The Evolution of Corporate Uses of Cash Flow

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Abstract

Using the statement of cash flow data, we track corporate uses of cash flow over the past three decades by jointly estimating the cash flow sensitivities of various cash flow uses (i.e., investment, additions to working capital and cash holdings, dividends, and external finance reductions). Firms have shifted their cash flow considerably from increasing working capital to reducing equity financing. Contrary to the findings of recent studies, the investment–cash flow sensitivity has neither disappeared nor declined in recent decades. Collectively, our findings reveal how firms have adjusted their use of internal cash flow to shape real and financial decisions.

JEL classification: G01, G31, G32

Keywords: cash flow allocation, cash flow sensitivities, investment, uses of funds, corporate policies

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* Email: changxin@ntu.edu.sg, wei.opie@deakin.edu.au, carmenshihcm@suss.edu.sg, and hong.zhang@deakin.edu.au, respectively. We thank Jun-koo Kang, Erwan Morellec, David Scharfstein, David Reeb, George Wong, Jiaquan Yao, Kelvin Tan and conference and seminar participants at the Central University of Finance and Economics, Nanyang Technological University, Deakin University, the University of Melbourne, and FIRN 2021 Corporate Finance Meeting for helpful comments and suggestions. All errors are ours. Chang acknowledges financial support from the Academic Research Fund Tier 1 provided by the Ministry of Education (Singapore) under grant numbers RT01/19 and RG103/22.

I. Introduction

Internally generated cash flow has been the dominant source of financing for nonfinancial U.S. firms over the past three decades, accounting for 67% to over 90% of the sum of internal and external funds.[1] Graham (2022) surveys chief financial officers and concludes that internal cash flow has "first-order effects" on corporate policies. Specifically, firms deploy internal cash flow for six primary uses (investments, working capital, cash reserves, dividends, and reductions in debt and equity financing), shaping their investment and financing decisions. These six cash flow uses are interrelated and determined jointly by firms (Tobin, 1988). This study examines how corporate cash flow allocation has evolved in recent decades based on an integrated regression framework that accounts for the interdependence of various cash flow uses.

Time-series variations in cash flow allocation deserve attention not only because of the economic importance of firms' internal cash flow but also because of the implications for the success of economic policies. For example, fiscal and monetary policies designed to stimulate corporate investments in a recession by boosting corporate cash flow (e.g., tax and interest rate cuts) would be ineffective if firms mainly use additional cash flow to build up cash balances or reduce external financing. Therefore, how firms allocate cash flow across different uses can directly affect the speed at which an economy recovers from a recession. Moreover, unprecedented technological advancements have revolutionized the U.S. economy over the past decades, driving economic growth through information and communication technology and innovative products from life and other sciences (e.g., Corrado and Hulten, 2010; Gutiérrez and Philippon, 2017). Thus, it is essential to understand whether and how firms adjust their use of internal funds amid swift technological upheavals.

Furthermore, our research sheds light on an important finding in the literature on the sensitivity of corporate investments to cash flow. Chen and Chen (2012) document that U.S. firms'

[1] The recent statistics from 1990 to 2020 are from the Board of Governors of the Federal Reserve System Flow of Funds Accounts (F.103 Nonfinancial Corporate Business of Financial Accounts of the United States) at https://www.federalreserve.gov/releases/z1/20230608/html/f103.htm.

investment–cash flow sensitivity has declined over time and disappeared in recent years—from around 0.3 in 1967 to almost zero in 2006. This implies that in response to a one-dollar increase in cash flow, an average U.S. firm allocated 30 cents to investment in 1967 but almost zero cents in 2006. This finding invites an interesting question: If firms have reduced incremental cash flow used for investments to zero, what alternative uses have they directed incremental cash flow toward? We aim to answer this question by tracking how firms' cash flow allocation across all primary uses has changed over time.

Our integrated regression framework regresses each use of cash flow on the cash flow and control variables. The cash flow sensitivity of a particular use reveals how much of an additional dollar of cash flow is deployed toward the use. Unlike prior studies estimating the cash flow sensitivities of different uses in isolation,[2] we account for the interdependence among corporate decisions by using the cash flow identity, which equates the sources of funds to their uses. As a result, it is tautological that the cash flow sensitivities of various cash flow uses add up to unity. In other words, if the internal cash flow increases by one dollar, the changes in all uses (i.e., investment, additions to cash holdings, working capital, dividends, and equity and debt reductions) must sum to one dollar. In short, our methodology can precisely pinpoint what firms do with their cash flow on the margin.

We use data from the Statement of Cash Flow (SCF) to define the uses and sources of funds. The SCF-based cash flow and cash flow uses differ from the conventional measures in prior studies. For example, cash flow is conventionally defined as income before extraordinary items plus depreciation and amortization (e.g., Fazzari, Hubbard, and Petersen, 1988). Our definition adjusts the conventional measure for an extensive list of non-cash, nonoperating, or nonrecurring items, resulting in a broader and cleaner measure of cash flow. Moreover, unlike traditional measures of investment that primarily focus on net capital expenditure (e.g., Kaplan and Zingales, 1997), which mainly captures internal investments in real assets, our total investment measure includes all investment items reported in the SCF (i.e., net capital

[2] Prior studies have separately estimated the investment–cash flow sensitivity (e.g., Fazzari, Hubbard, and Petersen, 1988), the cash–cash flow sensitivity (Almeida, Campello, and Weisbach, 2004), and the external finance–cash flow sensitivity (Almeida and Campello, 2010).

expenditure, acquisitions, and financial investments) that capture both internal and external investments in real and financial assets, thereby offering a more encompassing view of a firm's investing activities. More importantly, our variables, defined using SCF data, naturally satisfy the cash flow identity and thus provide a complete account of how firms use their cash flow.

Using a large panel of U.S. firms from 1988 to 2019, we document two distinct time trends in cash flow allocation. First, there has been an increasing trend of substitution between internal cash flow and external equity financing. Given an additional dollar of cash flow, an average firm uses almost 30 cents more to reduce its use of equity in 2019 than in 1988. Second, cash flow channelled into working capital has reduced over time. Given an additional dollar of cash flow, firms, on average, spent 14 cents less on working capital in 2019 than in 1988. We further confirm that the time trends are statistically significant using the Augmented Dickey–Fuller (ADF) test. In contrast, the cash flow allocated to investment, cash holdings, dividends, and debt reductions shows no significant variations over time.

Significantly, the allocation of cash flow to investment, as measured by the cash flow sensitivity of investment, has stayed around 0.25 throughout our sample period. This result sharply contrasts the findings of Chen and Chen (2012), who show that the investment–cash flow sensitivity of U.S. firms has declined significantly since 1967 and disappeared entirely by 2006. To reconcile our results with Chen and Chen's (2012), we compare the investment–cash flow sensitivities estimated using the traditional investment and cash flow measures with those obtained using our SCF-based variables. This comparison reveals that the definition of investment is the key factor explaining the difference in the two sets of sensitivity estimates. The conventional measure of investment—net capital expenditure—only absorbs a small fraction of the cash flow allocated to total investment. In contrast, acquisitions and financial investments contribute significantly to the estimated total investment–cash flow sensitivities. Therefore, the disappearing investment–cash flow sensitivity that Chen and Chen (2012) document primarily results from their narrow investment measure. The cash flow sensitivity of total investment has neither declined nor disappeared.

To better understand the time trend in the cash flow allocated to working capital, we focus on the main components of working capital and estimate the cash flow sensitivity of each component. Our analysis illustrates that the declining working capital–cash flow sensitivity is mainly driven by decreasing cash flow allocation to accounts receivable and inventory. This evidence is consistent with the stylized fact that the accounts receivable and inventory of U.S. firms have fallen significantly over the past decades (e.g., Aktas, Croci, and Petmezas, 2015; Bates, Kahle, and Stulz, 2009). As U.S. firms have become more efficient in managing their working capital over time, they deploy less cash flow to finance their working capital needs.

Next, we decompose net equity reductions into equity repurchases and issuances and estimate their cash flow sensitivities separately. The results show that firms allocate more cash flow to reduce their reliance on equity financing, primarily by decreasing equity issuances instead of increasing equity repurchases. In other words, equity issuance has become more responsive to cash flow shocks over time. As a result, firms issue more equity when facing a cash flow shortfall and cut back more on equity issuance when experiencing a positive cash flow shock. This pattern is consistent with the U.S. Securities and Exchange Commission's (SEC) deregulation efforts in recent decades, which bring down equity issuance costs and increase the ease and frequency with which firms access the equity market (Gustafson and Iliev, 2017).

Our main results survive many robustness checks. To ensure that the observed time trends are not because of changes in sample composition caused by newly listed companies in recent years (e.g., Fama and French, 2004; Graham and Leary, 2018), we classify firms into incumbents and new entrants based, respectively, on whether they are listed before or after 1980. We find that both incumbents and new entrants exhibit similar trends in allocating cash flow to working capital and net equity reductions, but their cash flow allocation to investment differs. In addition, to alleviate the concern that cash flow may contain information about firms' future growth opportunities, which results in biased cash flow sensitivity estimates, we use Beveridge and Nelson's (1981) approach to decompose cash flow into cycle and trend components. The trend component of cash flow contains information about future cash flow growth, whereas the cycle component includes little information about the future beyond short-term momentum. Using both components of cash flow in our regression analyses, we find that the cycle component offers cash flow allocation results similar to our main findings.

Additional analysis reveals that although the time trends in cash flow allocation vary substantially across the ten major industries defined using Fama and French's (1997) industry classification, the decreasing cash flow use for working capital and the increasing cash flow use for net equity reductions hold for most industries. Finally, we find that the time trends in cash flow allocation are similar for both financially constrained and unconstrained firms. They are also robust to an alternative measure of cash flow that nets out the change in net working capital, treating research and development (R&D) expenses as a form of investment, or accounting for intertemporal cash flow allocation (Dasgupta, Noe, and Wang, 2011) by adding lagged cash flow into the regressions.

Our study contributes to the extant literature in several ways. First, our study adds to the literature on the responses of corporate policies to internal cash flow. Instead of examining the response of a particular use of cash flow to cash flow innovations in isolation, we simultaneously track all cash flow uses to depict a complete picture of what firms do with their cash flow. Our research aligns well with Tobin's (1988) suggestion that "*... the firm jointly determines investment, dividend payments, and other ways of allocating its cash flow. Therefore, ... the authors (should) model investment and dividends as depending on the same set of explanatory variables.*" While several studies (Chang et al., 2014; Gatchev, Pulvino, and Tarhan, 2010; Lewellen and Lewellen, 2016) have investigated cash flow sensitivities using integrated regression frameworks, our study is among the first focusing on the time-series variations in corporate uses of cash flow.

Second, our research adds to the extensive literature on the link between investment and cash flow. Previous studies have obtained a variety of investment–cash flow sensitivity estimates, ranging from −0.11 (Erickson and Whited, 2012) to 0.7 (Kaplan and Zingales, 1997).[3] In

[3] Specifically, the estimated investment–cash flow sensitivities are 0.2–0.7 for manufacturing firms between 1970 and 1984 (Fazzari, Hubbard, and Petersen,1988; Kaplan and Zingales, 1997), around 0.06–0.15 for firms between 1988 and 1994 (Cleary, 1999), 0.11–0.15 for firms from 1980 to1999 (Baker, Stein, and Wurgler, 2003), 0.11 for

particular, Chen and Chen's (2012) finding of disappearing investment–cash flow sensitivities implies that internal cash flow is no longer critical for corporate investment. Our analysis illustrates that the estimated investment–cash flow sensitivity is highly sensitive to the definition of investment and cash flow. Using more comprehensive measures of investment and cash flow based on SCF data, we show that the investment–cash flow sensitivity remains largely stable at around 0.25 over the past three decades, suggesting that investment has always been a major use of cash flow. Using net capital expenditure to estimate the investment–cash flow sensitivity is likely to miss the big picture and underestimate the effect of cash flow on total investment.

Finally, our findings contribute to the literature on time trends in corporate policies. As corporate uses of cash flow shape real and financial decisions, time-series variations in cash flow allocation lead to time-series variations in corporate policies. In recent decades, U.S. firms have reduced their working capital (e.g., Bates, Kahle, and Stulz, 2009) and significantly increased their equity reductions (e.g., Kahle and Stulz, 2021). Our findings reveal the interconnected nature of these trends through an internal financing channel; substantial internal funds have been reallocated, from increasing working capital to reducing equity capital.

The remainder of this paper is organized as follows. Section II describes our empirical methods, sample selection procedures, variable constructions, and summary statistics. Section III presents the baseline results for how corporate uses of cash flow evolve. Section IV presents several additional analyses, and Section V concludes the paper.

firms between 1990 and 1998 (Rauh, 2006), 0.04–0.08 for firms from 1968 to 2003 (Hennessy, Levy, and Whited, 2007), −0.11–0.16 for firms from 1985 to 2000 (Almeida and Campello, 2007), 0.04–0.38 for firms between 1970 and 2005 (Almeida, Campello, and Galvao, 2010), 0.01–0.15 for firms between 1976 and 2008 (Erickson and Whited, 2012), and 0.0–0.3 for firms from 1967 to 2006 (Chen and Chen, 2012).

II. Empirical methodology, data, variables, and summary statistics

A. Empirical methodology

Our empirical analysis depicts what firms do with their cash flow, accounting for the interconnectedness of investment and financing decisions using the following accounting identity:

$$INV + \Delta WC + \Delta CASH + DIV + DR + ER = CF + DI + EI, \quad (1)$$

where the left-hand side of the equation includes various uses of funds: investment (*INV*), the change in working capital (ΔWC), the change in cash holdings ($\Delta CASH$), cash dividends (*DIV*), debt retirement (*DR*), and equity repurchases (*ER*). The right-hand side of Equation (1) reflects the sources of funds, including internally generated cash flow (*CF*), debt issuance (*DI*), and equity issuance (*EI*). Equation (1) is high dimensional in that investment, working capital, dividends, cash holdings, debt financing, and equity financing are all commonly regarded as important corporate decisions.

