Link SUR to Harford on mergers (02-06)

Major Investments, Firm Financing Decisions, and Long-run Performance[*]

Ralf Elsas [a]
Mark J. Flannery [b]
Jon A. Garfinkel [c]

May 2006

Abstract

We assemble a sample of 1,558 large investments made by 1,185 firms over the period 1989-1999, and study two main issues: How do firms pay for these large investments? And how does the stock market subsequently evaluate them? We find that major investments are mostly externally financed. The pecking order and market timing effects on capital structure are transitory. Firms move toward target leverage ratios. Long-run abnormal stock returns are not generally consistent with the hypothesis that managers tend to overinvest with internal funds. Only firms financing large projects with (newly-raised) external funds exhibit reliably negative abnormal returns over the subsequent 1 – 3 years.

JEL Classification: G14, G31, G32

Keywords: firm financing, firm investments, long-run performance

[*] We thank, without implicating, Jay Ritter and Mike Ryngaert for helpful comments and Stas Nikolova for editorial assistance with the manuscript. Kasturi Rangan graciously provided our target debt estimates. This work was largely completed while Elsas was visiting the University of Florida. He gratefully acknowledges financial support from the German Research Foundation DFG under the grant EL 256/1-1.

[a] Institute for Finance and Banking, LMU München, elsas@bwl.uni-muenchen.de.

[b] Department of Finance, University of Florida, flannery@ufl.edu.

[c] Department of Finance, University of Iowa, jon-garfinkel@uiowa.edu.

1. Introduction

At its most basic level, corporate finance concerns the choice of new investments and decisions about how to finance those investments. Each of these decisions has been studied extensively, but usually in isolation from the other. However, it may be inappropriate to study financing and investment decisions separately. New investments must be financed, and the financing decision may itself affect firm value by changing investors' expectations. The connections between capital structure and investment decisions should be most apparent when a firm undertakes a large investment (Mayer and Sussman [2004]). We have assembled a sample of such firms and study their financing decisions and their long-run stock-market performance. We screen all Compustat firms to identify those that made "major" investments during the period 1989-1999. We separately identify major internal or "built" investments (Compustat item #128, "capital expenditures") and investments "acquired" from outside the firm (Compustat item #129, "acquisitions"). We then use Compustat flow-of-funds data to infer how these major investments were financed. We use this sample to study two questions. First, what determines the combination of equity and debt securities issued to finance large investments? Second, how do various combinations of investment types and financing sources affect a firm's long-run equity performance?

Our capital-structure results can be summarized as follows. We find that major investments are mostly externally financed, with new debt providing at least half the required funds in the year of the investment. Only about 15 - 20% of the typical investment is financed by the sale of equity, with internal funds supplying most of the remainder. In the event year, firm financing choices reflect some pecking order and market timing effects, but firms systematically revise their initial financing decisions in subsequent years. Retained earnings and new equity issues pay down debt. Ultimately, these financing decisions are consistent with the trade-off hypothesis about capital structure: a firm's external securities issuance reflects its position vis-à-vis a firm-specific, target debt ratio computed from the usual combination of firm features. We also find that financing proportions vary with firm size: smaller firms rely more on external equity funds, which seems inconsistent with the pecking order theory of capital structure (Frank and Goyal [2003], Fama and French

[2003]). Finally, the data reflect a tendency for firms with higher Tobin's Q to fund themselves by issuing new securities.

In the long run, major investment projects are followed by significant equity under-performance. However, financing decisions importantly affect these long-run returns. Investments funded out of the firm's *internal* resources are followed by insignificant abnormal returns, contradicting the hypothesis that managers routinely over-invest in net operating assets. This is particularly surprising because managers are often said to have considerable autonomy over free cash flow. In sharp contrast with the first result, we find that externally financed investments generate significant mean underperformance over the next year. This underperformance is greater for built investments than for acquisitions, and for any investment financed with debt(!). These results seem to challenge the conventional wisdom that debt serves as a disciplining device, or that outside monitors are most active when a firm is issuing new securities. They also suggest a need for future research into the differences between built and acquired investments.

The rest of this paper is organized as follows. Section 2 sets the stage for our analysis with a short literature review. Section 3 explains how we identify "major" investments, and describes the features of our resulting sample firms. Financing patterns for these investments are evaluated in Section 4, and the long-run performance results appear in Section 5. The next section reports some robustness results, and the paper concludes with a summary and a discussion of the implications for other research.

2. Literature Review

Finance theory has long hypothesized that a firm's capital structure affects its market value, although empirical evidence remains unclear about the specifics. For example, Shaym-Sunder and Myers [1999] conclude that the pecking order hypothesis describes their sample of large, long-lived firms. But Frank and Goyal [2003] show that small firms quite often issue equity, contradicting the pecking order's assumption that managers are reluctant to sell equity to relatively pessimistic outsiders. Other hypotheses about capital structure

focus on security mis-pricing or convergence toward a target capital structure. We consider all of these possibilities when analysing how firms finance large investment projects.

Long-run equity performance studies have produced two puzzling conclusions. First, firms raising external funds underperform otherwise comparable firms for up to five years following the financing event. This finding applies to most types of securities.[1] Although some of these conclusions do not withstand econometric refinements (Mitchell and Stafford [2000]), the broad implication that external fund-raising generates negative stock returns provides a serious challenge to conventional concepts of market efficiency. Second, poor stock returns follow large investments. Titman, Wei and Xie [2004] find that large increases in net operating assets (NOA) are associated with significant underperformance, especially for firms with large internal cash flows or low leverage. [2] Lyandres, Sun and Zhang (2005) also conclude that poor performance follows large NOA increases.

Our event firms include those making a large purchase of assets, which can be either a takeover, or the purchase of a plant or division. Some of our results will therefore link to the extant literature on mergers and acquisitions. Many studies conclude that the typical acquiring firm loses market value in the short term. The literature also finds that the means of payment for an acquisition significantly affects announcement returns, with equity-financed acquisitions generating more negative abnormal returns for the acquirer. However, the evidence on acquisitions' long-run returns is mixed. Franks, Harris, and Titman [1991] find no underperformance, but Loughran and Vijh [1997] and Mitchell and Stafford [2000] find that negative longer-run returns are most pronounced for stock-financed acquisitions.[3]

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[1] Ritter [2003] provides a comprehensive discussion of the long-run performance effects of securities issuance. See Spiess and Affleck-Graves [1999] and Datta, Iskandar-Datta, and Raman [2000] on bonds; Ritter [1991] and Spiess and Affleck-Graves [1995] on equity; Hertzel *et al.* [2002] on private equity; Billett, Flannery, and Garfinkel [forthcoming] on bank loans. Richardson and Sloan [2003] show that the effect of securities issuance depends on how the resulting funds are deployed.

[2] Titman, Wei and Xie [2004] evaluate data from 1973-1996 and identify a "takeover period" [1984-89] within which investments do not generate underperformance. Our sample (1989-99) mostly post-dates their takeover period.

[3] Previous studies of firm acquisitions often use the Securities Data Corporate (SDC) database to identify acquisitions. Our list of acquisitions differs from those in two ways. First, we believe that Compustat more completely identifies the acquisition of small and/or private firms. Second, we will pick up sales of divisions or plants in addition to the acquisition of entire companies.

Our work most closely resembles that of Mayer and Sussman [2004], who also study capital structure changes for a sample of firms making large investments. They conclude that most large investments are initially financed by new debt, consistent with the pecking order theory of capital structure. Following the event year, however, Mayer and Sussman [2004] find some evidence consistent with the trade-off theory, as firms move back toward their historic debt ratios. Our study expands upon this analysis by using a SUR framework to examine how a broader range of firm characteristics affects the financing proportions. By examining several different financing windows, we illustrate that large investments tend to be associated with dynamic funding patterns.[4] Finally, we examine how large investments affect firm value by studying long-run performance following the events. Mayer and Sussman [2004] do not investigate valuation effects.

3. Sample Selection

Our research design requires a set of "major" investment events, which reveal information about a firm's preferred capital structure and the market's reaction to its investment and financing decisions. Theory provides no clear definition of "major" investments, so we proceed with one plausible rule, that an investment is "major" if

- it exceeds 200% of the firm's past three years' average investment level (its "benchmark" investment), *and*
- the investment is at least 30% of the firm's prior year-end total assets. [5]

For each firm-year, we compute separate benchmark investment levels for built and acquired capital expenditures.

[4] We also distinguish between "built" capital expenditures and acquisitions, and use a different filter to identify major investments. Mayer and Sussman [2003] seek firms with large investment "spikes" – one large investment that is preceded and succeeded by stable, lower investment expenditures. Examining the time series of investments associated with our major events (not reported here) suggests that the "spike" nature of Mayer and Sussman's filter rule will identify more acquisitions than built investments.

[5] Analysis based on a less restrictive, alternative rule (200% of trailing investment and only 20% of total assets) yields very similar results.

Starting in 1974, Compustat divides "investment" into two categories: capital expenditures and acquisitions. We refer to internal investment projects (pure capital expenditures) as *built investments*, and to external investments as *acquired investments* or *acquisitions*. We evaluate these alternate sorts of investment separately for two reasons. First, acquiring firms are considerably larger than those with large capital expenditures and firm size is related to long-run performance measures.??? Second, acquisitions and internal investments appear to substitute for one another, and are generally undertaken for different purposes (Andrade and Stafford [2004]). They are also viewed differently within the firm (Harford and Li [2006] JF). We therefore wish to see if those differences are evident in financing patterns or in long-run firm performance.

