003; Flannery and Rangan, 2005). In the same way, firms with larger collateral may be able to afford to have a larger amount of debt, as reported in Rajan and Zingales (1995), Kremp et al. (1999), Frank and Goyal (2003) and Flannery and Rangan (2005). Furthermore, profitable firms seem to borrow significantly less, consistent with the POT hypothesis, which predicts that firms prefer to use their internal funds first, and then raise external finance to implement their investment. Similar results are shown by

[8] Values for the lagged dependent variable are 0.766 for OLS, 0.470 for WG and 0.521 for GMM-DIFF. All estimations were carried out using STATA 9.

[9] Indeed the results of this paper are similar to what we obtain when we use the GMM-DIFF estimator.

Ozkan (2001), for UK companies, and Shyam-Sunder and Myers (1999), Frank and Goyal (2003) and Flannery and Rangan (2005).

As far as the financial variables added to the basic Rajan and Zingales model are concerned, the negative and significant coefficient of cash seems to support the transaction costs motive for holding cash. It could be also explained in the light of the POT hypothesis, interpreting cash as an alternative proxy for internal funds.

On the other hand, the positive and significant relation between maturity and leverage is consistent with the results documented by Johnson (2003): that is, long-term debt is associated with lower liquidity risk, which positively affects leverage.

In addition, dividends and non-debt tax shield show the predicted sign, although they are not significant, while growth opportunities do not seem to play a significant role in determining the level of leverage.

Finally, among the ownership variables, blockholding and board composition seem to be relevant in leverage decisions.

The result for blockholding is consistent with various interpretations. On the one hand, it may be evidence that leverage and outside shareholding are alternative agency control mechanisms. Therefore, a larger percentage of stakeholding in the hands of a non-managerial owner reduces the need for aligning incentives, such as direct equity holding by managers. Alternatively, this result could be interpreted in terms of the strategic alignment hypothesis, where blockholders are aligned with managers' interests and, consequently, prefer less than optimal leverage.

The results reported tend to support the view that firms with outside-dominated boards are likely to experience an increase in the monitoring of executives, and therefore a reduction in the agency costs of external finance.

4.2 Investment model

We now turn to the investment model estimations, to verify whether firms, having accumulated reserve borrowing power (RBP), are able to raise external funds to implement some valuable growth opportunities.

Table 5 shows the results of the investment model, and analyzes the behaviour of the different set of dummies that describe RBP firms. It reports the results that follow the calculation of the RBP dummies, using the "target methodology" with the most complete leverage model (i.e., Specification 3 above). Column A reports the results of the investment model for the entire sample of firms. We observe a positive and significant relationship between investments and Q, which is consistent with the prediction of the investment theory: that growth opportunities play a relevant role in investment decisions. The coefficient for cash flow is positive and significant, which may suggest the presence of capital market imperfections that may result in firms depending, at least partially, on available internal funds to invest. This is in line with the results reported in Devereux and Schiantarelli (1990), Blundell et al. (1992) and Vogt (1994).

The dummy indicating RBP status is always positive and statistically significant, indicating that these companies seem to invest significantly more than the others after an accumulation period of two (Specifications B through E) or three years (Specifications F through I). In fact, every alternative proxy of RBP has a positive and significant impact on capital expenditure.

Furthermore, we find that investment cash flow sensitivity, as represented by the interaction terms, is always negative, possibly confirming what we found above: investments for firms that accumulate reserve borrowing power are less sensitive to the availability of internal funds. This is further corroborated by the fact that, in two cases out of four (Specifications E and G), this interaction term is also statistically significant. To the extent that significant and positive cash flow sensitivity represents the company's financial constraints, this would imply that these firms' ability to invest is not jeopardized by asymmetric and agency costs problems with investors.

To provide a more complete picture of the behaviour of RBP companies, we further investigate the intertemporal characteristics of these firms, immediately before and after the time where their investment decisions are analyzed. To this end, we compute descriptive statistics for the three sub-samples of firms. In more detail, we plot the average values for the most important variables (such as investments, investment spikes, leverage, deviation from target, net debt issued and so on) at t-2...t-1…t…t+1…t+2.

4.3 Firm behaviour in time

Figure 1 presents the set of graphs describing the firms' choices and actions in time. We start by defining t = 0 as the time when RBP firms are assigned a value of 1. We analyze both their behaviour, in terms of investment and financial decisions, and their characteristics, in terms of growth opportunities, dividend policy and size before and after this defining moment (from t-2 to t+2).

Furthermore, we differentiate the trends of RBP firms from those of two other types of firm. The first, as discussed above, refers to ARBP companies that never change their LL strategy. The second is our "control group", constituted by firms that are never classified as RBP throughout the entire period (NRBP).

The first graph (Graph 1a) shows the trend for capital expenditures. Prior to t, RBP firms appear to invest less then the other two groups. Nonetheless, between t-1 and t, they appear to experience an important and sudden increase in their investments, which seem to decrease slowly again after t. Both ARBP and NRBP, on the contrary, show a steady and a decreasing level of investment, respectively. This may support the hypothesis that RBP firms have used their accumulated borrowing capacity to make more investments.

To corroborate further our argument, Graph 1b analyzes the value of the "non-routine investments", in line with Mayer and Sussman (2004). "Non-routine investments", or "spikes", are those capital expenditures that are larger in value than what appears to be the norm in the firm's life. To identify these spikes, we proceed as follows. First, we identify investments over a period of three years of data. We calculate the average value of investments only in the extreme years, excluding the central one (i.e., $(I_{t-1} + I_{t+1})/2$). This would represent the "norm" investment. Then, we define a spike if the investment value in the central year t is at least twice the average of these two extremes.[10] Once these spikes have been identified, we plot their average value for the three groups of firms. Graph 1b indicates how, between t-1 and t+1, RBP firms experience "non-routine investments" in a larger magnitude than other companies. This further supports the initial idea that RBP firms make "big" capital expenditure after having reinforced their capacity to raise external finance, in order to avoid having to pass up valuable growth opportunities.

The subsequent graphs shed more light on how firms finance these extraordinary investments. Figure 1c contains a plot of capital structure patterns. It is evident that, after a limited reduction of leverage between t-2 and t-1, firms suddenly and sharply increase their total borrowing between t-1 and t+2. We can also see, from the next graph, that this sudden increase corresponds to a decline in the gap between actual and predicted leverage. From time t, firms are much closer to their target, as the values for the deviations are closer to zero. In addition, Graph 1e confirms this trend,

[10] The same exercise was performed using a period of five rather than three years and delivers similar conclusions.

as RBP firms appear to suddenly and markedly issue new (net) debt between t-1 and t. In t+1 and t+2, their net debt issue decreases slightly, but remains positive and significantly larger than for the other two groups. This further corroborates our initial hypothesis that, after a period of borrowing restraint, RBP firms are more able to exploit the external markets, thanks to their maintained financial slack. Figure 1f provides additional interesting insight: it reveals a slight increase also in the net equity issues of RBP companies around t, although, overall, net equity issues are decreasing, as for the other two groups of firms.

Figure 1g shows that RBP firms decrease their stock of cash. The decrease in cash holding is more marked (though slight) between t and t+2, which may indicate an increased use of liquid assets to finance new projects.

Interestingly, Figure 1h shows an increasing trend of the market-to-book ratio for RBP firms, which may represent the positive expectations of investors in the market. Some caution is necessary, but this evidence may suggest that accumulating borrowing power seems to be value-enhancing behaviour, because it enables firms to implement their projects generally, both in intangible and capital expenditures. This deduction seems particularly sound when we compare the market-to-book ratio trend for RBP companies with the trend of the other two groups of firms that also show lower levels of investments.

However, it must also be underlined that expenditures in R&D grow only until time t (Graph 1i), and there subsequently appears to be a sharp drop in such types of investment.

Finally, Graphs 1l and 1m show how firms appear to keep their dividend payments relatively stable over time, and also maintain relatively constant size.

Overall, the results in this section seem to support the hypothesis that an accumulating borrowing power strategy increases the ability of firms to have better access to the external markets, and to raise the necessary funds to increase their investments, especially capital expenditures.

5. Robustness Checks

As we argued earlier in the text, we took several steps to test the soundness of the results, and to investigate whether they are a consequence of the leverage models chosen. The results of all these checks are presented and discussed below.

First, we run all the investment estimations and the intertemporal descriptive analysis as above, using both a) more parsimonious leverage models (Specification 1 and 2 above); and b) a more complete model that also includes taxes, R&D and capital expenditures.

Second, we re-run the complete set of regressions and tests using a longer time series, to investigate whether results are driven by some "shock" specific to the period under analysis that is not controlled for by year dummies.

Moreover, as we discussed in the introduction, to test in full the degree of dependence of our results on the choice of leverage model, we re-run all the analysis using the "percentile" methodology, because it does not entail the estimation of a capital structure equation.

Finally, we discuss the possibility of alternative interpretations of our set of results.

5.1 Investment results using different leverage models

Table 6 reports the results from all the alternative leverage models outlined above. For brevity, we include only one definition of RBP (*RBP3*) and its relative interaction with cash flow (*interRBP3*). The results of the different definitions of RBP status are similar to those presented here, and are omitted for brevity.

The findings in Table 6 seem virtually unaltered, irrespective of the leverage model. Even if we control for the effect of R&D and capital expenditures, as in Graham (2000), and taxes, as in the capital structure study by Lasfer (1995), the trends identified before remain unchanged. The dummy indicating the RBP *status* is always statistically significant and positive, while the interaction with cash flow remains statistically insignificant, corroborating the fact that at time t, RBP firms invest more than the others; and that, at least at this time, they do not appear to be particularly affected by the presence of financial constraints, probably due to their previously accumulated ability to access the external market.

All the alternative leverage specifications reported in Table 7 deliver very similar results. In Figure 2, therefore, we report the analysis of firm behaviour in time according to Model 4 in Table 6. The added value of showing this particular set of results is that we have allowed for a longer time series in the leverage model (1985-2001). This, in turn, implies a longer time series available to analyze the investment decisions as well. Therefore, in this set of graphs we study the evolution of firm choices between t-6 and t+6.

Some minor differences are apparent from the previous set of figures presented in Figure 1. For instance, leverage for RBP firms is never lower than for ARBP ones; and deviation from target of RBPs becomes even larger than for ARBPs at t-2. Despite these variations however, the main picture remains robust and consistent.

It is interesting to note how, in Graph d, RBP firms tend to be very close to their target leverage for the entire period, with the exception of the years corresponding to a large investment (around time t): at this stage, they appear to reduce their leverage, possibly to accumulate reserve borrowing power (Figure 2a), and they then increase their total borrowing again. Figure 2b also confirms that, following a period of LL *status*, firms are now able to finance more "abnormal" investments ("spikes") than before. Further, Graph 2e provides another interesting insight: it indicates that firms undergo a period of debt repurchase before starting new net debt issues between t-2 and t. These findings seem in line with the argument and the results in Mayer and Sussman's (2004) study, which shows how, in the longer term, financing patterns are more consistent with the trade-off theory. In their work, Mayer and Sussman provide clear evidence of capital structures reverting back to previous levels of leverage after an abnormal investment. Moreover, and consistent with previous results, average market to book ratio appears to increase in time.

One interesting difference with respect to Figure 1 is that, according to this specification, RBP firms appear to be more cash rich than NRBP ones (Figure 2g). This is probably because cash holding policy is not explicitly accounted for in this "Rajan and Zingales" model, and it is therefore part of the estimated residual (i.e., the predicted deviation from target).