We then move *DI* and *EI* to the left-hand side of the equation to allow for substitution between internal and external financing (Almeida and Campello, 2010). By defining two net terms, $\Delta D = DR - DI$ and $\Delta E = ER - EI$, we reduce the cash flow identity as follows:

$$INV + \Delta WC + \Delta CASH + DIV + \Delta D + \Delta E = CF \quad (2)$$

We refer to ΔD and ΔE as net debt and equity reductions, respectively. A positive value of net equity reduction occurs when the cash outflow for repurchases exceeds the cash inflow from issuances. Equation (2) stipulates that internal cash flow must be fully utilized across the six cash flow uses on the left-hand side of the equation. We define all variables in Equation (2) using SCF data to ensure that cash flow identity holds in our analysis. Additionally, we normalize the variables by deflating them with the beginning-of-period total assets.

In line with corporate decision-making process in practice, our framework requires that a firm jointly makes decisions on investment, working capital, cash holdings, dividend, and external financing, subject to the constraint of Equation (2). To track the uses of internal cash flow, our baseline model regresses each use of cash flow on internal cash flow (*CF*), control variables

(Y), firm fixed effects (f_i) that control for the impact of time-invariant unobservable company characteristics, and year fixed effects (y_t) that account for aggregate time variation in the uses of cash flow. The multi-equation regression model is as follows:

$$INV_{it} = \alpha^{INV} CF_{it} + \beta^{INV} Y_{it-1} + f_i + y_t + \varepsilon_{it}^{INV} \tag{3}$$
$$\Delta WC_{it} = \alpha^{\Delta WC} CF_{it} + \beta^{\Delta WC} Y_{it-1} + f_i + y_t + \varepsilon_{it}^{\Delta WC} \tag{4}$$
$$\Delta CASH_{it} = \alpha^{\Delta CASH} CF_{it} + \beta^{\Delta CASH} Y_{it-1} + f_i + y_t + \varepsilon_{it}^{\Delta CASH} \tag{5}$$
$$DIV_{it} = \alpha^{DIV} CF_{it} + \beta^{DIV} Y_{it-1} + f_i + y_t + \varepsilon_{it}^{DIV} \tag{6}$$
$$\Delta D_{it} = \alpha^{\Delta D} CF_{it} + \beta^{\Delta D} Y_{it-1} + f_i + y_t + \varepsilon_{it}^{\Delta D} \tag{7}$$
$$\Delta E_{it} = \alpha^{\Delta E} CF_{it} + \beta^{\Delta E} Y_{it-1} + f_i + y_t + \varepsilon_{it}^{\Delta E}. \tag{8}$$

The subscripts i and t in Equations (3) to (8) index firms and years, respectively. The superscripts of the coefficients (α and β) correspond to the particular use of cash flow in the regression equation. We capture how firms allocate cash flow across six uses based on the coefficients of CF (α) in Equations (3) to (8). For example, α^{INV} in Equation (3) reveals the amount of cash flow allocated to investment in response to a one dollar increase in cash flow. The α coefficients are also interpreted as cash flow sensitivities in prior studies (e.g., Almeida, Campello, and Weisbach, 2004; Fazzari, Hubbard, and Petersen, 1988). Given that various uses of cash flow are jointly determined, subject to Equation (2), the cash flow sensitivities of the six cash flow uses must add to unity. Mathematically, the coefficient estimates in Equations (3) to (8) must satisfy the following add-up constraints:

$$\alpha^{INV} + \alpha^{\Delta WC} + \alpha^{\Delta CASH} + \alpha^{DIV} + \alpha^{\Delta D} + \alpha^{\Delta E} = 1 \tag{9}$$
$$\beta^{INV} + \beta^{\Delta WC} + \beta^{\Delta CASH} + \beta^{DIV} + \beta^{\Delta D} + \beta^{\Delta E} = 0 \tag{10}$$

Constraint (9) is implied by Equation (2) and reflects an all-encompassing view of how firms use internal cash flow. That is, a one dollar increase in internal cash flow must be fully used to increase investment, working capital, cash holdings, dividends, or external financing reductions. Moreover, if the cash flow allocated to a particular use (e.g., investment) changes, the cash flow allocated to all other uses must adjust accordingly to ensure that constraint (9) still holds. Constraint (10) stipulates that the total response across all sources and uses of funds must be zero if the shock stems from a control variable representing neither a source nor a use of funds in the current period.[4]

When the variables in Equation (2) are consistently and accurately measured so that the cash flow identity holds in the data, constraints (9) and (10) must hold automatically and need not be imposed explicitly in the estimation (Chang et al., 2014). While Equations (3) to (8) can be estimated simultaneously using the seemingly unrelated regressions (SUR) method because all explanatory variables are either exogenous or predetermined, Greene (2012) suggests that the SUR estimates are equivalent to equation-by-equation ordinary least squares (OLS) estimates if the same explanatory variables are included in all regression equations, which is precisely the case in Equations (3) to (8). Thus, we estimate these equations individually using OLS regressions without explicitly imposing constraints (9) and (10).[5]

We demean all the dependent and independent variables in Equations (3) to (8) over the entire sample period to remove the time-invariant unobserved firm heterogeneity. This approach also allows us to run annual cross-sectional regressions with the demeaned variables, thereby tracking the changes in cash flow allocations over time. For control variables (*Y*), we include the market-to-book assets ratio (*MB*) as a proxy for investment opportunities, the log of the book value of assets (*Ln*(*Assets*)) as a proxy for firm size, the annual sales growth rate (*SalesG*) as an additional control for firms' growth prospects, the net property, plant, and equipment (PPE) to assets ratio (*PPE/Assets*) as a measure of asset tangibility and the leverage ratio (*Leverage*) defined as total debt (the sum of short-term and long-term debt) divided by total assets.

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[4] For instance, suppose that the coefficient of *MB* is 0.1 in Equation (3), indicating that investment increases by 10% of total assets if *MB* increases by one. Since investment is a use of funds and total uses of funds must be equal to the total sources of funds, the net effect of the increase of *MB* on other uses must sum to −10% of total assets.

[5] In an unreported robustness check, we confirm that our unconstrained single-equation estimation generates the same results as those obtained by estimating Equations (3) to (8) simultaneously using the SUR method with constraints (9) and (10) imposed. Gatchev, Pulvino, and Tarhan (2010) argue that estimating all the cash flow sensitivities simultaneously without explicitly imposing the add-up constraints leads to erroneous coefficient estimates. However, Chang et al. (2014) show that Gatchev, Pulvino, and Tarhan's (2010) claim is false because their variable definitions are inconsistent, and the cash flow identity is violated for a substantially large percentage of the observations in their sample.

B. Data

Our sample consists of firms listed in the Compustat Industrial Annual files between 1988 and 2019. Our analysis hinges critically upon the flow-of-funds data available electronically for all firms since 1971. However, before 1988, companies could report one of the following three flow-of-funds statements: working capital statement (format code = 1), cash statement by source and use of funds (format code = 2), and cash statement by activity (format code = 3). Effective for fiscal years ending after July 15, 1988, the statement of Financial Accounting Standards #95 requires all U.S. companies to report the SCF (format code = 7).[6] As we focus on the time-series variation in cash flow allocation, we start the sample in 1988 to ensure that our results are unaffected by the changes or inconsistency in the reporting formats of cash flow statements. For firms with missing *SCF* data, we manually collect, whenever possible, the data from the 10-K statements that firms file with the SEC.

Data on stock prices are from the Center for Research on Security Prices (CRSP) files. Dollar values are converted into 2019 constant U.S. dollars using the GDP deflator. Following common practice (e.g., Almeida, Campello, and Weisbach, 2004), we exclude financial institutions (SIC codes 6000–6999) and utilities (SIC codes 4900–4999).[7] We also require firms to have non-missing information on their total assets, sales growth, and market capitalization. In addition, we follow Almeida and Campello (2010) and exclude firm years for which (1) the market value of assets (GDP deflator adjusted) is less than $1 million, (2) the asset growth rate exceeds 100%, or (3) the annual amount of sales (GDP deflator adjusted) is less than $1 million.[8] To ensure that the cash flow identity holds well in our data, we exclude

[6] The reported items can be quite different across different reporting formats. For instance, Increase in Investments (*ivch*), Sales of Investments (*siv*), Short-Term Investments-Change (*ivstch*), and Cash and Cash Equivalents – Increase (Decrease) (*chech*) are reported in the Statement of Cash Flows (format code = 7), but unavailable or incomplete under other format codes (1, 2, or 3) before 1988. The variable names in parentheses are the Compustat XPF variable names.

[7] Financial and utility firms are excluded because they are heavily regulated. In particular, financial firms are subject to additional regulations, such as capital adequacy requirements, which are not relevant for nonfinancial firms.

[8] Very small firms are removed because they have severely limited access to public capital markets. Extremely high growth firms are eliminated because they are normally involved in major corporate restructuring, such as

observations for which the absolute value of the difference between the left- and right-hand sides of equation (2) exceeds 1% of the beginning-of-period total assets.[9] These filtering rules leave us with an unbalanced panel comprising 103,246 firm-year observations (11,531 unique firms).

C. Variables in cash flow identity

We define the variables in Equation (2) using the SCF, which summarizes the cash and cash equivalents entering and leaving a company, and we include variable construction details in Appendix A. In this subsection, we highlight the main advantages of our SCF-based measures over those used in prior studies (Chen and Chen, 2012; Fazzari, Hubbard, and Petersen, 1988).

For cash flow, the conventional measure (*CCF*) is income before extraordinary items plus depreciation and amortization (e.g., Erickson and Whited, 2012; Fazzari, Hubbard, and Petersen, 1988). To uphold the cash flow identity in the SCF, we expand the cash flow definition by including more corrections for non-cash items (*NCF*), including provisions for doubtful debt, assets, and inventory write-offs, impairment of assets and goodwill, adjustments for currency exchange rate changes, and stock-based compensation. Additionally, we make more adjustments for nonrecurring or nonoperating activities (*OCF*), such as extraordinary items, discontinued operations, and gains/losses from asset sales and unconsolidated subsidiaries. As a result, our definition of cash flow (*CF*) is almost the same as cash flow from operations (*CFO*) in the SCF, except that *CF* does not include spending on working capital (ΔWC), which we view separately as a use of cash flow. Namely, $CF = CCF + NCF + OCF = CFO - \Delta WC$.

mergers and acquisitions. Firms with very low sales are excluded to minimize the sampling of financially distressed firms.

[9] 9,386 observations are deleted because of this screen. The difference between the left- and right-hand sides of Equation (2) is mainly because of rounding errors, misrecorded data, or winsorization. In particular, winsorization leads to a mild violation of the cash flow identity for a small number of firms because not all scaled variables in the cash flow identity take extreme values simultaneously in a given firm-year. Robustness checks (untabulated) show that our main results are unaffected if we do not remove these observations.

Chart A of Figure 1 shows that, from 1988 to 2019, all firms in our sample collectively generate cash flow amounting to $35.97 trillion in 2019 constant U.S. dollars. *CCF* accounts for about 87% of *CF* generated by all firms. The corrections for non-cash items and the adjustments for nonrecurring/nonoperating activities amount to 12.7% and 0.3% of *CF*, respectively. Chart B depicts how the aggregate amount (unadjusted for inflation) of *CF* and its components have evolved. *CF* and *CCF* closely resemble each other before 2000 but diverge significantly thereafter, mainly because of the correction for non-cash items (*NCF*). Although *CCF* and *CF* are highly correlated (the correlation coefficient is 0.88) for the entire sample, *CF* is a broader and cleaner measure of cash flow than *CCF* because *CF* includes more nonrecurring items and excludes more non-cash and nonoperating items.

For investment, the conventional measure is capital expenditure (*CE*) or net capital expenditure (*NCE*), which captures firms' internal investment in fixed assets (e.g., Kaplan and Zingales, 1997; Lewellen and Lewellen, 2016).[10] In contrast, our investment (*INV*) measure captures all investing activities reported in the SCF, including *NCE*, acquisitions, and other investments.[11] Acquisitions (*ACQ*) reflect external investment paid by cash and exclude stock-for-stock transactions. Other investments (*OINV*) include long-term financial investments (e.g., debt and equity securities, operating leases, and investment in other firms) and short-term investments in marketable securities. Chart C of Figure 1 shows that, over our sample period, 1988 to 2019, *NCE* accounts for 71% of the aggregate amount of *INV* in 2019 constant U.S. dollars, whereas acquisitions and *OINV* constitute 26.9% and 2.1%, respectively. Chart D illustrates that the gap between the aggregate amounts of *NCE* and *INV* widens over time. This result suggests that, while capital expenditure has been a major component of total investment since 1988, its relative importance in total investment has decreased gradually. U.S. firms have become increasingly oriented toward external investments (acquisitions) and financial investments. The untabulated correlation between *NCE* and *INV* is 0.53 for the whole sample. Compared with

[10] Net capital expenditure = capital expenditure – sale of property, plant, and equipment (PPE). In our sample, sale of PPE is roughly 6.6% of capital expenditure, on average.

[11] Our investment measure does not include R&D because it is not reported in the SCF. Instead, it is reported as an operating expense in the income statement. We discuss this exclusion in greater details in Section IV. F.

NCE, *INV* encompasses a broader range of assets, offering a more comprehensive view of a firm's investing activities.