Compustat's flow-of-funds data, which we use to identify financing patterns, become available only in 1988. We therefore focus on investment events that occurred between 1989 and 1999.[6] Starting with the universe of Compustat firms also listed on CRSP, we excluded firms from the sample for any year in which:

- The firm's book value of equity is negative in the current or the previous year.
- A firm is missing data for capital expenditures *and* acquisitions (items #128 and #129), or for income before extraordinary items (item #123, used to calculate cash-flows).

We also exclude firms from regulated industries or industries with unusual capital structures: all firms with two-digit NAICS industry codes equal to 22 (utilities), 52 (finance and insurance), 55 (management of companies and enterprises), or exceeding 90 (public administration). These screens leave 76,448 annual observations (for 11,090 firms), which we search for major investment events.

Table 1 reports the frequency distribution of the firms and events in our sample. We identify 703 firms with major built investments and 602 firms with major acquisitions. Because some firms have multiple events, the full sample includes 977 built events and 734 acquisitions. In order to evaluate built and acquired events separately, we omit sixty firms with both built and acquired major investments during the 1989-99 sample period. This yields 899 built events and 659 acquired events for our main testing sample.

[6] The observation period ends in 1999 so that we can examine three full years of subsequent stock returns for all event firms. We begin identifying large investments in 1989 so that we can examine Compustat cash flow data for the year preceding investment.

Table 2 compares our Built and Acquired sample firms to the composition of all firms on the Compustat tape. Although some industries are more represented than others in our sample, no single industry dominates our sample. Large investments over this time period were relatively common in the manufacturing (NAICS = 32, 33) and Information (NAICS = 51) industries, while Health Care (62) and Accommodations (72) undertook relatively few major investments.

Table 3 presents descriptive statistics for the event firms. Many of the relevant variables are ratios, which can take extreme values for a small number of observations. We therefore exclude the 0.5% highest and 0.5% lowest observations from our reported means and medians, and we concentrate our discussion on the *median* values.[7] Panel A of Table 3 compares the built vs. acquiring firms' median financial ratios for the year preceding the investment event. These two groups differ significantly in almost all measured characteristics. Most notably, the acquiring firms are far larger and more profitable than firms with built investments and exhibit a significantly higher median debt ratio (19% versus 14%). For both groups, the median market-to-book ratio for equity is fairly high (around 2.5), indicating that the market had been anticipating growth for firms making major investments. The two groups' recent asset growth rates are high, and statistically indistinguishable.

Panel A of Table 3 may reflect an unavoidable element of inter-temporal comparison, since the built and acquired investments need not occur at the same rate through time. Panel B therefore compares each event firm to the set of non-event firms available on Compustat at the same point in time. Our sample firms differ significantly from the non-event populations in nearly every dimension. Firms with large Built investments tend to be smaller, less levered, faster-growing, and less R&D-intensive than the non-event firms in Compustat. Acquiring firms tend to be larger, faster-growing and slightly less R&D-intensive. The rank sum test results in the middle column of Panel B indicate that the cross-sectional differences between firms with built investments and acquisitions resemble those in Panel A.

[7] The sample is truncated only when reporting the statistics in Table 3. We use all observations when identifying event firms and conducting tests of financing and long-run performance.

4. Capital Structure (Financing) Decisions

We have identified firms that are very likely to be raising external funds. The literature on capital structure provides a multitude of factors that might influence their financing choice. Our data can indicate the extent to which sample firms' behaviour is consistent with the pecking order hypothesis, the trade-off hypothesis, and the market-timing hypothesis.

The Appendix describes how we aggregate Compustat's annual cash-flow data into four main financing sources. The following identity must hold for each firm over an arbitrary time interval:

$$\textit{Invest}_i = \textit{Equity}_i + \textit{Debt}_i + \textit{Internal}_i + \textit{Other}_i \quad (1)$$

where $\textit{Invest}_i$ is the sum of firm i's Built and Acquired capital expenditures during the interval

$\textit{Equity}_i$ is the dollar value of (net) common and preferred share sales during the interval (Compustat items 108 + 115).

$\textit{Debt}_i$ is the net change in long-term and short term debt during the interval (Compustat items 111 plus 114 less 301).

$\textit{Internal}_i$ is operating cash-flows, defined as after-tax income before extraordinary items plus depreciation and amortization less cash dividends (Compustat items 123 + 125 - 127).

$\textit{Other}_i$ is the aggregate of all other funds flow categories, including changes in working capital, asset sales, and statistical discrepancies.

Although (1) must hold within each accounting period, some of the funds required for a large investment might have been raised in prior years. If a firm issued debt or equity in year τ-1, the event-year cash flows might not reflect how the financing truly occurred (Mayer and Sussman [2004]). For example, suppose a firm issues equity shares in τ = -1 and temporarily uses the funds to pay down a bank line of credit, which is then drawn to purchase new assets.[8] The event-year values in (1) would indicate a ***Debt***-financed investment. If we examine changes over the [-1, 0] window, however, we correctly observe that the investment was ***Equity*** financed. (The debt increase in τ=0 exactly offsets the debt reduction in τ=-1.) Likewise, a firm's subsequent financing decisions could either reinforce or offset the leverage effect of the event-year's financing. By examining financing sources over several event windows, we can identify any systematic effects of this sort.

[8] Sufi [2005] indicates that bank lines are often used to adjust leverage.

4.1. Financing Decisions: Univariate Results

The first three rows of Table 4 report the average dollar amounts of built vs. acquired investments and their financing. The Table's last four rows describe each financing source's relative contribution to investment spending for three different time intervals: the event year itself ($\tau = 0$), the two year window starting in the event year ($\tau = [0, +1]$), and the three-year interval centered on the event year ($\tau = [-1, +1]$). Because the mean of a ratio can be substantially influenced by a few extreme values, we follow Loughran and Ritter [1997] and Fama and French [2003] in reporting the ratio of averages instead of the average of firms' individual ratios. For example, we compute the contribution of new ***Equity*** to investment financing (20.53% for the event year alone ($\tau = 0$)) as the ratio of all sample firms' new equity issues to their total investment expenditures. The proportions for ***Debt***, ***Internal***, and ***Other*** are computed analogously.

The left half of Table 4 indicates that built major investments are initially financed primarily by external funds. During the event year, firms issue new debt equal to 48.86% of their total investment expenditures and new equity shares for another 20.53%. ***Internal*** funds contribute 25.16% in the event year. These "snapshot" results appear to support the pecking order theory's implication that most investment is debt financed. However, over a wider event window the proportions of ***Internal*** and ***Other*** fund sources rise from a combined 29.64% to more than 39%. The relative importance of ***Debt*** declines by about the same proportion, from 48.86% to about 39%.

The right half of Table 4 describes major acquisitions, which are substantially larger (in dollar terms) than built investments. Major acquisitions are also financed primarily by external funds (74.37%), and the event-year role of debt (61.39%) is more pronounced than for built investments. However, acquiring firms exhibit the same dynamic feature as built firms: their reliance on debt financing falls to 42.6% over the [-1, +1] period, as ***Internal*** funds rise. Although ***Debt*** remains the most important source of funds for major acquisitions, the effect is smaller than one would infer from examining the event year alone. Consistent with Mayer and Sussman [2004], profitable firms finance their new investments with ***Debt***, apparently planning to reduce their leverage in subsequent years. However, Mayer and Sussman [2004] report that the reversal oc-

curs primarily through ***Equity*** issuance whereas our data indicate a larger role for ***Internal*** funds. The same broad pattern emerges from (unreported) comparisons of firms' *median* financing choices. External ***Equity*** plays a small role in funding major investments, particularly for acquisitions. ***Debt*** is the most important single source of new funds, and the majority of ***Debt*** is issued in the event year. Over time, ***Internal*** funds displace ***Debt***.

The ratios of averages reported in Table 4 mitigate the impact of a few extreme ratios on the reported balance sheet contributions. However, those ratios cannot be compared via simple statistical tests. We next examine how firm size affects median funding decisions, which are readily compared across groups by means of a non-parametric Mann/Whitney rank sum test. Mann/Whitney rank sum tests indicate that our acquiring firms use more ***Debt*** and less ***Equity*** than firms with built investments, particularly in the event year

Previous writers have found that securities issuance activities vary substantially with firm size. Table 5 reports median financing ratios for each size group over three event periods. The results clearly indicate that firm size matters. For example, over the broadest [-1, +1] window, ***Debt*** provides the plurality of funds for Large Firms and for all acquisitions. Medium Firms finance the largest proportion of their Built investments with ***Internal*** funds (38%), while Small Firms' greatest financing source is ***Equity*** (40%). The extent to which financing choices differ with firm size is further illustrated in Figure 1. For each fiscal year, we sort the universe of Compustat firms that were searched for major investments into three equal-sized groups on the basis of their book assets. Our event firms are then placed into the "Small", "Medium", or "Large" grouping.[9] Figure 1 plots median financing patterns during the event year ($\tau = 0$) for different-sized firms. ***Debt*** provides the largest proportion of investment funds for both investment types and for all firm size groups. ***Debt*** is more important for larger firms, and when financing acquisitions.[10]

[9] The results are qualitatively similar when we form size groupings on the basis of equity market value instead of book assets.

[10] ***Equity*** is more important for funding smaller firms, as shown by Frank and Goyal [2003].

Table 5 again indicates that financing patterns change as we widen the event window. Over time, firms replace some of the ***Debt*** issued in year 0 with ***Internal*** funds and new ***Equity.*** ***Internal*** funds grow more rapidly at larger firms and external ***Equity*** grows more rapidly at smaller firms.