5.2 Investment results using the percentile methodology

In an attempt to fully verify the extent to which the above mentioned results may result from any sort of misspecification of the leverage model, we also replicate all the above analysis adopting the "percentile methodology": this does not entail estimating any leverage model, but, rather, as discussed earlier, consists in assigning LL status by using the distribution of leverage across firms each year. Firms are classified as LL when (in each year) they belong to the bottom three deciles of the leverage distribution. As we stated in our earlier discussion, to assign the RBP status, we require firms to be in the bottom three deciles for at least three consecutive years prior to the investment decision. If firm A is classified as low-leverage for 1991, 1992 and 1993, it is assigned a value of 1 in 1994 to capture its "flexible" status in the previous three years (RBPpct3). For robustness purposes, we also compute a parallel set of results, using another dummy that takes the value of 1 if the company belongs to the bottom three deciles for two rather than three consecutive years (RBPpct2).

As Table 2B shows, when we follow this methodology, we obtain a lower number of companies that are classified as RBP (176), while there are 385 NRBP firms. Fifty-two firms are always classified as low-leverage (ARBP). Despite these differences in classification, it appears that firms adopt this strategy only temporarily, since companies are classified as RBP for an average (median) of 3.02 (3) consecutive periods. This figure is larger than that obtained using the target method. As we discussed above, this may be because the former is more stringent in assessing the evolution of firm's leverage in time, which makes it more difficult for firms to change status.

Similarly to what we described above, the results in Table 7 confirm what we would expect from the extant literature. We observe a positive and significant relationship between investments and Q across all specifications, which is consistent with the hypothesis that growth opportunities play a relevant role in investment decisions. The cash flow sensitivity parameter is positive and statistically significant, which may indicate the presence of capital market imperfections that affect companies' investment policy.

However, both dummies indicating firms with reserves of borrowing power (*RBP2* and *RBP3*) are significant and positive, indicating an increased ability to invest. The interaction with cash flow is statistically insignificant though still negative, which may confirm that asymmetric and agency costs do not particularly affect firms' ability to invest.

Figure 3 describes firm behaviour in time around the (hypothesized) investment decision. As before, t refers to the first year when firms are assigned RBP status. Some differences from previous results can be noted. First, according to this specification, RBP firms seem always able to invest more than the other companies, whereas, with the targeting method, we reported RBP firms below the others before t, then investing above NRBP and ARBP from t onwards. Also, the increase in net equity issues appears more pronounced with the percentile methodology than with the target methodology. Further, the estimated impact on firm value appears to differ. In this case (Graph 3g), RBP firms appear to persistently outperform the other two groups, whereas in Figure 1 Graph g we detect a clear increasing trend in mtbv over the entire period under analysis.

Nonetheless, the results generally confirm previous findings, in that firms experience an increase in investments around t (Graph 3a) and an increase in their investment spikes (Graph 3b). This appears to be linked to a leverage policy that suddenly and sharply increases between t-1 and t+2, mostly as a result of new net debt issues (Graph 3d). Cash holding appears decreasing, especially starting from t-1, as before, and, similarly to what was previously detected, R&D expenses appear to increase around t but then suddenly decrease (Graph3h.). It must be underlined that, unlike what we previously detected, the proxy for market to book value does not increase in time; and, moreover, firms that are classified as RBP in this way appear to always display a higher average than the other two sub-groups.

5.3 Alternative interpretation of results

In this section, we discuss some other potential interpretations of our results. In particular, a low-leverage policy may be interpreted as the expression of the difficulty firms have in raising external capital. Alternatively, a low level of leverage may be driven by managerial entrenchment.

5.3.1. Financial flexibility or financial constraint?

It could be argued that firms may be characterized by low leverage not as a result of a policy, but rather as a consequence of the difficulty of raising more external debt. In other words, it could be argued that leverage may be viewed as a proxy of accessibility to external capital (John, 1993). Under this perspective, it is possible to interpret low-leverage firms as financially constrained rather than financially flexible, because they are incapable of raising more capital on the external market.

An argument, based on the analysis of the coefficients of cash flow between sub-samples can be produced against this view. We split firms between RBP and NRBP ones, and analyze whether investment cash flow sensitivities differ between the two groups. The second is based on information on the supply side of debt.

A typical approach in the investment literature consists in identifying firm characteristics that are a priori considered signals of financial constraints. For example, firm size is so used, based on the idea that small firms are more opaque and therefore face more asymmetric information. Dividends were also so used, following Fazzari et al.'s (1988) intuition that low dividend payments can be viewed as an expression of a firm's financial constraints (also see Devereux and Schiantarelli, 1990; Hoshi et al., 1991; amongst many others). Accordingly, to provide more insight on this issue, we split the sample between RBP and NRBP firms. We would expect that, if LL is an expression of financial constraints rather than flexibility, the coefficient for cash flow should be larger in magnitude, positive and statistically significant for RBP firms. In contrast, if RBP is an expression of flexibility, we would expect a lower, and possibly insignificant, coefficient for cash flow, suggesting a lower degree of dependence on the availability of internal funds to invest. Table 8 Column A reports results for the whole sample, while Column B shows the estimated coefficients for NRBP firms (i.e., those that are never classified as LL for at least three consecutive years).[11] Finally, Column C reports results for RBP firms. It can be noted that firms that are classified as having reserve borrowing power show an estimated cash flow coefficient that is insignificant and lower than NRBP firms. Following the interpretation of cash flow sensitivities as proxies for financial constraints, the results for RBP firms seem to suggest that those companies are less (or no more) exposed to capital market imperfections than those firms that never show a low-leverage policy for at least three consecutive years. This may imply that a (persistent) low-leverage policy does not necessarily imply that firms systematically experience difficulties in raising funds from the external markets.

Further, some of the findings from the intertemporal analysis discussed above may corroborate this view. For instance, to the extent that dividends or size are meaningful proxies of financial constraints (e.g., Fazzari et al., 1988), we would expect to find that RBP firms belong to the bottom deciles of dividend distribution more systematically than NRBP firms, if leverage is interpreted as a proxy of financial constraints. However, Figures 1.j and 1.k show that RBP firms pay, on average, more dividends than NRBP ones. Our own calculations reveal that, of 969

[11] Results for firms that are always classified as RBP (*ARBP*) are not reported, since no explanatory variable is significant. This may be due to the very low number of observations available in total for this sub-sample of firms.

observations belonging to the bottom three deciles of dividends, about 54% of them pertain to NRBP firms while 46% belong to RBP. Similar arguments could be made regarding firm size. These arguments may corroborate the view that RBP firms are not necessarily more exposed to market imperfections than others.

Moreover, some authors have argued that financially constrained firms are expected to have higher incentives to hold large cash reserves (Fazzari et al., 1996; Kim et al., 1998; Hovakimian and Titman, 2003). In other words, firms anticipating future financial constraints in the external capital market may, as a reaction, tend to accumulate substantial cash holdings. This does not appear to be our case either. From Figure 1.g we can see that RBP firms do not appear to be cash rich when compared to the other sub-samples. This would be inconsistent with the previous argument, and would make it unlikely that these firms are following a conservative leverage policy because of the difficulty of raising money in the external market.

5.3.1. Financial flexibility or managerial entrenchment?

The relationship between leverage and the likelihood of expropriation by managers depends on whether debt constrains or facilitates this expropriation. On the one hand, some authors have proposed theories under which managers prefer to keep debt ratios low, to reduce risk and protect their undiversified human capital (Fama, 1980), or to alleviate the pressure that comes with interest payment commitments (e.g., Jensen, 1986). On the other hand, according to Harris and Raviv (1988) and Stulz (1988), managers may prefer higher leverage in order to inflate their voting power and reduce the possibility of a takeover. Furthermore, according to Leland and Pyle's (1977) signalling hypothesis, managers may choose higher leverage to convince investors of their ability to generate sufficient earnings to repay their debt.

Therefore, it is not necessarily unambiguous to conclude that a low-leverage policy may be driven by the presence of managerial entrenchment issues inside the firm. Nonetheless, to the extent that entrenched managers prefer a suboptimal level of leverage, we would expect an adjustment in those variables that represent conflicts between managers and shareholders that correspond to the dramatic change detected in the amount of debt held by RBP firms. We would expect, therefore, a structural break in executive ownership, blockholding and/or board composition. We may also expect a sharp variation in the dividend payout, as an alternative control mechanism to leverage.

In Figure 4, we plot trends in executive ownership, blockholding and ratio of non-executives on total board, for RBP, NRBP and ARBP firms. No significant "break" is documented in these variables. Figures 1.j, 2.j and 3.j show how dividends also remain relatively constant in time. In other words, no significant change is detected in any of these variables.

Further, a sound and consistent result from the ownership and performance literature is that we would expect a significantly lower firm valuation in the presence of managerial entrenchment (i.e., during low-leverage periods). An examination of the average market to book ratios for RBP firms in Figures 1.g, 2.g and 3.g, however, provides no evidence of sharp increase in market to book when there is a change in the leverage policy. On the contrary, depending on the specification, a steadily increasing average firm value (Figures 1.g and 2.g) or, a relatively stable but larger than other groups average firm value (Figure 3.g), is detected for these companies.

Overall, this evidence does not appear to be consistent with the view that low-leverage may be driven by managerial entrenchment issues.

6. Conclusions

The focus of this work was to systematically investigate the interactions between a specific capital structure characteristic, that is, low-leverage policy, and the capital expenditures of firms. Our argument, based on the ideas of Modigliani and Miller (1963) and Myers (1984), maintains that those firms that anticipate financial constraints in the future respond to these potential constraints by accumulating reserve borrowing power. In fact, through a policy of low leverage for a certain number of years (t-n … t-1), companies may accumulate financial flexibility that allows them to have access to the external market at time t (RBP firms), and to be able to raise funds to invest more than their internal funds would allow them to do.

To investigate whether this hypothesis is supported by the actual behaviour of a large sample of UK non-financial listed firms between 1991 and 2001, we conducted two types of analyses. First, we estimated an investment model augmented by those variables that represent the leverage policy *status*, that is, RBP dummies and their interaction with the cash flow sensitivity. Second, we described the intertemporal behaviour of RBP firms, in terms of their investment and financial decisions, and their characteristics, in terms of growth opportunities, dividend policy and size before and after the analyzed investment decision.

Our findings contrast with Graham (2000), in that low-leverage (LL) policy appears to be transitory. On average, firms maintain this status for an average of 2.6 consecutive years. Further, RBP firms are able, after a period of LL, to invest significantly more in capital expenditures.

Our intertemporal analysis tends to corroborate our predictions, revealing that, after a period of two/three years of being LL, RBP firms sharply increase their amount of capital expenditures with respect to the previous years, and they are able to invest "better". Indeed, we identify an increase in investment "spikes" after firms acquire RBP status, and an increase in average market to book ratio. In addition, we provide evidence that, after being LL, firms close the deviation from their target leverage via new net debt issues.

Thanks to a robustness check over a longer time series, we are able to show that, in fact, these firms have a long-term financing pattern that is more consistent with the trade-off theory. In other words, it seems that their capital structures revert back, after an abnormal investment, to those levels of leverage that preceded the accumulation period of borrowing power.

Furthermore, they appear to experience a reduction in internal funds (cash), and seem to be able to steadily increase their average value through this policy.

Finally, we provide several robustness checks of alternative leverage model specifications, and also different methodologies to define LL. The results are similar in all cases, and support the soundness of our initial predictions.

Table 1. Variables definitions.