Working capital is an integral part of a firm's stock of capital, complementing fixed capital in providing factors of production, such as inventory and accounts receivable. Given its liquidity and reversibility, firms often adjust working capital to smooth their investment in fixed capital in response to cash flow shocks (Fazzari and Petersen, 1993). For example, a firm can absorb a negative shock to internal cash flow by reducing working capital (e.g., reducing inventory, intensifying efforts to collect accounts receivable, tightening credit policies on new sales, or taking longer to pay its bills).

We define *ΔWC* as the net investment in non-cash non-debt working capital items, which equals the change in inventory (*ΔIV*) + the change in accounts receivable (*ΔAR*) – the change in accounts payable and accrued liabilities (*ΔAP*) – the change in other net payable (*ΔOP*).[12] The purchase of additional inventory with cash is a cash outflow. A firm can sell its goods and services for cash or on credit, both of which raise cash flow by elevating net income. However, cash sales increase cash holdings, while credit sales increase accounts receivables. Thus, an increase in accounts receivable can be viewed as a competing use of cash flow relative to an increase in cash holdings. A cash payment to reduce accounts payable implies a cash outflow. Fazzari and Petersen (1993) also point out that working capital competes with fixed investment for a limited finance pool.

Finally, *ΔCASH* is the change in cash and cash equivalents. *DIV* refers to cash dividends paid to common and preferred shareholders. When defining variables capturing financing activities (*DR*, *DI*, *ER*, and *EI*), we only include corporate actions resulting in cash inflows or outflows (e.g., seasoned equity offerings and debt repayment) and exclude those generating no cash flow, such as granting shares to employees or financing acquisitions with stock (Fama and French, 2005).

[12] Other net payable includes accrued income taxes, other net liabilities, and other financing activities.

D. Summary statistics

Table 1 and Figure 2 show the descriptive statistics of our sample. All variables in Equation (2) are normalized by the beginning-of-period total assets and winsorized at the top and bottom 1% of their distributions.[13] Panel A of Table 1 shows that an average firm in our sample invests 8.3%, increases cash holdings by 0.5%, increases net working capital by 1.3%, and pays 0.8% of its beginning-of-period total assets as dividends. To finance these uses of funds, firms make net debt and equity issuances amounting to 1.6% and 2.3% of their beginning-of-period assets (i.e., net debt and equity reductions are −1.6% and −2.3%), respectively. The gap between the uses of funds and external financing is met by internally generated cash flow, which accounts for 7% of firms' beginning-of-period assets. *DIF*—the difference between the left- and right-hand sides of Equation (2)—has a mean, median, and standard deviation lower than 0.001 of total assets, indicating that the cash flow identity holds well in our sample, albeit not perfectly.

Panel B of Table 1 presents the summary statistics of the three components of *CF*. The mean value of *CF* exceeds that of the conventional measure of cash flow (*CCF*) by 0.026. The corrections for non-cash items (*NCF*) account for most of the differences between *CF* and *CCF*. The average value of the adjustments for nonrecurring and nonoperating activities (*OCF*) is close to zero. Panel C summarizes the components of *INV*. On average, the conventional measures of investment, *CE* and *NCE*, are about 73.5% and 68.7% of total investments respectively. The mean value of acquisitions (*ACQ*) accounts for 30.1% of *INV*. Although the mean value of *OINV* is approximately zero across firms, the analysis in Section III.B shows that *OINV* contributes significantly to the cash flow sensitivity of investment (i.e., the allocation of cash flow to investment). Panel D presents descriptive statistics of the four components of the change in net working capital. The average value of the change in accounts receivable (ΔAR) is significantly larger than those of the other components of ΔWC. The

[13] This approach reduces the impact of extreme observations by assigning the cutoff values to those observations whose values are beyond the cutoff points. Untabulated results show that our results are qualitatively the same when we truncate instead of winsorize the distributions. Our main results are unaffected if we use the beginning-of-period total capital (i.e., gross PPE) as the scaler.

average change in other net payable (*ΔOP*) is nearly zero. Panel E describes the control variables used in the regressions, whose statistics are generally consistent with those in prior studies (e.g., Chang et al., 2014).

Chart A of Figure 2 reports the number of sample firms by year. Following an initial increase in the first decade, the number of firms declined steadily in the subsequent two decades, mirroring the change in the number of Compustat firms. Charts B–H plot the yearly mean and median values of the seven key SCF variables in Equation (2). *CF* and *INV* display the most considerable volatility over time, followed by *ΔWC* and *ΔCash*. There are visible dips in *CF*, *INV*, and *ΔWC* around the "dot com" crisis in the early 2000s and the 2008 financial crisis. The mean values of ΔD and ΔE also vary significantly over time, with median values centering around zero. This evidence is consistent with Frank and Goyal's (2003) finding that most firms occasionally access the debt and equity markets, resulting in large mean values and close-to-zero median values of ΔD and ΔE. Lastly, *DIV* remains stable over time, with mean values at around 1% of total assets and zero median values.

III. Main results

In this section, we first present our baseline findings on time-series variations in corporate uses of cash flow. We then reconcile our investment–cash flow sensitivity with Chen and Chen's (2012) finding of the disappearing investment–cash flow sensitivity. Lastly, we provide a breakdown of the cash flow allocation to various components of investment, the change in net working capital, and external finance reductions.

A. Time trends in the allocation of cash flow across various uses

Table 2 shows how firms allocate internal cash flow across various uses over the entire sample period. Consistent with previous studies (e.g., Almeida and Campello 2010; Almeida et al. 2004; Fazzari et al. 1988), firms exhibit strong investment–cash flow, cash–cash flow, and external finance–cash flow sensitivities. The estimated coefficients of *CF* reveal that a one dollar increase in cash flow elevates cash holdings by 25.1 cents, increases investment by 26.9 cents, increases dividends by less than 1 cent, reduces the use of debt by 9.2 cents, and lowers the use of equity by 19 cents. The add-up constraints (Equations (9) and (10)) are well satisfied because the dependent variables are interrelated through Equation (2).

More importantly, our analysis illustrates how corporate uses of cash flow evolve over time. After demeaning all dependent and independent variables in Equations (3) to (8) relative to the firm-specific averages to remove firm fixed effects, we estimate the equations individually for each year. As such, the yearly coefficient estimates also satisfy the add-up constraints (9) and (10). Using equal-height histograms, Figure 3 reports the yearly estimated coefficients on *CF* ($\alpha^{INV}, \alpha^{\Delta CASH}, \alpha^{\Delta WC}, \alpha^{DIV}, \alpha^{\Delta D}$, and $\alpha^{\Delta E}$) from 1988 to 2019. In 1988, firms, on average, spend 61 cents out of a one dollar increase in cash flow, making investment and raising working capital. They also add 17 cents to cash reserves, use 21 cents to reduce external finance, and pay out 1 cent as dividend. The allocation of cash flow to investment and cash dividends remains relatively stable over time, but the allocation to the other four uses experiences changes of varying degrees. Firms increasingly use cash flow to lower their use of equity, spending almost an additional 29 cents out of a dollar in 2019 compared with 1988. Firms gradually reduce their spending on working capital, with a reduction of 14 cents from 1988 to 2019. Firms also display some tendencies to spend less cash flow on reducing their use of debt (around 8 cents) and save more cash out of cash flow over time; however, these trends are less salient than those for working capital and equity reductions.

To rigorously detect the time trends, we perform the ADF test on the yearly estimates of six cash flow uses, which takes the following form:

$$\Delta Y_t = \delta_0 + \delta_1 Trend + \delta_2 Y_{t-1} + \delta_3 \Delta Y_{t-1} + \varepsilon_t \tag{11}$$

where Y represents the yearly estimates of cash flow allocation coefficients ($\alpha^{INV}, \alpha^{\Delta WC}, \alpha^{\Delta CASH}$, $\alpha^{\Delta D}$, $\alpha^{\Delta E}$, $or\ \alpha^{DIV}$). The time trend variable (*Trend*) is the fiscal year minus the sample's starting year (with 1988 as the base year). $\delta_1$captures the linear trend of cash flow allocated to a particular use. We include the first lag of ΔY based on the Bayesian Information Criterion; however, our results are robust to including more distant lags (untabulated).

Panel A of Table 3 reports the ADF test results. Two salient time trends emerge, confirming our key findings in Figure 3. First, given a one dollar increase in cash flow, on average, firms' use of cash flow for working capital has reduced by 0.4 cents (the coefficient of *Trend* = -0.004) per year from 1988 to 2019. Second, over the same period, the use for equity financing reductions has increased by 0.8 cents per year for each additional dollar of cash flow. In addition, the coefficient of *Trend* for the allocation of cash flow to dividends is 0.0001, which is statistically significant. The trend coefficients for investment, cash holdings, and debt financing reductions are economically small and statistically insignificant.

The estimated yearly allocation coefficients in Figure 3 exhibit significant volatility because each annual regression has only about 3,000 observations. In Figure 4, we estimate the trends of cash flow allocations using longer periods to smooth out short-term fluctuations. Specifically, we run OLS regressions using the demeaned variables and year dummies for over eight consecutive four-year periods (1988 to 1991, 1992 to 1995, 1996 to 1999, 2000 to 2003, 2004 to 2007, 2008 to 2011, 2012 to 2015, and 2016 to 2019). We find that the amount of cash flow allocated to working capital declines almost monotonically over the eight subperiods, from 33 cents (out of a dollar of cash flow) during 1988 to 1991 to about 16 cents during 2016 to 2019. Furthermore, firms dramatically increase their spending on net equity reductions, from 9.3 cents out of an additional dollar of cash flow during 1988 to 1991 to more than 30 cents during 2016 to 2019. The allocations to the other cash flow uses show limited variations across subperiods. Overall, these results reaffirm the evidence presented in Figure 3. In subsequent analysis, we primarily rely on cash flow allocation estimates over the eight consecutive four-year subperiods.

B. Allocation of cash flow to investment

Section III.A shows that the fraction of cash flow allocated to investment (i.e., investment–cash flow sensitivity) has been stable at around 0.25 from 1988 to 2019. However, Chen and Chen (2012) document that the investment–cash flow sensitivity has declined drastically since 1967 and disappeared by the end of 2006. As explained in Section II.C, our SCF-based measures of investment (*INV*) and cash flow (*CF*) are broader than the conventional measures (*NCE* and *CCF*) used by Chen and Chen (2012).

In Chart A of Figure 5, we follow Chen and Chen's (2012) definitions and scale *NCE* and *CCF* by PPE instead of total assets. The estimated investment–cash flow sensitivities are close to zero in all eight subperiods, confirming Chen and Chen's (2012) findings. Taking this result at face value, one would conclude that firms, on average, do not use any incremental internal cash flow to finance investments in recent decades. Scaling *NCE* and *CCF* by total assets increases the investment–cash flow sensitivity from zero to about 0.05. More importantly, using SCF-based measures (*INV* and *CF*), we find that the estimated investment–cash flow sensitivities are around 0.25 across all subperiods.[14]

Using various combinations of conventional and SCF-based measures of investment and cash flow, Figure 5 further reveals that the main cause of the difference in the two sets of sensitivity estimates is the difference in investment measures.[15] Compared with the estimation using *NCE* and *CCF* scaled by total assets, switching to *CF* while keeping *NCE* results in a 57% increase in the average estimated sensitivities (the average estimate increases from 0.052 to 0.082 across eight subperiods), whereas switching to *INV* while keeping *CCF* results in a 169% increase in the average estimated sensitivities (from 0.052 to 0.141 across eight subperiods). In sum, we show that the estimated allocation to investment is sensitive to the definition of investment and cash flow, and the finding of disappearing sensitivity by Chen and Chen (2012) is specific to the narrow measures of investment and cash flow that they adopted. Based on a broad SCF-based investment measure, U.S. firms have, on the margin, used a sizable faction of internal

[14] How investment and cash flow are normalized in the regression analysis affects the estimated cash flow allocation. As we use a comprehensive measure of investment that accounts for more than investment in fixed assets, we choose total assets rather than PPE (used by Chen and Chen, 2012) as the scaling factor in our empirical analyses. We also replicate Chen and Chen's (2012) test for the period 1976 to 2019 and report the results in Figure A1 of the Internet Appendix.

[15] Lewellen and Lewellen (2016) suggest that the disappearing investment–cash flow sensitivity is caused by the increasing gap between *CCF* and *CF*. It is noteworthy that although they also use SCF data to define cash flow, our measure of cash flow differs from theirs in that we start our sample from 1988 to ensure all firms consistently report under format code 7, whereas their sample contains firms using different format codes over time. Our sample choice enables us to estimate the cash flow components more precisely. Moreover, we supplement missing SCF data with hand-collected data, from 10-K statements that firms file with the SEC, resulting in a larger sample to begin with.

cash flow to finance investments, and such a fraction has been stable instead of diminishing in recent decades.

