Financialization and the nonfinancial corporation: an investigation of firm-level investment behavior in the U.S., 1971-2011

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by

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Abstract

Changes in the portfolio and financing behavior of nonfinancial corporations (NFCs) over the post-1970 period point to the financialization of the nonfinancial corporation and raise the question of accompanying changes in fixed investment behavior. Using a firm-level panel, this paper econometrically investigates the relationship between financialization and investment, exploring the implications of changes in financing behavior, increasingly entrenched shareholder value norms, and rising firm-level demand volatility for investment by NFCs in the U.S. between 1971 and 2011. Shareholder value norms and firm-level volatility are, in particular, identified as characteristics of the post-1970 U.S. economy that are associated with a significant decline in NFC investment rates. The analysis also highlights key differences by firm size. In particular, shareholder value norms are found to primarily influence the investment behavior of large NFCs, while rising volatility most substantially impacts small firms.

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1 Introduction

The increasingly dominant role of finance in the U.S. over the post-1970 period has, in recent years, led to a growing literature on financialization. While the precise concept of financialization varies considerably across analyses, the shared premise is that financial sector growth signifies an important structural change in the post-1970 U.S. economy. The growing dominance of finance is highlighted by a sustained increase in the share of financial-sector profits in total corporate profits over the post-WWII period (Krippner, 2012). With respect to nonfinancial business, financialization is manifested in an increasingly complex relationship between nonfinancial corporations (NFCs) and the financial sector. Many large NFCs have come to resemble financial companies and are increasingly engaged in the provision of financial services. The hostile takeover movement and the emergence of shareholder value ideology point to changes in corporate governance, arguably increasing the weight of short-term valuations of firm performance in managerial decision-making (Crotty, 2005; Lazonick and O'Sullivan, 2000). Changes in NFC financial behavior are reflected in both an increasing share of financial assets in firm portfolios, and in changes in the structure of external finance, including increasing indebtedness and growing equity repurchases among large firms.

This paper explores changes in firm-level fixed investment behavior in the post-1970 U.S. economy, emphasizing the implications of changes in NFC financing behavior, increasingly entrenched shareholder value norms, and rising firm-level volatility for fixed investment. Recent work provides empirical support for the contention that changes associated with a broadly defined phenomenon of financialization inhibit fixed investment. Stockhammer (2004) finds that rising rentiers' income explains roughly one third of a slowdown in capital accumulation in the U.S. (p. 736), and Van Treeck (2008) argues that rising rentier incomes are responsible for a diversion of funds from physical investment into consumption expenditure. This literature generally emphasizes the aggregate level, a key exception being Orhangazi (2008), who finds that increased payments by NFCs to the financial sector and higher financial profits earned by NFCs constrain fixed investment, particularly among large firms.

While these analyses point to important empirical relationships regarding increased flows between NFCs and the financial sector, and fixed investment, they also raise further questions. In particular, the use of financial profits, rentiers' income or payments to the financial sector as indicators of financialization raises the question of what changed over the post-1970 period such that these variables rose in a dramatic and sustained way. Take, for example, Orhangazi's (2008) finding that increased flows between NFCs and the financial sector constrain NFC investment rates. These financial flows stem from firm-level decisions to acquire financial assets, or to borrow, repurchase stocks or pay dividends. On the one hand, an increase in NFC payments to the financial sector — as an example — draws (by definition) on the pool of available funds and, therefore, comes at a short-run tradeoff with other uses of funds, including physical investment. On the other hand, higher leverage — and correspondingly higher interest payments — is the result of a firm's decision to borrow in pursuit of some objective: profits, long-run growth, a stock price increase, or to cover rising interest obligations. The implications for fixed investment are likely to vary with this motivation; borrowing to acquire fixed capital, for example, differs from borrowing to buyback stock. Thus, the question arises of why NFC leverage has risen over the post-1970 period or, more broadly, what factors have led to the observed changes in NFC financial behavior over recent decades?

This paper explores these issues via an econometric investigation of a firm-level investment function. The empirical specification is based on theories of investment in the spirit of Keynes and Minsky, which impart a key role to financial factors in investment decisions. Because the decision to invest involves not only a decision about the proposed investment, but also a decision about how to finance that investment, a firm's

financing and investment decisions are interdependent. A large empirical literature based on this body of theory emphasizes the relevance of financial factors in investment models (Kuh and Meyer, 1957; Fazzari and Mott, 1986; Fazzari et al, 1988; Ndikumana, 1999; Brown et al, 2009). This theoretical perspective starkly contrasts a mainstream literature, based in part on the Modigliani-Miller theorem, which disregards financial factors in describing investment behavior (Modigliani and Miller, 1958; Jorgenson, 1963). This mainstream approach relies, however, on assumptions of perfect capital markets and perfect information, for which evidence is weak.

In addition to changes in financial behavior, however, the econometric analysis in this paper incorporates two factors capturing the changing context within which NFCs make investment and financing decisions specific to the post-1970 period: increasingly entrenched shareholder value norms, and rising firm-level volatility. In doing so, this paper makes two contributions to the literature on financialization and fixed investment. First, the paper identifies shareholder value norms and rising firm-level volatility as factors associated with a meaningful decline in NFC investment rates over the post-1970 period. Thus, while changes in investment are linked to financial decisions, changes in investment and financing behavior are also rooted in new corporate governance norms and rising firm-level volatility. Second, the paper explores firm-size differences, highlighting that shareholder value norms significantly impact the behavior of large firms, while investment among smaller firms is more strongly inhibited by rising volatility. This decomposition of the nonfinancial corporate sector by firm size highlights the power of utilizing firm-level data. The analysis is also motivated using firm-level descriptive statistics, thereby adding to the existing literature in which elaboration of the stylized facts has been limited to the sector level.

The paper is organized as follows. Section 2 summarizes the stylized facts describing changes in NFC financial structure from 1971 to 2011. Section 3 motivates the econometric specification, and section 4 presents the empirical specification and data. The econometric results are presented in section 5 and section 6 concludes.

2 The 'financialization' of the nonfinancial corporation

2.1 NFC financial decisions: portfolio composition and external finance

Trends in the structure of firm-level balance sheets summarize changes in NFC investment and financing behavior over the post-1970 period.[1] The asset side of the balance sheet highlights, first, a sustained decline in the share of fixed capital, raising questions about fixed investment in recent decades. The across-firm yearly median of fixed capital measured relative to sales, shown by the black line in figure 1a, declined 5.3 percentage points between 1971 and 2011, from 24.1 percent in 1971 to 18.8 percent in 2011.[2] Concurrently, financial assets relative to sales rose 18.1 percentage points, from 27.4% in 1971 to 45.5% in 2011. This portfolio shift towards away from fixed and towards financial assets has been cited in the literature on financialization to motivate a possible relationship between financialization and fixed investment, raising the question of whether financial investments are crowding out physical assets.

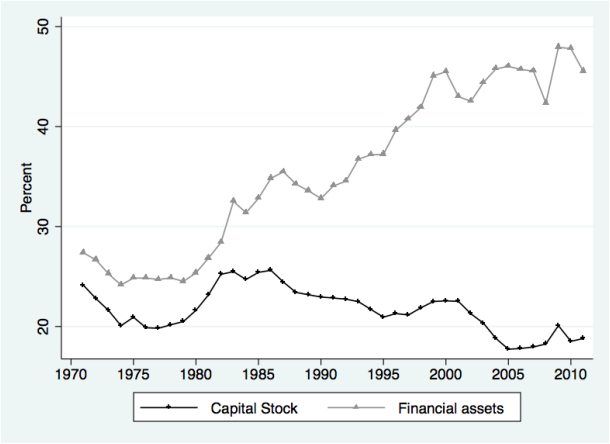
Growth in NFC financial assets holdings is concentrated, first, in liquid short-term investments and, second, in 'miscellaneous' financial assets. Figure 1b decomposes total financial assets into four (exhaustive)

[1]The data is from Standard & Poor's Compustat annual database for 1971 through 2011; details on the variables are in section 4.2 and also summarized in the appendix.

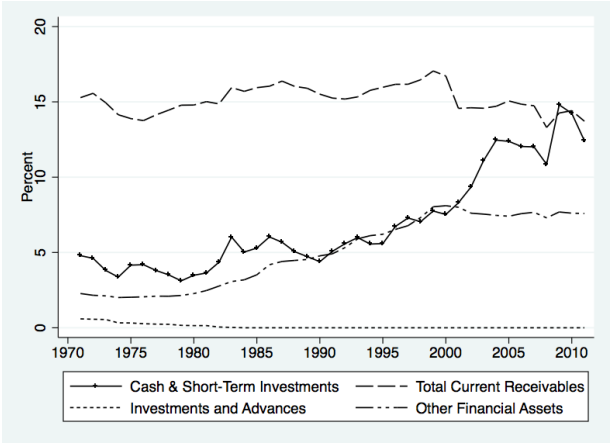
[2]The trend is similar if financial assets are instead measured relative to total assets. Sales are used here to proxy for firm size.

Figure 1: Financial assets and capital relative to sales

(a) Financial assets and the capital stock relative to sales



(b) Components of financial assets measured relative to sales



Yearly medians

Source: Compustat, author's calculations

Table 1: Changes in components of financial assets relative to sales for small and large firms; medians

	All firms			Small firms*			Large firms**		
	1971	2011	pp change	1971	2011	pp change	1971	2011	pp change
Total financial assets	27.4%	45.5%	18.1	28.5%	51.4%	22.9	29.8%	47.2%	17.4
Cash & short-term investments	4.8%	12.4%	7.6	5.5%	20.4%	14.9	4.9%	9.1%	4.2
Current receivables	15.3%	13.7%	-1.6	16.0%	13.3%	-2.7	15.0%	13.6%	-1.4
Advances	0.6%	0.0%	-0.6	0.0%	0.0%	0	3.3%	2.9%	-0.4
'Other' financial assets	2.3%	7.6%	5.3	2.3%	5.9%	3.6	2.5%	11.1%	8.6
Capital	24.1%	18.8%	-5.3	18.2%	9.7%	-8.5	52.4%	43.9%	-8.5

* A firm is categorized as small if its total assets are in the bottom quartile of the asset distribution for any given year.
** A firm is categorized as large if its total assets are in the top quartile of the asset distribution for any given year.