4.2. Financing Decisions: Seemingly Unrelated Regression Results

The univariate analysis in Tables 4 and 5 appears broadly consistent with the pecking order hypothesis. ***Debt*** finances the largest part of major investments in the event year, but firms tend to offset some of the leverage effect soon afterwards. The key question about capital structure is not whether ***Debt*** initially funds new investments, but whether that choice has a persistent effect on a firm's capital structure. In addition, financial decisions for these large investments may reflect a firm's position vis-à-vis some type of target leverage ratio.

We now investigate multiple determinants of financing behavior via the regression

$$F_{i\tau} = \alpha + \beta 1\ DEV_{-1} + \beta 2\ Profit_{-1} + \beta 3\ \ln(Size_{-1}) + \beta 4\ INV\_TA_{-1} + \beta 5\ FA\_TA_{-1} + \beta 6\ Runup_{-17,-6} + \beta 7\ Q_{-1} + \varepsilon_{i\tau} \quad (2)$$

where

$F_{i\tau}$ = the proportion of the net new investment financed by one of the four funding sources: i = ***Equity***, ***Debt***, ***Internal***, and ***Other***) during the event window τ.

DEV = the deviation from target leverage: the firm's estimated target debt ratio (from Flannery and Rangan [forthcoming]) less its actual market debt ratio at t = -1.

Profit = net annual income as a proportion of yearend total assets

ln(Size$_{-1}$) = log of the firm's yearend book assets. Table 5 indicates a substantial effect of size on financing choices.

INV_TA = the ratio of investments (built plus acquired) during the event window to book total assets at the yearend preceding the event window. Larger investments may be financed differently.

FA_TA = the firm's yearend book value of fixed assets as a proportion of total assets; a measure of "debt capacity".

Runup = the stock's excess return, relative to the market, over the months [-17,-6] if the event window starts in τ=0 and over the months [-29,-18] if the event window starts in τ=-1. Firms tend to issue stock following a ***Runup*** in the price (Korajczyk, Lucas and MacDonald [1991]).

Q = the ratio of the firm's market value (market value of equity plus book value of debt) to the book value of assets at the yearend preceding the event window. ***Q*** measures the firm's investment opportunity set.

We specify a regression of the form (2) for each of the four funding sources and estimate them as seemingly unrelated regressions, constraining each independent variable's coefficients to sum to zero across the four equations. This constraint requires that a change in firm characteristics will shift its reliance on alternative funding sources, but the net effect on all funding decisions must leave the investment fully funded. [11]

The firm's deviation from target leverage (***DEV***) bears particular discussion. Following Flannery and Rangan [forthcoming], we define leverage as

$$MDR_{i,t} = \frac{D_{i,t}}{D_{i,t} + S_{i,t}P_{i,t}} \quad , \tag{3}$$

where $\boldsymbol{D_{i,t}}$ denotes the book value of firm *i*'s interest-bearing debt (the sum of Compustat items 9 plus 34) at time *t*, $\boldsymbol{S_{i,t}}$ denotes the number of common shares outstanding (Compustat item 199) at time *t*, and $\boldsymbol{P_{i,t}}$ denotes the price per share (Compustat item 25) at time *t*. Flannery and Rangan [forthcoming] fit a partial-adjustment model to the set of all industrial firms:

$$\begin{aligned} \boldsymbol{MDR_{i,t+1} - MDR_{i,t}} &= \boldsymbol{\lambda\,(MDR_{i,t+1}^{*} - MDR_{i,t})} + \tilde{\delta}_{i,t+1} \\ &= \boldsymbol{\lambda\,(DEV_{it})} + \tilde{\delta}_{i,t+1} \end{aligned} \tag{4}$$

According to this specification, the typical firm annually closes a proportion λ of the deviation ("***DEV***") between its actual ($\boldsymbol{MDR_t}$) and its desired leverage ($\boldsymbol{MDR_{t+1}^{*}}$). Specifying the desired (target) leverage as a linear combination of firm characteristics gives the estimable model

$$\boldsymbol{MDR_{i,t+1} = (\lambda\beta)\,X_{i,t} + (1-\lambda)\,MDR_{i,t}} + \tilde{\delta}_{i,t+1}\,. \tag{5}$$

[11] Since it is an accounting identity, all investment expenditures need to be financed. The slope coefficients measure relative importance of regressors across each type of financing (the system of equations). These coefficients need to add up to zero to let the accounting identity hold. The financing types' fractions are reflected in the intercept terms. We also estimated a SUR model that constrained the four intercept terms to sum to unity, with very similar results to those presented in Table 6.

Where X is a vector of variables commonly used to proxy for a firm's target debt ratio and β is a coefficient vector.[12]

We use the estimated coefficients (λ, β in (5)) from Flannery and Rangan's "base model" (their Table 2, column 7) to estimate a target debt ratio for each firm at the start of each year. The trade-off theory of capital structure implies that the Debt proportion should be positively related to ***DEV***. A firm with ***DEV*** < 0 is "over leveraged" and should be seeking to reduce its leverage by issuing equity; a firm with ***DEV*** > 0 should be trying to increase its actual leverage. Merging these target debt ratios with the other data on investing firms leaves 529 Built large investments and 498 Acquired large investments.

The results of estimating (2) for the [0], [0,+1], and [-1,+1] event windows are presented in Table 6. Consider first the event-year (τ = 0) results for Built investments in Panel A, columns 1 - 4. The first row of coefficients indicates that ***DEV***iation from the firm's target debt ratio has a significantly positive effect on ***Debt*** and a similar-sized (but insignificant) negative effect on ***Equity***. These coefficients imply that firms finance their large investments in a way that moves them toward a target leverage ratio. The leverage ***DEV***iation has smaller, insignificant effects on the proportion of investment financed with ***Internal*** and ***Other*** funds. Higher (lagged) profitability has no direct effect on ***Debt***, but clearly results in a substitution of ***Internal*** financing for external ***Equity***. This implies that profitability does not influence the marginal Built investment's effect on firm leverage. Larger firms (as measured by ***Size***) show a strong inclination to finance with ***Debt*** and ***Internal*** funds over ***Equity***. Larger investments (***INV_TA***) tend to be financed with more ***Debt***, and less external ***Equity***. We also find that firms with more fixed assets ("debt capacity") have no marginal preference among financing sources, but perhaps this effect is fully captured in the target debt ratio. The last two rows in Table 6 present evidence that market timing influences financing decisions in the event year. ***Runup*** has a significantly positive effect on ***Equity***, while a higher Tobin's Q increases the use of both types of external funds while substantially discouraging use of ***Internal*** and ***Other*** sources.

[12] Relevant firm characteristics include earnings per asset dollar, the assets' market to book ratio, depreciation expense as a proportion of total assets, the log of (real) total assets, fixed assets as a proportion of total assets, R&D expenditures as a proportion of total assets, the firm's industry median MDR value, and a dummy variable indicating whether the firm has a credit rating. Flannery and Rangan [forthcoming] also include firm fixed effects, which have important implications for their estimated adjustment speeds (λ). We thank Kasturi Rangan for computing the estimated target values.

Over the short run ($\tau = 0$), this evidence is consistent with both the pecking order hypothesis (***Debt*** predominance) and trade-off theory (***DEV*** results). Firms also appear to pay some attention to market timing (***Runup*** results) in their financing decisions. These conclusions contrast somewhat with Mayer and Sussman [2004], who only provide support for the trade-off theory in the long-run.

Columns 5-8 of Panel A employ a wider event window, from the start of the event year through the end of the following year ($\tau = [0,1]$). The dependent variable sums the new financing obtained from each source over the two years, deflated by the amount of two-year investment volume. The leverage targeting effect remains strong: ***DEV*** has a significantly positive effect on ***Debt*** and significantly ($p = 6\%$) negative effect on ***Equity***. The negative (positive) effects of profitability on ***Equity*** (***Internal***) also persist over the longer time frame. The tendency of larger firms ("***Size***") to rely on ***Debt*** instead of ***Equity*** in the event year is somewhat attenuated and no longer statistically significant. ***INV_TA*** has smaller, less significant effects on financing choices, and ***FA_TA***'s effect remains insignificant. Turning to the market timing variables in the last two rows of Panel A, we find that the impacts of ***Runup*** are much smaller over the wider window, and no longer statistically significant. The preference for ***Equity*** finance manifested in the event year reverses sign in year $\tau = 1$, and becomes insignificant. This manifestation of a "market timing" effect only affects leverage temporarily. A high ***Q*** continues to encourage ***Equity*** finance, consistent with the hypothesis that growth firms prefer lower leverage, but the effect on ***Debt*** has lost its statistical significance.

Comparing the results for $\tau=0$ and the longer event window from [0, +1] makes clear the importance of viewing a firm's financing decisions over an [appropriately lengthy] adjustment period. Some of the event year effects are reversed, with important implications for the theory of capital structure, like the temporary effect(s) of market timing. We widen the window even further in columns 9-12 of Table 6's Panel A, which reports SUR estimates over the event window [-1, +1]. We include the pre-event year to allow financing of major investments before the actual undertaking of the investment.[13] The results are mostly unchanged. De-

[13] Widening the event window creates a few situations in which a firm has major investment events in adjacent years, which we then treat as a single event. We omit events that include another large investment in either the preceding or subsequent year.

viations from the target debt ratio (***DEV***) systematically drive equity and debt issues. Greater profitability causes a firm to replace ***Equity*** with ***Internal*** financing. As with the [0, 1] window, the stock price runup carries an insignificant coefficient, consistent with ***Runup*** having only a transitory effect on financing decisions.