Panel A. Economic variables	
Lev	Ratio of total debt to total assets
Mtbv	Ratio of book value of total assets minus book value of equity plus market value of equity to book value of assets
Size	Natural logarithm of total assets
Collateral	Ratio of fixed assets to total assets
Profitability	Ratio of the earnings before interest, tax and depreciation (EBITD) to total assets
Cash	Ratio of total cash and equivalents to total assets
Maturity	Ratio of loans repayable after one year to total debt
Div	Ratio of total payment dividend to total assets
Ndts	Ratio of annual depreciation expense to total assets
Spike Value	It is defined over a pattern of three years of investment data. The average value of investments is calculated in the extreme years. The spike exists in this pattern only if the investment value in the central year is at least twice the average of the extremes.
Debt Issue	Ratio of net debt issued in each year to total assets
Equity Issue	Ratio of net equity issued in each year to total assets
R&D	Research and Development expenditures on total assets
Capital Expenditures	Capital Expenditures on total assets
Tax	Total tax charge divided by pre-tax profits
I	Due to changes in company accounts definitions in 1991, until 1991 it is equal to the total new fixed assets; from 1991 it is equal to the sum of payments for fixed assets and the net of fixed assets of subsidiaries.
K	Capital stock is measured on a replacement cost basis. For the first observation, the replacement cost is assumed equal to the historic cost of total net fixed assets, adjusted for inflation. For the following observations, a standard perpetual inventory method process is adopted as follows: $K_{it} = K_{it-1}\left(1-\delta\right)+I_{it}$, where δ is the rate of depreciation assumed to be 0.08.
CF	Cash flow equal to the operating profits before tax, interest and preference dividends plus depreciation of fixed assets
IK	Investment to capital stock
CFK	Cash flow to capital stock
Q	Market value of assets to capital stock
RBP2	Dummy equal to 1 if a company is identified as low-leverage for the two consecutive years before the analyzed investment decision, and 0 otherwise
interRBP2	Interaction term between RBP2 and CFK
RBPpct2	Dummy equal to 1 if a company has a negative deviation from its target larger than at least 25% of all undershooting firms for the two consecutive years before the analyzed investment decisions, and 0 otherwise
interRBPpct2	Interaction term between RBPpct2 and CFK
RBP3	Dummy equal to 1 if a company is identified as low-leverage for the three consecutive years before the analyzed investment decision, and 0 otherwise
interRBP3	Interaction term between RBP3 and CFK
RBPpct3	Dummy equal to 1 if a company has a negative deviation from its target larger than at least 25% of all undershooting firms for the three consecutive years before the analyzed investment decisions, and 0 otherwise
interRBPpct3	Interaction term between RBPpct3 and CFK
Panel B. Ownership variables	
Man	Sum of ordinary shareholdings by all directors (%)
Blockholding	Sum of all external shareholdings above 3%
Ratio	The proportion of non-executive directors on total board

Table 2. Classification of firms. Panel A.

Firm id	year	deviation	LL-status	RBP
AAA	1991	N/A	N/A	N/A
AAA	1992	<	1	N/A
AAA	1993	<	1	N/A
AAA	1994	<	1	N/A
AAA	1995	>	0	1
AAA	1996	>	0	0
AAA	1997	<	1	0
AAA	1998	<	1	0
AAA	1999	<	1	0
AAA	2000	<	1	1
AAA	2001	<	1	1

This table provides a brief example, showing how the RBP dummy was generated. Deviation represents the difference between the predicted target leverage and the actual value. LL stands for low-leverage.

Table 2. Classification of firms. Panel B.

	NRBP	RBP	ARBP	TOTAL
Target method	277	270	66	613
Percentile method	385	176	52	613

This table reports the classification of firms between never having been classified as having *reserve borrowing power* (NRBP), having been classified as having attained *reserve borrowing power* (RBP) and those which are always classified as *reserve borrowing power* (ARBP).

Table 3. Descriptive statistics.

	Mean	St.dev.	25^{th} perc	Median	75^{th} perc
Lev	0.17	0.13	0.07	0.16	0.25
Mtbv	1.50	0.80	0.99	1.29	1.75
Size	11.27	1.80	9.98	11.05	12.40
Collateral	0.34	0.21	0.19	0.31	0.46
Profitability	0.13	0.10	0.09	0.13	0.18
Cash	0.10	0.12	0.02	0.06	0.14
Maturity	0.47	0.34	0.11	0.50	0.76
Dividends	0.03	0.02	0.01	0.02	0.04
Ndts	0.04	0.03	0.02	0.04	0.05
Man	10.05	15.79	0.18	2.12	13.28
Blockholding	31.63	18.75	16.77	30.20	45.17
Ratio	0.41	0.16	0.33	0.42	0.50
IK	0.12	0.14	0.06	0.11	0.18
CFK	0.32	0.22	0.19	0.29	0.42
Q	2.78	2.64	1.18	1.89	3.39

This table reports the descriptive statistics of the main variables included in both leverage and investment models. LEV is defined as the ratio of total debt to total assets; *Mtbv* is equal to the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of total assets; *Size* represents the natural logarithm of total assets in 1991 prices; *Collateral* is defined as the ratio of Fixed Assets to total assets; *Profitability* is the ratio of the earnings before interest, tax and depreciation (EBITD) to total assets; *Man* is equal to the sum of ordinary shareholdings held by executive directors (%); *Blockholding* is the sum of the external (non-managerial) shareholdings above 3%; *Ratio* is equal to the proportion of non-executives to total number of directors; *Cash* is defined as the ratio of total cash and equivalents to total assets; *Maturity* represents the ratio of loans repayable after one year to total debt; *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax to total assets; *Ndts* (Non-Debt Tax Shield) is defined as the ratio of annual depreciation expense to total assets. *IK* is defined as the ratio of investment to capital stock; *CFK* is equal to the ratio of cash flow to capital stock; *Q* represents the ratio of market value of assets to capital stock.

Table 4. Leverage models.

	Spec.1	Spec.2	Spec.3
lev$_{t-1}$	0.700***	0.717***	0.682***
	[0.000]	[0.000]	[0.000]
mtbv	0.012	0.013	0.002
	[0.119]	[0.229]	[0.305]
size	0.017***	0.016***	0.012***
	[0.000]	[0.000]	[0.000]
collateral	0.071**	0.093***	0.058**
	[0.036]	[0.002]	[0.033]
profitability	-0.114*	-0.099*	-0.131***
	[0.073]	[0.097]	[0.003]
man		0.001*	0.00
		[0.097]	[0.218]
blockholding		-.000062	-0.003**
		[0.236]	[0.043]
ratio		0.053	0.039*
		[0.130]	[0.082]
cash			-0.073**
			[0.045]
maturity			0.045***
			[0.000]
dividends			-0.16
			[0.527]
ndts			-0.25
			[0.140]
Observations	5660	5660	5660
Number of firms	677	677	677
Implied adj. Factor	0.300	0.283	0.317
Sargan test	334.27	382.58	478.98
	[0.354]	[0.205]	[0.221]
m1 test	-12.79***	-12.78***	-12.46***
	[0.000]	[0.000]	[0.000]
m2 test	-0.68	-0.65	-0.72
	[0.495]	[0.515]	[0.471]

This table presents GMM-SYS regressions predicting leverage choices. The estimation period is 1991-2001. In GMM estimations all the regressors are dated at time [t], except for the lagged dependent variable at [t-1]. The models are a linear system of the first differenced and levels equations. The instruments are the levels dated [t-2…t-5] of all regressors for the first differenced equations and the first differences dated [t-2] for the level equations. In GMM model time dummies are included. Asymptotic standard errors robust to heteroskedasticity are used in all the estimations. P-values are reported in parentheses. Sargan test is a test of overidentifying restrictions, distributed as chi-square under the null of instrument validity; m1 and m2 are test statistics for first and second order autocorrelations in residuals, respectively, distributed as standard normal N(0,1) under the null of no serial correlation; the adjustment factor is calculated from the estimated coefficient of the lagged dependent variable. *Lev* is defined as the ratio of total debt to total assets; *mtbv* is equal to the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of total assets; *size* represents the natural logarithm of total assets in 1991 prices; *collateral* is defined as the ratio of Fixed Assets to total assets; *profitability* is the ratio of the earnings before interest, tax and depreciation (EBITD) to total assets; *man*

is equal to the sum of ordinary shareholdings held by executive directors (%); *blockholding* is the sum of the external (non-managerial) shareholdings above 3%; *ratio* is equal to the proportion of non-executives to total number of directors; *cash* is defined as the ratio of total cash and equivalents to total assets; *maturity* represents the ratio of loans repayable after one year to total debt; *dividends* is the ratio of ordinary dividends net of Advance Corporation Tax to total assets; *ndts* (Non-Debt Tax Shield) is defined as the ratio of annual depreciation expense to total assets.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5. Investment models.

	A	B	C	D	E	F	G	H	I
IK_{t-1}	0.108***	0.100***	0.097***	0.098***	0.103***	0.094***	0.099***	0.101***	0.111***
	[0.001]	[0.002]	[0.008]	[0.002]	[0.002]	[0.003]	[0.002]	[0.002]	[0.000]
lCFK	0.150*	0.121	0.167**	0.144*	0.162**	0.123	0.204**	0.134*	0.150**
	[0.057]	[0.138]	[0.044]	[0.084]	[0.044]	[0.124]	[0.018]	[0.097]	[0.046]
Q	0.021***	0.021***	0.020***	0.019***	0.021***	0.021***	0.023***	0.020***	0.021***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
RBP2		0.064***	0.113***						
		[0.000]	[0.009]						
interRBP2			-0.158						
			[0.159]						
RBPpct2				0.062***	0.137***				
				[0.000]	[0.010]				
interRBPpct2					-0.221*				
					[0.092]				
RBP3						0.082***	0.202***		
						[0.000]	[0.001]		
interRBP3							-0.375***		
							[0.009]		
RBPpct3								0.036*	0.104
								[0.065]	[0.125]
interRBPpct3									-0.206
									[0.207]
Observations	4006	4006	4006	4006	4006	4006	4006	4006	4006
Number of firms	613	613	613	613	613	613	613	613	613
Sargan test	58.55	62.90	95.78	63.23	83.81	62.71	92.31	59.20	70.14
	[0.529]	[0.374]	[0.210]	[0.363]	[0.393]	[0.380]	[0.304]	[0.505]	[0.777]
m1 test	-7.84	-7.60	-7.13	-7.79	-7.60	-7.65	-7.48	-7.80	-8.07
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
m2 test	-1.00	-0.81	-0.86	-1.10	-1.13	-1.12	-0.99	-1.03	-0.94
	[0.318]	[0.419]	[0.389]	[0.271]	[0.260]	[0.261]	[0.322]	[0.303]	[0.349]

This table shows the GMM results for the investment model with the leverage *status* dummies computed from the estimation of the "complete" leverage model (that is, R&Z augmented by the ownership and other financial characteristics). The estimation period for GMM is 1994-2001, depending on the availability of leverage *status* dummies. GMM is the model in the first differences with levels dated [t-2, t-5] of all regressors as instruments. In GMM model time dummies are included. Asymptotic standard errors robust to heteroskedasticity are used in all the estimations. P-values are reported in parentheses. Sargan test is a test of overidentifying restrictions, distributed as chi-square under the null of instrument validity; m1 and m2 are test statistics for first and second order autocorrelations in residuals, respectively, distributed as standard normal N(0,1) under the null of no serial correlation. *IK* is defined as the ratio of investment to capital stock; *CFK* is equal to the ratio of cash flow to capital stock; *Q* represents the ratio of market value of assets to capital stock; *RBP2* is a dummy equal to 1 if a company is identified as low-leverage for the two consecutive years before the analyzed investment decision and 0 otherwise; *RBP3* is a dummy equal to 1 if a company is identified as low-leverage for the three consecutive years before the analyzed investment decision and 0 otherwise; *RBPpct2* is a dummy equal to 1 if a company has a negative deviation from its target larger than at least 25% of all undershooting firms for the two consecutive years before the analyzed investment decisions and 0 otherwise; *RBPpct3* is a dummy equal to 1 if a company has a negative deviation from its target larger than at least 25% of all undershooting firms for the three consecutive years before the analyzed investment decisions and 0 otherwise; *interRBP2* is the interaction term between *RBP2* and *CFK*; *interRBP3* is the interaction term between *RBP3* and *CFK*; *interRBPpct2* is the interaction term between *RBPpct2* and *CFK*; *interRBPpct3* is the interaction term between *RBPpct3* and *CFK*. * significant at 10%; ** significant at 5%; *** significant at 1%.