Source: Compustat, author's calculations

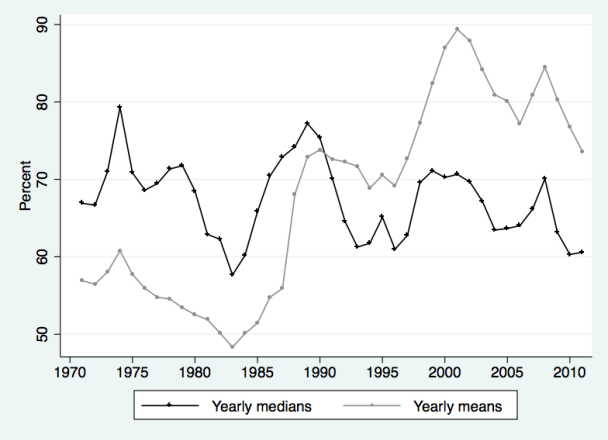
subcategories: total current receivables, cash and short-term investments, investments and advances, and 'other' financial assets. The first panel of table 1 summarizes the changes in total financial assets, each subcategory and capital between 1971 and 2011. While current receivables and advances have both grown relatively proportionally to firm-level sales, 'other' miscellaneous financial assets rise from 2.3 percent of sales in 1971 to 7.6 percent in 2011.[3] The largest increase is, furthermore, in liquid financial assets, which rise from 4.8 percent of sales in 1971 to 12.4 percent in 2011.[4]

The portfolio shift away from fixed capital and towards financial assets occurs across firm size. The second and third panels of table 1 summarize the change in each portfolio component between 1971 and 2011 for small and large firms, where size is defined by total assets. Small firms are defined as firms with total assets in the bottom quartile of the asset distribution in a given year; large firms have total assets in

[3]The documentation on what constitutes 'other' financial assets is unilluminating. A similar issue arises in the Flow of Funds data, in which the largest category of financial assets is an unidentified category (see Crotty 2005 for a discussion). One can, however, draw inferences from the business press, which Krippner (2012) cites in listing "an array of new financial instruments—money market mutual funds, 'stripped' treasuries, Euromarket and Caribbean offshore dollar markets, foreign currency instruments, and portfolios composed of options and futures contracts" held on NFC balance sheets.

[4]'Cash and short-term investments' includes both cash and securities with original maturities less than one year; because of accounting rules, 'cash' cannot be disaggregated from other 'short-term investments'.

Figure 2: Debt relative to the capital stock



Source: Compustat, author's calculations

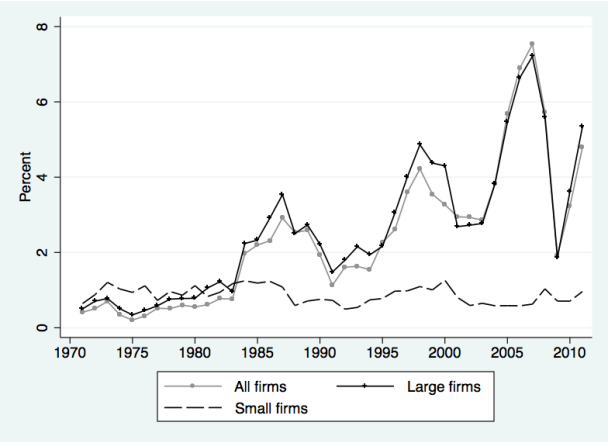
the top quartile of the asset distribution. Among small firms, total financial assets rise from 28.5 percent of sales in 1971 to 51.4 percent in 2011, while fixed capital declines from 18.2 percent of sales to 9.7 percent. Similarly, total financial assets held by large firms increase from 29.8 percent of sales in 1971 to 47.2 percent in 2011, and fixed capital declines from 52.4 percent to 43.9 percent of sales.

Thus, a portfolio shift towards financial assets occurs across the distribution of firms. The composition of financial assets acquired, however, differs by size. For both small and large firms growth in financial assets is concentrated in short-term and 'other' financial assets, as with the full sample. Among small firms, the largest increase is in liquid financial assets, which rise from 5.5 percent of sales in 1971 to 20.4 percent in 2011. Concurrently, 'other' financial assets rise from 2.3 percent to 5.9 percent of sales. Among large firms, on the other hand, financial asset acquisitions are far less concentrated in liquid assets. Instead, the greatest increase lies in 'other' financial assets, which rose from 2.5 percent to 11.1 percent of sales from 1971 to 2011.

While the shift in NFC portfolio composition occurs across the distribution of firms, albeit to varying degrees, changes in the structure of both debt and equity differ decisively by firm size. An increase in gross corporate debt has been cited as a definitive characteristic of the financialization of nonfinancial corporations (Palley, 2007), and Flow of Funds data clearly documents rising leverage at the sector-level. At the firm level, however, rising mean leverage across NFCs is simultaneous with declining median leverage, shown in figure 2. The different trends in mean and median gross indebtedness points to rising leverage among large firms and concurrent de-leveraging among small firms. Since the early 1970s, the distribution of debt among small firms has become increasingly skewed towards zero, such that in the last five years of the sample (2005-2009) more than 55 percent of small firms have leverage between zero and twenty-five percent of capital. Among large firms, on the other hand, the distribution of debt has shifted to the right, such that there are fewer large firms with 'low' leverage at the end of the period than in the early 1970s.

Rising debt among large firms is accompanied by a dramatic increase in NFC repurchases of own stock. Stock repurchases have received considerable attention in reference to the shareholder value movement (Lazonick and O'Sullivan, 2000; Lazonick, 2009), and the sector-level trend towards buybacks is well known. While the firm-level data reinforces this sector-level trend, it also highlights that repurchases are concentrated among large firms. Figure 3 plots the across-firm yearly mean of gross equity repurchases relative to total outstanding equities for the full sample of firms and by firm size. While equity repurchases among

Figure 3: Equity buybacks



Source: Compustat, author's calculations

large firms follow the full-sample pattern quite closely, repurchases are low among small firms over the entire period. Furthermore, the median of equity buybacks in any given year, both for the full sample and each sub-sample of firms, is zero, reflecting the bulky and episodic nature of repurchase plans: firms announce that stock will be repurchased over a set number of years, followed by years without repurchases.

Concurrent with these changes in the structure of external finance, the correlation between new borrowing and investment – shown in figure 4 – has declined, indicating that rising leverage among large firms is not channeled into physical investment.[5] Holmstrom and Kaplan (2001) argue, for example, that leveraged buyouts during the hostile takeover movement, particularly during the 1980s, contribute to the rise in corporate debt. Borrowing to buyout a company has no direct link to capital investment. The same is true of repurchasing stock. The concurrent rise in debt and repurchases over this period, therefore, suggests that equity is being replaced with debt on the balance sheets of large firms, while 'traditional' financing behavior – debt finance for the acquisition of physical assets – is breaking down. As with changes on the asset side of NFC balance sheets, changes in the structure of external finance, therefore, raise questions about fixed investment in the post-1970 U.S. economy.

2.2 Changing corporate governance norms: shareholder value ideology

The growing entrenchment of shareholder value norms is one factor that has likely shaped changes in NFC behavior over the post-1970 period. Institutional changes supporting the emergence of shareholder value principles began in the 1970s — as inflation increased the value of corporate plant and equipment relative to low stock prices, supporting the emergence of a corporate takeover market (Krippner, 2012) — and became increasingly entrenched over the 1980s and 1990s, with the rise of agency theory, institutional investors and changing norms regarding managerial pay (Lazonick and O'Sullivan, 2000). Agency theory suggests two mechanisms to alleviate agency problems between managers and shareholders (owners) within firms: a hostile market for corporate control, which 'disciplines' managers via a threat to managerial autonomy (Jensen, 1986, p. 324), and stock option based executive compensation (Jensen and Murphy, 1990). The concurrent rise of institutional investors has supported both a transition away from long-term stock holding towards higher trading frequency (Lazonick and O'Sullivan, 2000; Stout, 2012), and the push for stock-option

[5] A version of this graph appeared in Mason (2013).

Figure 4: Correlation between investment and borrowing over time

Source: Compustat, author's calculations

based managerial pay (Krippner, 2012).

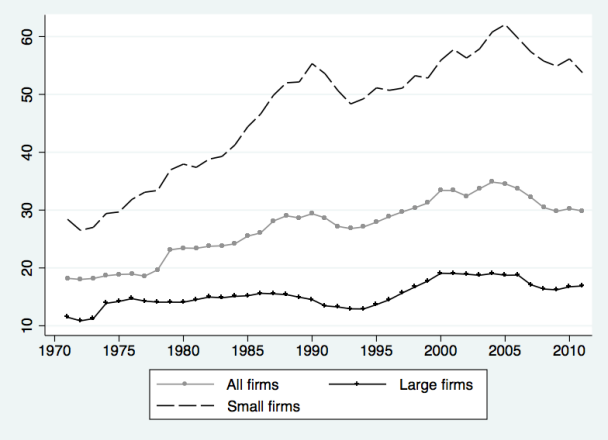
These institutional changes have gradually led to the internalization of 'value maximization' as a motive driving managerial decision-making. This shift from traditional objectives – such as growth or profits – to 'value maximization' is summarized by an introductory corporate finance text, which emphasizes the "fundamental objective of corporate finance: maximizing the current market value of the firm's outstanding shares...[The] objective overrides other plausible goals, such as 'maximizing profits"' (Brealey and Meyers, 2012, p. 13). Trends in firm-level balance sheets, furthermore, suggest that this shift in objectives influences managers' portfolio and financing decisions. Stock buybacks, in particular, are a clear manifestation of shareholder value ideology: buybacks improve (stock) market-based valuations of firm performance, reflected both in a higher share price, and in an increase in return on equity. As such, buybacks both diminish the likelihood of hostile takeover and increasing the value of stock options.

The imposition of shareholder value norms on managerial decision-making may, however, be primarily limited to large firms. This distinction is suggested by figure 3, which indicates that equity buybacks over the post-1970 period are concentrated among large firms. This firm-size difference is also consistent with evidence that stock option-based pay is greater among large firms, both in absolute values and relative to firm size, than among small firms (Core et al, 1999).