As our investment measure (*INV*) consists of *NCE*, *ACQ*, and *OINV*, we then explore how the three components of investment contribute to the investment–cash flow sensitivity over time. To this end, we replace *INV* in Equation (3) with each investment component, resulting in the following regression equations:

$$NCE_{it} = \alpha^{NCE} CF_{it} + \beta^{NCE} Y_{it-1} + f_i + y_t + \varepsilon_{it}^{NCE} \tag{12}$$

$$ACQ_{it} = \alpha^{ACQ} CF_{it} + \beta^{ACQ} Y_{it-1} + f_i + y_t + \varepsilon_{it}^{ACQ} \tag{13}$$

$$OINV_{it} = \alpha^{OINV} CF_{it} + \beta^{OINV} Y_{it-1} + f_i + y_t + \varepsilon_{it}^{OINV} \tag{14}$$

Under the cash flow identity, the estimated allocations to individual investment components should add up to the overall cash flow allocation to total investments. That is, $\alpha^{NCE} + \alpha^{ACQ} + \alpha^{OINV} = \alpha^{INV}$. Chart B of Figure 5 reports the estimated cash flow allocation to the three investment components. *OINV*, which primarily includes financial investments, accounts for the largest proportion of cash flow allocated to total investment, followed by *NCE* and *ACQ*. Although the mean and median values of *OINV* are close to zero, it absorbs a considerable fraction of cash flow shocks, indicating that firms have consistently utilized financial investment to smooth out the effect of volatile cash flow on their investment decisions. In other words, when firms experience positive (negative) cash flow shocks, they increase (decrease) financial investments accordingly, which contributes significantly to positive investment–cash flow sensitivities. Moreover, the cash flow allocations to the three investment components are stable over time. The ADF test results shown in Panel B of Table 3 confirm that there are no statistically significant time trends in the fractions of cash flow allocated to the three investment components. Collectively, our investment component analysis confirms that cash flow allocated to total investments has neither declined nor disappeared. Chen and Chen's (2012) investment–cash flow sensitivities substantially underestimate how much firms rely on internal cash flow to finance investments.

C. Allocation of cash flow to working capital

Firms use working capital to fund operations and meet short-term obligations (Fazzari and Petersen, 1993). Meanwhile, working capital must be financed at a cost, and excessive working capital harms operating performance (e.g., Kieschnick, Laplante, and Moussawi, 2013). To understand the cause of the declining cash flow allocation to working capital in Figure 4, we decompose the change in working capital (ΔWC) into the changes in accounts receivable, inventory, accounts payable, and other payables (ΔAR, ΔIV, ΔAP, and ΔOP, respectively) based on the following accounting identity:

$$\Delta WC = \Delta AR + \Delta IV - \Delta AP - \Delta OP. \quad (15)$$

We then regress each component of ΔWC on the explanatory variables in Equation (4) and plot the coefficients of cash flow in Figure 6. Charts A and B reveal that declining cash flow allocation to working capital is primarily driven by declining cash flow allocations to accounts receivable and inventory. The ADF tests in Panel C of Table 3 confirm that these time trends are statistically significant. The allocation to ΔAR out of every additional dollar of cash flow reduces by 0.4 cents each year. The reduction in the allocation to ΔIV is 0.2 cents per year. The cash flow allocation to ΔAP decreases by 0.1 cents per year, increasing the cash flow allocation to working capital, given the negative sign of ΔAP in Equation (15). Lastly, the cash flow allocated to the other net payables exhibits no significant time trend.

Our findings of declining cash flow allocation to ΔAR and ΔIV align with the recent trends in firms' working capital management documented by prior studies. For instance, Bates, Kahle, and Stulz (2009) find that inventory and accounts receivable as a percentage of firms' total assets have decreased significantly from the 1980s to the 2000s.[16] The decline in inventory is often attributed to the adoption of the just-in-time (JIT) inventory management system introduced to the U.S. in the early 1980s. Chen, Frank, and Wu (2005) show that the JIT system significantly improves inventory management efficiency and reduces resources held up in

[16] Aktas, Croci, and Petmezas (2015) document similar findings for inventory and account receivable scaled by sales.

inventory by shortening the inventory-holding period. Therefore, the declining cash flow allocation to inventory reflects firms' decreasing need to finance inventory with internal funds.[17]

Furthermore, the decreasing cash flow allocation to accounts receivable is consistent with recent studies on trade credit. In particular, Na (2019) finds that information technology has helped U.S. firms reduce accounts receivable over the past five decades. Seifert and Seifert (2011) show that U.S. firms use factoring or reverse factoring to reduce their accounts receivable and improve their working capital management efficiency.[18] Choi and Kim (2005) document a negative relation between accounts receivable and credit conditions, implying that the ease of credit conditions in financial markets helps lower accounts receivable in recent decades. These factors (i.e., information technology, working capital management efficiency, and improved access to debt financing) should reduce firms' cash flow use for accounts receivable.

D. Allocation of cash flow to reductions in external financing

Figure 4 shows an increasing trend of cash flow allocated to net equity reductions and no salient trend for net debt reductions. To understand whether these patterns are driven more by security issuances or repurchases, we decompose ΔD into DR and DI and decompose ΔE into ER and EI, given that $\Delta D = DR - DI$ and $\Delta E = ER - EI$. We then regress each component on the explanatory variables in Equations (7) and (8) and obtain the cash flow allocation estimates (α^{DR}, α^{DI}, α^{ER}, and α^{EI}) shown in Figure 7. For example, a negative estimate of α^{EI} indicates that firms reduce (increase) EI in response to positive (negative) cash flow shocks.

[17] Gao (2018) suggests that firms shift internal resources from inventory to cash reserves following the adoption of JIT. However, we do not observe an increasing allocation to cash holdings over time. Instead, we find that cash flow is increasingly used to reduce firms' reliance on external equity finance.

[18] Factoring is a form of accounts receivable financing in which a supplier company sells its invoices to a third-party entity (the factor) in exchange for immediate cash, and the factor is responsible for collecting payment from the buyer when the invoices are due. On the contrary, reverse factoring is a financing method initiated by the buyer, where the factor provides early payment to the supplier against the buyer's approved invoices.

Charts A and B show that increasing allocation to net equity reductions is mainly driven by firms using internal cash flow to reduce equity issuances instead of increasing equity repurchases. The ADF results in Panel D of Table 3 further confirm that firms, on average, reduce equity issuances by 0.7 cents each year out of every additional dollar of cash flow. In contrast, firms spend only 0.1 cents of an extra dollar of cash flow each year to repurchase equity. The allocations to debt financing components show weak or no trends.

The increasing substitution between *EI* and cash flow suggests that *EI* is becoming more responsive to cash flow shocks. Namely, firms issue more equity when facing a cash flow shortfall and cut back more on *EI* when experiencing a positive cash flow shock. This finding is at odds with the pecking order theory (Myers and Majluf, 1984), which implies that debt should be more sensitive to cash flow variations than equity. At the beginning of our sample period (1988 to 1991), debt and equity issuances are used almost to an equal extent by firms to absorb cash flow shocks (Charts B and D), while both exhibit low sensitivities to cash flow (around −0.1). However, in recent years, equity issuance has become the primary buffer against cash flow shocks, while debt issuance has maintained its low sensitivity to cash flow.

We note that the increasing substitution between internal cash flow and equity issuance is broadly consistent with firms' ease of equity market access over time because of SEC deregulations, which have made seasoned equity offerings easier and less costly for firms. At the center of a series of SEC rule changes is the "shelf rule," introduced in 1982. It allows firms with a public float above a certain threshold to register all securities they expect to issue over the following two years, enabling them to offer shelf-registered shares with little advanced notice. The SEC reduced the public float requirement from $150 million to $75 million in 1992. It further relaxed the requirement in 2008, allowing firms with a public float of less than 75 million to access capital markets (Umar, Yimfor, and Zufarov, 2021).

Shelf registrations were not utilized much by firms in the 1980s but became popular in the 1990s (Autore, Kumar, and Shome, 2008). Rule changes have lowered issuance costs and promoted gradual changes in equity issuance methods favoured by firms. For example, public seasoned equity offerings of shelf-registered shares (accelerated SEOs) are cheaper and faster than traditional SEOs, and they incur lower underwriter fees (Gustafson and Iliev, 2017). At-the-market (ATM) equity offerings, an alternative to accelerated SEOs, issue shelf-registered non-underwritten shares directly in the secondary market (Billett, Floros, and Garfinkel, 2019). However, unlike SEOs, ATMs allow shelf-registered shares to be issued over multiple settings, making it easier for managers to time the market. Lastly, the private placement of shelf-registered shares to selected investors (a registered direct) allows immediate share resales, resulting in lower offering discounts (Umar, Yimfor, and Zufarov, 2021).[19] Overall, our finding of an increasing substitution between equity issuance and cash flow since the early 1990s concurs with the timing of SEC rule changes that significantly reduced issuance costs.

Theoretically, as equity markets become more accessible and the costs of issuing equity reduce, firms access equity markets more frequently as needed, leading to an increasing substitution between equity financing and cash flow. Consistent with this, a model developed by Bolton, Wang, and Yang (2021) predicts that, in the extreme case where equity issuance is costless, firms issue (reduce) equity freely after a negative (positive) cash flow shock to rebalance their capital structure, implying a high cash flow sensitivity of equity issuance.

IV. Additional analyses

In this section, we extend our baseline analysis in several directions. First, we examine whether our baseline findings reflect firms changing their cash flow uses or recent changes in the characteristics of publicly traded firms. Second, we investigate whether time trends differ for firms across different industries. Third, we compare the time trends in cash flow allocations between financially constrained and unconstrained firms. Finally, we provide evidence that our baseline findings are robust to alternative empirical specifications that account for measurement errors of firms' future growth opportunities, consider intertemporal cash flow allocations, deduct the change in working capital from the cash flow measure, or adjust both cash flow and investment for R&D.

[19] Another popular equity issuance method in the 1990s is the private investments in public equity, which place unregistered shares to a selected group of investors. PIPEs incur a shorter holding period compared with a typical private placement, lowering liquidity risk for investors (Chaplinsky and Haushalter, 2010).

A. Incumbents vs. new entrants

Are the time trends of cash flow allocation driven by firms changing their way of using cash flow, or by the changes in our sample composition over time? Fama and French (2004) point out an influx of new listings in the 1980s and 1990s, which differ significantly from incumbent firms. Relatedly, Graham and Leary (2018) attribute the secular rise in the average cash holdings of U.S. firms in recent decades to the entrants of high cash firms rather than fundamental changes in corporate cash policy over time. To examine this issue, we conduct the baseline regression analysis for incumbent firms and new entrants separately.

We classify firms as incumbents or new entrants based on their year of listing. Specifically, incumbents are firms listed before 1980, and new entrants are those listed in or after 1980.[20] The ADF tests in Panel A of Table 4 show that the time trends in cash flow allocated to working capital and net equity reductions are statistically significant for both incumbents and new entrants; however, incumbents exhibit a more pronounced declining cash flow allocation to working capital (−0.007 vs. −0.004) and a less pronounced cash flow allocation to net equity reductions (0.005 vs. 0.008) than new entrants. Moreover, incumbents spend more cash flow on investment over time, but new entrants do the opposite. For every dollar increase in cash flow, incumbents, on average, increase the allocation to investment by 0.7 cents per year, whereas new entrants reduce the use for investment by 0.2 cents per year.

New entrants are typically small firms relying more heavily on equity finance than incumbent firms (Frank and Goyal, 2003), and about 20.6% (untabulated) of new entrants are in high-tech industries. Given new entrants' strong investment needs for growth, their declining cash flow allocation to investments implies that they increasingly rely on external equity for investment. As such, they also exhibit a weaker substitution between cash flow and equity finance than incumbents do. In an untabulated robustness check, we require incumbents to have at least 25 years of data to alleviate the concern that incumbents may exit the sample shortly after 1980. Qualitatively, similar results ensue. To summarize, the increasing cash flow use for net equity

[20] Our findings are qualitatively the same if we use 1988 as the cutoff year to classify firms into incumbents and entrants.

reductions and the decreasing use for working capital are not merely driven by changes in sample composition because we observe similar trends in both incumbents and new entrants. In contrast, cash flow allocation toward investment is highly sensitive to the sample's composition.

B. Cross-industry analysis

In this subsection, we investigate whether and how time trends in cash flow allocation vary across industries. We split firms into ten industry groups based on Fama and French's (1997) industry classification,[21] estimate Equations (3) to (8) for each industry and perform ADF tests to quantify the time trends. Column (2) in Panel B of Table 4 shows that the coefficients of *Trend* for cash flow allocated to working capital are negative for all industries and statistically significant for seven out of ten industries. The decreasing cash flow use for working capital is most pronounced for consumer nondurables, telecommunications, and manufacturing firms, indicating their fast-declining need to finance working capital with internal funds. In contrast, consumer durables, chemicals, and energy firms experience no significant decrease in cash flow uses for working capital.

Column (5) shows that the coefficients of *Trend* for cash flow allocated to net equity reductions are most significant in the health, wholesale and retail, and business equipment industries, indicating that these industries have been more actively using cash flow to reduce their reliance on external equity finance over time. Furthermore, column (1) illustrates that consumer durables and health industries have reduced their reliance on cash flow for investments over time, while consumer nondurables and telecommunications have increased their cash flow uses for investments. In column (3), we exhibit that chemicals, telecommunications, and energy firms have strong rising tendencies to save cash out of cash flow. Thus, although the cash flow allocated to investments and cash holdings has no evident time trends for the whole sample, it exhibits noticeable differences across industries.

[21] Our sample contains ten industries from Fama and French's 12-industry classification because finance and utilities are excluded.

C. Financial constraints and time trends in cash flow allocation

Prior studies find significant differences in the cash flow sensitivities of various cash flow uses between financially constrained and unconstrained firms (e.g., Fazzari, Hubbard, and Petersen, 1988; Almeida et al., 2004). In this subsection, we examine whether the time trends of cash flow allocation differ between constrained and unconstrained firms. We measure financial constraints using Hadlock and Pierce's (2010) index (the *HP* index).[22] By construction, higher *HP* index values indicate that firms are more financially constrained. A firm is classified as financially constrained (unconstrained) each year if its *HP* index is in the top (bottom) three deciles of the distribution.

We then separately estimate cash flow allocated to various uses for constrained and unconstrained firms and report the results for eight subperiods in Figure 8. We find that unconstrained firms deploy more cash flow toward investments and direct less toward cash savings and external capital reductions than constrained firms. These results are consistent with constrained firms using internal cash flow to accumulate liquidity and reduce external capital, thereby buffering against future financial constraints (Chang et al., 2014). Although these cross-sectional differences in cash flow uses between unconstrained and constrained firms are evident in any given year, the time trends in cash flow uses are qualitatively similar for the two groups.[23] In other words, our main findings regarding how corporate cash flow uses evolve hold for both unconstrained and constrained firms.