Figure 1. **Firm behaviour in time.**

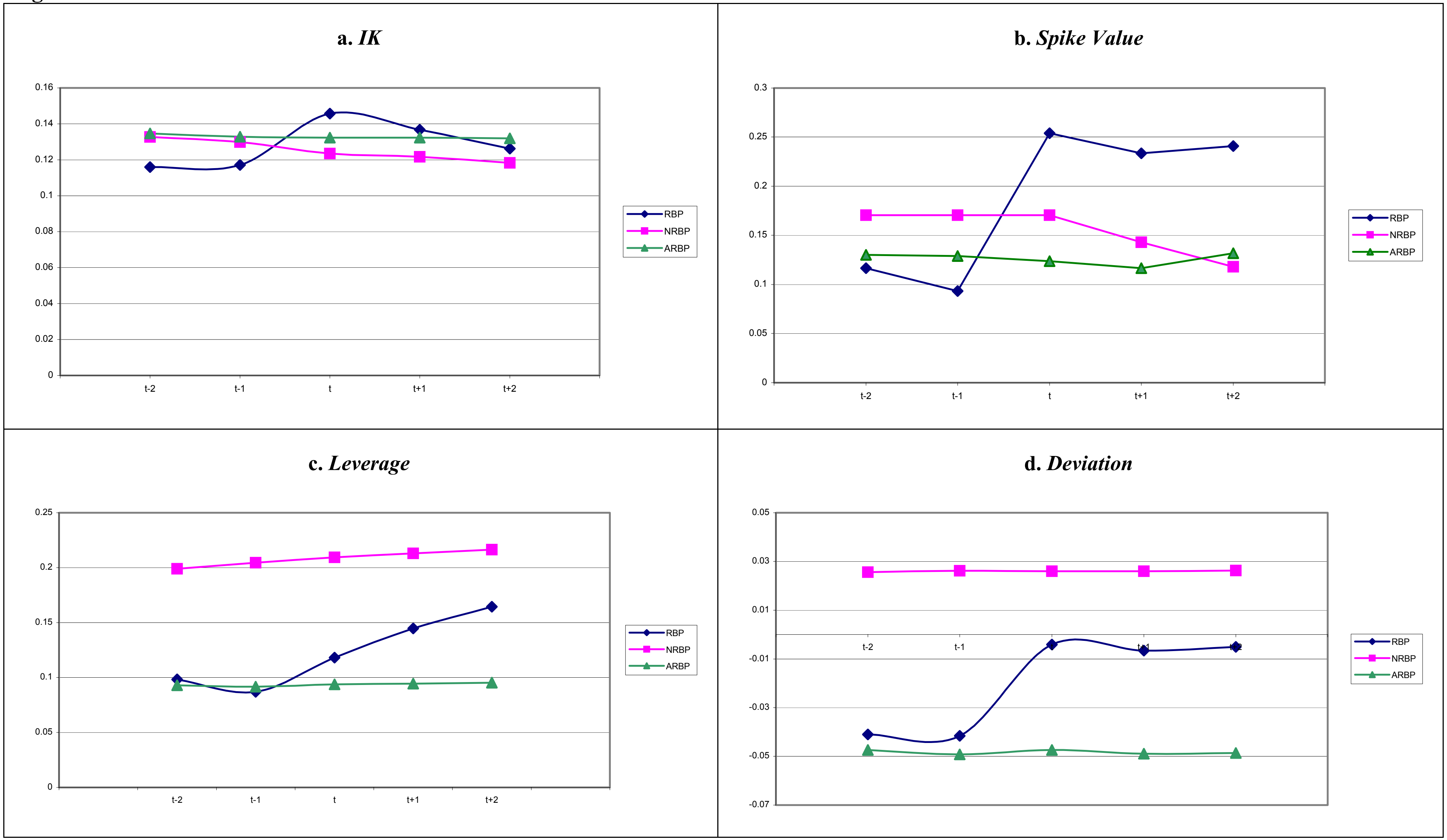
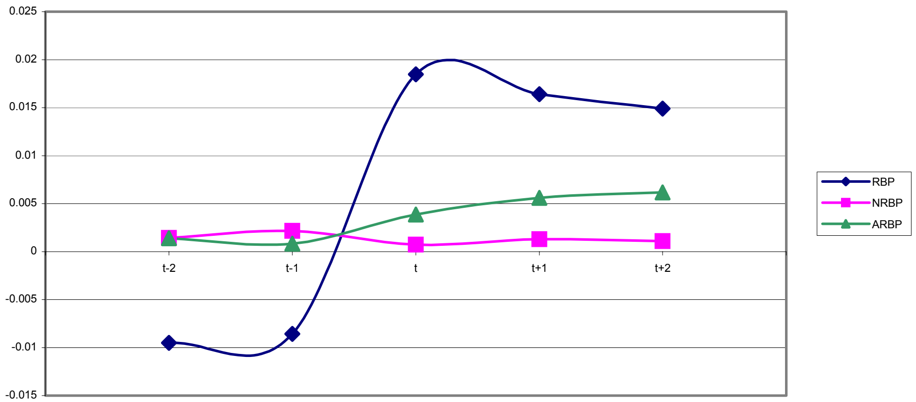
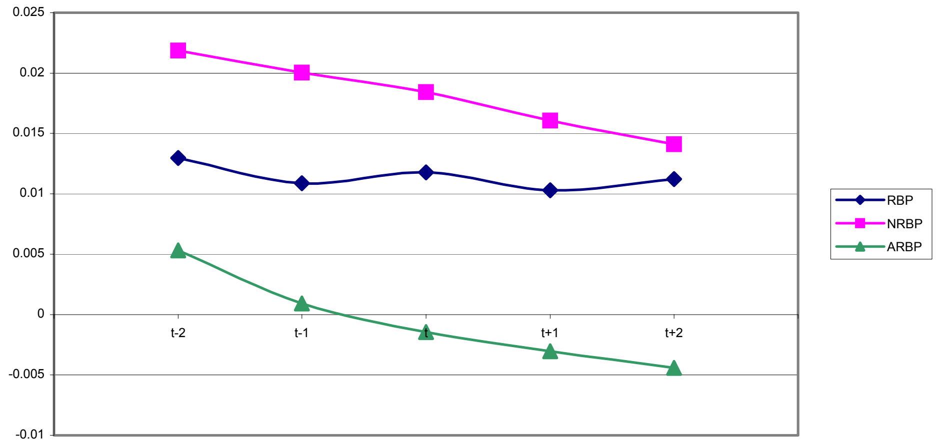


Figure 1. Firm behaviour in time (continued).

e. ***Net Debt Issued***



f. ***Net Equity Issued***



g. ***Cash***

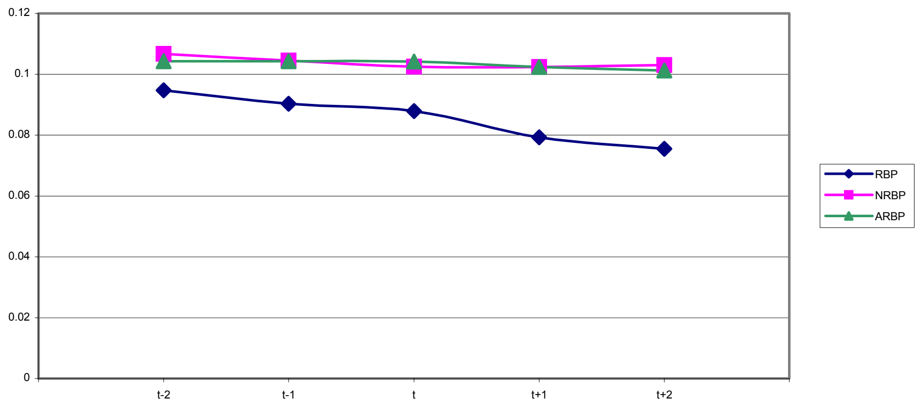
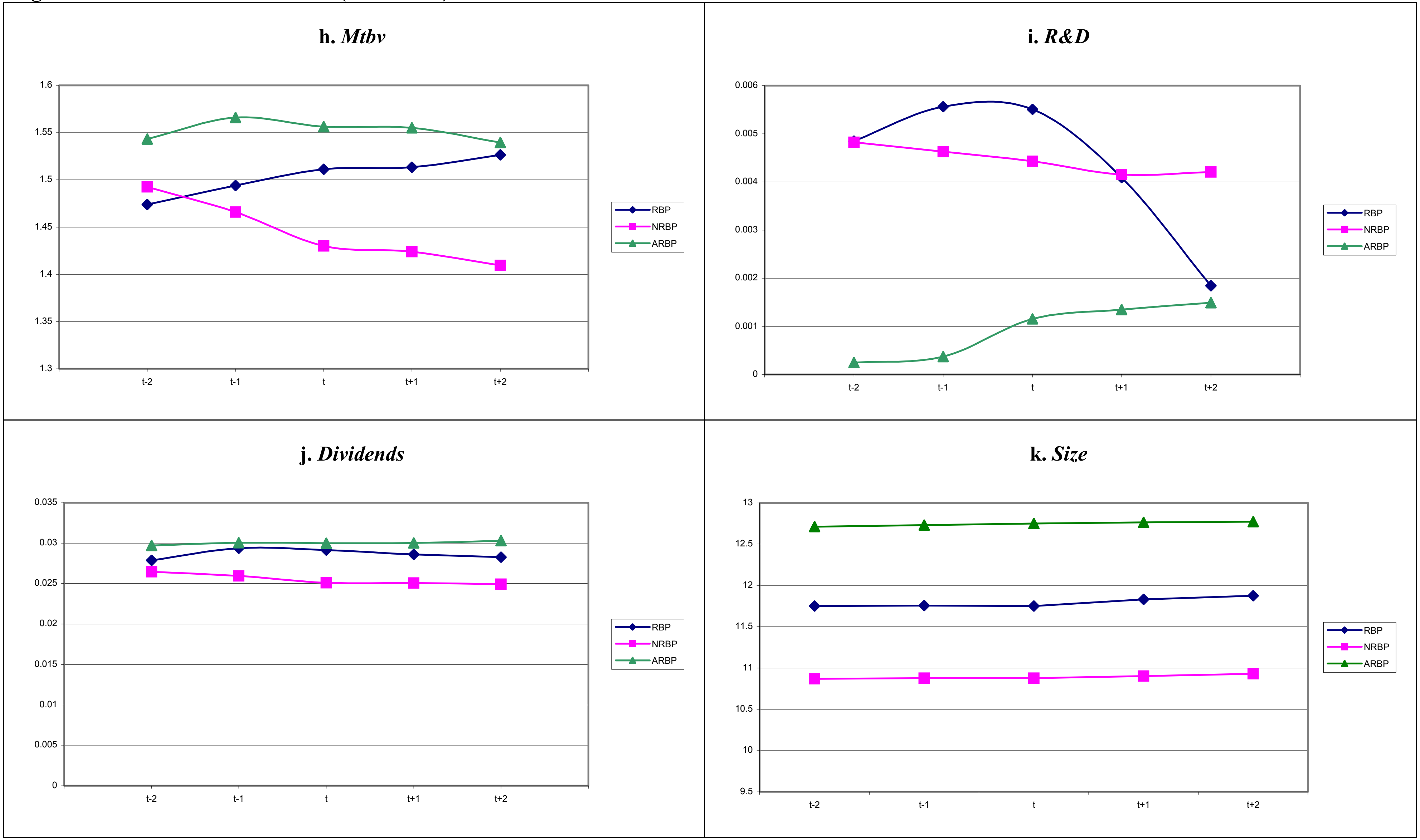