The results for large Acquisitions, in Panel B of Table 6, are quite similar. Most importantly, the coefficients on ***DEV*** clearly reflect efforts to move a firm toward its target leverage ratio. However, one difference is that the share price ***Runup*** persistently encourages ***Equity*** and ***Internal*** funds use while discouraging use of ***Debt***, even over the longer event window [0,+1]. The former makes intuitive sense. Firms have an incentive to issue equity after a stock price ***Runup***, but this effect vanishes when the pre-event year is included in the "financing period."

Before turning to the long-run performance issues, we summarize the observed financing patterns for major investments. First, and most important, we provide evidence that firms systematically adjust capital structures towards a target debt ratio (even) in the case of major investments. Market-timing and pecking order effects appear only as transitory effects in the data. Second, the financing mix changes in important ways after the event year. Hence, empirical studies of capital structure should incorporate a time dimension – the time interval after which they assume that the firm has completed its financing decisions for a specific investment.[14]

5. Long-Run Equity Returns

We now investigate the valuation effects of major investments. We estimate these effects using long-run performance methods for two reasons. First and foremost, not all large investments are announced, rendering event study approaches meaningless. Second, financial market frictions (e.g. short sale constraints) may temporarily bias price responses to some announced investments. We study how financing and investment decisions interact because many authors have previously shown that poor performance follows securities

[14] For example, Hovakimian, Hovakimian and Tehranian [2004] argue that firms undertaking a recapitalization should be near their target leverage ratios, but the same is not necessarily true for other firms.

issuances. With most investments funded from multiple sources, however, categorizing financing decisions becomes problematic. We concentrate on investments associated with two sorts of financing "predominance": ***Internal*** vs. ***External*** and (among the latter firms) ***Debt*** vs. ***Equity***. [15]

- ***Internal:*** An investment is *predominantly* internally funded if ***Internal*** funds finance at least 50% of investment expenditures, while ***Debt, Equity,*** and ***Other*** sources each contribute less than 50%.[16]

- ***External:*** An investment is *predominantly* externally funded if ***Debt*** and ***Equity*** together contribute at least 50% of investment expenditures, and ***Internal*** and ***Other*** sources each contribute less than 50%.

Out of 899 Built events, we categorize 149 as ***Internal***, 434 as ***External***, and (by subtraction) 316 were funded with a relatively balanced mix of ***Internal*** and ***External*** funds**.** Out of 659 Acquired events, we categorize 53 as ***Internal***, 429 as ***External***, and 177 as lacking a predominant financing source.

Among the ***External*** cases, we further identify predominant financing as

- ***Equity***: An investment is *predominantly* ***Equity*** funded if at least 50% of investment expenditures come from new equity issuance, while ***Debt, Internal*** and ***Other*** financing each contributes less than 50%.

- ***Debt***: An investment is *predominantly* ***Debt*** funded if at least 50% of investment expenditures come from new debt issuances, while ***Equity, Internal*** and ***Other*** financing each contributes less than 50%.

Among the 434 ***Built*** investments with predominantly ***External*** funding, this procedure yields 113 predominantly ***Equity*** and 209 predominantly ***Debt*** events. By subtraction, therefore, 112 firms had no dominant source of external funds. Out of 429 ***External Acquired*** events, 66 were predominantly ***Equity***, 293 were predominantly ***Debt***, and only 70 had no predominant funding source.

Note that many major investments are funded with a relatively diffuse mixture of ***Internal, Debt, Equity,*** and ***Other*** funds. These projects cannot be characterized as predominantly funded with "debt" vs. "equity," or by "retained earnings" vs. "external funds." At least for these large investments, we find little evi-

[15] We have shown above that financing proportions change in systematic ways as the event window widens. The numbers in the text and in Tables 7-8 describe the sample when "predominant" financing is based on the $\tau = [0, 1]$ window. Panel B of Table 9 reports long-run performance for financing groups identified for the $\tau = 0$ window. Unreported results based on the widest ($\tau = [-1, +1]$) event window are also very similar.

[16] This condition on Debt, Equity and Other funding sources rules out the possibility that refinancing transactions (e.g. issuing equity to retire debt) cause more than one type of funds to "provide" a majority of required amount.

dence to support the "pecking order" implication that firms fund their investments primarily using ***Internal*** funds. Our sample's financing decisions seem more complex than many textbook descriptions imply.

5.1. Measuring Long-Run Performance

Lyon, Barber, and Tsai [1999, p. 198] observe that "the analysis of long-run abnormal returns is treacherous." An extensive literature evaluates alternative methodologies for measuring the long-run performance of stocks (e.g., Barber and Lyon [1997], Kothari and Warner [1997], Lyon, Barber, and Tsai [1999], Mitchell and Stafford [2000]). Obstacles to computing meaningful statistics include the skewness of abnormal return distributions, the characteristics of benchmark or peer groups, and cross-sectional correlation of events. The potential cross-sectional correlation problem might be particularly important when analyzing firm investments because aggregate investment varies over the business cycle. Table 2 also indicates that major investments tend to cluster in specific industries. We will utilize three distinct methodologies to ensure that our results are robust.

Our first two measurement techniques accommodate cross-sectional correlations by evaluating the returns to portfolios of firms that had an event sometime in the preceding 12 months (Mitchell and Stafford [2000]).[17] The *calendar-time portfolio approach* is based on the Fama and French [1993] three-factor model. Each month, we form a portfolio of all firms with an event within the prior 12 months, and regress the portfolio's time-series excess return on the three Fama and French [1993] factors:

$$r_{p,t} - r_{f,t} = \alpha_p + \beta_p(r_{m,t} - r_{f,t}) + s_p SMB_t + h_p HML_t + \varepsilon_{p,t} \quad (6)$$

where $r_{p,t}$ denotes a portfolio return at time t,

$r_{f,t}$ is the risk-free interest rate,

$r_{m,t}$ is the return of the market portfolio

SMB_t is the zero-investment portfolio representing the return difference between a portfolio of small and large stocks,

[17] Our 12-month performance measures are presented for the sake of comparison with Titman, Wei and Xie [2004]. We also present results for a 36-month horizon.

HML_t is the return difference between a portfolio of high book-to-market and low book-to-market stocks.

A negative intercept (α_p) indicates under-performance. [18]

Our second method compares the event firms to peers, allowing us to avoid the restriction in (6) that the factor loadings remain constant over the entire estimation period. Vijh's [1999] *calendar-time abnormal returns* (CTAR) approach requires that we first calculate the monthly return to the portfolio of firms that had an event within the last 12 months. We then subtract the monthly return on a portfolio of peer firms to obtain monthly excess returns. We calculate a t-statistic for the average of these monthly excess returns using the time series standard deviation of monthly excess returns. The results reported in the text describe peer firms selected on the basis of their equity market value and book-to-market ratio, as in Spiess and Affleck-Graves [1999].[19] As a robustness check, we repeated the CTAR analysis for peer firms based on calendar time, size, book-to-market, and industry affiliation, with similar results.

Our third approach to measuring long-run performance follows Titman, Wei and Xie [2004] in applying the methodology of Daniel, Grinblatt, Titman and Wermers ("DGTW") [1997]. Each year, we sort all traded stocks into five equity market size groups, each of which is then sorted into five book-to-market groups, each of which is then sorted into five momentum groups.[20] This process yields 125 portfolios. Each event firm's return is then compared to that of the appropriate benchmark portfolio. The time-series standard deviation of excess returns is then used to assess whether the mean excess return differs statistically from zero.

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[18] This interpretation of α_P assumes that the Fama/French three-factor model is properly specified, but some evidence suggests that the model describes small firms relatively poorly. Mitchell and Stafford [2000] suggest making inferences from a bootstrap distribution. We estimate the model for 1,000 sets of peer firms selected to resemble the event firms in calendar time, size and book-to-market. The observed distribution of the intercept term (α_P in (6)) captures "normal" variation in the model's intercept, which can be used to evaluate the statistical significance of our event firms' α_P estimates. These adjustments did not qualitatively affect the long-run performance results produced by our Fama/French measure.

[19] We require a close size match (+/- 10%) because Barber and Lyon [1997] find this dimension to be particularly important for larger event firms.

[20] Book equity is based on common equity. Market equity is the fiscal year-end market capitalization. Size is measured as a firm's market capitalization at the beginning of the month.

Tables 7 and 8 present abnormal return estimates for portfolios of firms with various financing decisions for built and for acquired major investments. We initially apply all three estimation methods to the 12-month period starting in the first month of the fiscal year after the event. We subsequently provide some 36-month estimation results in Table 9. In all cases, we seek evidence whether internal and external financing impose different constraints on a manager's ability to invest. (These results relate to the disciplining effects of debt financing and the market for corporate control.) We are also interested in comparing the long-run performance effects of built vs. acquired investments.

5.2. Results

We initially categorize the predominant type of financing using the $\tau = [0,1]$ window. Table 7 presents abnormal return calculations for equal-weighted portfolios of event firms. The first two portfolios show significant under-performance (7% - 12%) in the year following the event year, consistent with the findings of Titman, Wei and Xie [2004] that larger investments lead to poor performance. However, we find that all investments are not alike. Internally-funded projects (portfolios 3 and 4 of Table 7) have relatively small abnormal returns, which do not differ significantly from zero. In sharp contrast, the externally-financed projects (portfolios 5 and 6) have large and reliably negative abnormal returns. When we further divide the externally-financed sample into those that are predominantly equity vs. predominantly debt (portfolios 7 – 10), we see that significant under-performance is associated only with debt-financed projects.[21] The debt-funded, Built projects are particularly bad for shareholders. By all three measurement methods, these investments elicit significantly more negative abnormal returns than the Acquired projects ($p < .05$).