[22] The *HP* index is defined as $-0.737 \times Ln\ (Assets) + 0.043 \times Ln\ (Assets)^2 + 0.04 \times Firm\ Age$. *Firm Age* is the number of years elapsed since a firm enters the CRSP database. Untabulated robustness checks obtain similar results if we measure financial constraints using firm size, the dividend payer dummy, the credit rating dummy, and the WW index (Whited and Wu, 2006).

[23] We employ an ADF model specification to estimate the coefficients of *Trend* for unconstrained and constrained firms, respectively. The time trends in cash flow allocated to working capital and net equity reductions are statistically significant for both unconstrained and constrained groups. Unconstrained firms display a stronger declining cash flow allocation to working capital (−0.006 vs. −0.004) and a weaker cash flow allocation to net equity reductions (0.005 vs 0.007) than constrained firms (untabulated).

D. Trend and cycle components of cash flow

Erickson and Whited (2000) point out that if cash flow contains information about firms' future growth prospects, which are not adequately controlled for in our multi-equation regression framework, the estimated cash flow sensitivities can be biased. To mitigate this measurement error concern, we follow Chang et al. (2014) and use Beveridge and Nelson's (1981) approach to decompose cash flow into a trend (permanent) and a cycle (transitory) component.[24] The trend component of cash flow captures persistent shocks to future cash flow growth. Thus, it should be correlated with the error terms when our regression framework does not adequately control for growth opportunities. In contrast, the cycle component of cash flow is a zero-mean stationary process that contains little information about future growth beyond short-term momentum. Therefore, the coefficients of the cycle component are not subject to measurement error concerns, thus offering unbiased estimates of corporate uses of cash flow.

For this test, we restrict the sample to firms with at least ten years of cash flow data because the Beveridge–Nelson decomposition requires a reasonably long time-series. Our results (untabulated) are qualitatively similar if we require firms to have at least 15 or 20 consecutive years of cash flow data. The resulting trend and cycle components of cash flow, deflated by the beginning-of-period book value of assets, are denoted by *CF_Trend* and *CF_Cycle,* respectively. We then replace *CF* with *CF_Trend* and *CF_Cycle* and reestimate Equations (3) to (8) over the eight subsample periods. Figure A2 in the Internet Appendix exhibits the allocation coefficients of *CF_Cycle* and *CF_Trend*. The time trends in cash flow allocated to various uses are similar to those reported in Figure 4.

[24] Prior studies (e.g., Riddick and Whited, 2009) employ a modified Generalized Method of Moments (GMM) method based on higher-order moments to correct for the measurement errors. Chang et al. (2014), however, show that the GMM estimators do not offer unbiased estimates of the cash flow allocation across various uses. Specifically, while the true values of cash flow coefficients in Equations (3) to (8) are unknown to researchers, to the extent that GMM estimators offer consistent estimates for all equations, the cash flow coefficients should add up to unity across Equations (3) to (8). Chang et al. (2014) show that unlike OLS estimates that always satisfy the adding-up constraint, GMM estimates violate the constraint often by large amounts. This finding is consistent with that of Almeida, Campello, and Galvao (2010) who use Monte Carlo simulations and real data to show that fixed effects, error heteroscedasticity, and data skewness cause higher-order GMM estimators to deliver biased coefficients.

E. Intertemporal cash flow allocations

Thus far, we have focused on concurrent cash flow allocation to various uses. However, Dasgupta, Noe, and Wang (2011) show that firms delay their investment response to cash flow shocks. When there is an increase in cash flow, firms often add incremental cash flow to their cash reserves or use it to reduce external finance instead of increasing investment immediately in the same period. By doing so, they can finance future investments by drawing down their cash holdings or raising external capital in subsequent periods. As a result, concurrent cash flow uses (e.g., investment and cash savings) could all be affected by both past and current cash flow. To account for the intertemporal allocation of cash flow, we augment Equations (3) to (8) by adding two lags of *CF* as additional controls.

Consistent with Dasgupta, Noe, and Wang (2011), our regression results (untabulated) confirm that lagged cash flow terms are significantly associated with current uses of cash flow. More importantly, we find that including lagged cash flow has no material impact on the estimated allocation coefficients of current cash flow. Figure A3 in the Internet Appendix displays the current cash flow allocations to the six uses after controlling for lagged cash flow in the regressions. The results are similar to those reported in Figure 4.[25]

F. Alternative definitions of cash flow and investment

Several studies on cash flow sensitivities (e.g., Chang et al., 2014; Gatchev, Pulvino, and Tarhan, 2010) define cash flow as the operating cash flows, net of the change in working capital. Bushman, Smith, and Zhang (2011) suggest that the conventional measure of cash flow in the investment–cash flow literature (e.g., Fazzari, Hubbard, and Petersen, 1988) is essentially earnings before depreciation, which contains a cash component (operating cash flows) and a non-cash component in the form of working capital accruals. Thus, by removing the effect of the change in working capital and focusing on cash flows from operations, one

[25] In an untabulated robustness check, we include the lagged depended variable in Equations (3) to (8) ($INV_{t-1}, \Delta WC_{t-1}, \Delta CASH_{t-1}, DIV_{t-1}, \Delta D_{t-1}$, and ΔE_{t-1}) to account for the intertemporal dependencies within and across various uses of cash flow (Gatchev, Pulvino, and Tarhan, 2010). The resulting cash flow allocation coefficients display similar patterns as those in Figure 4.

can mitigate the concern that the estimated cash flow sensitivities reflect the correlations between the uses of funds (e.g., investment) and working capital accruals.

After deducting ΔWC from CF to investigate the allocation of operating cash flow (CF-ΔWC), ΔWC is no longer viewed as a use of cash flow. Thus, the number of cash flow uses is reduced from six to five. Essentially, we subtract ΔWC from both sides of Equation (2), so the cash flow identity still holds. Figure A4 in the Internet Appendix displays the allocation coefficients for the eight subperiods. We observe that the increasing trend in the operating cash flow allocated to net equity reductions remains, although it appears less pronounced than the trend based on *CF*. The ADF tests, reported in Table A1 of the Internet Appendix, confirm the milder time trend from using the alternative cash flow measure. Figure A4 also shows a slight downward trend in ($CF-\Delta WC$) allocated to net debt reductions, although the ADF test reveals that the trend is not statistically significant. The trends in operating cash flow allocated to other uses (cash holdings, investment, and dividends) are similar to those obtained using *CF*.

Our comprehensive investment measure does not include R&D investments, which are reported by firms in the income statement under operating expenses and are excluded from cash flow from investment activities in the cash flow statement. If we treat R&D as a form of investment instead of an operating expense, a simple accounting adjustment should be lowering operating expenses and increasing cash flow by the amount of R&D (e.g., Brown, Martinsson, and Petersen, 2013).[26] We then add R&D to both sides of Equation (2) to ensure that the cash flow identity still holds. The right-hand side of the equation is a new measure of cash flow adjusted for R&D ($CF\_ADJ = CF + R\&D$). The left-hand side of the equation contains a broader investment measure, which includes R&D ($INV\_ADJ = INV + R\&D$). We rerun our baseline regressions using the adjusted investment and cash flow measures and plot the cash

[26] An alternative way of accounting for R&D is to capitalize all R&D expenses, for example, using a perpetual inventory method (e.g., Peters and Tylor, 2017). However, we do not have information about a firm's amortizable life of R&D assets. Moreover, around 40% of Compustat firms have missing R&D expenses. Koh and Reeb (2015) show that many firms deliberately choose not to report R&D, or not to report R&D separately from other expenses. They argue that simply replacing missing R&D with zero will lead to biased empirical tests where R&D plays a significant role. In a recent study, Canace, Jackson, and Ma (2018) suggest that U.S. firms adjust R&D to manage their earnings, and a lot of reported capital expenditures might already include R&D investment that have been capitalized.

flow allocated to the six uses in Figure A5 of the Internet Appendix. The time trends for the R&D-adjusted cash flow allocations are similar to those for *CF* in Figure 4, indicating that our baseline findings are not sensitive to whether R&D is treated as an investment or an expense.

V. Conclusions

We study the evolution of the cash-flow allocation of U.S. firms over the period 1988 to 2019. We find secular trends in cash flow allocated to working capital and net equity reduction. The allocation to working capital has almost halved over time, while the allocation to the reduction of equity finance has increased from 9 cents to 38 cents per additional dollar of cash flow. These time trends tie in with the decline in working capital and the rise in equity reductions of U.S. firms over the same period. We further demonstrate that conventional investment and cash flow measures have become less representative of firms' overall investment activities and cash flow availability, resulting in the disappearing investment–cash flow sensitivity documented by Chen and Chen (2012). Using comprehensive measures of investment and cash flow based on SCF data, we show that investment remains an important use of cash flow.

Overall, our findings reveal fundamental changes in what firms do with their cash flow over the past three decades. An important implication of our analysis is that the cash flow allocated to various uses varies over time in an interdependent manner. Future research studying firms' investment, financing, or payout decisions should consider the interrelated nature of these decisions. In particular, firms can alter multiple corporate policies simultaneously by shifting internal cash flow across various uses.

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Appendix A. Variable definition using items in the Statement of Cash Flow (SCF)

This appendix details the definition of variables in Equation (2) using the SCF data from Compustat. We include in parentheses the Compustat XPF variable names in lowercase italics. *NCF* includes deferred taxes (*txdc*), gains in sales of PPE and investments (*sppiv*), the exchange rate effect (*exre*), and other funds from operations (*fopo*). *OCF* is the sum of extraordinary items and discontinued operations (*xidoc*) and equity in net loss (*esubc*). Other long-term investments (*OILT*) indicate an increase in investments (*ivch*) minus the sum of the sales of investments (*siv*) and other investing activities (*ivaco*). A positive value of *siv*, *ivaco*, or *ivstch* in the SCF represents a cash inflow. The change in other net payable (ΔOP) consists of increases in accrued income taxes (*txach*) and other net liabilities (*aoloch*) and other financing activities (*fiao*). A positive value of *recch* and *invch* in the SCF represents a decrease in accounts receivable and inventory.

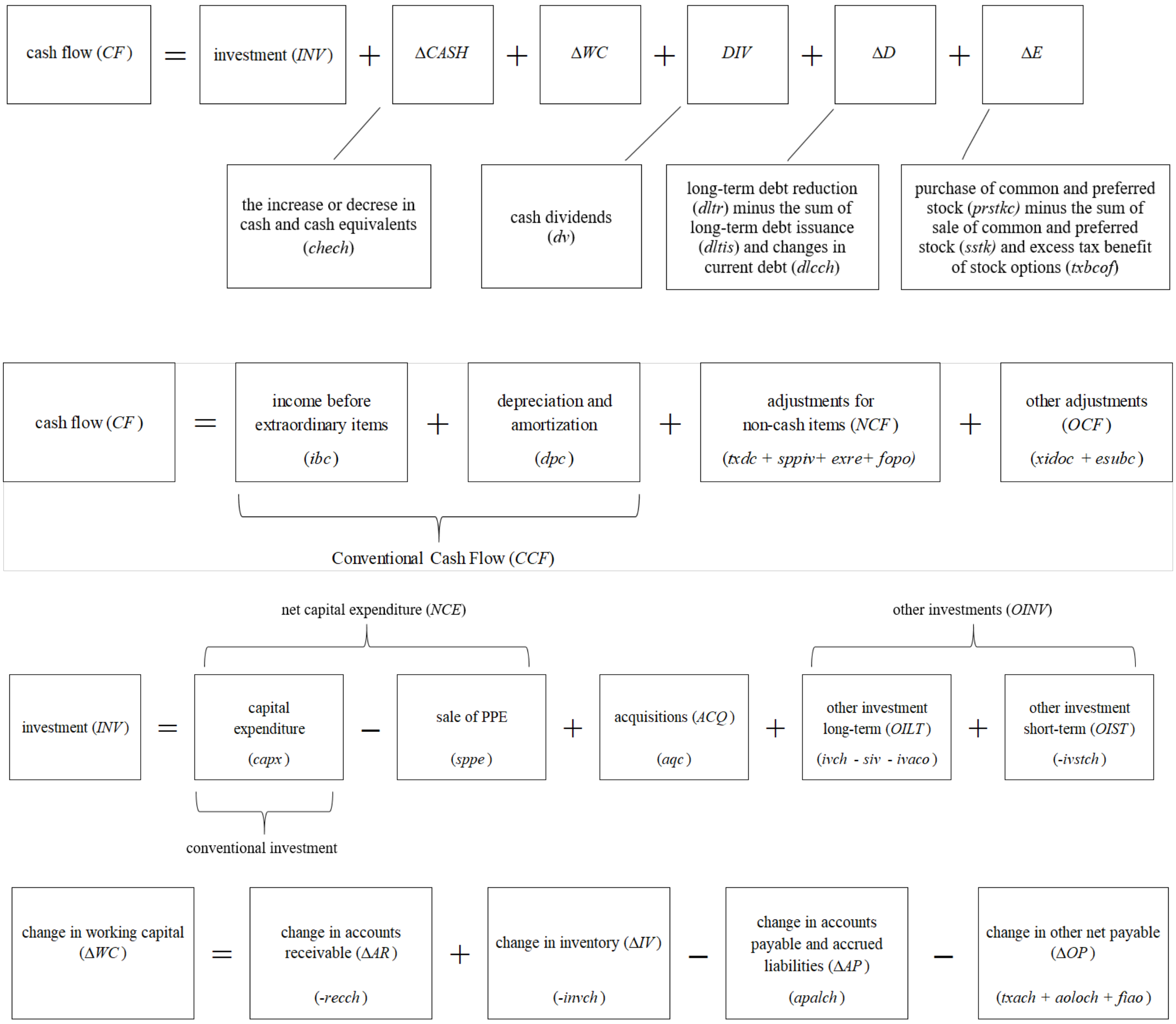


Figure 1. Aggregate amounts of cash flow and investment, 1988–2019

The sample includes firm-years jointly covered in Compustat and CRSP for the period 1988 to 2019. Chart A (C) depicts the proportions and amounts of cash flow (investment) components aggregated over the entire sample period. Cash flow (*CF*) is the sum of conventional cash flow (*CCF*), non-cash adjustments (*NCF*), and other cash-flow adjustments (*OCF*). Investment (*INV*) is the sum of net capital expenditure (*NCE*), acquisitions (*ACQ*), and other investments (*OINV*). Charts B and D depict the aggregate annual amounts of cash flow and investment components respectively. All variables are defined in Appendix A.