Figure 1. **Firm behaviour in time (continued).**



These figures are constructed with the leverage *status* dummies derived from the complete leverage model (specification 3). Firms are divided in three categories here: RBP are firms that at some point in time are identified with RBP=1 and they are separated from those firms that are always “low-leverage” for the entire period which are clarified as ARBP. NRBP are those that are never identified as RBP. At time t the capital expenditures of RBP firms are examined after a period of low-leverage policy. The analysis of the trends for each firm characteristic is conducted before and after this defining moment (from t-2 to t+2). *IK* is defined as the ratio of investment to capital stock; *Spike Value* is defined over a pattern of 3 years of investment data. The average value of investments is calculated in the extreme years. Thus, there is a spike in this pattern only if the investment value in the central year is at least twice the average of the extremes; *Leverage* is defined as the ratio of total debt to total assets; *Deviation* represents the difference between the actual and predicted level of leverage for each firm; *Net Debt Issued* is the ratio of net debt issued in each year to total assets; *Net Equity Issued* represents the ratio of net equity issued in each year to total assets; *Cash* is defined as the ratio of total cash and equivalents to total assets; *Mtbv* is equal to the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of total assets; R&D is equal to the ratio of total intangible assets to total assets; *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax to total assets; *Size* represents the natural logarithm of total assets in 1991 prices.

Table 6. Investment models derived from alternative leverage models.

	1	1	2	2	3	3	4	4
IK_{t-1}	0.112***	0.097***	0.109***	0.100***	0.107***	0.095***	0.095***	0.095***
	[0.001]	[0.004]	[0.002]	[0.006]	[0.002]	[0.005]	[0.000]	[0.000]
lCFK	0.059*	0.060*	0.063**	0.062*	0.058*	0.059**	0.058***	0.045**
	[0.058]	[0.055]	[0.044]	[0.065]	[0.068]	[0.041]	[0.003]	[0.024]
Q	0.012***	0.012***	0.012***	0.012***	0.013***	0.011***	0.013***	0.013***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
RBP3	0.074***	0.064***	0.085***	0.056	0.071***	0.032	0.069***	0.058***
	[0.000]	[0.006]	[0.000]	[0.180]	[0.000]	[0.312]	[0.000]	[0.000]
interRBP3		0.006		0.043		0.069		0.005
		[0.865]		[0.692]		[0.289]		[0.782]
Observations	4006	4006	4006	4006	4006	4006	8128	8128
Number of firms	613	613	613	613	613	613	873	873
Sargan test	62.74	80.29	60.25	83.98	63.65	82.84	250.07	320.61
	[0.380]	[0.470]	[0.467]	[0.359]	[0.349]	[0.392]	[0.195]	[0.156]
m1 test	-8.04	-8.07	-7.97	-7.60	-8.02	-8.08	-11.37	-11.38
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
m2 test	-1.18	-1.30	-1.10	-1.15	-1.21	-1.34	-0.57	-0.53
	[0.240]	[0.195]	[0.270]	[0.250]	[0.225]	[0.182]	[0.566]	[0.594]

This table shows the GMM results for the investment model with the leverage *status* dummies computed from the estimation of alternative leverage models. That is, specifications 1 derive from the RZ leverage model; specifications 2 from the RZ augmented by the ownership characteristics; specifications 3 from the complete leverage model augmented by the capital and R&D expenditures and taxes variables; specifications 4 from the RZ model estimated on a longer time series from 1985 to 2001. The estimation period for GMM in the first three specifications is 1994-2001, depending on the availability of leverage *status* dummies. For brevity reasons, we present here only the results for the leverage status dummies of RBP3 and interRBP3. GMM is the model in the first differences with levels dated [t-2, t-5] of all regressors as instruments. In GMM model time dummies are included. Asymptotic standard errors robust to heteroskedasticity are used in all the estimations. P-values are reported in parentheses. Sargan test is a test of overidentifying restrictions, distributed as chi-square under the null of instrument validity; m1 and m2 are test statistics for first and second order autocorrelations in residuals, respectively, distributed as standard normal N(0,1) under the null of no serial correlation. *IK* is defined as the ratio of investment to capital stock; *CFK* is equal to the ratio of cash flow to capital stock; *Q* represents the ratio of market value of assets to capital stock; *RBP3* is a dummy equal to 1 if a company is identified as low-leverage for the three consecutive years before the analyzed investment decision and 0 otherwise; *interRBP3* is the interaction term between *RBP3* and *CFK*. significant at 10%; ** significant at 5%; *** significant at 1%.

Figure 2. Firm behaviour in time over a longer time series.

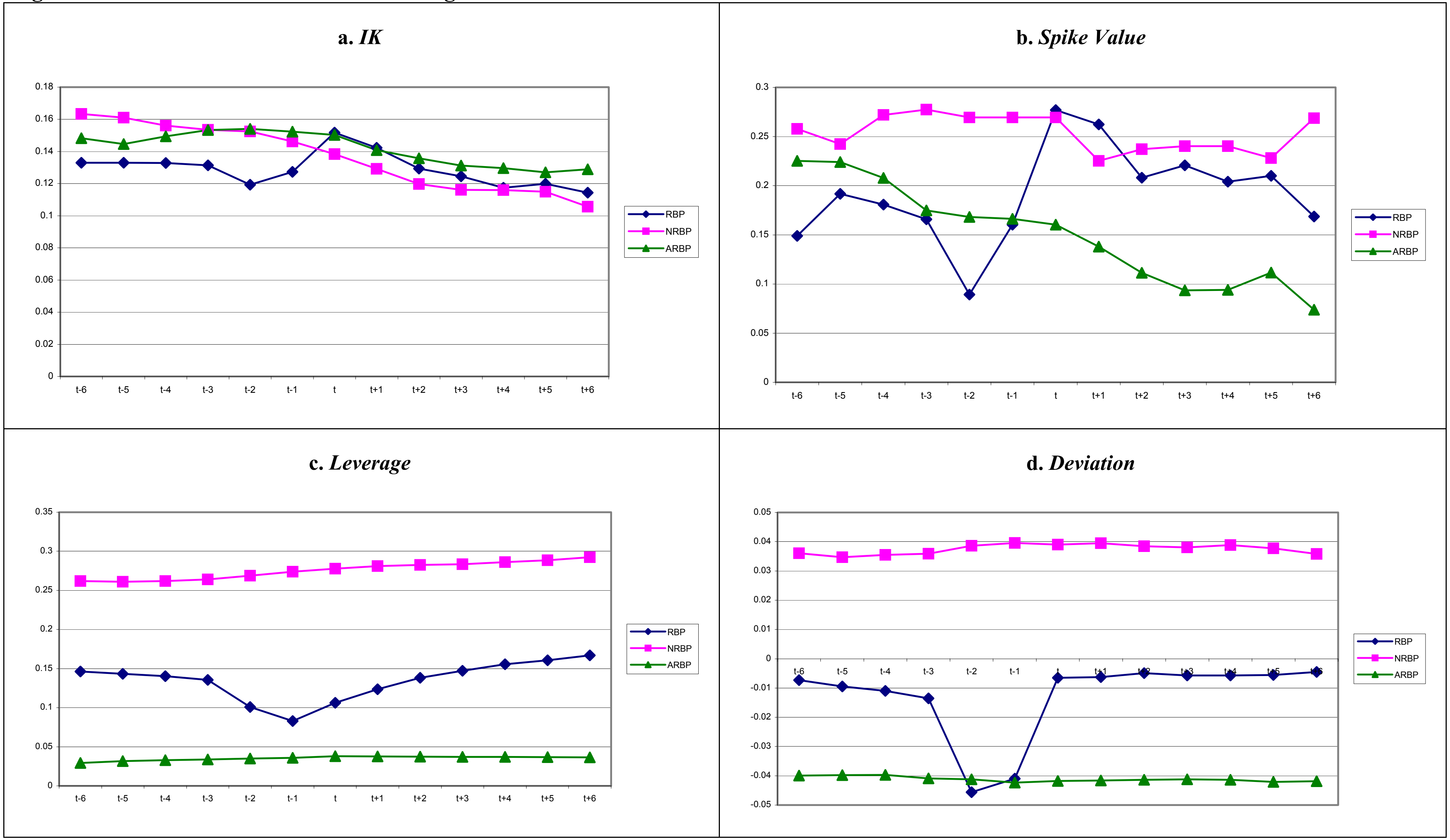
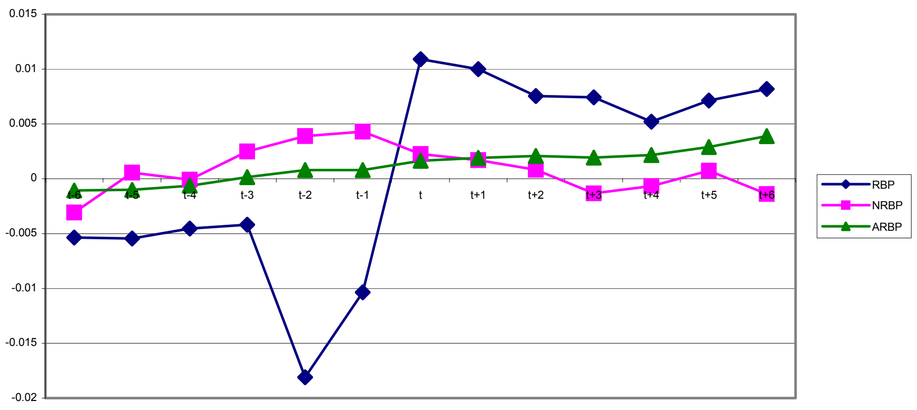
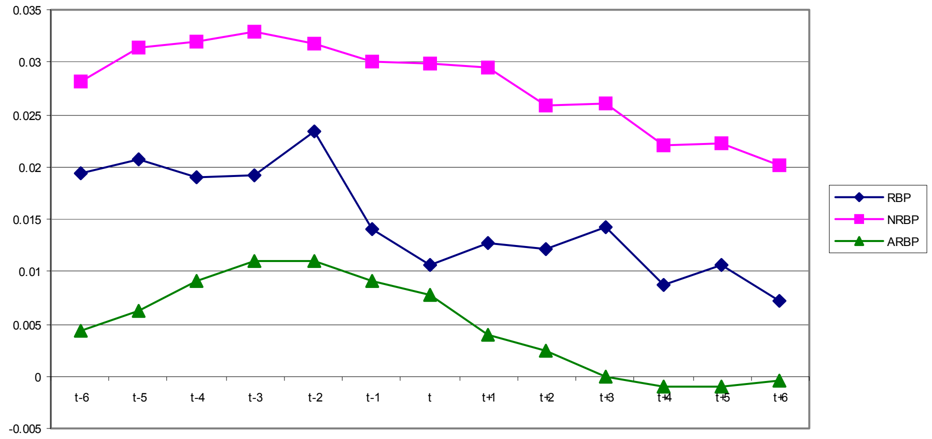