Researchers often detect significant long-run underperformance in equal-weighted event portfolios, only to have these effects disappear with value-weighting. Table 8 shows that value-weighting leaves most of the significant effects in Table 7 unaffected. The value-weighted mean abnormal returns provide less support for the hypothesis that large investments are always bad for shareholders. However, support for underperfor-

[21] In fact, Built projects funded predominantly with ***Equity*** have positive, but insignificant, mean abnormal returns.

mance following externally-financed projects remains strong, and the debt-financed projects are (again) largely responsible. Unlike the equal-weighted results in Table 7, value weighting provides some support for the hypothesis that equity-funded acquisitions harm investors in the long run, perhaps because larger firms are more likely to make major acquisitions with equity. The value-weighted results do not reject the hypothesis that internally-funded projects give rise to no abnormal returns.

Table 9 demonstrates that the implications of Tables 7 and 8 are robust to longer performance intervals (36 months as well as 12) and to a shorter event window (predominance defined on the basis of $\tau = [0]$ rather than $\tau = [0, 1]$). Panel A is based on the [0, 1] definition of predominance and the left half therefore repeats (qualitatively) some of the information provided in Tables 7 and 8. The first two rows of Panel A show that Built or Acquired investments are more likely to generate significantly negative abnormal returns under equal-weighting than under value weighting. As pointed out by Loughran and Ritter [2000], this most likely reflects the greater difficulty of shorting small stocks, which can therefore remain mispriced for longer periods of time. The next broad conclusion from Panel A of Table 9 is that internally financed projects never(!) generate significant underperformance. In contrast, all categories of externally-financed, Built investments and most externally-finance Acquisitions elicit negative mean abnormal returns. The last two rows of Panel A provide strong support for the hypothesis that Debt-financed, Built projects are followed by significant underperformance. The evidence is, again, more mixed for Debt-financed acquisitions or for any type of Equity-financed projects.

Panel B of Table 9 repeats the analysis with predominance defined on the basis of only the event year's financing ($\tau = 0$). The main results are identical: Internally-funded projects never lead to statistically significant abnormal performance; Built investments do, especially when they are ***Debt***-funded.

5.3. Interpretation

Tables 7 – 9 indicate that financing (debt vs. equity) and investment (built vs. acquired) choices have important interaction effects that influence firm value. We believe we are the first to illustrate this point. More specifically, we reach three main conclusions about long-run performance.

First, it appears that large investments *per se* do not generate poor performance, since predominantly internally financed investments exhibit insignificant ex-post returns. Like Titman, Wei, and Xie [2004], we conclude that large investment outlays are followed by poor stock returns. However, our results differ from those of Titman et al. because significant underperformance is associated only with external financing, particularly debt financing. This suggests that external financial claimants do not impose the discipline hypothesized in the extant literature on capital acquisition (Easterbrook [1984]). The specific disciplining effects of debt (Jensen [1986]) also fail to appear in our sample.

The inverse of this first conclusion is that internally-funded projects engender no long-run underperformance. These are large projects, for which the firm may have accumulated non-trivial amounts of cash in advance of the investment. Agency costs are sometimes hypothesized to be extreme in such situations. Nevertheless, the managers in our sample make reasonable investment decisions with internal funds, in an environment with relatively little external scrutiny. By contrast, one generally assumes that outside monitors are most active when new securities are being issued. In our results, however, the investments financed with external funds are least likely to perform well. This poses a serious challenge to some current assessments of principal-agent problems within U.S. firms.

Finally, our finding that Built investments under-perform Acquired investments is consistent with disciplining effects of the market for corporate control (Jensen [1986]). Perhaps shareholders must approve large acquisitions, while Built investments do not receive such explicit scrutiny.

6. Robustness

In addition to the results reported in Tables 6 - 9, we conducted a series of robustness tests with respect to applied sample selection and methodology. All of these exercises yielded qualitatively the same results as those reported in the previous sections.

Identifying the Event Firms. Our definition of "major" firm investments is essentially arbitrary. For the results reported above, we selected firms whose absolute capital/acquisition expenditures exceed 200% of

a trailing (3-year) average investment ratio and 30% of the prior year's total assets. We replicated our long-run performance analysis with a sample in which "major" investments exceeded only 20% of the firm's prior year-end assets. The main conclusions are unchanged. Externally-financed investments produce significant under-performance but internally-financed investments do not. The results are, again, somewhat more significant under equal-weighting than under value-weighting.

IPO Dominance? Ritter [1991] has shown that the mean firm underperforms the market in the three years following its IPO. Since new, small firms might also tend to make relatively large investments, perhaps our long-run performance results reflect primarily the tendency of new firms to underperform. We find that about 20% of our major investment events occurred within three years of the firm's IPO. [22] Omitting these recent IPO events from our sample yields similar conclusions about long-run performance. In other words, new firms do not appear to drive our earlier results.

Book-valued Target Leverage Estimates. The ***DEV***iation variable in Table 6 assumes that firms target *market*-valued leverage ratios. However, some researchers prefer to measure leverage in book terms and many researchers report results for both book and market measures. When we define define leverage in book-value terms (the book value of interest-paying debt over total book assets), ***DEV*** becomes the difference between actual and target book leverage. The results are very similar to those reported in Table 6.

Errors-in-Variables. The DEV variable in Table 6 is a generated regressor, which may bias our SUR estimates unless the measurement errors are uncorrelated with the regression residuals.[23] We therefore conduct three robustness checks. First, we estimate the same set of regressions separately as 2SLS, where DEV is treated as an endogenous variable (we use lagged DEV as the instrument). Second, we estimate simple OLS (with and without imposing the constraint that coefficients add-up to zero). Finally, we employ a bootstrap procedure to both OLS and 2SLS to estimate the true distribution of coefficient errors. None of these ap-

[22] We thank Jay Ritter for providing access to his IPO database.

[23] Other researchers have also ignored this potential source of estimation error (e.g., Hovakimian, Opler and Titman [2001], Fama and French [2002]).

proaches reverses the main conclusions in Table 6. We also checked the sensitivity of these results to winsorizing the data – again with no substantive change.

7. Summary and Conclusions

This paper studies U.S. firms that made relatively large capital expenditures or acquisitions during the 1989-99 period. Such activities are necessarily accompanied by major financing decisions. Because these investments represent a substantial proportion of our sample firms' total assets (at least 30%, by construction), we anticipate that the associated financing decisions will reflect managerial attitudes toward overall capital structure.

We find similar financing patterns for both built and acquired major investments. Debt issues pay for the largest proportion of new investments in the event year, particularly for large firms. Equity has a relatively small role. This initial pattern seems consistent with a pecking order view of capital structure. Over time, however, firms systematically replace the new debt with equity funds. Relative to large firms, small firms rely more on issuing new equity to replace debt, while medium-sized firms tend to use internal cash flow. This seems inconsistent with the pecking order theory of capital structure, because smaller firms are often said to confront higher information costs in selling their shares (Frank and Goyal [2003]). Furthermore, our regression analysis indicates that firms choose financing vehicles that move them toward a target debt ratio. Although "pecking order" and "market timing" effects appear in the data, they are transitory.

Our data set permits us to separate the long-term valuation effects of investment and financing decisions. As previously reported by Richardson [2002], Titman, Wei, and Xie [2004],and Lyandres, Sun and Zhang [2005], we find significant long-run underperformance by firms making major investments. However, under-performance does not follow all investment projects in our sample, but only those financed predominantly with new, external funds. We find some evidence that debt financing generates more negative long-run performance than equity financing. However, projects financed with internal funds (e.g. cash flow) never generate significant share underperformance. This finding clearly indicates that not all large investments harm shareholders. It also raises the question why the monitoring associated with raising new funds in the market

does not prevent managers from undertaking poor investments. The conventional wisdom specifies that managers can more readily spend internal cash flows on poor projects. We have been unable to square that assessment with our empirical evidence.

Our analysis suggests several areas for further research. Compustat's flow of funds data do not permit us to identify various types of debt. Yet private ("bank") debt may have very different effects than publicly issued bonds or commercial paper, because private debt presumably involves better ("inside") information and monitoring incentives, and more complex covenants (Sufi [2005]). Given the negative results associated with debt in this study, it will be important to determine whether public and private debt have similar implications for long-run firm performance. We also know that debt's maturity structure influences investors' monitoring incentives, which suggests that maturity structure may affect a firm's performance following large investments.