Chart A: Aggregate Cash Flow (*CF*)
In 2019 constant U.S. dollars ($35.97 Trillion)

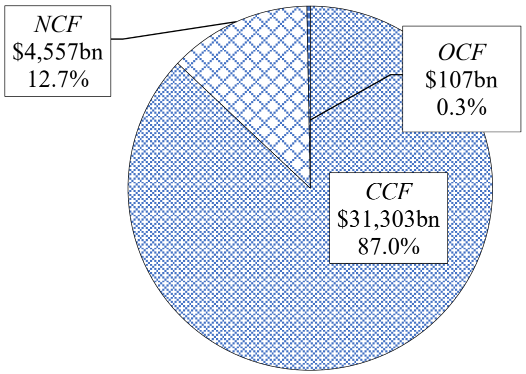


Chart B: Cash Flow (*CF*) By Year
In nominal U.S. dollars

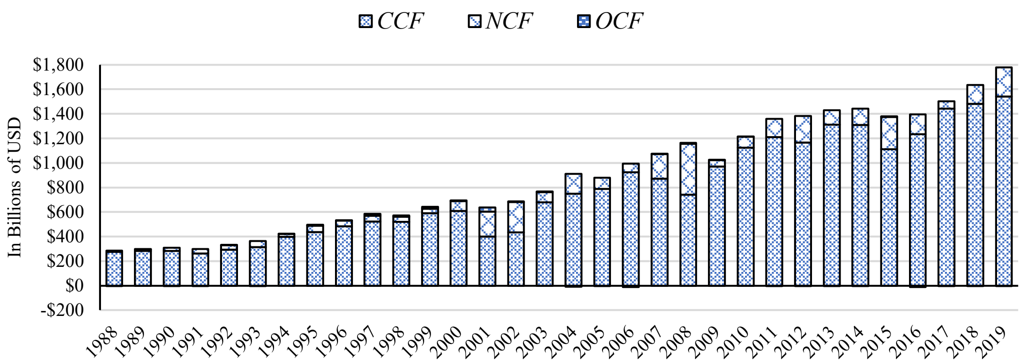


Chart C: Aggregate Investment (*INV*)
In 2019 constant U.S. dollars

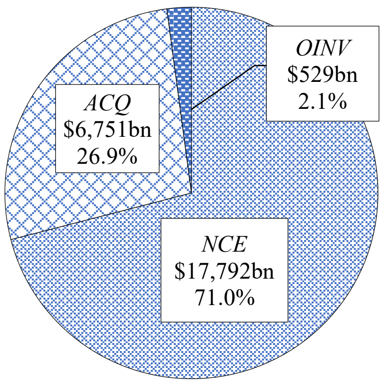


Chart D: Investment (*INV*) By Year
In nominal U.S. dollars

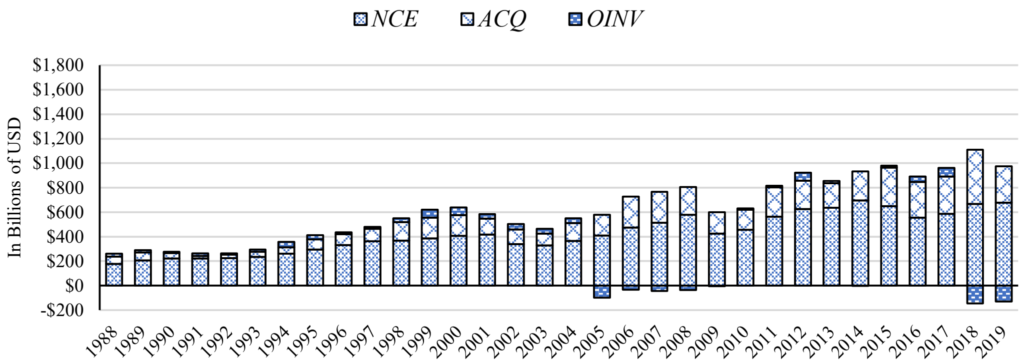


Figure 2. Time trend of Statement of Cash Flow (SCF) variables, 1998–2019

The sample includes firm-years jointly covered in Compustat and CRSP for the period 1988 to 2019. Chart A reports the number of firms by year. Charts B to H depict the mean and median values of the SCF variables, which include cash flow (*CF*), investment (*INV*), the change in working capital (ΔWC), the change in cash holdings ($\Delta CASH$), net debt reduction (ΔD), net equity reduction (ΔE) and cash dividends (*DIV*). The variables are normalized by lagged total assets and variable definitions are provided in Appendix A.

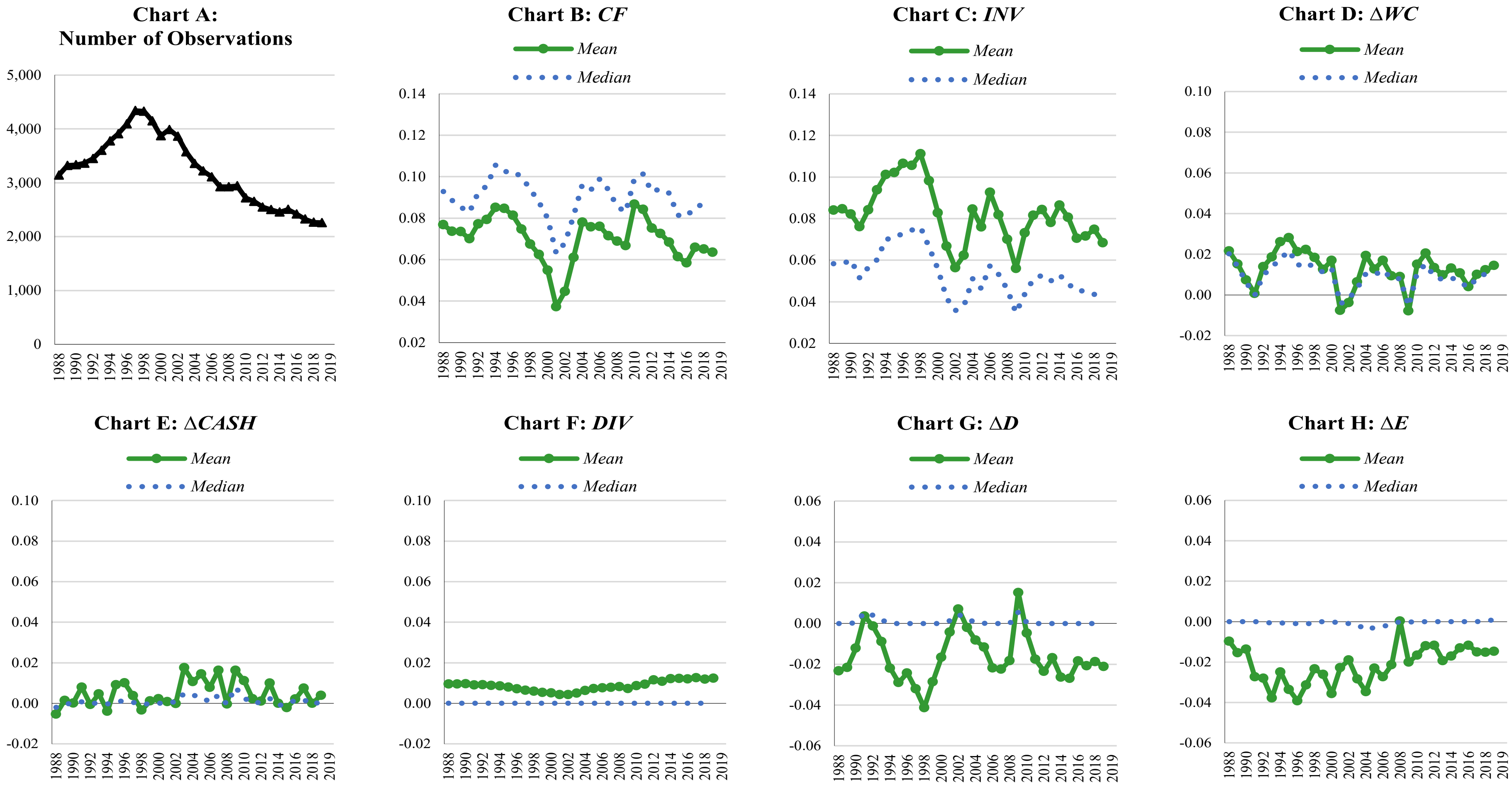


Figure 3. Corporate uses of cash flow, 1988–2019

This figure depicts the annual allocations of cash flow (*CF*) to various uses of funds for the period 1988 to 2019. The rates of allocation are the estimated coefficients on *CF* in Equations (3) to (8), that is, $\alpha^{INV}, \alpha^{\Delta CASH}, \alpha^{\Delta WC}, \alpha^{DIV}, \alpha^{\Delta D}$, and $\alpha^{\Delta E}$, respectively. All variables are demeaned by firm to remove firm fixed effects. Cross-sectional regression is then estimated every year. Uses of funds include investment (*INV*), the change in working capital (*ΔWC*), the change in cash holdings *(ΔCASH*), cash dividends (*Div*), net debt reduction (*ΔD*), and net equity reduction (*ΔE*). The variables are normalized by lagged total assets and variable definitions are provided in Appendix A. Control variables are included in the regressions to account for various firm characteristics. They include the market-to-book ratio (*MB*), defined as (total assets + market value of equity – book value of equity)/total assets; the natural log of the book value of assets (*Ln*(*Assets*)); the annual sales growth rate (*SalesG*), which is the change in net sales scaled by lagged net sales; the net property, plant, and equipment-to-assets ratio (*PPE*/*Assets*); and the leverage ratio (*Leverage*), that is, total debt (sum of short-term and long-term debt) divided by total assets.

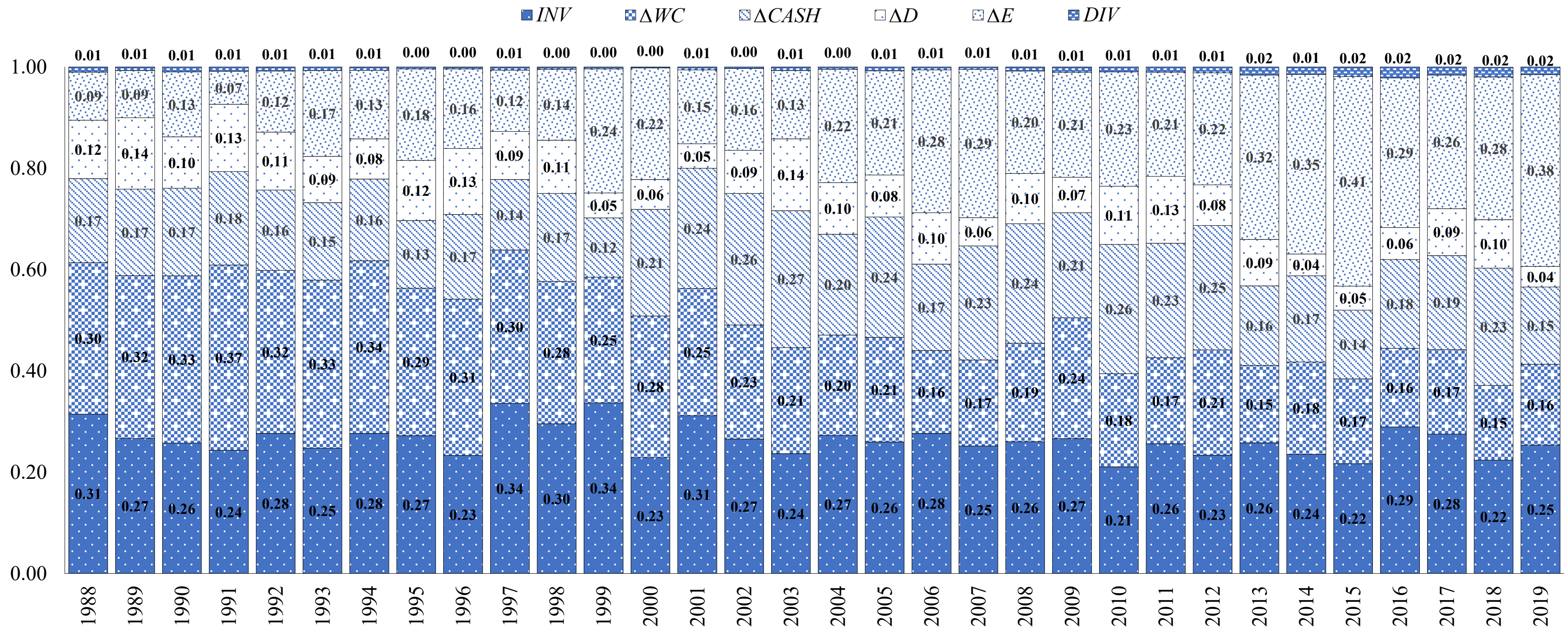


Figure 4. Corporate uses of cash flow by subperiods

This figure depicts the allocation of cash flow (*CF*) to various uses of funds over eight consecutive subperiods: 1988 to 1991, 1992 to 1995, 1996 to 1999, 2000 to 2003, 2004 to 2007, 2008 to 2011, 2012 to 2015, and 2016 to 2019. The rates of allocation are the estimated coefficients on *CF* in Equations (3) to (8), that is, α^{INV}, $\alpha^{\Delta WC}$, $\alpha^{\Delta CASH}$, $\alpha^{\Delta D}$, $\alpha^{\Delta E}$, and α^{DIV}, respectively. All variables are demeaned by firm to remove firm fixed effects. Cross-sectional regressions with year fixed effects are then estimated for each subperiod. The Statement of Cash Flow (SCF) variables are normalized by lagged total assets, and variable definitions are provided in Appendix A. Control variables are the same as those defined in Figure 3.