2.3 Rising firm-level volatility

Rising firm-level volatility over the post-1970 period may have also contributed to the changes in firm-level financing and investment behavior that point to the financialization of nonfinancial corporations. Rising firm-level volatility has been extensively documented in the existing literature (Comin and Phillipon, 2005), and has been linked, for example, to new information and communication technologies leading to shorter product life cycles (Skott and Guy, 2013). Figure 5 shows volatility for firms in this sample, plotting the coefficient of variation in the firm-level sales-to-capital ratio, where the standard deviation and mean are based on five years of lags. Sales volatility for the full sample of firms, shown by the grey line, rises almost one hundred percent between 1971 and 2011, and volatility among large firms increased approximately fifty percent, from 11.5 percent in 1971 to 16.9 percent in 2011. Compared to large firms, however, volatility among small firms increased far more dramatically, nearly doubling from 28.4 percent in 1971 to 53.8 percent

Figure 5: Volatility (the coefficient of variation in S/K)



in 2011. Figure 5, therefore, suggests that rising volatility provides particular insight into changes in the behavior of small firms over the recent financialization of the U.S. economy.

For example, higher volatility, reflecting greater uncertainty, is likely to drive increased demand for liquid assets. Bates et al (2009) find evidence that idiosyncratic risk (firm-level volatility) is a determinant of increased cash holdings over this period (p. 2018).[6] This evidence is consistent with the fact that small firms hold relatively greater shares of liquid – as opposed to non-liquid – financial assets than large firms (see table 1). Higher volatility and correspondingly greater uncertainty regarding future demand may similarly be a factor behind de-leveraging among small firms. Similarly, volatility may affect the decision to invest in fixed capital. Capital investments are long-term and largely irreversible; in a more volatile environment, investment demand is likely to be lower for given expected returns.

3 Investment

3.1 Framework

The changes in NFC portfolio composition and external financing behavior suggest accompanying changes in investment behavior. This section outlines the determinants of investment demand at the firm level, thereby motivating the econometric specification used below. Consider a firm that invests in two types of assets – fixed capital (K) and financial capital (M) – and that finances its expenditures via a combination of internal funds, new debt (D), and proceeds from new equity issues. Using a dot over a variable to denote a time rate of change, the firm's uses of funds include the acquisition of new assets, whether fixed capital ($\dot{K} = I$) or financial assets ($\dot{M}$), dividend payments to shareholders (Div), and interest payments on outstanding debt ($i^{debt}D$, where i^{debt} is the firm's cost of borrowing). The firm's sources of funds include profits earned on fixed capital (π), returns earned on financial assets ($i^{dep}M$, where i^{dep} is the financial profit rate), new share issues ($\dot{N}$ new shares at a price of ν per share), and new borrowing ($\dot{D}$).

The firm's finance constraint, equating the firm's total uses and sources of funds, can then be expressed

[6] An alternative explanation for the build-up of cash among NFCs emphasizes tax motives: because profits earned abroad would be taxed if repatriated, firms hold foreign profits as cash (Foley et al, 2007). This explanation would apply primarily to large NFCs, which are more likely to earn foreign income. Bates et al (2009) find, however, that even firms without foreign income exhibit a secular increase in cash holdings.

as:

$$pI + \dot{M} + Div + i^{debt}D = \pi + i^{dep}M + \upsilon\dot{N} + \dot{D} \tag{1}$$

where p denotes the price of the investment good. Normalizing p to one for simplicity, and writing $Div = (1 - s_f)(\Pi - i^{debt}D)$ where Π denotes total profits ($\Pi = \pi + i^{dep}M$) and s_f is the retention rate, the finance constraint can be rewritten as:

$$I + \dot{M} = s_f(\Pi - i^{debt}D) + \nu\dot{N} + \dot{D} \tag{2}$$

Equation 2 is an identity, capturing that total assets acquired by a firm – fixed and financial – are equivalent to the sum of retained earnings and new external finance. This expression highlights the interdependence of investment and financing decisions: decisions to invest in fixed capital or to acquire financial assets are concurrent with decisions about how to finance that asset acquisition.

For a given set of objectives, the firm's desired stocks of capital, financial assets and debt (K^*, M^*, and D^*) can be defined as the levels the firm would select if it could adjust each stock freely in pursuit of these objectives, subject to labor market, demand and financing constraints.[7] Financing constraints include both the macroeconomic interest rate environment, and also how the interest rate faced by an individual firm depends on factors such as current leverage and wealth. A large firm with greater accumulated wealth, for example, has a larger desired stock of capital or debt, at otherwise equal expected rates of return, than a firm with less accumulated wealth. Due to imperfect competition in goods markets and imperfections in financial markets – requiring, for example, collateral to obtain external financing – the desired stocks are finite.

The desired stocks of capital, financial assets, and debt can be summarized as jointly determined by the expected profit rate on fixed capital, the financial profit rate and the cost of borrowing. A higher expected profit rate on fixed capital (π^e) makes holding capital more desirable ($K^*_{\pi_e} > 0$). Consistent with a Keynesian perspective, the specification emphasizes that future profits are unknown, such that investment depends on the *expected* profit rate on new capital. Similarly, all else equal, a higher financial profit rate (i^{dep}) makes holding financial assets more desirable ($M^*_{i_{dep}} > 0$), and a higher cost of borrowing (i^{debt}) leads to a smaller desired stock of debt ($D^*_{i^{debt}} < 0$).

The adjustment of the firm's capital stock can then be described by a stock adjustment from the current level of each stock towards the desired level. Because K, M and D are jointly determined, the evolution of capital depends not only on the discrepancy between the current and desired level of capital, but also on the simultaneous discrepancy between the current and desired levels of financial assets and debt. The adjustment of the firm's capital stock over time ($\dot{K}$) can, therefore, be summarized as:[8]

$$\dot{K} = f(K^* - K, M^* - M, D^* - D)$$

such that the firm's investment rate can be written:

$$\hat{K} = \frac{\dot{K}}{K} = \frac{I}{K} = f(\frac{K^* - K}{K}, \frac{M^* - M}{K}, \frac{D^* - D}{K}) \tag{3}$$

$$= f(\frac{K^*}{K}, \frac{K^*}{K}\frac{M^*}{K^*}, \frac{M}{K}, \frac{K^*}{K}\frac{D^*}{K^*}, \frac{D}{K}) \tag{4}$$

[7] Of course, firms do not directly maximize objective functions; however, strict maximization is not necessary. The key point is that, at any point in time, firms have desired stocks of capital, financial assets and debt, which are determined in pursuit of the firm's objectives, and which are jointly determined due to the finance constraint.

[8] After including capital, financial assets and debt, the book value of equity is simply a residual; the adjustment of the stock of equity is, therefore, not included separately here.

As discussed above, the desired levels of each stock (expressed in equation 4 as $\frac{K^*}{K}$, $\frac{M^*}{K^*}$ and $\frac{D^*}{K^*}$) are jointly determined by the expected profit rate, the financial profit rate and the cost of borrowing.[9] Assuming that individual NFCs do not have price-setting power in financial markets, both the financial profit rate and the cost of borrowing are exogenous determinants of investment. With imperfect competition in product markets, however, expected profitability is not an exogenous parameter; expected profitability is, instead, summarized by the combination of current profits (π) and the utilization rate of fixed capital (u), which together capture the demand and production conditions facing the firm (Skott, 1989). Because expectations regarding future profits are formed largely on the basis of recent performance, current profitability is an indicator of expected future profitability. However, un-utilized capital does not earn profits; thus, the expected return on additional capital also depends on whether the additional unit of capital will be utilized. If the firm's utilization rate is below its desired level, the expected profit rate on additional capital is correspondingly low. Equation 5, therefore, summarizes the determinants of investment demand:

$$I/K = \tilde{f}(\pi, u, i^{dep}, i^{debt}, \frac{M}{K}, \frac{D}{K}) \tag{5}$$

The expected signs follow from the discussion above. A higher expected profit rate increases the desired stock of capital, thereby stimulating investment, the profit rate and the utilization rate are positively related to the investment rate. Utilization also captures an accelerator effect: an increase in demand, reflected in increased utilization, induces a firm invest so as to re-build its desired level of excess capacity. The financial profit rate, on the other hand, is negatively associated with the investment rate. The financial profit rate captures the opportunity cost of acquiring fixed rather than financial assets and, therefore, the 'hurdle' rate of return that a manager must expect to earn on fixed capital in order to invest in fixed rather than financial assets. This logic is consistent with Tobin's (1965) discussion of portfolio decisions in a monetary economy. Similarly, a higher cost of borrowing is associated with a lower investment rate. Because capital investments are generally financed with a combination of internal and external funds, an increase in the cost of external funds decreases investment demand at otherwise equal expected rates of return.

The stock of financial assets is positively related to the investment rate. Financial assets have characteristics that support investment; in particular, financial assets, unlike debt, are under the sole discretion of managers and entail no future cash payment commitments. If the firm's outstanding stock of financial assets exceeds the desired stock of financial assets, resources will be reallocated into capital investments, and investment will rise. The relationship between financial assets and capital, therefore, captures a portfolio readjustment process whereby, at given rates of return on fixed and financial assets, a firm holds both financial assets and fixed capital in a relatively stable proportion. This point is, again, consistent with Tobin (1965), who argues that in a monetary economy with two types of assets, "the community will hold the two assets in proportions that depend on their respective yields" (Tobin, 1965, p. 678), such that "Capital deepening in production requires monetary deepening in portfolios" (p. 679).

Last, the stock of debt is, all else equal, negatively associated with the investment rate. Contrary to financial assets, debt entails future cash payment commitments. A larger stock of debt increases both lenders' and borrowers' risk, reducing the firm's investment demand (Keynes, 1936; Minsky, 1975). From the perspective of management, a larger stock of debt reduces the firm's margin of safety with which to

[9] The stock adjustment in equation 3 similarly describes the adjustment of stocks of financial assets and debt ($\dot{M}$ and $\dot{D}$):

$$\begin{aligned} \dot{M} &= h(K^* - K, M^* - M, D^* - D) \\ \dot{D} &= z(K^* - K, M^* - M, D^* - D) \end{aligned}$$

These three adjustment processes must be jointly satisfied.

respond to adverse shocks (Kalecki, 1971), thereby decreasing managerial willingness to tie up funds in capital investments.[10] From the perspective of creditors, a large stock of debt signals potential solvency problems and intensifies agency problems in the lending relationship. Thus, a large stock of debt may inhibit a firm's ability to obtain (additional) external funds, constraining future investment.

3.2 Shareholder value norms

Because the firm's objectives define the desired stocks of capital, financial assets and debt (K^*, M^*, and D^*), the specific functional form of investment demand depends on these objectives as well. As of yet, these objectives have not been specified. As discussed in section 2, however, the increasing entrenchment of shareholder value norms over recent decades has led to the internalization of 'value maximizing' norms and, accordingly, a shift in objectives towards a growing emphasis on 'value'. It has, furthermore, been a frequent claim in the literature that this growing emphasis on shareholder value has shortened managerial time horizons, such that managers targeting value are less likely to tie up funds in long-term, irreversible capital investments than managers targeting 'traditional' objectives, all else equal.