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Table 1: Frequency Distribution of Major Investment Events 1989-1999

Type of Firm	Number of Firms	Events
Initial Sample		
With major built investment	703	977
With major acquisition	602	734
Overlap: Firms with *both* built and acquired investment	60	78 (Built) / 75 (Acquired)
Final Sample:		
With only major built investment(s)	643	899
With only major acquisition(s)	542	659

Table 2: Industry Affiliation of Event Firms (event period 1989-1999)

NAICS	Definition	Built Investments			Acquired Investments		
		Number firms	% of event firms	% of all firms in industry	Number firms	% of event firms	% of all firms in industry
21	Mining	178	25.32%	23.77%	38	6.31%	5.07%
31	Manufacturing (Food, Beverages…)	28	3.98%	5.17%	20	3.32%	3.69%
32	Manufacturing (Wood,…)	67	9.53%	4.93%	75	12.46%	5.51%
33	Manufacturing (Metal,…)	102	14.51%	3.11%	186	30.90%	5.68%
42	Wholesale Trade	11	1.56%	1.93%	37	6.15%	6.48%
51	Information	72	10.24%	4.26%	58	9.63%	3.43%
54	Professional, Scientific and Technical Services	17	2.42%	2.31%	32	5.32%	4.35%
62	Health Care and Social Assistance	23	3.27%	7.03%	38	6.31%	11.62%
72	Accommodation and Food Services	51	7.25%	16.78%	11	1.83%	3.62%
---	Other (<5% each)	154	21.91%		107	17.77%	
	Sum	703	100%	Avg = 6%	602	100%	Avg = 5%

Table 3: Descriptive Statistics for Event Firms

Summary statistics for event firms in the year preceding the investment event (event period: 1989-1999). Calculations are based on the sample of firms that had either built or acquired investments, but not both. Ratios have been multiplied by 100. The number of observations for each statistic may differ from the maximum number because of missing values and subsequent events. The test of "Medians, Built = Acquired" refers to a non-parametric Mann/Whitney rank sum test on differences in medians. *** denotes significance at the 1% significance-level.

	Firms with Built Investment (max. 899 events)				Firms with Acquisitions (max. 659 events)		
Panel A: Firms with Built vs. Acquired Major Investments							
Data taken from the year preceding the event. Dollar magnitudes expressed in 1983 dollars.							
	Mean	Std.Dev	Median	Medians, Built = Acquired?	Mean	Std.Dev	Median
Size [Million $]	125.90	424.23	28.93	***	368.76	921.69	95.40
M/B Ratio	4.11	16.95	2.66	***	3.28	4.27	2.47
Profit [%]	-5.84	49.18	3.58	***	4.15	12.17	5.80
Growth [%]	48.46	169.18	18.51		56.34	415.34	12.86
Equity Ratio [%]	57.00	21.46	56.02	***	53.95	17.79	53.54
Debt Ratio [%]	19.10	19.11	14.04	***	22.15	18.06	19.22
Liabilities (other) [%]	19.87	12.86	17.77	***	23.91	11.31	22.93
Investment Ratio [%]	24.80	34.18	17.03	***	9.23	17.53	5.87
Acquisition Ratio [%]	3.26	14.60	0	***	17.41	93.65	3.59
R&D [%]	8.87	23.99	1.60		4.49	6.96	2.27
Panel B: Firms with Major Investments vs. the Remaining Firm Population							
Entries measure the difference between sample firms and the median non-event firm in the same year. Dollar magnitudes expressed in 1983 dollars.							
	Mean	Std.Dev	Median [a]	Median deviations, Built = Acquired?	Mean	Std.Dev	Median [b]
Size [Million $]	69.97	448.02	-19.11	***	337.29	971.02	45.69
M/B Ratio	2.52	12.07	0.75	***	1.11	3.52	0.44
Profit [%]	-9.27	54.18	0.71	***	1.38	12.00	2.78
Growth [%]	42.73	174.98	13.93		31.90	72.61	8.05
Equity Ratio [%]	9.43	22.41	9.87	***	0.90	19.57	0.19
Debt Ratio [%]	1.12	19.46	-3.56	***	4.14	17.76	1.27
Liabilities (other) [%]	-4.14	13.45	-6.63	***	1.26	11.51	0.38
Investment Ratio [%]	19.52	28.50	12.31	***	1.49	5.77	-0.02
Acquisition Ratio [%]	2.39	14.11	0	***	14.03	28.44	4.12
R&D [%]	5.20	27.27	-2.71		0.13	6.08	-1.59

[a] For all the reported variables, the difference between the Built firms' and nonevent firms' median values differs significantly from zero at the 5% confidence level or better, except for Debt Ratio and Liabilities (other).
[b] For all the reported variables, the difference between the Acquiring firms' and nonevent firms' median values differs significantly from zero at the 5% confidence level or better.

Variable	Definition	Compustat
Size [Million $]	Total Assets	#6
M/B Ratio	Market Value Equity / Book Value Equity	#199/(#60/#125)
Profit [%]	Income before extraordinary items over total assets	#123 / #6
Growth [%]	Percentage change in total assets.	(#6-#6[t-1]) / (#6[t-1])
Equity Ratio [%]	Common and preferred equity over total assets	(#60+#130) / #6
Debt Ratio [%]	Long-term debt and current debt over total assets	(#9+#34) / (#6)
Liabilities (other) [%]	Other Liabilities which are not long-term debt or debt in current liabilities (e.g. accounts payable, deferred taxes, etc.)	(#181-#9-#34) / #6
Investment Ratio [%]	Capital expenditures over total assets [t-1]	#128/ (#6[t-1])
Acquisition Ratio [%]	Acquisition expenditures over total assets [t-1]	#129/ (#6[t-1])
R&D [%]	R&D expenditures over total assets	#46 / #6

Table 4: Financing Patterns Associated with Major Built and Acquired Investments

We report financing patterns for three alternative event windows: the event year itself ($\tau = 0$), a two-year window beginning in the event year ($\tau = [0, 1]$), and the three-year interval centered on the event year ($\tau = [-1, +1]$). The first three show the magnitude of investments in dollar amounts. The last four rows report the mean value for each financing source, expressed as the cumulative change in financing divided by the cumulative investment expenditures over the same time period. To minimize the effect of outlier ratios, we report the sum of all firms' financing as a proportion of all firms' investments. Dollar amounts are measured in millions of 1983 dollars.

Type	Built (max. 899 events)			Acquired (max. 659 events)		
Event Window:	$\tau = 0$	$\tau = [0, +1]$	$\tau = [-1, +1]$	$\tau = 0$	$\tau = [0, +1]$	$\tau = [-1, +1]$
Sum of Financing	$110.85	$156.11	$193.93	$297.78	$365.38	$406.93
Built Investment Exp.	$101.55	$143.70	$175.44	$30.82	$65.34	$98.25
Acquisition Exp.	$10.34	$13.61	$20.59	$271.98	$304.73	$314.19
Equity	20.53%	19.85%	20.88%	12.98%	12.40%	13.60%
Debt	48.86%	39.61%	38.52%	61.39%	47.42%	42.60%
Internal	25.16%	29.57%	30.65%	13.71%	25.64%	29.80%
Other	4.48%	10.20%	8.88%	10.26%	13.45%	12.67%

Table 5: Financing Patterns Differentiated by Firm Size

Numbers provided are median ratios of funds raised by the respective source to total investment expenditures per firm over the corresponding event window. The size classification is based on total assets of the population of Compustat firms, as defined in Section 3, and updated yearly. The median financing ratios for built and acquired investments were compared using a non-parametric Mann/Whitney rank sum test.

	Built			Acquired		
Type of Financing	$\tau = 0$	$\tau = [0, 1]$	$\tau = [-1, +1]$	$\tau = 0$	$\tau = [0, 1]$	$\tau = [-1, +1]$
Panel A: Small Firms [N(Built) = 284 / N(Acquired) = 51]						
Equity	21.32%	34.60%	39.72%	14.97%	22.54%	33.80%
Debt	31.14%	31.90%	29.45%	55.27% **	48.71%*	45.35% **
Internal	4.87%	4.54%	15.59%	11.15%	8.51%	13.65%
Other	4.55%	8.43%	6%	-2.00%	-2.53%	-9.06%
Panel B: Medium Firms [N(Built) = 356 / N(Acquired) = 228]						
Equity	8.18%	16.06%	20.21%	3.15% *	4.80%	14.47%
Debt	34.49%	31.87%	30.12%	59.55% ***	38.02%**	38.01%
Internal	20.65%	34.32%	37.56%	20.99% ***	29.48%	34.58%
Other	-0.34%	0.84%	0%	-3.04%	-4.60%*	-5.96%
Panel C: Large Firms [N(Built) = 259 / N(Acquired) = 380]						
Equity	5.37%	11.57%	18.61%	0.82% ***	2.27%***	7.73% ***
Debt	47.75%	43.41%	38.75%	68.50% ***	55.31%***	49.30% ***
Internal	18.13%	33.20%	33.40%	17.95% ***	27.92%	33.23%
Other	1.52%	5.28%	2.35%	0.92%	1.03%	2.27%

*, **, and *** denote that the median ratios for Built vs. Acquiring firms differ at the 10%, 5% and 1%-level, respectively.

Table 6: Seemingly unrelated regression estimates of four equations of the form:

$$F_{it} = \alpha + \beta 1\ DEV_{-1} + \beta 2\ Profit_{-1} + \beta 3\ \ln(Size_{-1}) + \beta 4\ (INV\_TA) + \beta 5\ FA_{-1} + \beta 6\ Runup_{-17,-6} + \beta 7\ Q_{-1} + \varepsilon_{it} \quad (2)$$

where

F_{it} = the proportion of the net new investment financed by each of the four funding sources: i = ***Equity***, ***Debt***, ***Internal***, and ***Other***) during the event window t.

DEV = the deviation from target leverage: the firm's estimated target debt ratio (from Flannery and Rangan [forthcoming]) less its actual market debt ratio at t = -1.

Profit = net annual income as a proportion of yearend total assets

ln(Size$_{-1}$) = log of the firm's yearend book assets. Table 5 indicates the effect of size on financing choices.