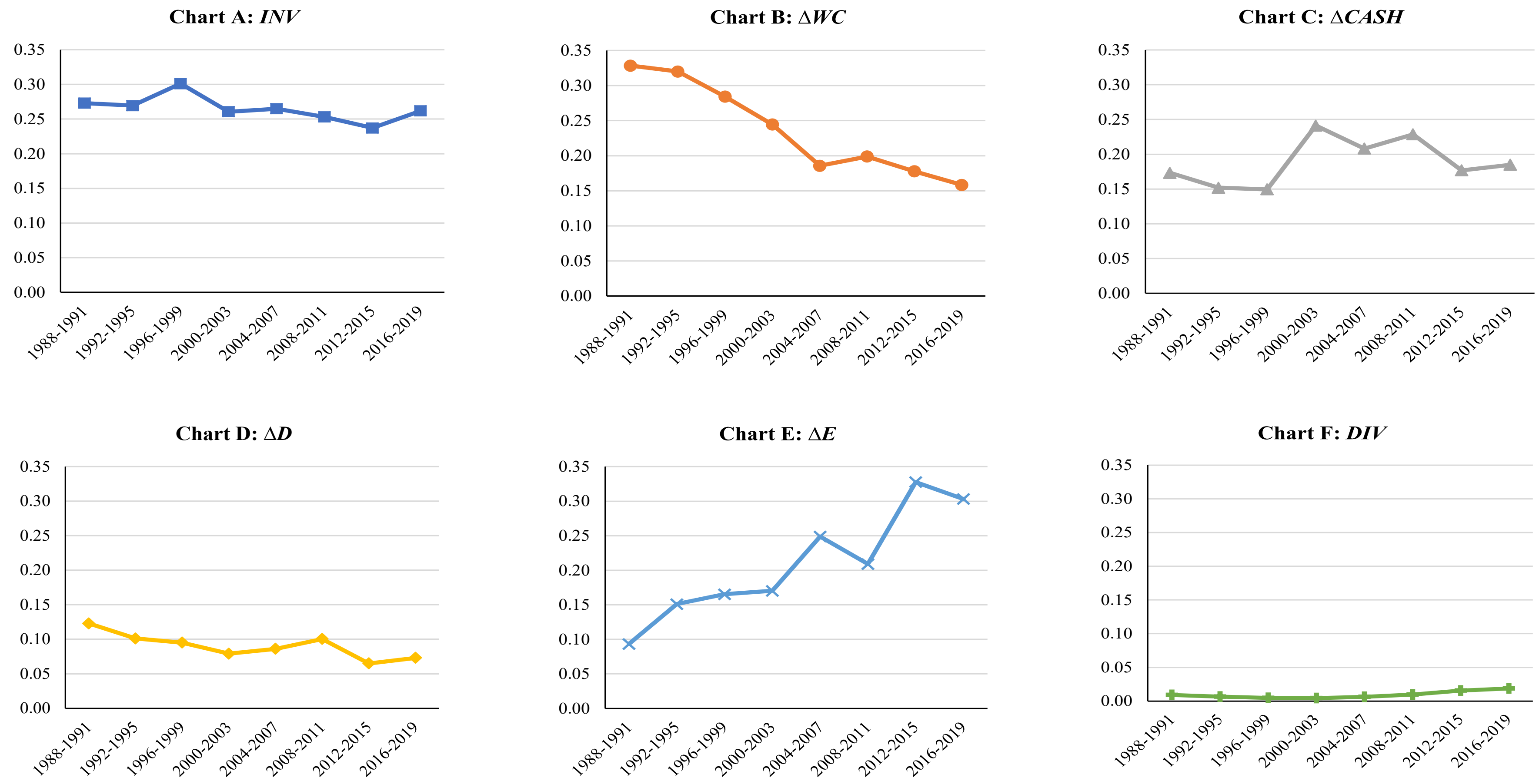
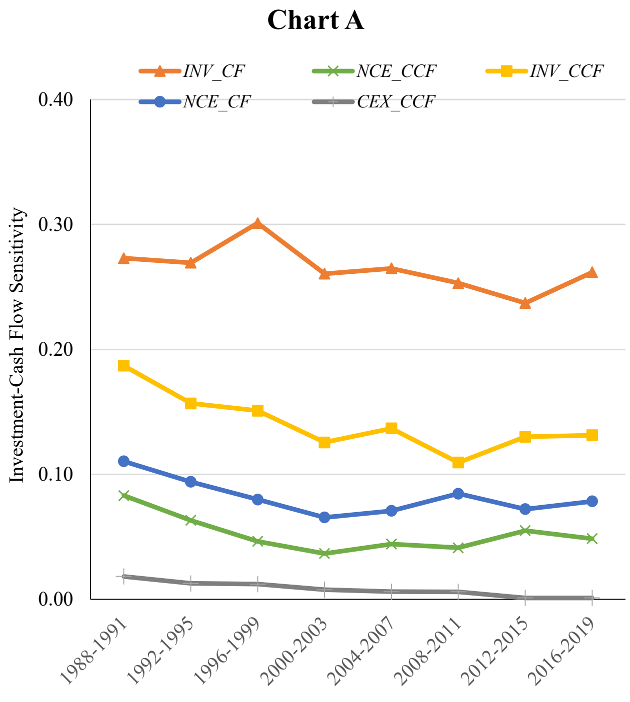


Figure 5. The evolution of investment–cash flow sensitivity: SCF versus conventional measures

Chart A depicts the investment–cash flow sensitivities estimated using alternative measures of investment or cash flow for eight consecutive subperiods: 1988 to 1991, 1992 to 1995, 1996 to 1999, 2000 to 2003, 2004 to 2007, 2008 to 2011, 2012 to 2015, and 2016 to 2019. *NCE* is a firm's net capital expenditure, whereas *INV* is the Statement of Cash Flow (SCF) measure of investment. *CCF* is the conventional cash flow measure, and *CF* is the SCF cash flow measure. Chart B depicts the composition of investment–cash flow sensitivities. *INV* is the sum of net capital expenditure (*NCE*), acquisitions (*ACQ*), and other investments (*OINV*). The variables are normalized by lagged total assets, and variable definitions are provided in Appendix A. Control variables are the same as those defined in Figure 3. *CEX_CCF* is constructed following Chen and Chen's (2012) definition of investment and cash flow, scaled by the beginning-of-period net property, plant, and equipment (PPE).



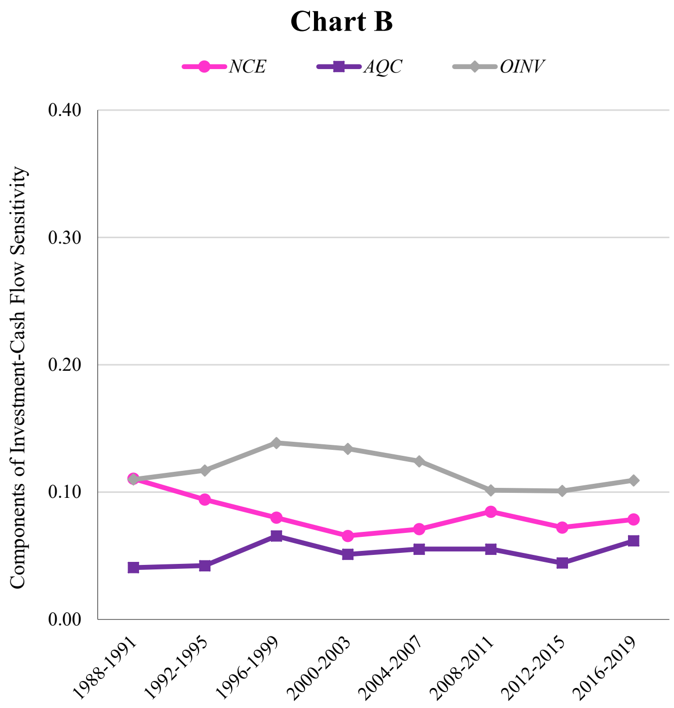


Figure 6. The allocation of cash flow to working capital components

This figure depicts the allocation of cash flow (*CF*) to various components of the change in working capital (*ΔWC*). The estimated allocation is the regression coefficient on *CF* in Equation (4), with *ΔWC* replaced by its components: the changes in accounts receivable (*ΔAR*), inventory (*ΔIV*), accounts payable and accrued liabilities (*ΔAP*), and another net payable (*ΔOP*). The variables are normalized by lagged total assets. Variable definitions are provided in Appendix A. Control variables are the same as those used in Figure 3 and Table 2.

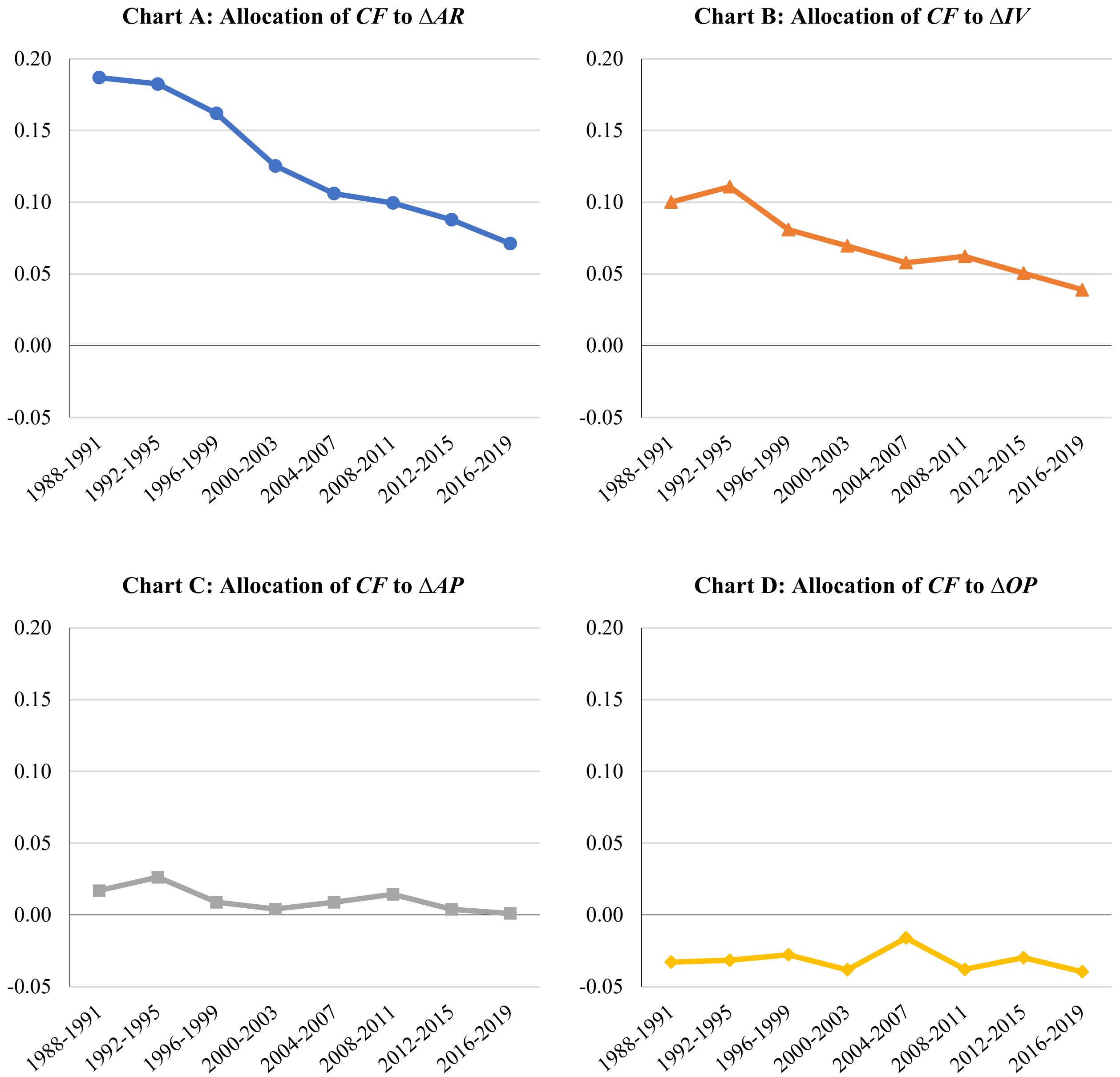


Figure 7. The allocation of cash flow to net debt and equity reductions

This figure depicts the allocation of cash flow (*CF*) to net debt and equity reductions for eight consecutive subperiods: 1988–1991, 1992–1995, 1996–1999, 2000–2003, 2004–2007, 2008–2011, 2012–2015, and 2016–2019. The cash flow allocations are estimated by regressing *DR* (debt retirement), *DI* (debt issuance), *ER* (equity repurchase), and *EI* (equity issuance), separately as explanatory variables in Equations (7) and (8). All variables are demeaned over the entire sample period to remove firm fixed effects. Cross-sectional regressions with year fixed effects are then estimated for each subperiod. The variables are normalized by lagged total assets. Variable definitions are provided in Appendix A. Control variables are the same as those defined in Figure 3 and Table 2.