The implication is that growing emphasis on 'value maximizing' objectives has a direct negative effect on NFC investment rates, which can be captured via a shift in the investment demand function:

$$I/K = \tilde{f}(u, \pi, i^{dep}, i^{debt}, K, M, D; Sv) \tag{6}$$

where Sv denotes shareholder value objectives and $(I/K)_{Sv} < 0$. Equation 6 states that at an otherwise equal financial profit rate, expected profit rate, utilization rate, cost of borrowing, and stocks of capital, financial assets and debt, a manager aiming to maximize a firm's stock market valuation will allocate fewer funds towards long-term capital investment projects than a manager targeting traditional objectives.

Stockhammer (2004) also argues that shareholder value ideology constrains investment via changing managerial preferences. Empirically, Stockhammer equates shareholder value objectives with rentiers' income, a variable that is similar to financial profits. Because rentiers' income is endogenous to the investment decision, however, it is also interrelated with the firm's other financial decisions, such as the use of debt and equity. Equating shareholder value objectives with rentiers' income, therefore, omits changes in a firm's response to a given cost of borrowing or financial profitability that may accompany an increased emphasis on shareholder value. Here, the implications of shareholder value norms are, instead, explored via a shift in the finance constraint to allow for possible impacts of shareholder value norms on other financial decisions, in addition to investment. Specifically, the implications of shareholder value objectives are explored via the impact of shareholder value *norms* on investment, where the growing entrenchment of these norms can be understood as exogenous to the individual firm.

3.3 Firm-level volatility

On the other hand, for given objectives, a firm's desired stocks of capital, financial assets and debt also depend on its environment. Rising volatility over the post-1970 period signals, however, changes in the environment within which NFCs make investment and financing decisions. Because higher volatility reflects

[10] The 'appropriate' or safe level of leverage may vary with the business cycle: during an upswing, for example, the level of leverage that both managers and creditors find appropriate may rise (Minsky, 1975). This endogenous change in the safe level of leverage would diminish the negative impact of debt on investment during an upswing, and increase the strength of the effect during a downswing.

greater uncertainty, a manager facing high volatility is expected to invest less in fixed capital, all else equal, than a manager facing low volatility. As with shareholder value norms, the impact of firm-level volatility on the investment decision can be expressed via a shift in the investment demand function, capturing that managers react differently to the same financial variables in a highly volatile or a less volatile environment. Incorporating volatility (V), equation 7 presents the final investment specification:

$$I/K = \tilde{f}(u, \pi, i^{dep}, i^{debt}, K, M, D; Sv, V) \tag{7}$$

In addition to shareholder value norms and volatility, other factors – in particular, changes in the competitive environment stemming from increased international competition and the globalization of production – are also likely to influence NFC investment behavior over the post-1970 period.[11] Rather than proposing an exahustive explanation of factors causing changes in investment behavior, however, this paper focuses more narrowly on the implications of two particular channels for domestic investment. The exclusion of other potentially relevant factors is, however, a limitation of this paper.

4 Empirical strategy and data

4.1 Statistical specification

The empirical specification of the investment function follows from the discussion in section 3:

$$(I/K)_{it} = \beta_0 + \beta_1 (I/K)_{i,t-1} + \beta_2 u_{i,t-1} + \beta_3 \pi_{i,t-1} + \beta_4 i^{dep}_{i,t-1} + \beta_5 i^{debt}_{i,t-1} + \beta_6 (\frac{M}{A})_{i,t-1} + \beta_7 (\frac{D}{A})_{i,t-1} + \beta_8 R_{k,t-1} + \beta_9 V_{i,t-1} + \varepsilon_{it} \tag{8}$$

where A denotes total assets, the subscript i denotes the firm, t denotes the year, and k denotes industry.

In addition to the terms discussed above, the empirical specification includes a lagged dependent variable to incorporate dynamic effects in the adjustment of the capital stock. These dynamic effects capture persistence and path dependencies in investment stemming from the long-term nature of capital investments, irreversibilities in investments, and adjustment costs in the acquisition and implementation of new capital. Thus, the coefficient is expected to be positive ($\beta_1 > 0$). Kopcke and Brauman (2001) and Eberly et al (2012) demonstrate the significance of a lagged dependent variable in explaining investment behavior.

The remaining expected signs follow from section 3. The coefficient on capacity utilization (u) is expected to be positive ($\beta_2 > 0$) and, controlling for capacity utilization, the coefficient on the profit rate is also expected to be positive ($\beta_3 > 0$). Both the financial profit rate and the cost of borrowing are expected to be negatively related to fixed investment ($\beta_4 < 0$ and $\beta_5 < 0$). Finally, the coefficient on the stock of financial assets is expected to be positive ($\beta_6 > 0$), while the coefficient on the firm's outstanding stock of debt is expected to be negative ($\beta_7 < 0$).

4.1.1 Shareholder value norms

In the empirical specification, shareholder value norms are captured by the yearly industry-level average of gross stock repurchases relative to total equity (R_{kt}). The variable is included to explore the impact on investment of the expectations of (stock) market participants that managers target stock market-based indicators of firm performance over profit or growth objectives. Because the objective is to explore the

[11] The development of global value chains and the offshoring of production, such that capital is moved abroad but sales are recorded in domestic income accounts, are additional factors behind the declining capital to sales ratio (see, for example, Milberg, 2008).

implications of changing corporate governance norms on investment, the repurchases variable does not explore the direct effect of an individual firm's decision to repurchase stock on its own investment. The independent inclusion of firm-level repurchases would, however, provide little econometrically relevant information about investment due to the bulky and episodic nature of stock repurchase plans.

The expectation is that norms encouraging managerial 'maximization' of market-based value impinge on the allocation of resources for fixed investment ($\beta_8 < 0$). In particular, managers operating in industries in which average repurchases rise face pressure to target financial indicators of firm performance, because the firms in each industry constitute a comparison group against which managerial performance is evaluated. As a manager in industry k, higher average industry-level repurchases indicate that other managers in industry k are repurchasing stock, thereby, both improving financial metrics of performance such as earnings per share and return on equity, and increasing the value of their own stock options. Consequently, as a manager in this industry, you also face pressure to target these financial indicators. Not doing so, first, makes your firm appear undervalued on the stock market relative to competitors, thus making your firm a candidate for corporate takeover and risking your position of authority as a manager. Second, the value of the stock options of other managers in your peer group rise relative to your own. The resulting pressure to reallocate funds towards financial performance squeezes fixed investment.

As suggested by the discussion in section 2, however, shareholder value norms are expected to primarily influence the behavior of large corporations. These large corporations also drive the sector-level trends. Thus, the relationship between the repurchases variable and the investment rate is expected to be negative for large firms and for the full sample; however, the effect is expected to be stronger for large firms. With less evidence that shareholder value norms impact the behavior of smaller firms, the coefficient is expected to be insignificant for subsamples of small firms.

4.1.2 Volatility

Similarly, managers of firms facing high volatility are expected to be less willing to tie up funds in long-term fixed investment projects, and more apt to acquire financial assets. Thus, an increase in firm-level volatility is expected to have a negative effect on fixed investment ($\beta_9 < 0$). Like shareholder value norms, volatility is expected to have differential effects on investment; however, unlike shareholder value norms, volatility is expected to most strongly impact the investment rates of small firms.

4.2 Estimation strategy

The empirical specification also includes time- and firm-level fixed effects. These fixed effects capture unobservable year- and firm-specific factors that are relevant for describing a firm's behavior but cannot be explicitly controlled for in the regression — in the case of firm fixed effects, for example, managerial capability. The estimations use the Arellano-Bond Generalized Method of Moments (GMM), which accounts for potential endogeneity arising from the inclusion of a lagged dependent variable and firm-level fixed effects in a panel setting.

The estimations also include additional lags of the explanatory variables. The inclusion of lags is standard in empirical work on investment functions (Fazzari et al, 1988; Fazzari and Mott, 1986; Ndikumana, 1999). Because managers act subject to uncertainty and imperfect information, investment decisions are based on expectations regarding the future. These expectations, formed on the basis of recent experience, are captured empirically by lags of the explanatory variables. Results are reported for three lags of the explanatory