Figure 2. **Firm behaviour in time over a longer time series (continued).**

e. ***Net Debt Issued***



f. ***Net Equity Issued***



g. ***Cash***

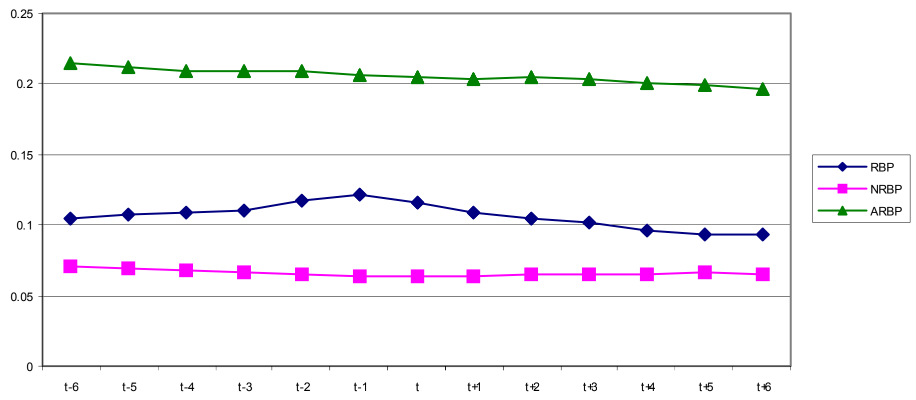
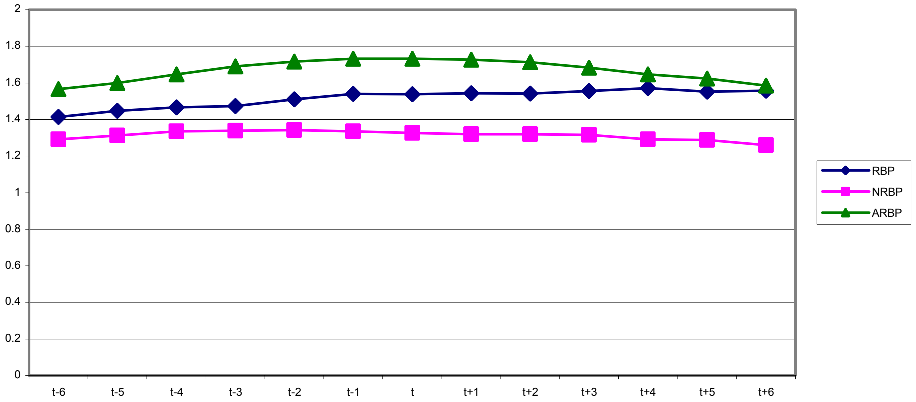
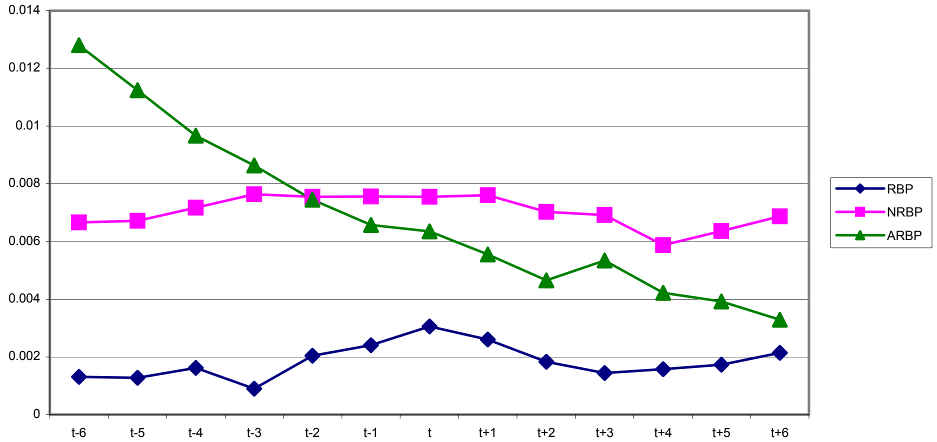


Figure 2. **Firm behaviour in time over a longer time series (continued).**

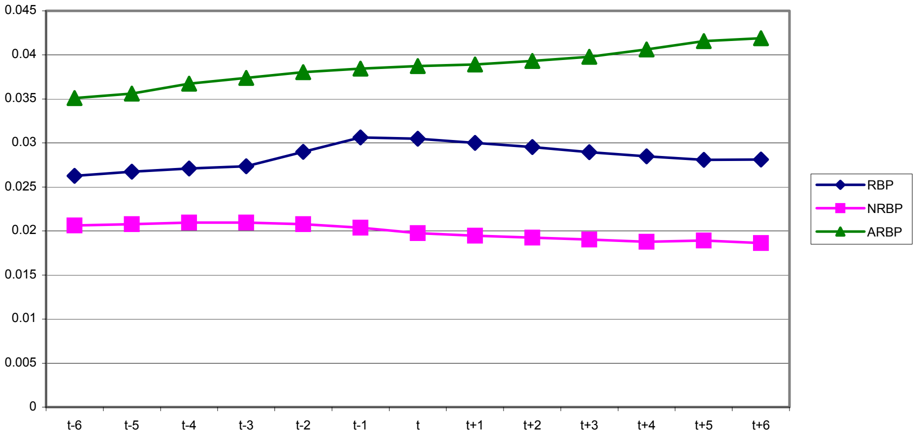
h. *Mtbv*



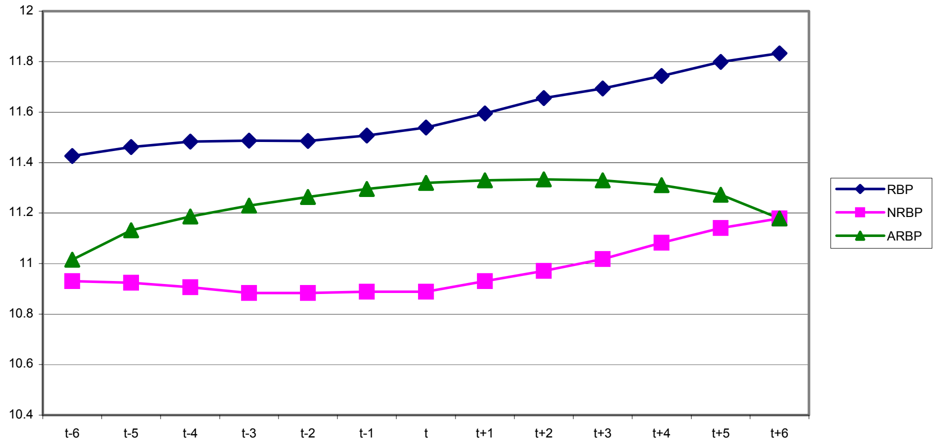
i. *R&D*



j. *Dividends*



k. *Size*



These figures are constructed with the leverage *status* dummies derived from the RZ leverage model over a longer time series (1985-2001). Firms are divided in three categories here: RBP are firms that at some point in time are identified with RBP=1 and they are separated from those firms that are always "low-leverage" for the entire period which are classified as ARBP. NRBP are those that are never identified as RBP. At time t the capital expenditures of RBP firms are examined after a period of low-leverage policy. The analysis of the trends for each firm characteristic is conducted before and after this defining moment (from t-6 to t+6). *IK* is defined as the ratio of investment to capital stock; *Spike Value* is defined over a pattern of 3 years of investment data. The average value of investments is calculated in the extreme years. Thus, there is a spike in this pattern only if the investment value in the central year is at least twice the average of the extremes; *Leverage* is defined as the ratio of total debt to total assets; *Deviation* represents the difference between the actual and predicted level of leverage for each firm; *Net Debt Issued* is the ratio of net debt issued in each year to total assets; *Net Equity Issued* represents the ratio of net equity issued in each year to total assets; *Cash* is defined as the ratio of total cash and equivalents to total assets; *Mtbv* is equal to the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of total assets; R&D is equal to the ratio of total intangible assets to total assets; *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax to total assets; *Size* represents the natural logarithm of total assets in 1985 prices.

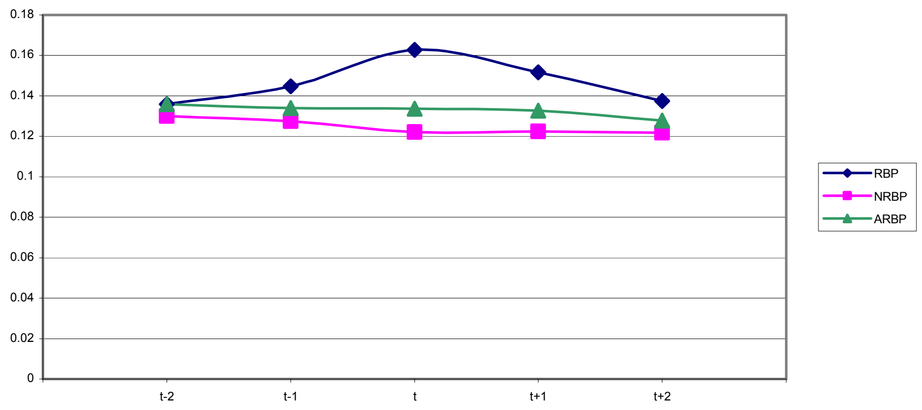
Table 7. Investment models with RBP status dummies computed through the percentile methodology.