INV_TA = the ratio of investments (built plus acquired) during the event window to book total assets at the yearend preceding the event window. Larger investments may be financed differently.

FA_TA = the firm's yearend book value of fixed assets as a proportion of total assets; a measure of "debt capacity".

Runup = the stock's excess return, relative to the market, measured with 6 month distance to the event window over 18 months. Hence, if the event window starts at τ=0, ***Runup*** is measured over the months [-17,-6], if it starts at τ=-1, Runup is measured over the months [-29, -18]. Firms tend to issue stock following a runup in the price (Korajczyk, Lucas and MacDonald [1991]).

Q = the ratio of the firm's market value (market value of equity plus book value of debt) to the book value of assets at the yearend preceding the event window. ***Q*** measures the firm's investment opportunity set.

Note that all explanatory variables are measured in the year preceding the event window.
Each independent variable's four coefficients are constrained to sum to zero across the four equations.
A p-value for equality with zero is reported in parentheses below each of the estimated coefficients.

Panel A: Built Investments

	Event Window: τ = 0				Event Window: τ = [0, +1]				Event Window: τ = [-1, +1]			
Dependent Variable	(1) Debt	(2) Equity	(3) Internal	(4) Other	(5) Debt	(6) Equity	(7) Internal	(8) Other	(9) Debt	(10) Equity	(11) Internal	(12) Other
DEV	0.72	-0.72	-0.06	0.05	0.52	-0.95	0.11	0.32	0.89	-0.75	-0.30	0.16
	(0.00)	(0.26)	(0.86)	(0.92)	(0.00)	(0.06)	(0.79)	(0.30)	(0.00)	(0.08)	(0.53)	(0.68)
Profit	0.04	-4.2	3.57	0.59	0.03	-3.34	3.52	-0.21	0.24	-2.67	3.34	-0.92
	(0.86)	(0.00)	(0.00)	(0.22)	(0.80)	(0.00)	(0.00)	(0.45)	(0.08)	(0.00)	(0.00)	(0.00)
Size	6.88	-13.83	6.57	0.38	0.85	-9.23	3.86	4.52	-0.87	-10.72	4.73	6.86
	(0.00)	(0.07)	(0.08)	(0.95)	(0.58)	(0.11)	(0.43)	(0.20)	(0.59)	(0.01)	(0.33)	(0.06)
INV_TA	12.78	-34.57	26.32	-4.53	-0.06	-0.32	0.11	0.27	-0.04	-0.16	0.03	0.17
	(0.01)	(0.03)	(0.00)	(0.72)	(0.14)	(0.02)	(0.38)	(0.00)	(0.26)	(0.05)	(0.73)	(0.03)
FA_TA	-1.06	0.63	0.68	-0.26	0.43	0.73	1.35	-2.51	-0.52	-2.47	4.20	-1.21
	(0.80)	(0.78)	(0.55)	(0.99)	(0.34)	(0.67)	(0.35)	(0.02)	(0.26)	(0.03)	(0.00)	(0.25)
Runup (over 18 mnths pre-event	0.03	0.43	0.06	-0.52	0.01	0.19	0.04	-0.23	-0.02	0.09	0.33	-0.39
	(0.66)	(0.04)	(0.53)	(0.00)	(0.88)	(0.24)	(0.78)	(0.02)	(0.60)	(0.45)	(0.02)	(0.00)
Q	1.62	15.32	-6.68	-10.27	0.50	15.05	-10.34	-5.21	1.45	5.01	-5.18	-1.28
	(0.04)	(0.00)	(0.00)	(0.00)	(0.38)	(0.00)	(0.00)	(0.00)	(0.02)	(0.00)	(0.01)	(0.38)
Nobs	529	529	529	529	498	498	498	498	374	374	374	374
R^2	0.08	0.26	0.38	0.11	0.08	0.32	0.33	0.12	0.12	0.35	0.34	0.13

Panel B: Acquired Investments

	Event Window: τ = 0				Event Window: τ = [0, +1]				Event Window: τ = [-1, +1]			
Dependent Variable	(1) Debt	(2) Equity	(3) Internal	(4) Other	(5) Debt	(6) Equity	(7) Internal	(8) Other	(9) Debt	(10) Equity	(11) Internal	(12) Other
DEV	0.46	-0.23	-0.21	-0.03	0.66	-0.22	-0.45	-0.01	1.04	-0.50	-0.42	-0.12
	(0.00)	(0.06)	(0.00)	(0.80)	(0.00)	(0.01)	(0.00)	(0.95)	(0.00)	(0.00)	(0.00)	(0.43)
Profit	-0.32	-1.22	1.63	-0.09	-0.812	-0.806	2.072	-0.455	-0.70	-1.29	1.76	0.22
	(0.10)	(0.00)	(0.00)	(0.84)	(0.00)	(0.00)	(0.00)	(0.05)	(0.00)	(0.00)	(0.00)	(0.31)
Size	2.26	-7.2	1.19	3.75	0.554	-8.849	0.801	7.495	0.58	-8.78	0.30	7.90
	(0.09)	(0.00)	(0.13)	(0.00)	(0.64)	(0.00)	(0.38)	(0.00)	(0.58)	(0.00)	(0.77)	(0.00)
INV_TA	8.94	8.4	-7.66	-9.68	0.008	-0.055	-0.168	0.215	-0.06	-0.05	-0.59	0.70
	(0.02)	(0.02)	(0.00)	(0.01)	(0.88)	(0.28)	(0.00)	0.00	(0.48)	(0.56)	(0.00)	(0.00)
FA_TA	0.9	-3.25	1.75	0.59	-0.969	-0.712	3.256	-1.575	-0.90	-0.39	3.64	-2.36
	(0.18)	(0.00)	(0.00)	(0.33)	(0.12)	(0.27)	0.00	(0.03)	(0.13)	(0.57)	(0.00)	(0.00)
Runup (over 18 mnths pre-event)	-0.19	0.22	0.1	-0.12	-0.129	0.205	0.109	-0.185	0.04	0.07	0.06	-0.16
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.36)	(0.19)	(0.16)	(0.01)
Q	-1.97	2.57	0.86	-1.45	-0.358	1.921	0.736	-2.299	1.22	1.06	-1.30	-0.98
	(0.01)	(0.00)	(0.05)	(0.31)	(0.61)	(0.01)	(0.18)	(0.01)	(0.09)	(0.19)	(0.06)	(0.31)
Nobs	477	477	477	477	446	446	446	446	373	373	373	373
R^2	0.13	0.21	0.14	0.08	0.18	0.23	0.4	0.16	0.29	0.32	0.37	0.21

Table 7: Long-run Performance of Equal-weighted Event Portfolios Differentiated by Type of Investment and Financing (predominance based on [0, 1] window).

The table reports long-run performance estimates for equal-weighted event-portfolios measured over a 12 month post-event horizon and differentiated by type of predominant financing and type of investment. Predominant financing occurs when the indicated source of funds contributes at least 50% of investment expenditures. The three different estimation methods are explained in the text. Abnormal returns are measured as excess returns on a monthly basis. *, **, and *** denote significance at the 10%, 5%, and 1%-level, respectively. The number of months within a sub-sample varies between 141 and 162.

Financing Type	PF #	Investment Type	No. of Events	Fama / French Regression		Calendar-Time Abnormal Returns		DGTW	
				Abnormal Return	p-value	Abnormal Return	p-value	Abnormal Return	p-value
All types of financing	1.	Built	899	-1.053%***	.001	-1.133%***	.001	-1.233%***	.000
	2.	Acquired	659	-0.871%***	.002	-0.610%***	.043	-0.647%**	.018
		Built – Acquired Diff?			.683		.269		.166
		Jointly Zero ?			.000		.000		.005
Predominantly Internal	3.	Built	149	0.022%	.957	-0.156%	.734	0.391%	.421
	4.	Acquired	53	-0.150%	.804	0.769%	.240	-0.030%	.958
		Built – Acquired Diff?			.879		.296		.563
		Jointly Zero ?			.987		.496		.370
Predominantly External	5.	Built	434	-1.376%***	.002	-1.417%***	.006	-1.575%***	.001
	6.	Acquired	429	-1.073%***	.004	-0.798%**	.041	-0.894%**	.026
		Built – Acquired Diff?			.584		.344		.253
		Jointly Zero ?			.000		.002		.002
Predominantly Equity	7.	Built	113	0.751%	.405	1.171%	.291	0.808%	.403
	8.	Acquired	66	-1.128%	.248	-0.737%	.485	-0.786%	.394
		Built – Acquired Diff?			.254		.282		.258
		Jointly Zero ?			.520		.561		.578
Predominantly Debt	9.	Built	209	-2.488%***	.000	-2.615%***	.000	-2.878%***	.000
	10.	Acquired	293	-1.224%***	.002	-1.079%***	.007	-1.234%***	.003
		Built – Acquired Diff?			.047		.052		.013
		Jointly Zero ?			.000		.000		.003

Table 8: Long-run Performance of Value-weighted Event Portfolios Differentiated by Type of Investment and Financing (predominance based on [0, 1] window).

The table reports long-run performance estimates for value-weighted event-portfolios measured over a 12 month post-event horizon and differentiated by type of predominant financing and type of investment. Predominant financing occurs when the indicated source of funds contributes at least 50% of investment expenditures. The three different estimation methods are explained in the text. Abnormal returns are measured as excess returns on a monthly basis. *,**, and *** denote significance at the 10%, 5%, and 1%-level, respectively. The number of months within a sub-sample varies between 141 and 162.