Table 2: Descriptive statistics

Variable		All firms Median	All firms Std Dev	All firms Obs	1st Quartile (Small) Median	1st Quartile (Small) Std Dev	1st Quartile (Small) Obs	2nd Quartile Median	2nd Quartile Std Dev	2nd Quartile Obs	3rd Quartile Median	3rd Quartile Std Dev	3rd Quartile Obs	4th Quartile (Large) Median	4th Quartile (Large) Std Dev	4th Quartile (Large) Obs
	overall		0.22	N=237,427		0.29	N=59,677		0.23	N=64,927		0.18	N=58,925		0.13	N=53,898
	between		0.17	n=17,999		0.22	n=91,32		0.21	n=10,512		0.18	n=7,634		0.14	n=4,062
$(I/K)_{t-1}$	within	0.27	0.18	T-bar=13.2	0.24	0.24	T-bar=6.5	0.25	0.17	T-bar=6.2	0.21	0.12	T-bar=7.7	0.16	0.08	T-bar=13.3
	overall		18.02	N=240,654		24.92	N=60,357		18.18	N=65,577		13.37	N=59,702		9.30	N=55,018
	between		15.68	n=18,023		20.07	n=9,163		17.10	n=10,544		13.54	n=7,670		9.81	n=4,092
$(S/K)_{t-1}$	within	4.45	11.19	T-bar=13.4	5.90	16.20	T-bar=5.9	5.81	9.48	T-bar=6.2	4.59	5.97	T-bar=7.8	2.37	4.18	T-bar=13.4
	overall		16.93	N=240,025		12.68	N=60,190		4.68	N=65,441		1.72	N=59,558		1.03	N=55,018
	between		14.55	n=18,017		9.92	n=9,153		4.80	n=10,534		1.86	n=7,655		1.08	n=4,092
π_{t-1}	within	0.32	11.01	T-bar=13.3	-0.06	8.22	T-bar=6.6	0.38	2.95	T-bar=6.2	0.43	1.18	T-bar=7.8	0.31	0.78	T-bar=13.4
	overall		0.08	N=239,537		0.11	N=62,793		0.07	N=65,194		0.06	N=58,748		0.07	N=52,802
	between		0.05	n=18,029		0.06	n=9,243		0.05	n=10,549		0.05	n=7,652		0.05	n=4,076
i^{dep}_{t-1}	within	-0.01	0.07	T-bar=13.3	0.00	0.09	T-bar=6.8	-0.01	0.05	T-bar=6.2	-0.01	0.05	T-bar=7.7	-0.01	0.06	T-bar=13.0
	overall		0.23	N=208,477		0.33	N=47,912		0.25	N=65,274		0.18	N=54,088		0.12	N=53,424
	between		0.17	n=18,028		0.23	n=8,343		0.22	n=10,550		0.15	n=7,304		0.10	n=4,018
i^{debt}_{t-1}	within	0.05	0.20	T-bar=13.4	0.07	0.27	T-bar=5.7	0.06	0.20	T-bar=5.5	0.05	0.15	T-bar=7.4	0.05	0.10	T-bar=13.3
	overall		0.25	N=240,553		0.27	N=63,372		0.24	N=65,410		0.21	N=58,880		0.19	N=52,891
	between		0.06	n=18,035		0.23	n=9,297		0.24	n=10,568		0.22	n=7,660		0.19	n=4,081
$(M/A)_{t-1}$	within	0.41	0.06	T-bar=13.3	0.53	0.17	T-bar=6.8	0.45	0.11	T-bar=6.2	0.37	0.09	T-bar=7.7	0.31	0.09	T-bar=13.0
	overall		0.35	N=244,573		0.55	N=63,533		0.27	N=65,961		0.25	N=59,959		0.19	N=55,121
	between		0.28	n=18,044		0.37	n=9,303		0.26	n=10,589		0.24	n=7,694		0.20	n=4,100
$(D/A)_{t-1}$	within	0.24	0.25	T-bar=13.6	0.18	0.40	T-bar=6.8	0.18	0.15	T-bar=6.2	0.27	0.14	T-bar=7.8	0.30	0.11	T-bar=13.4
	overall		0.01	N=260,380		0.01	N=64,171		0.06	N=61,583		0.06	N=56,993		0.07	N=52,126
	between		0.01	n=18,054		0.01	n=9,314		0.04	n=10,214		0.04	n=7,465		0.04	n=4,013
R_{t-1}	within	0.02	0.01	T-bar=14.4	0.02	0.01	T-bar=6.9	0.00	0.05	T-bar=6.0	0.00	0.05	T-bar=7.6	0.00	0.06	T-bar=13.0
	overall		0.29	N=163,528		0.41	N=30,404		0.28	N=41,455		0.19	N=44,467		0.14	N=47,202
	between		0.31	n=14,757		0.40	n=5,364		0.29	n=7,088		0.21	n=5,937		0.15	n=3,565
V_{t-1}	within	0.18	0.16	T-bar=11.1	0.38	0.23	T-bar=6,7	0.23	0.16	T-bar=5.9	0.16	0.11	T-bar=7.5	0.12	0.10	T-bar=13.2

variables. Estimations with two lags are similar but show evidence of second order autocorrelation in the errors, which is ameliorated by the inclusion of the third lag. Because volatility is constructed on the basis of a five-year moving average and, therefore, incorporates multiple years of information, only the first lag of volatility is included.

It is, finally, important to note inherent difficulties in empirical analyses of investment functions. The interdependence of portfolio and financing decisions introduces potential endogeneity between the financing variables and the investment decision. In this paper, two steps are taken to ameliorate the potential for bias. First, the estimates are based on lagged rather than contemporaneous values of the explanatory variables. Fazzari and Mott (1986) use a similar procedure: "Because all investment must be financed somehow, either internally or externally, current investment is closely linked to current finance by definition. Omitting the contemporaneous finance variables from the regression and using only lagged values alleviates this problem" (p. 179).[12] The investment rate is, similarly, defined as a function of lagged explanatory variables in Orhangazi (2008) and Stockhammer (2004). Second, the Arellano-Bond methodology, which corrects for endogeneity introduced by the lagged dependent variable by instrumenting I/K_{t-1} with its own lags, is extended to the other potentially endogenous variables. Thus, the variables appearing in the firm's finance constraint (π, i^{dep}, i^{debt}, M, D) are also instrumented with their own lags using GMM.

4.3 Data

The sample is an unbalanced panel of annual data for publicly traded nonfinancial U.S. firms from Standard & Poor's Compustat databse between 1971 and 2011.[13] Table 2 summarizes descriptive statistics for the full sample and by size quartiles. Size is again defined by total assets. The variable definitions are as follows. The investment rate is capital expenditures relative to the capital stock. This investment rate refers to domestic investment. Capacity utilization is defined as sales relative to the capital stock. This definition of capacity utilization is standard in empirical studies using firm-level data because there is no analog for capacity at the firm level (Fazzari and Mott, 1986; Orhangazi, 2008). The profit rate on fixed capital is defined as profits (gross operating income) relative to the capital stock. Analogously, the financial profit rate is financial profits (non-operating income) relative to the outstanding stock of financial assets. Financial assets are the sum of cash and short-term investments, current receivables, 'other' investments, and advances. The cost of borrowing is the firm's effective interest burden: interest payments relative to total debt. This variable captures factors contributing to a firm's cost of obtaining external finance, such as the firm's bond or credit rating, banking relationships and outstanding lines of credit. The financial profit rate and effective interest burden are adjusted for inflation using the GNP deflator. Shareholder value norms are captured by the yearly industry average of gross stock repurchases relative to total outstanding equity. Finally, volatility is the coefficient of variation in firm-level sales-to-capital ratio, where the mean and standard deviation are averaged over the previous five years of data. The ratios are winsorized. These variable definitions, with the Compustat reference numbers, are also summarized in the appendix.

A final data issue concerns adjustment of the measured rates of return for taxes. The rates of return here are pre-tax rates of return and are, therefore, imperfect measures of the profit rates facing firms in the U.S.

[12] Additional justification for this choice stems from the fact that, for example, profits earned in period t are still unrealized when investment decisions in period t are made, whereas profits from period $t-1$ are already realized and, therefore, a determinant of the decision to invest.

[13] The unbalanced panel is preferable to a balanced panel for two reasons. First, because Compustat's coverage increases over time, balancing the panel would substantially truncate the information used in the estimations. Because a balanced panel is unnecessary econometrically, dropping this available information is undesirable. Second, by only including firms that have survived for the full period, a balanced panel would introduce biases favoring large and well-established firms.

economy. This is a limitation of the available data. While a firm's average tax rate can be calculated, it is not possible to determine whether those taxes are applied to financial or nonfinancial income. The extent to which firms are differentially able to avoid taxation further discredits attempts to incorporate a firm's tax burden into the measured profit rates (tax havens, for example, are likely to be more heavily utilized by large multinational corporations). A direct treatment of taxes is similarly avoided in other firm-level investment studies.

5 Results

Table 3 presents the primary regression results for the full sample and for size quartiles. Long-run multipliers, summarizing the total effect of the three lags of each explanatory variable on investment, are shown in table 4.[14]

5.1 Non-financial determinants of investment

Together, the non-financial determinants of investment — the lagged dependent variable, capacity utilization and the profit rate — point to the validity of the regression model. For the full sample of firms, the coefficient on the first lag of the dependent variable is positive and significant, capturing dynamic effects in investment behavior. With the exception of the smallest quartile of firms, this coefficient is also positive for all size sub-samples, and the magnitude of the effect becomes stronger as firm size increases.

The coefficients on capacity utilization and profitability also have the expected signs in most specifications. Coefficients on both the first lag and the long-run multipliers for capacity utilization are positive and significant for the full sample of firms and the first three size quartiles; for the largest quartile of firms the coefficient is negative, but insignificant. The magnitude of the short-run relationship between capacity utilization and investment, captured by the coefficient on the first lag of S/K, is large: in the full sample, a one standard deviation increase in capacity utilization implies a 0.29 standard deviation increase in the investment rate. The short run coefficient on the profit rate also has the expected sign in the largest three quartiles, and the estimate is significant for sub-samples of above-median firm size. The long run coefficients have the expected sign in all but the smallest sample of firms, but are insignificant. An insignificant coefficient on the profit rate is, however, unsurprising given that other explanatory variables capture trends that are empirically similar to profits and, in particular, capacity utilization may absorb the effect of the profit rate.

5.2 Financial determinants of investment

The results highlight the importance of changes in NFC financial behavior since the early 1970s for fixed investment. Beginning with the financial profit rate, the coefficients on both the first lag and the long-run multiplier for the full sample of firms are negative as expected, although not statistically significant. Furthermore, with respect to the financial profit rate the firm size results are particularly interesting. While the short run coefficients on the first lag of the financial profit rate for the smaller three quartiles of firms are

[14]The appendix also includes additional specifications. The long-run multipliers are calculated as follows. Consider, for example, a basic investment function, in which investment is a function of three lags of both investment and profits: $(I/K)_t = \sum_{i=1}^{3} \alpha_i (I/K)_{t-i} + \sum_{i=1}^{3} \beta_i \pi_{t-1}$. The long-run multiplier for profits (LR_π) captures the cumulative effect of a change in profits on investment: $LR_\pi = (\sum_{i=1}^{3} \beta_i)/(1-\sum_{i=1}^{3} \alpha_i)$.