	A	B	C	D	E	F	G
IK_{t-1}	0.108***	0.084***	0.112***	0.097***	0.086***	0.112***	0.107***
	[0.001]	[0.006]	[0.002]	[0.001]	[0.003]	[0.000]	[0.000]
lCFK	0.150*	0.092***	0.054	0.076***	0.093***	0.075***	0.091***
	[0.057]	[0.000]	[0.158]	[0.006]	[0.001]	[0.006]	[0.000]
Q	0.021***	0.014***	0.005*	0.011***	0.010***	0.010***	0.009***
	[0.000]	[0.000]	[0.092]	[0.003]	[0.000]	[0.003]	[0.002]
RBP2				0.079***	0.084***		
				[0.000]	[0.001]		
interRBP2					-0.001		
					[0.975]		
RBP3						0.069***	0.089***
						[0.003]	[0.002]
interRBP3							-0.048
							[0.326]
Observations	4006	2867	1366	4006	4006	4006	4006
Number of firms	613	385	176	638	638	638	638
Sargan test	58.55	82.43	83.75	64.69	84.02	64.69	84.02
	[0.529]	[0.435]	[0.395]	[0.316]	[0.358]	[0.316]	[0.358]
m1 test	-7.84	-7.59	-4.04	-7.76	-7.9	-7.76	-7.9
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
m2 test	-1.00	-0.86	-0.55	-0.91	-0.93	-0.91	-0.92
	[0.318]	[0.389]	[0.584]	[0.361]	[0.370]	[0.361]	[0.374]

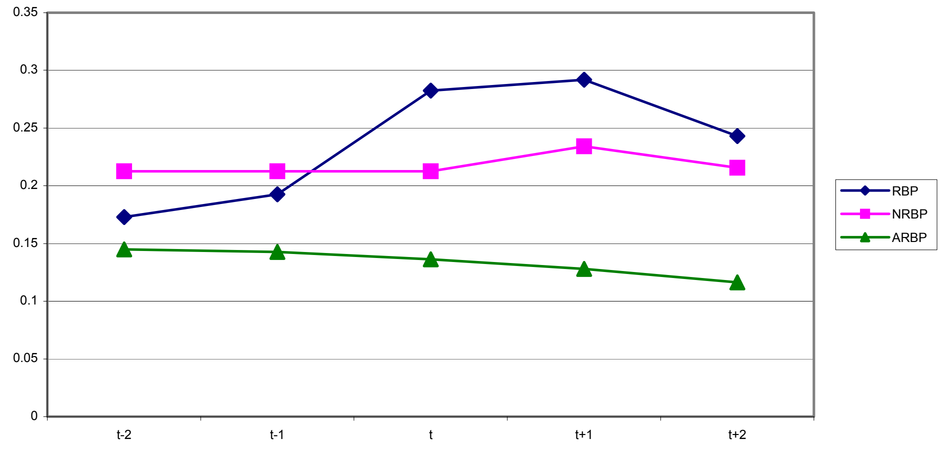
This table shows the GMM results for the investment model with the leverage *status* dummies computed through the percentile methodology. The estimation period for GMM is 1993-2001, depending on the availability of leverage *status* dummies. GMM is the model in the first differences with levels dated [t-2, t-5] of all regressors as instruments. In GMM model time dummies are included. Asymptotic standard errors robust to heteroskedasticity are used in all the estimations. P-values are reported in parentheses. Sargan test is a test of overidentifying restrictions, distributed as chi-square under the null of instrument validity; m1 and m2 are test statistics for first and second order autocorrelations in residuals, respectively, distributed as standard normal N(0,1) under the null of no serial correlation. *IK* is defined as the ratio of investment to capital stock; *CFK* is equal to the ratio of cash flow to capital stock; *Q* represents the ratio of market value of assets to capital stock; *RBP2* is a dummy equal to 1 if a company is identified as low-leverage (with the percentile methodology) for the two consecutive years before the investment decision and 0 otherwise; *RBP3* is a dummy equal to 1 if a company is identified as low-leverage (with the percentile methodology) for the three consecutive years before the investment decision and 0 otherwise; *interRBP2* is the interaction term between *RBP2* and *CFK*; *interRBP3* is the interaction term between *RBP3* and *CFK*. * significant at 10%; ** significant at 5%; *** significant at 1%.

Figure 3. Firm behaviour in time with RBP status dummies computed through the percentile methodology.

a. ***IK***



b. ***Spike Value***



c. ***Leverage***

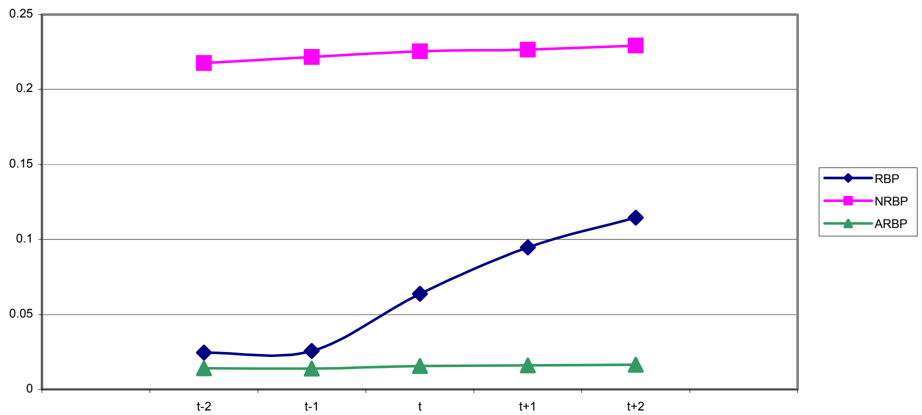
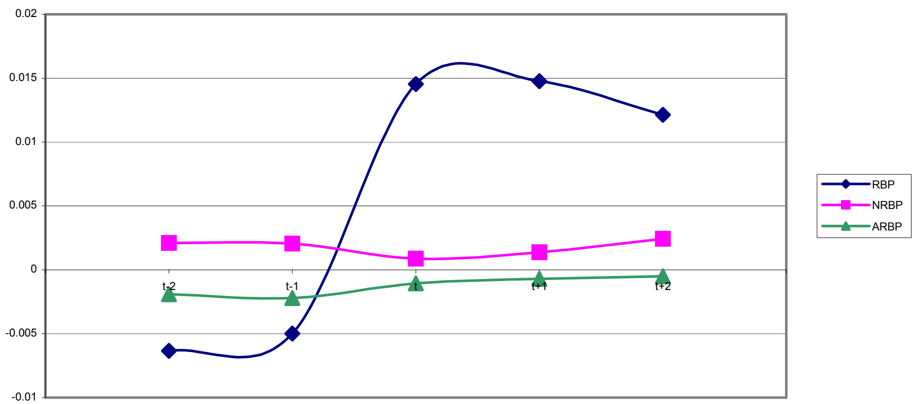
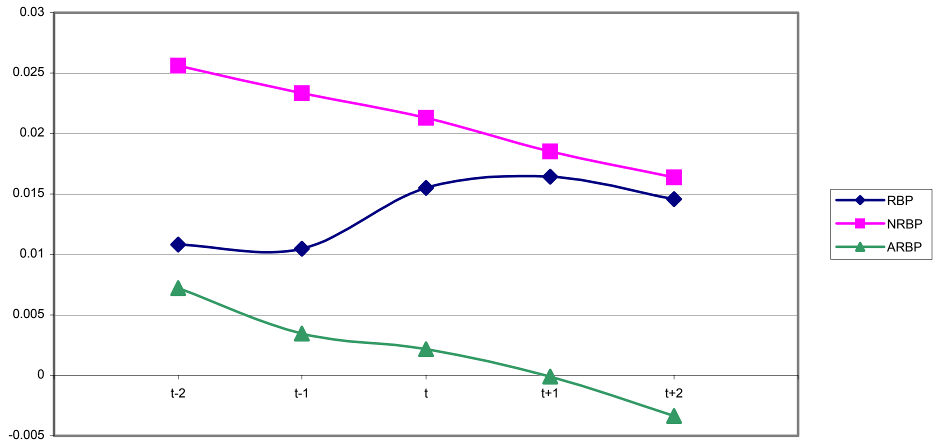


Figure 3. Firm behaviour in time with RBP status dummies computed through the percentile methodology (continued).

d. *Net Debt Issued*



e. *Net Equity Issued*



f. *Cash*

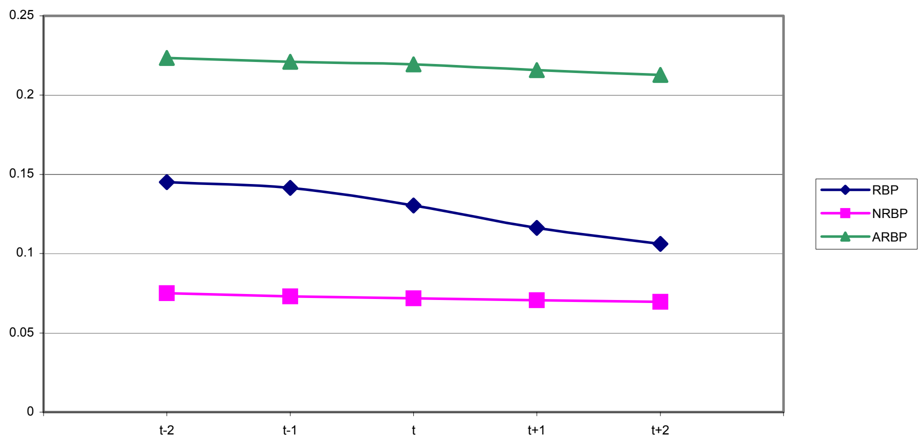
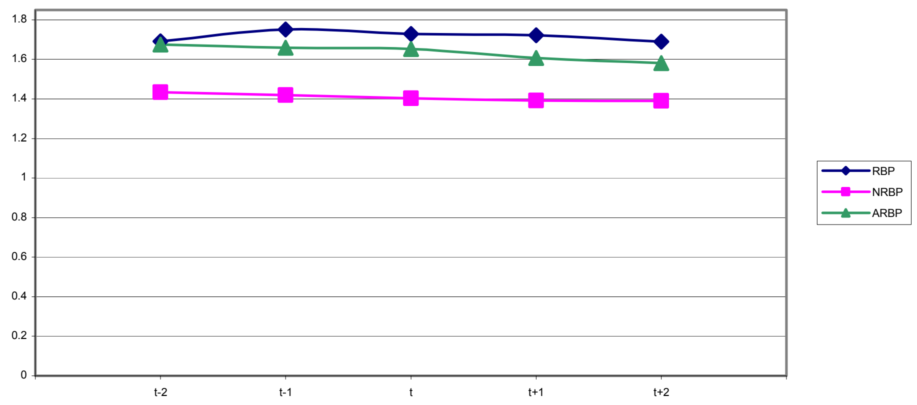
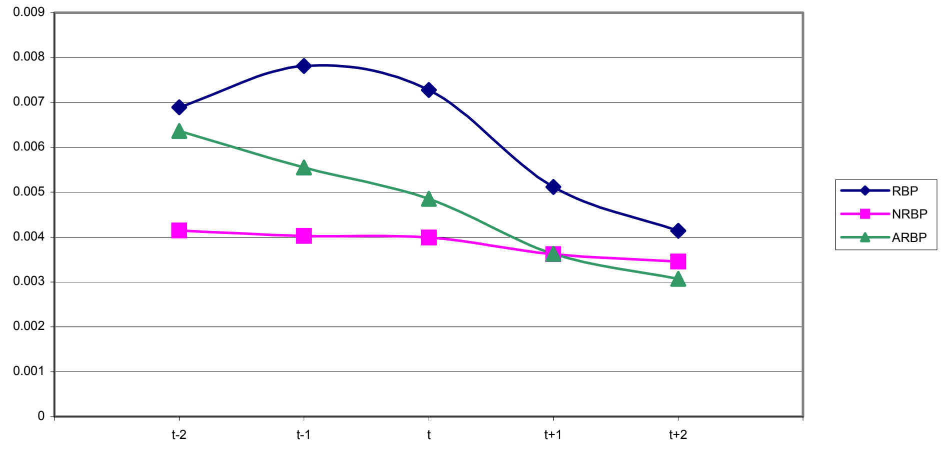


Figure 3. Firm behaviour in time with RBP status dummies computed through the percentile methodology (continued)