Financing Type	PF #	Investment Type	No. of Events	Fama / French Regression		Calendar-Time Abnormal Returns		DGTW	
				Abnormal Return	p-value	Abnormal Return	p-value	Abnormal Return	p-value
All types of financing	1.	Built	899	-0.581%	.354	-0.305%	.668	-1.037%**	.018
	2.	Acquired	659	-0.590%*	.077	-0.208%	.646	-0.449%	.140
		Built – Acquired Diff?			.990		.905		.273
		Jointly Zero ?			.144		.834		.090
Predominantly Internal	3.	Built	149	-0.144%	.818	-0.161%	.826	0.578%	.397
	4.	Acquired	53	-0.488%	.498	-0.184%	.818	-0.183%	.770
		Built – Acquired Diff?			.765		.905		.309
		Jointly Zero ?			.797		.971		.561
Predominantly External	5.	Built	434	-2.744%***	.000	-2.298%***	.001	-2.509%***	.000
	6.	Acquired	429	-0.777%**	.042	-0.294%	.536	-0.749%*	.055
		Built – Acquired Diff?			.005		.012		.004
		Jointly Zero ?			.000		.003		.008
Predominantly Equity	7.	Built	113	-0.586%	.539	-0.402%	.697	0.442%	.651
	8.	Acquired	66	-2.321%**	.030	-3.036%**	.018	-1.899%	.054
		Built – Acquired Diff?			.368		.106		.087
		Jointly Zero ?			.124		.055		.013
Predominantly Debt	9.	Built	209	-3.250%***	.000	-2.748%***	.001	-3.489%***	.000
	10.	Acquired	293	-0.868%*	.051	-0.561%	.305	-1.148%***	.008
		Built – Acquired Diff?			.006		.024		.001
		Jointly Zero ?			.000		.002		.030

Table 9: Summary of Significant Abnormal Returns to Portfolios of Major Investments, with "Predominant Financing" assessed for different event windows.

The portfolios are identified in the first column, and correspond to the order of Tables 7 and 8. Blank cells indicate an insignificant mean portfolio return.
The stars indicate that an abnormal return was negative and statistically significant at the 1% (***), 5% (**), or 10% (*) confidence level.
Post-event periods begin with the first month of the year following the event year. Three methods of computing abnormal returns are:

- FF: intercept term from the Fama-French regression (6).
- CTAR: Abnormal returns are computed as the difference between the event firms and non-event firms matched on size and book-to-market, as in Vijh [1999].
- DGTW: Abnormal returns are computed as the difference between each event firm's return and the return on a corresponding portfolio of firms similar to the event firm in terms of size, book-to-market and momentum.

Panel A: Predominance Based on Observed Financing during the [0, 1] Window

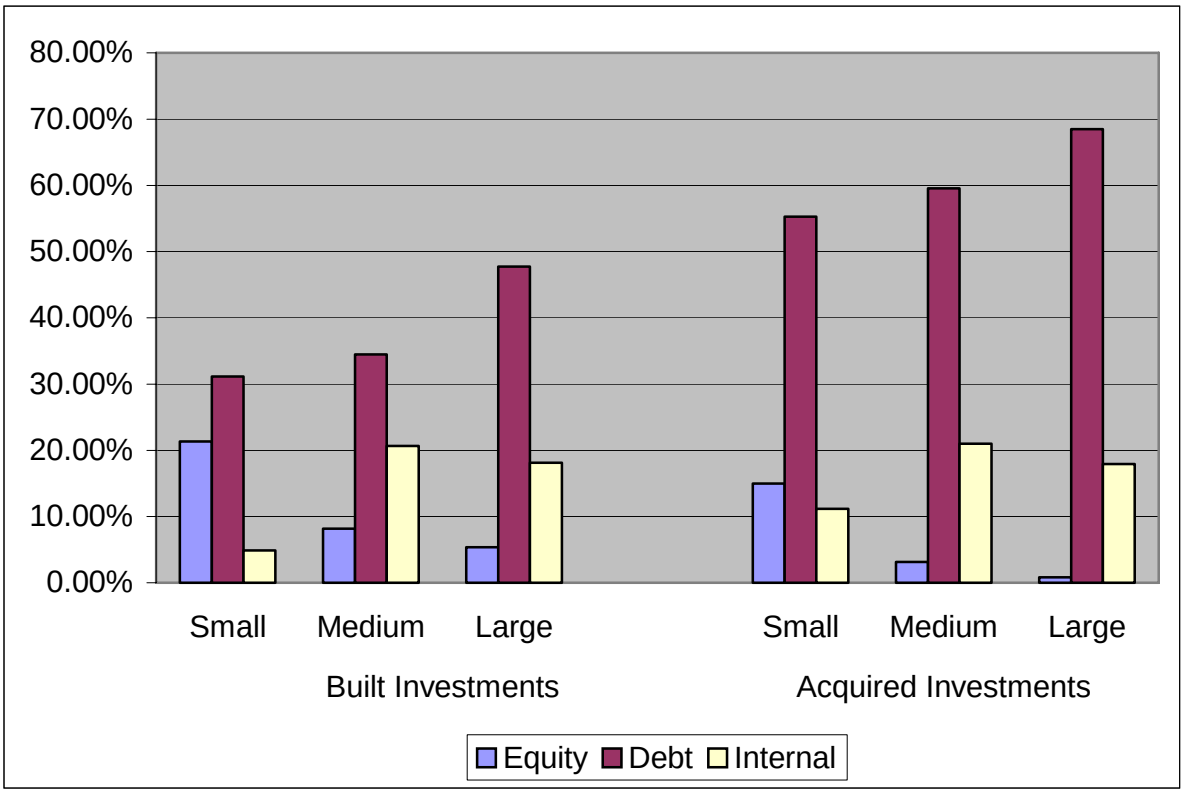
		12-month post-event horizon						36-month post-event horizon					
		EW portfolios			VW portfolios			EW portfolios			VW portfolios		
Portfolio		FF	CTAR	DGTW	FF	CTAR	DGTW	FF	CTAR	DGTW	FF	CTAR	DGTW
All – Built	1.	***	***	***			**	*	**	**			**
All – Acq.	2.	***	***	***	*			**	**	**			
Internal – Built	3.												
Internal – Acq.	4.												
External – Built	5.	***	***	***	***	***	***	**	**	***	***	***	***
External – Acq.	6.	***	**	***	**		*	**	**	**			
Equity – Built	7.							*		**	***	**	***
Equity – Acq.	8.				**	**	*				*	**	
Debt – Built	9.	***	***	***	***	***	***	**	***	***	***	***	**
Debt – Acq.	10.	***	***	***	*		***	*	*	***			

Panel B: Predominance Based on Observed Financing during the Event year (τ = 0) Window

		12-month post-event horizon						36-month post-event horizon					
		EW portfolios			VW portfolios			EW portfolios			VW portfolios		
Portfolio		FF	CTAR	DGTW	FF	CTAR	DGTW	FF	CTAR	DGTW	FF	CTAR	DGTW
All – Built	1.	***	***	***			***	*	**	**			**
All – Acq.	2.	***	***	***	*			**	**	**			
Internal – Built	3.												
Internal – Acq.	4.												
External – Built	5.	***	***	***	***	***	***	**	**	***	**	*	**
External – Acq.	6.	***	**	*	**			**	**	**			
Equity – Built	7.					*					**	**	**
Equity – Acq.	8.												
Debt – Built	9.	***	***	***	***	***	***	**	**	***	**		*
Debt – Acq.	10.								**	*			

Figure 1: Financing Patterns for Firms with Built and Acquired Investment Differentiated by Size

The figure shows the median proportions of financing sources as a proportion of total investment expenditures in the event year (τ=0). The size classes are based on total assets of the universe of COMPUSTAT firms as defined in Section 3. *Equity* is financing from the net sale of common and preferred stock, *Debt* is financing from new long- and short-term debt, and *Internal* is financing from operating cash-flows.



Appendix: Construction of Cash-Flow Financing Measures

The following table shows the exact definition of our financing measures. The scheme is based on Compustat's "Statement of Cash Flows," chapter 4 of the 2001 User's Manual, pp. 15-16. Following Mayer and Sussman [2004], we assign zero values for missing data when a more aggregated item is present. For example, if there is a missing value for change in inventories (item 303), but the higher aggregate of operating activities – net cash flow (item 308) has a non-missing value, then we infer a zero value for change in inventories.

Sign	Definition	Compustat Data Item
Invest		
+	Capital expenditures ("Built")	128
+	Acquisitions ("Acquired")	129
EQUITY		
+	Sale of equity	108
-	Purchase of equity	115
DEBT		
+	Issuance of long-term debt	111
-	Retirement of long-term debt	114
+	Change in current debt	301
INTERNAL CASH-FLOW (from operations)		
+	After tax income before extraordinary items	123
+	Depreciation and amortization	125
-	Cash dividends	127
OTHER		
+	Sale of property, plant, equipment (book value)	107
+	Loss (gain) in sale of PPE and investments	213

+	Change in account payables and accrued liabilities	304
+	Change in accrued income taxes	305
+	Equity in net loss (earnings)	106
+	Extraordinary items	124
+	Other funds from operations	217
+	Exchange rate effect	314
+	Change in receivables	302
+	Deferred tax	126
+	Change in other assets and liabilities	307
+	Other financing	312
+	Other investment	310
-	Increase in investment	113
+	Sale of investment	109
+	Increase in short-term investment	309
-	Change in cash and equivalent	274
+	Change in inventory	303