Table 3: Estimation results; dependent variable I/K

	All NFCs	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
$(I/K)_{t-1}$	0.2600***	0.0435*	0.1519***	0.2991***	0.4127***
	(0.0118)	(0.0232)	(0.0200)	(0.0189)	(0.0202)
$(I/K)_{t=2}$	0.0165*	-0.0654***	-0.0231*	0.0007	0.0040
	(0.0083)	(0.0156)	(0.0128)	(0.0119)	(0.0121)
$(I/K)_{t-3}$	0.0032	-0.0381***	-0.0265***	-0.0056	-0.0078
	(0.0068)	(0.0132)	(0.0101)	(0.0100)	(0.0090)
$(S/K)_{t-1}$	0.0035***	0.0030***	0.0043***	0.0031***	-0.0001
	(0.0003)	(0.0004)	(0.0004)	(0.0006)	(0.0011)
$(S/K)_{t-2}$	-0.0007***	-0.0001	-0.0006*	0.0003	-0.0005
	(0.0002)	(0.0003)	(0.0004)	(0.0005)	(0.0011)
$(S/K)_{t-3}$	-0.0001	0.0001	0.0001	-0.0005	0.0003
	(0.0002)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
π_{t-1}	-0.0007	-0.0016	0.0005	0.0067***	0.0094**
	(0.0015)	(0.0011)	(0.0019)	(0.0023)	(0.0046)
π_{t-2}	0.0000	-0.0014	0.0009	-0.0040*	0.0003
	(0.0014)	(0.0013)	(0.0022)	(0.0024)	(0.0022)
π_{t-3}	0.0011	0.0009	0.0009	0.0004	-0.0006
	(0.0011)	(0.0012)	(0.0010)	(0.0017)	(0.0017)
i^{dep}_{t-1}	-0.1222*	-0.0422	-0.0535	-0.1110	0.0227
	(0.0670)	(0.0715)	(0.0894)	(0.0705)	(0.0371)
i^{dep}_{t-2}	0.0884	-0.0045	-0.0328	-0.0029	0.0554*
	(0.0591)	(0.0749)	(0.0799)	(0.0524)	(0.0316)
i^{dep}_{t-3}	-0.0157	-0.0417	0.1017**	-0.0335	-0.0224
	(0.0284)	(0.0414)	(0.0442)	(0.0337)	(0.0201)
i^{debt}_{t-1}	-0.0468	-0.0069	-0.0208	-0.0093	-0.0460
	(0.0295)	(0.0287)	(0.0269)	(0.0250)	(0.0284)
i^{debt}_{t-2}	0.0301	0.0099	0.0015	0.0033	0.0009
	(0.0319)	(0.0323)	(0.0272)	(0.0245)	(0.0228)
i^{debt}_{t-3}	0.0099	0.0138	0.0124	0.0039	0.0227**
	(0.0094)	(0.0124)	(0.0116)	(0.0113)	(0.0116)
$(M/A)_{t-1}$	0.1549***	0.1689***	0.1620***	0.1417**	0.1082**
	(0.0552)	(0.0601)	(0.06222)	(0.0588)	(0.0472)
$(M/A)_{t-2}$	0.1036*	0.1607***	-0.0087	0.0878*	0.1105***
	(0.0560)	(0.0583)	(0.0641)	(0.0514)	(0.0417)
$(M/A)_{t-3}$	-0.1002***	-0.0326	-0.0657	-0.0533	-0.0895***
	(0.0360)	(0.0448)	(0.0431)	(0.0375)	(0.0322)
$(D/A)_{t-1}$	-0.1024***	-0.0670**	-0.05661	-0.1513***	-0.1640***
	(0.0314)	(0.0284	(0.0404)	(0.0405)	(0.0422)
$(D/A)_{t-2}$	0.0680**	0.0483*	-0.0629	0.0515	0.0124
	(0.0334)	(0.0278)	(0.0408)	(0.0384)	(0.0385)
$(D/A)_{t-3}$	-0.0234	-0.0130	-0.0101	-0.0038	0.0369
	(0.0236)	(0.0234)	(0.0284)	(0.0268)	(0.0265)
R_{t-1}	-0.3366**	-1.0764*	0.2419	-0.1991	-0.4463***
	(0.1551)	(0.6253)	(0.3826)	(0.2140)	(0.1621)
R_{t-2}	-0.2130	-0.7491	-06556*	0.1486	-0.1891
	(0.1469)	(0.6308)	(0.3733)	(0.2036)	(0.1408)
R_{t-3}	-0.1862	-1.2875	0.1784	0.0321	-0.4648**
	(0.1792)	(0.7978)	(0.4555)	(0.2363)	(0.1840)
V_{t-1}	-0.0990***	-0.0895***	-0.0859***	-0.0726***	-0.0653***
	(0.0094)	(0.0168)	(0.1434)	(0.0158)	(0.0165)
Obs	99,096	13,624	21,830	28,397	35,245
Firms	10,316	2,835	4,153	4,177	3,006
Firm dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Sargan (p value)	0.0000	0.5706	0.0003	0.0321	0.0000
2nd order auto.	0.4691	0.5347	0.9105	0.5287	0.7697

The regressions are based on the Arellano-Bond Generalized Method of Moments. The instrument set includes includes instruments beginning from $t-2$, and is restricted to three additional lags of the explanatory variables to keep the number of instruments less than the number of groups. Coefficients for the year fixed effects are not reported. Robust standard errors are in parentheses. The p values for the Hansen-Sargan test of overidentifying restrictions and for the Arellano-Bond test of second order autocorrelation are obtained from two-step estimations.
* Significant at 10%; ** Significant at 5%; *** Significant at 1%.
Each firm-size quartile is defined according to total assets (the first quartile includes firms with total assets below the 25th percentile of total assets for that year, the second quartile includes firms with total assets above the 25th percentile and below the 50th percentile of total assets for that year, etc.).

Table 4: Long-run coefficients; dependent variable I/K

	All NFCs	*1st Quartile*	*2nd Quartile*	*3rd Quartile*	*4th Quartile*
(S/K)	0.0038***	0.0029***	0.0041***	0.0040***	-0.0005
	(0.0005)	(0.0005)	(0.0006)	(0.0007)	(0.0020)
π	0.0005	-0.0020	0.0026	0.0044	0.0153
	(0.0026)	(0.0018)	(0.0034)	(0.6248)	(0.0096)
i^{dep}	-0.0687	-0.0834	0.0172	-0.2088*	0.0943**
	(0.0730)	(0.0963)	(0.1368)	(0.1144)	(0.0408)
i^{debt}	-0.0009	0.0158	-0.0077	-0.0028	-0.0378
	(0.0568)	(0.0426)	(0.0439)	(0.0415)	(0.0519)
(M/A)	0.2197***	0.2802***	0.0975	0.2496***	0.2186***
	(0.0503)	(0.0655)	(0.0162)	(0.0679)	(0.0519)
(D/A)	-0.0802***	-0.0300	-0.1444***	-0.1469***	-0.1940***
	(0.0283)	(0.0279)	(0.0461)	(0.0388)	(0.0401)
R	-1.0215**	-2.9371**	-0.2622	-0.0261	-1.8613**
	(0.4398)	(1.1785)	(0.8218)	(0.6248)	(0.5762)
V	-0.0990***	-0.0895***	-0.0859***	-0.0726***	-0.0653***
	(0.0094)	(0.0168)	(0.1434)	(0.0158)	(0.0165)

The long-run coefficients are based on the regression results in table 3. Results for volatility are based replicated from table 3 for comparison. Long-run coefficients are calculated on the basis of an autoregressive process: the sum of the coefficients on the lags of each variable, divided by one minus the sum of the coefficients on the lags of investment. The p-values are based on a Chi^2 statistic. The standard errors, shown in parentheses, are calculated by dividing the estimate by square root of the Chi^2 statistic.
* Significant at 10%; ** Significant at 5%; *** Significant at 1%.

negative as expected, the coefficients on both the first lag and the long-run multiplier for the largest quartile of firms are positive and – in the case of the long-run effect – statistically significant.

The positive relationship between the financial profit rate and investment among large firms suggests that large firms generate complementarities between financial profits and the non-financial components of their business that are not captured by smaller firms. As noted in section 2, large firms have also acquired relatively more non-liquid ('other') financial assets than smaller firms. Together, the different composition of financial assets by firm size and the positive coefficient on the financial profit rate for large firms suggest different motivations for acquiring financial assets for firms of different sizes. While the liquid assets acquired by small firms may hedge against volatility and risk, the 'other' financial assets held by large NFCs may instead reflect movement into the provision of financial services, namely borrowing and lending for profit. NFC expansion into car loans and store-issued credit cards are particularly cogent examples (Froud et al, 2005). Store-issued credit cards, for example, generate financial profits and also capture demand for the firm's non-financial products, thereby supporting fixed investment.

The coefficient on the first lag of the effective interest burden is negative in all specifications, but statistically insignificant. Furthermore, the magnitude of the effect is quite small. For the full sample, a one standard deviation increase in the effective interest rate corresponds to a 0.05 standard deviation decline in the investment rate. The long-run multiplier is also insignificant in all specifications, suggesting that a higher cost of borrowing has no significant long-run effect on investment. Notably, Orhangazi (2008) finds a negative, but in most subsamples significant, relationship between the first lag of NFC payments to the financial sector and fixed investment. However, Orhangazi's payments variable combines interest payments with shareholders payouts (dividend payments and stock buybacks). Importantly, the difference between Orhangazi's results and those presented here suggests that the strength of Orhangazi's finding captures payouts to shareholders, rather than to creditors.

The stock of financial assets is found to have a positive and robust relationship to fixed investment in both the short-term and the long-run in most specifications. This result does not lend support to the proposition

in the financialization literature that financial assets are crowding out physical investment. Instead, the stock of financial assets is the only avenue through which post-1970 changes in NFC financial structure are found to support investment. In the full sample, a one standard deviation increase in the stock of financial assets is associated with a 0.18 standard deviation increase in the investment rate. This positive relationship is consistent with the portfolio adjustment process described in section 3: for given expected returns, firms hold both fixed and financial assets, and investment increases if the stock of financial assets rises above the desired level.[15] Thus, firms acquire financial assets – which ameliorate inherent risks of long-term and irreversible capital investments – concurrently with fixed capital. The magnitude of the coefficient is smaller for large firms, particularly in the short run, which is consistent with the idea that large firms face fewer constraints than small firms in obtaining external finance and, therefore, depend less strongly on the smoothing function of financial assets.

The stock of financial assets has not been included in the empirical literature on financialization and investment, and the independent inclusion of the stock of financial assets and the financial profit rate is an innovation of this paper. While the stock of financial assets is found to have a robust positive relationship to fixed investment, the financial profit rate is negatively related to investment in most specifications. The difference points to different time implications of the financial profit rate and an acquired stock of financial assets. An increase in the financial profit rate may drive a short-term reallocation of funds towards financial assets, but a larger stock of financial assets provides flexibility to carry out long-term fixed investment projects despite uncertainty regarding profits and the cost and availability of external finance.

Last, for the full sample and all size sub-samples, an increase in the stock of debt is found to constrain investment. In both the short run and the long run, the stock of debt is found to have a negative and significant relationship to fixed investment in most specifications, and particularly among large firms. In the full sample, a one standard deviation increase in the stock of debt is associated with a 0.16 standard deviation decline in investment. This finding is consistent with the existing literature, which also highlights a robust negative relationship between a firm's stock of debt and investment rate (Ndikumana, 1999; Orhangazi, 2008). Thus, among large firms, whose stocks of debt rose substantially after the 1970s, this negative relationship points to a marked decline in the support of external finance for fixed investment in recent decades.