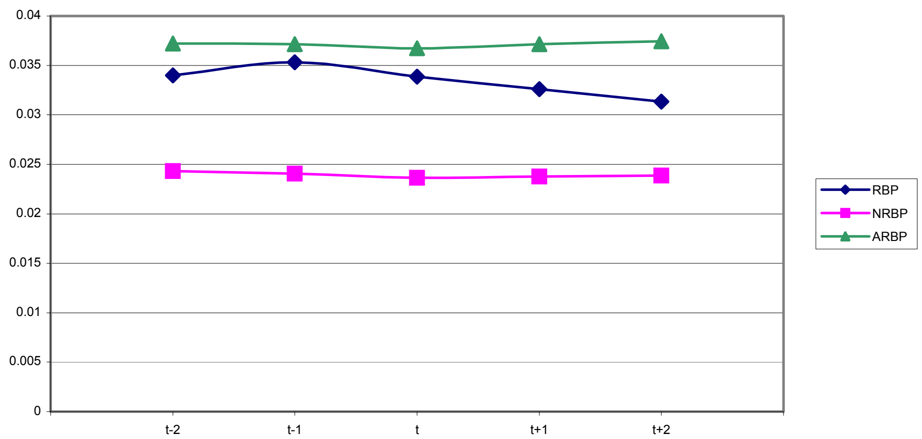
g. *Mtbv*



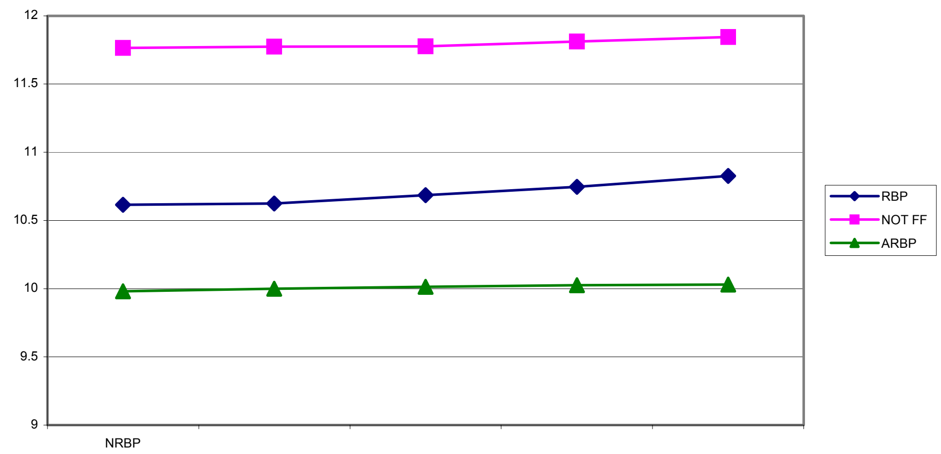
h. *R&D*



i. *Dividends*



j. *Size*



These figures are constructed with the leverage *status* dummies derived from the percentile methodology. Firms are divided in three categories here: RBP are firms that at some point in time are identified with RBP=1 and they are separated from those firms that are always "low-leverage" for the entire period which are classified as ARBP. NRBP are those that are never identified as RBP. At time t the capital expenditures of RBP firms are examined after a period of low-leverage policy. The analysis of the trends for each firm characteristic is conducted before and after this defining moment (from t-2 to t+2).). *IK* is defined as the ratio of investment to capital stock; *Spike Value* is defined over a pattern of 3 years of investment data. The average value of investments is calculated in the extreme years. Thus, there is a spike in this pattern only if the investment value in the central year is at least twice the average of the extremes; *Leverage* is defined as the ratio of total debt to total assets; *Deviation* represents the difference between the actual and predicted level of leverage for each firm; *Net Debt Issued* is the ratio of net debt issued in each year to total assets; *Net Equity Issued* represents the ratio of net equity issued in each year to total assets; *Cash* is defined as the ratio of total cash and equivalents to total assets; *Mtbv* is equal to the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of total assets; R&D is equal to the ratio of total intangible assets to total assets; *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax to total assets; *Size* represents the natural logarithm of total assets in 1991 prices.

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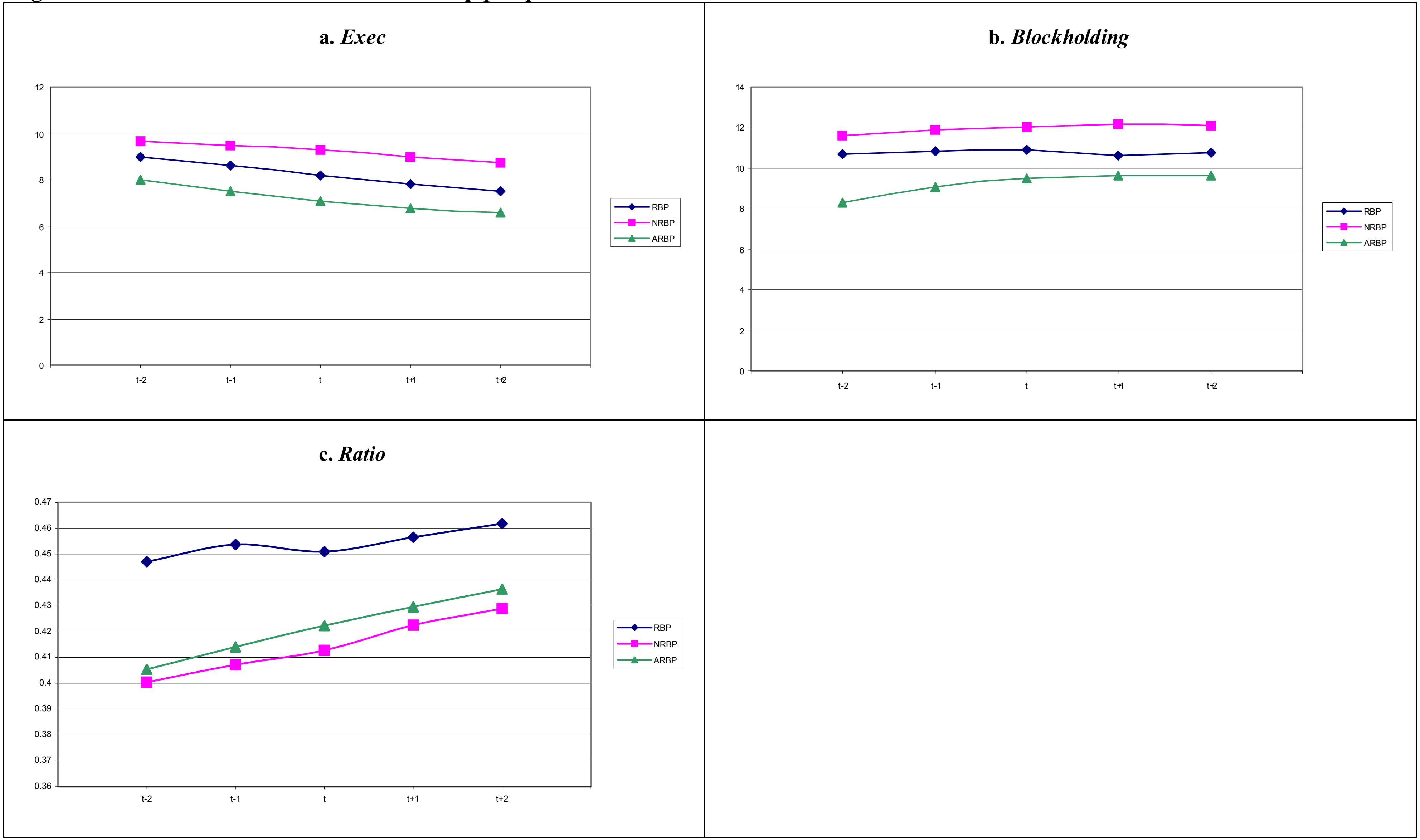
Table 8. Investment model: splits of the sample.

	A	B	C
IK_{t-1}	0.108***	0.082*	0.104**
	[0.001]	[0.089]	[0.040]
lCFK	0.150*	0.188*	0.13
	[0.057]	[0.065]	[0.127]
Q	0.021***	0.017***	0.027***
	[0.000]	[0.008]	[0.002]
Observations	4006	1720	1561
Number of firms	613	277	270
Sargan test	58.55	66.61	67.05
	[0.529]	[0.260]	[0.248]
m1 test	-7.84	-5.08	-5.19
	[0.000]	[0.000]	[0.000]
m2 test	-1.00	-0.50	-0.75
	[0.318]	[0.378]	[0.453]

This table shows the GMM results for the investment model. Specification "A" refers to the whole sample; specification "B" refers only to NRBP firms; specification "C" refers to RBP firms. The estimation period for the GMM is 1994-2001. GMM is estimated in first differences with levels dated [t-2, t-5] of all regressors as instruments. Time dummies are always included. Asymptotic standard errors robust to heteroskedasticity are used in all the estimations. P-values are reported in parentheses. Sargan test is a test of overidentifying restrictions, distributed as chi-square under the null of instrument validity; m1 and m2 are test statistics for first and second order autocorrelations in residuals, respectively, distributed as standard normal N(0,1) under the null of no serial correlation. *IK* is defined as the ratio of investment to capital stock; *CFK* is equal to the ratio of cash flow to capital stock; *Q* represents the ratio of market value of assets to capital stock. * significant at 10%; ** significant at 5%; *** significant at 1%.

Figure 4. Firm behaviour in time: an ownership perspective.



These figures are constructed with the leverage *status* dummies derived from the target methodology. Firms are divided in three categories here: RBP are firms that at some point in time are identified with RBP=1 and they are separated from those firms that are always "low-leverage" for the entire period which are classified as ARBP. NRBP are those that are never identified as RBP. At time t the capital expenditures of RBP firms are examined after a period of low-leverage policy. The analysis of the trends for each firm characteristic is conducted before and after this defining moment (from t-2 to t+2). *Exec* is defined as the sum of ordinary shareholdings by executive directors (%). *Blockholding* is defined as the sum of all external shareholdings above 3%. *Ratio* is defined as the proportion of non-executive directors on total board.

Appendix 1: The Partial Adjustment Model

The underlining assumption of a partial adjustment model is that firms have a LEV target (LEV$*_{it}$) that is a function of K firm-specific characteristics, ($\sum_{k=1}^{k} \beta_k X_{kit}$) and a disturbance term, (u_{it}).

$$\mathrm{LEV}_{it}^{*} = \sum_{k=1}^{k} \beta_k X_{kit} + u_{it} \qquad \text{(A1)}$$

Firms try to adjust their current LEV holding level to be closer to their target. This produces a partial adjustment process as follows:

$$\mathrm{LEV}_{it} - \mathrm{LEV}_{it-1} = \lambda\left(\mathrm{LEV}_{it}^{*} - \mathrm{LEV}_{it-1}\right) \qquad \text{(A2)}$$

where LEV_{it} is the current LEV holding, $\left(\mathrm{LEV}_{it}^{*} - \mathrm{LEV}_{it-1}\right)$ is the target change and λ is the adjustment factor or, in other words, what can effectively be adjusted.

If we substitute the function (A1) in the partial adjustment equation (A2) and include η_i and η_t, we obtain our model (A3)

$$\mathrm{LEV}_{it} = \delta \mathrm{LEV}_{it-1} + \sum_{k=1}^{k} \gamma_k X_{kit} + \eta_i + \eta_t + \nu_{it} \qquad \text{(A3)}$$

where now $\delta = (1 - \lambda)$, $\gamma_k = \lambda\beta_k$ and $v_{it} = \lambda u_{it}$. From the estimated coefficient of the lagged dependent variable, thus, we derive the estimated adjustment factor λ for our sample. λ can take any value between 0 and 1. If λ=1 there is an immediate adjustment ($\mathrm{LEV}_{it} = \mathrm{LEV}_{it}^{*}$) which, in turn, means that both the costs of adjustment are very low and the costs of being off-target are relatively high. On the other hand, if λ =0, implying $\mathrm{LEV}_{it} = \mathrm{LEV}_{it-1}$, the costs of adjustment are so high that firms cannot change their actual LEV holding level. This may also imply that the costs of being away from the target are negligible.

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