5.3 Shareholder value norms

The results, furthermore, capture a negative relationship between shareholder value norms and fixed investment rates. Both the first lag and the long-run multiplier of the repurchases variable are found to have a significant negative relationship to NFC investment rates for the full sample of firms, implying that an increase in average industry-level repurchases leads to a decrease in investment rates among other firms in that industry. Thus, managers in industries in which average repurchases rise also face pressure to target financial performance indicators. The pressure to reallocate funds towards financial targets squeezes fixed investment. This finding is consistent with the financialization literature emphasizing changes in corporate governance associated with shareholder value ideology (Lazonick and O'Sullivan, 2000), and the findings here draw a direct link between shareholder value norms and investment behavior. These conclusions are consistent with Stockhammer (2004), but provide explicit firm-level, rather than aggregate-level, empirical support for a negative relationship between shareholder value ideology and fixed investment.

[15] Empirically, the stock of financial assets may also capture a 'financing motive' , summarizing profitability and demand from previous periods as firms saved up to invest. The empirical results are, however, robust to omitting financial assets from the regression; these results are shown in the appendix.

The empirical results also reiterate the expected firm-size differences: shareholder value norms are found to most strongly impact the investment behavior of the largest quartile of firms. While average industry-level repurchases are also found to be significant for the full sample and weakly significant for the smallest quartile of firms, the magnitude of the effect among the largest firms is considerably greater than for either the full sample or small firms.[16] A one standard deviation increase in average industry-level repurchases is associated with only a 0.02 standard deviation decline in investment for the full sample of firms, and a 0.05 standard deviation decline in investment for the smallest firms. For the largest quartile of firms, however, a one standard deviation increase in average industry-level repurchases is associated with a 0.14 standard deviation decline in investment. This comparison highlights both that these largest firms drive the sector-level behavior, and that the impingement of shareholder value norms on fixed investment is largely a phenomenon of large corporations.

5.4 Firm-level volatility

The results also highlight the importance of rising volatility in driving changes in the investment behavior of small firms. Rising firm-level volatility is found to have a negative and significant impact on fixed investment rates for both the full sample and each subsample of firms, supporting the claim that rising firm-level volatility over the post-1970 period has contributed to a decline in investment rates. For the full sample, a one standard deviation increase in volatility is associated with a 0.13 standard deviation decline in the investment rate. The magnitude of the effect is, furthermore, greater for the smallest quartile of firms: among small firms, a one standard deviation increase in volatility is associated with a 0.17 standard deviation decline in the investment rate. Among the largest quartile of firms, on the other hand, a one standard deviation increase in volatility is associated with only a 0.04 standard deviation decline in the investment rate. This finding highlights that small firms are more sensitive to a given increase in volatility than larger firms, which is logical given that small firms – with fewer total assets and market power – are more vulnerable to swings in sales than large firms. Because the total rise in volatility is also especially dramatic among smaller firms, the cumulative effect of rising volatility is particularly important in explaining the investment behavior of small NFCs over the post-1970 period. Volatility has not been raised in the existing literature on financialization and investment; however, these results suggest that rising volatility is an important factor in explaining changes in firm investment behavior over the post-1970 period. Because volatility can, similarly, be expected to influence the decisions to acquire financial assets and debt, it is an important factor to bring into the discussion of the financialization of NFCs.

6 Conclusion

Changes in the portfolio composition and external financing behavior of NFCs over the post-1970 period in the U.S. raise important questions about fixed investment and accumulation in a 'financialized' economy. This paper contends that shareholder value norms and rising firm-level volatility are two factors driving changes in portfolio composition and external financing behavior, and constraining NFC investment between 1971 and 2011. In doing so, this paper builds on a literature emphasizing the relationship between fixed

[16] Sub-period estimations, shown in the appendix, furthermore show that the negative relationship between shareholder value norms and investment strengthens over the post-1970 period. Dropping the 1970s – the decade during which shareholder value ideology had not yet become firmly entrenched – strengthens the estimated effect of shareholder value norms on fixed investment. Additional robustness checks in the appendix further support the conclusion that shareholder value norms most substantially and robustly impact the investment behavior of large NFCs.

investment and financial profits, payments to the financial sector, and rentiers' income. These indicators of financialization are, however, endogenous to the individual firm's investment decision and are ultimately driven by other changes – for example, in managerial priorities or the institutional context within which firms operate. This paper, therefore, explores the role of changing managerial priorities and rising firm-level volatility in driving the sustained changes in NFC financial behavior over the post-1970 period that have led to dramatic increases in indicators such as financial profits or rentiers' income.

Shareholder value norms inhibit fixed investment by inducing a shift in managerial priorities towards financial targets. A large literature critical of shareholder value ideology has raised concerns regarding the implications shareholder value norms for a host of key economic variables, including employment, growth, sustainable prosperity and investment. This paper corroborates the claims in this literature, emphasizing a link between shareholder value norms and declining investment rates. It does so in a novel way, by examining the implications of changing *norms* regarding corporate governance and the appropriate allocation of funds for investment behavior. Rising firm-level volatility similarly makes managers less willing to tie-up funds in long-term and irreversible investment projects.

Both the descriptive and econometric analysis in this paper emphasizes differences by firm size, pointing to two different stories of financialization for large and for small firms. These firm-size differences indicate that the constraints faced by small and large firms have evolved differently over the post-1970 period. Shareholder value norms have significantly impacted the investment behavior of large firms. The dramatic increase in volatility facing small firms, on the other hand, highlights that rising volatility is a particularly important factor driving changes in the financial behavior of smaller NFCs. Concurrent de-leveraging and a declining share of capital in small firm's portfolios, furthermore, suggests that small firms have faced growing real-side constraints that have led them to borrow less and hold more liquidity, inhibiting fixed investment.

The analysis in this paper lies entirely at the firm level. In many cases, particularly with the descriptive statistics, large firms mirror the sector and drive the aggregate trends. Still, further analysis linking the firm level to the aggregate level is necessary to draw conclusions about capital accumulation and macroeconomic dynamics in the U.S. economy. The econometric results also raise some more specific questions; for example, suggesting that large firms may exploit complementarities between financial and non-financial activities that are not available to smaller firms, reflected in the positive relationship between the financial profit rate and investment for large firms. This finding suggests that further investigations of financialization and nonfinancial corporations should delve more specifically into the types of financial activities that NFCs engage in. Because of the ambiguity regarding the definitions of 'other' financial assets in both the firm level and the aggregate (Flow of Funds) data, this point also highlights the importance of case studies in further research of financialization and nonfinancial firms. Overall, however, the findings in this paper suggest that the increasingly financial orientation of firms in the U.S. economy inhibits fixed investment. In particular, changes in the behavior of the largest firms, which are traditionally important sources of both employment and investment in the U.S. economy, raise fundamental questions about the sustainability of increasingly finance-oriented growth.

Appendix:

Summary of variable definitions:

	Variable	Definition	Compustat Items
I/K	Investment rate	Capital expenditures relative to the capital stock (net property, plant and equipment)	Capital expenditures (128) Capital stock (141)
S/K	Capacity utilization	Sales relative to the capital stock	Sales (12) Capital stock (141)
π	Profit rate	Gross operating income relative to the capital stock	Operating income before depreciation (13) Capital stock (141)
i^{dep}	Financial profit rate	Gross non-operating income relative to financial assets[1]	Non-operating income (61) Financial assets (see below)
i^{debt}	Effective interest burden	Interest payments relative to total debt (the sum of current and long-term debt)	Interest payments (15) Total debt (34 and 142)
M^{dep}	Financial assets	Cash and short-term investments, current receivables, other current assets (less inventories), and 'other' investments and advances (which includes, for example, investments in and advances to unconsolidated subsidiares and affiliates, and banks and savings & loan investment securities, and miscellaneous assets such as stock or debt issuance costs) (Relative to total assets in econometric specification)	Financial assets (1, 2, 68, 31, 32, and 69 respectively) Total assets (6)
D	Total debt	Current and long-term debt (Relative to total assets in econometric specification)	Total debt (34 and 142) Total assets (6)
R	Industry average of gross repurchases	Gross repurchases relative to total equity	Gross repurchases (115) Total equity (144)
V	Coefficient of variation in sales to capital ratio[2]	The standard deviation of S/K relative to the mean; five year average	Sales (12) Capital stock (141)

[1] The results are robust to financial profits defined as the sum of interest and dividend income.
[2] The results are robust to defining the coefficient of variation in profits to capital ratio.
Inflation adjustment based off the GNP deflator.

Additional specifications; dependent variable I/K

	Column 1	Column 2	Column 3	Column 4	Column 5	1971-2011	1981-2011
$(I/K)_{t-1}$	0.2561***	0.2799***	0.2762***	0.1333***	0.4381***	0.2600***	0.2600***
	(0.0102)	(0.0118)	(0.0102)	(0.0186)	(0.0204)	(0.0118)	(0.0130)
$(I/K)_{t-2}$	0.0324***	0.0115	0.0266***	-0.0159	0.0142	0.0165*	0.0170*
	(0.0062)	(0.0077)	(0.0067)	(0.0118)	(0.0128)	(0.0083)	(0.0089)
$(I/K)_{t-3}$	0.0099*	-0.0012	0.0091	-0.0187*	-0.0030	0.0032	0.0043
	(0.0052)	(0.0067)	(0.0057)	(0.0105)	(0.0095)	(0.0068)	(0.0076)
$(S/K)_{t-1}$	0.0030***	0.0038***	0.0035***	0.0035***	00007	0.0035***	0.0032***
	(0.0003)	(0.0003)	(0.0002)	(0.0003)	(0.0010)	(0.0003)	(0.0003)
$(S/K)_{t-2}$	-0.0006***	-0.0005**	-0.0006***	-0.0002	-0.0003	-0.0007***	-0.0005**
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0006)	(0.0002)	(0.0002)
$(S/K)_{t-3}$	0.0001	-0.0003	-0.0005***	-0.0004*	0.0002	-0.0001	-0.0001
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0003)	(0.0002)	(0.0002)
π_{t-1}	-0.0008	-0.0011				-0.0007	-0.0012
	(0.0014)	(0.0015)				(0.0015)	(0.0017)
π_{t-2}	-0.0016	-0.0001				0.0000	0.0007
	(0.0014)	(0.0015)				(0.0014)	(0.0013)
π_{t-3}	0.0004	0.0013				0.0011	0.0013
	(0.0009)	(0.0012)				(0.0011)	(0.0012)
i^{dep}_{t-1}	-0.1447**	-0.1487**	-0.1684**	0.0024	0.0185	-0.1222*	-0.1608**
	(0.0631)	(0.0715)	(0.0705)	(0.0829)	(0.0381)	(0.0670)	(0.0669)
i^{dep}_{t-2}	0.0562	0.0697	0.0999	0.0226	0.0401	0.0884	0.0599
	(0.0580)	(0.0635)	(0.0665)	(0.0858)	(0.0345)	(0.0591)	(0.0609)
i^{dep}_{t-3}	0.0087	-0.0048	0.0147	0.0084	-0.0190	-0.0157	0.0009
	(0.0242)	(0.0293)	(0.0268)	(0.0393)	(0.0211)	(0.0284)	(0.0282)
i^{debt}_{t-1}	-0.0121	-0.0455				-0.0468	-0.0813***
	(0.0302)	(0.0329)				(0.0295)	(0.0285)
i^{debt}_{t-2}	0.0586*	0.0290				0.0301	0.0215
	(0.0282)	(0.0325)				(0.0319)	(0.0318)
i^{debt}_{t-3}	0.0083	0.0124				0.0099	0.0123
	(0.0067)	(0.0095)				(0.0094)	(0.0098)
$(M/A)_{t-1}$	0.2368***		0.2023***	0.2407***	0.1748***	0.1549***	0.1425**
	(0.0546)		(0.0578)	(0.0695)	(0.0521)	(0.0552)	(0.0580)
$(M/A)_{t-2}$	0.0902*		0.0233	0.0467	0.0756	0.1036*	0.0871
	(0.0522)		(0.0616)	(0.0730)	(0.0467)	(0.0560)	(0.0597)
$(M/A)_{t-3}$	-0.1131***		-0.0120	0.0447	-0.1087***	-0.1002***	-0.1037***
	(0.0302)		(0.0373)	(0.0466)	(0.0345)	(0.0360)	(0.0383)
$(D/A)_{t-1}$	-0.1059***	-0.1078***	-0.1186***	-0.0888***	-0.0835**	-0.1024***	-0.1101***
	(0.0284)	(0.0328)	(0.0313)	(0.0295)	(0.0402)	(0.0314)	(0.0336)
$(D/A)_{t-2}$	0.0892***	0.0702**	0.0148	0.0106	-0.0422	0.0680**	0.0706**
	(0.0309)	(0.0344)	(0.0339)	(0.0317)	(0.0412)	(0.0334)	(0.0349)
$(D/A)_{t-3}$	-0.0178	-0.0190	0.0149	0.0051	0.0360	-0.0234	-0.0173
	(0.0159)	(0.0249)	(0.0229)	(0.0241)	(0.0301)	(0.0236)	(0.0242)
R_{t-1}		-0.3038*	-0.2103	-0.4433	-0.3805**	-0.3366**	-0.6048***
		(0.1554)	(0.1542)	(0.5467)	(0.1594)	(0.1551)	(0.1597)
R_{t-2}		-0.2974**	-0.1778	-0.6922	-0.1328	-0.2130	-0.1643
		(0.1448)	(0.1427)	(0.5032)	(0.1423)	(0.1469)	(0.1525)
R_{t-3}		-0.2631	0.1265	-0.5874	-0.4876***	-0.1862	-0.6536***
		(0.1821)	(0.1759)	(0.6741)	(0.1858)	(0.1792)	(0.1830)
V_{t-1}		-0.0939***	-0.0995***	-0.1003***	-0.0760***	-0.0990***	-0.0946***
		(0.0092)	(0.0086)	(0.0149)	(0.0172)	(0.0094)	(0.0099)
Obs	123,556	99,096	121,510	21,286	37,033	99,096	81,917
Firms	13,319	10,316	11,833	3,683	3,125	10,316	9,394
Firm dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sargan (p value)	0.0000	0.0000	0.0000	0.3352	0.0000	0.0000	0.0000
2nd order auto.	0.3618	0.2219	0.3716	0.3530	0.0843	0.4691	0.5320

The estimation strategy is identical to that in table 3. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.
Column 1: a baseline investment model that omits shareholder value norms and volatility.
Column 2: omits the stock of financial assets.
Columns 3-5: omits financing variables that are insignificant in full sample and show firm-size results (column 3 shows the full sample, column 4 the smallest quartile of firms, and column 5 the largest quartile of firms). The results are robust to dropping insignificant variables, and also reinforce that shareholder value norms primarily impacts large NFCs.
The last two columns show sub-period estimations: column 6 reproduces the full sample estimations, and column 7 drops 1971-1980.

References

[1] Bates, T., Kahle, K. and Stulz, R. 2009. Why do U.S. firms hold so much more cash than they used to?, *The Journal of Finance*, vol 64, no. 5, 1985-2021

[2] Brealey, R. and Myers, S. 2012. *Principles of corporate finance*. McGraw-Hill, 7th edition

[3] Brown, J., Fazzari, S. and Petersen, B. 2009. Financing innovation and growth: cash flow, external equity and the 1990s R&D boom, *The Journal of Finance*, vol 64, no. 1, 151-185

[4] Comin, D. and Phillipon, T. 2005. The rise in firm-level volatility: causes and consequences, *NBER Macroeconomics Annual 2005*, vol 22, 167-228

[5] Core, J.E., Holthausen, R.W. Larcker, D.F., 1999, Corporate governance, chief executive officer compensation, and firm performance, *Journal of Financial Economics* vol 51, no. 3, 371-406

[6] Crotty, J. 2005. The Neoliberal Paradox: The Impact of Destructive Product Market Competition and 'Modern' Financial Markets on Nonfinancial Corporate Performance in the Neoliberal Era", in Epstein, G. (ed.), *Financialization and the World Economy*, Northampton, MA, Edward Elgar

[7] Eberly, J., Rebelo, S. and Vincent, N. (2012). What explains the lagged investment effect?, NBER Working Paper Series no. 16889

[8] Fazzari S., Hubbard, R. and Peterson, B. 1988. Financing contraints and corporate investment, *Brookings Papers on Economic Activity*, vol 1, 141-206

[9] Fazzari S. and Mott, T. 1986. The investment theories of Kalecki and Keynes: an empirical study of firm data, 1970-1982, *Journal of Post Keynesian Economics*, vol 9, no. 2, 171-187

[10] Foley, C., Fritz, J.H., Titman, S. and Twite, G. 2007. Why do firms hold so much cash? A tax-based explanation, *Journal of Financial Economics*, vol 86, no. 3, 1629-1658

[11] Froud, J., Sukhdev, J., Leaver, A. and Williams, K. 2005. *Financialization and Strategy: Narrative and Numbers*, New York, Routledge

[12] Holmstrom, B. and Kaplan, S. 2001. Corporate governance and merger activity: making sense of the 1980s and 1990s, NBER Working Paper Series no. 8220

[13] Jensen, M. 1986. Agency cost of free cash flow, corporate finance and takeovers, *American Economic Review*, vol 76, no. 2, 323-329

[14] Jensen, M. and Murphy, K. 1990. Performance pay and top management incentives, *Journal of Political Economy*, vol 98, no. 2, 225-264

[15] Jorgenson, D. 1963. Capital Theory and Investment Behavior. *American Economic Review*, vol 53, no. 2, 247-259

[16] Kalecki, M. 1971. *Selected Essays on the Dynamics of the Capitalist Economy 1933-1970*, Cambridge, Cambridge University Press

[17] Keynes, J.M. 1936. *The General Theory of Employment, Interest, and Money*, London, Macmillan

[18] Krippner, G. 2012. *Capitalizing on Crisis: The Political Origins of the Rise of Finance*, Cambridge, Harvard University Press

[19] Kuh, E. and Meyer, J. 1957. Acceleration and related theories of investment: an empirical inquiry, *Review of Economics and Statistics*, vol 38, no. 3, 217-230

[20] Kopcke, R. and Brauman, R. 2001. The performance of traditional macroeconomic models of businesses' investment spending, *New England Economic Review*, vol 2, 3-39

[21] Lazonick, W. 2009. *Sustainable Prosperity in the New Economy: New Business Organization and High-Tech Employment in the United States*, Kalamazoo, W.E. Upjohn Institute for Employment Research

[22] Lazonick, W. and O'Sullivan, M. 2000. Maximizing shareholder value: a new ideology for corporate governance, *Economy and Society*, vol 29, no. 1, 13-35

[23] Mason, J.W. 2013. What is business borrowing for? slackwire.blogspot.com/2013/01/what-is-business-borrowing-for.html

[24] Milberg, W. 2008. Shifting sources and uses of profits: sustaining US financialization with global value chains, *Economy and Society*, vol 37, no. 4, 420-451

[25] Minsky, H. 1975. *John Maynard Keynes*, McGraw-Hill Professional

[26] Modigliani, F. and Miller, M. 1958. The cost of capital, corporation finance and the theory of investment, *American Economic Review*, vol 48, no. 3, 261-297

[27] Ndikumana, L. 1999. Debt service, financing constraints, and fixed investment: evidence from panel data, *Journal of Post Keynesian Economics*, vol 21, no. 3, 455-478

[28] Orhangazi, O. 2008. Financialisation and capital accumulation in the non-financial corporate sector, *Cambridge Journal of Economics*, vol 32, no. 6, 863-886

[29] Palley, T. 2007. Financialization: what it is and why it matters, The Levy Economics Institute of Bard College Working Paper no. 525

[30] Skott, P. 1989. *Conflict and Effective Demand in Economic Growth*, Cambridge, Cambridge University Press

[31] Skott, P. and Guy, F. 2013. Power, luck and ideology in a model of executive pay, University of Massachusetts Department of Economics Working Paper no. 2013-01

[32] Stockhammer, E. 2004. Financialisation and the slowdown of accumulation, *Cambridge Journal of Economics*, vol 28, no. 5, 719-741

[33] Stout, L. 2012. *The Shareholder Value Myth: How Putting Shareholders First Harms Investors, Corporations, and the Public*, San Francisco, Berrett-Koehler Publishers, Inc

[34] Tirole, J. 2005. *The Theory of Corporate Finance*, Princeton, NJ, Princeton University Press

[35] van Treeck, T. 2008. Reconsidering the investment-profit nexus in finance-led economies: an ARDL-based approach, *Metroeconomica*, vol 59, no. 3, 371-404