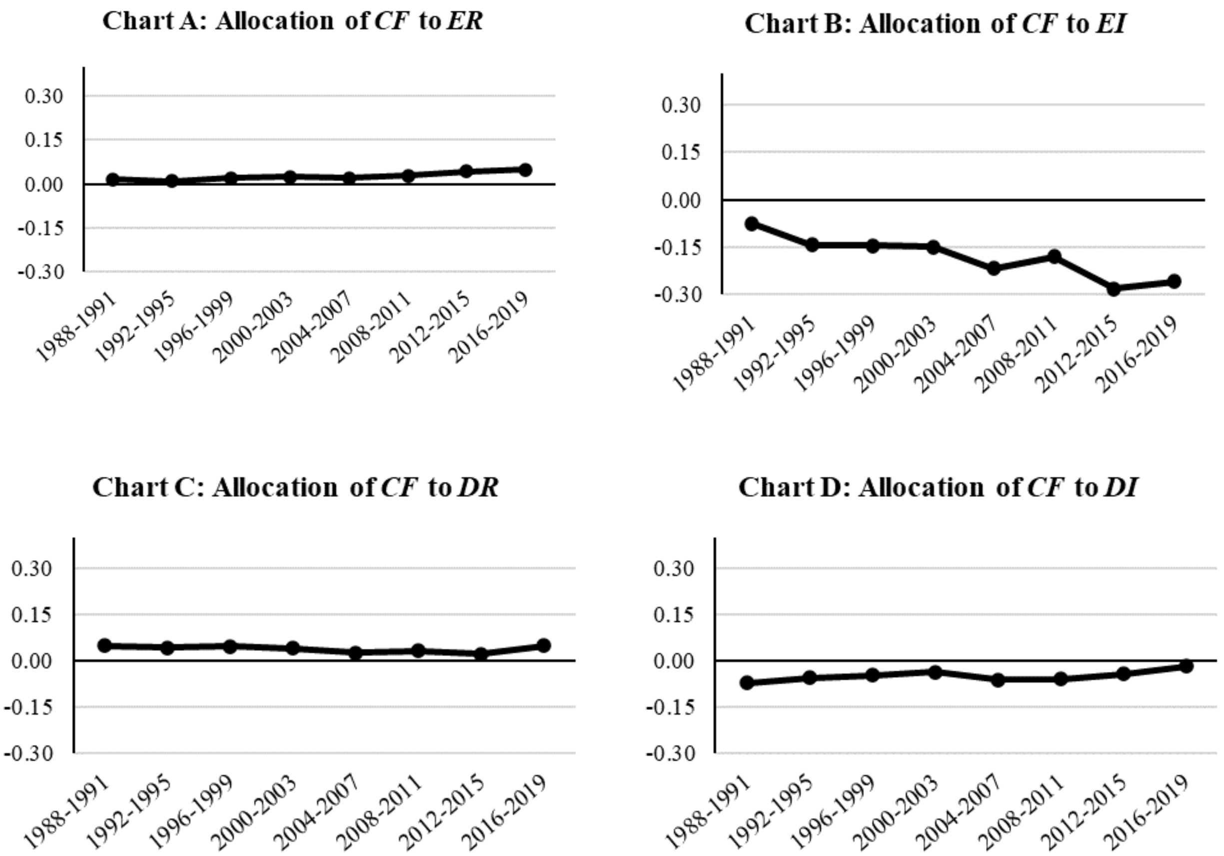


Figure 8. The allocation of cash flow: Financially constrained versus unconstrained firms

This figure depicts the allocation of cash flow (*CF*) to the various uses of funds for financially constrained and unconstrained nonfinancial U.S. firms in Compustat. Each year, a firm is classified as financially constrained (unconstrained) if its score on the Hadlock and Piece (2010) (*HP*) Index is above the seventieth (below the thirtieth) percentile. The rates of allocation are based on the ordinary least squares regression coefficients on *CF* as listed in Equations (3) to (8), that is, $\alpha^{INV}, \alpha^{\Delta WC}, \alpha^{\Delta CASH}, \alpha^{\Delta D}$, $\alpha^{\Delta E}$ and α^{DIV}, respectively, estimated with eight consecutive panels. Uses of funds include investment (*INV*), the change in working capital (*ΔWC*), the change in cash holdings *(ΔCASH*), net debt reduction (*ΔD*), net equity reduction (*ΔE*) and cash dividends (*Div*). The variables are defined in Appendix A. Control variables are included in the regressions to account for various firm characteristics. They include the market-to-book ratio (*MB*), defined as (total assets + market value of equity – book value of equity)/total assets; the natural log of the book value of assets (*Ln*(*Assets*)); the annual sales growth rate (*SalesG*), which is the change in net sales scaled by lagged net sales; the net property, plant, and equipment-to-assets ratio (*PPE*/*Assets*); and the leverage ratio (*Leverage*), that is, total debt (sum of short-term and long-term debt) divided by total assets.

Chart A: Allocation of *CF* to *INV*

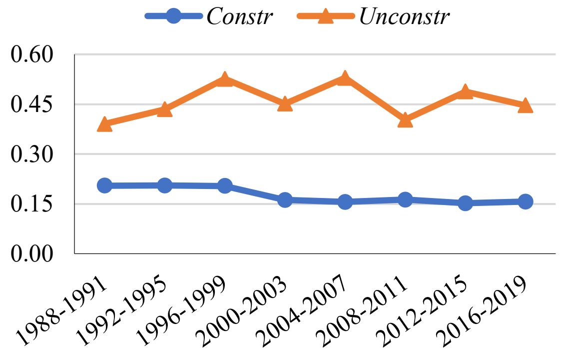


Chart B: Allocation of *CF* to Δ*WC*

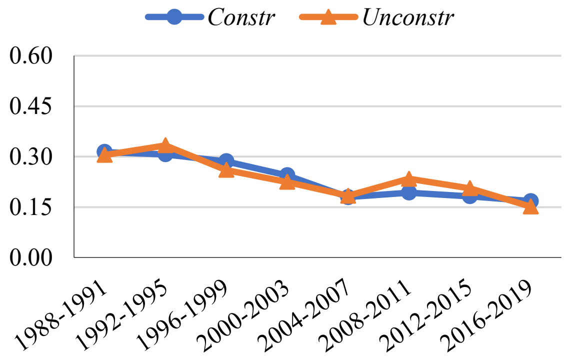


Chart C: Allocation of *CF* to Δ*CASH*

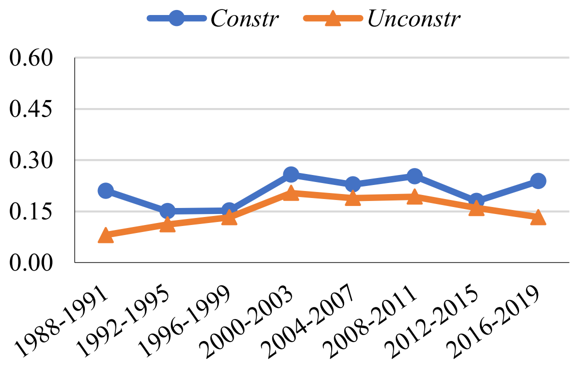


Chart D: Allocation of *CF* to Δ*D*

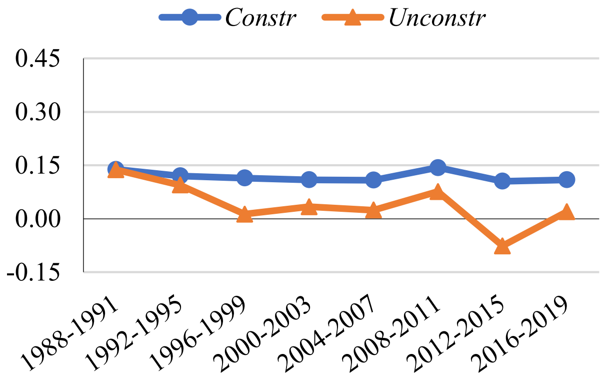


Chart E: Allocation of *CF* to Δ*E*

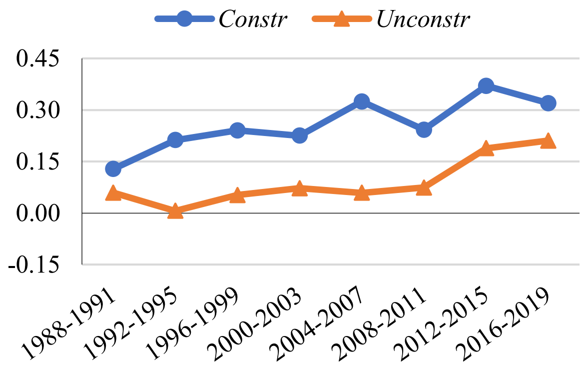


Chart F: Allocation of *CF* to *DIV*

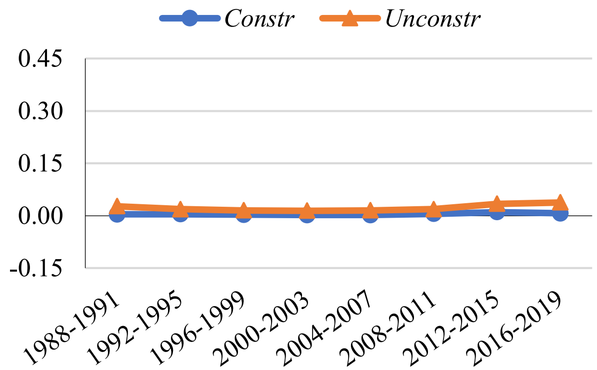


Table 1. Summary statistics, 1988 to 2019

This table reports the summary statistics of the key variables used in the analysis. Panel A summarizes the statistics of the Statement of Cash Flow (SCF) variables defined in Appendix A. *DIF* is the difference between *CF* and the sum of *INV*, Δ*WC*, Δ*CASH*, Δ*D*, Δ*E* and *DIV*. Panels B, C, and D present the statistics of the components of *CF*, *INV,* and Δ*WC*, respectively. All key variables are normalized by the beginning-of-period total assets. Panel E describes the characteristics of the firms in our sample. *MB* is the market-to-book ratio, defined as (total assets + market value of equity – book value of equity)/total assets. *Ln*(*Assets*) is the natural log of the total book value of assets. *SalesG* is the change in net sales scaled by lagged net sales. *PPE*/*Assets* is the net property, plant, and equipment (PPE) divided by total assets. *Leverage* is the total debt (i.e., the sum of short-term and long-term debt) divided by the total assets.

Variable	Mean	S.D.	Min.	25th	Median	75th	Max.
Panel A: SCF variables							
INV	0.083	0.137	−0.340	0.015	0.053	0.123	0.940
Δ*CASH*	0.005	0.093	−0.364	−0.023	0.001	0.029	0.616
Δ*WC*	0.013	0.080	−0.325	−0.021	0.009	0.045	0.373
DIV	0.008	0.018	0.000	0.000	0.000	0.009	0.136
Δ*D*	−0.016	0.105	−0.740	−0.031	0.000	0.025	0.260
Δ*E*	−0.023	0.119	−1.220	−0.009	0.000	0.002	0.206
CF	0.070	0.144	−0.791	0.025	0.090	0.147	0.446
DIF	0.000	0.000	−0.010	0.000	0.000	0.000	0.010
Panel B: Components of *CF*							
CCF	0.044	0.175	−0.986	0.007	0.079	0.135	0.445
NCF	0.026	0.072	−0.185	−0.001	0.010	0.033	0.446
OCF	0.000	0.011	−0.062	0.000	0.000	0.000	0.059
Panel C: Components of *INV*							
CE	0.061	0.073	0.000	0.017	0.037	0.075	0.451
NCE	0.057	0.069	−0.033	0.015	0.035	0.072	0.426
ACQ	0.025	0.076	−0.003	0.000	0.000	0.006	0.579
OINV	0.001	0.084	−0.376	−0.009	0.000	0.008	0.469
Panel D: Components of Δ*WC*							
Δ*AR*	0.012	0.057	−0.173	−0.008	0.004	0.027	0.274
Δ*IV*	0.008	0.044	−0.138	−0.002	0.000	0.015	0.213
Δ*AP*	0.007	0.043	−0.141	−0.005	0.000	0.017	0.209
Δ*OP*	0.000	0.051	−0.220	−0.017	−0.001	0.014	0.245
Panel E: Firm characteristics							
MB	1.814	1.255	0.553	1.067	1.409	2.063	7.964
Ln(*Assets*)	5.545	2.164	1.035	3.953	5.495	7.053	10.776
SalesG	0.080	0.242	−0.614	−0.039	0.066	0.189	0.823
PPE/*Assets*	0.272	0.229	0.005	0.091	0.204	0.393	0.899
Leverage	0.232	0.209	0.000	0.039	0.199	0.363	0.846

Table 2. The allocation of cash flow for the whole sample

This table reports the results of panel regressions investigating the allocation of cash flow to various uses from 1988 to 2019. The cash flow allocation is captured by the regression coefficients on *CF* in Equations (3) to (8) ($\alpha^{INV}, \alpha^{\Delta WC}, \alpha^{\Delta CASH}$, $\alpha^{\Delta D}$, $\alpha^{\Delta E}$ and α^{DIV}). Uses of cash flow include investment (*INV*), the change in working capital (*ΔWC*), the change in cash holdings (*ΔCASH*), net debt reduction (*ΔD*), net equity reduction (*ΔE*), and cash dividends (*Div*). The variables are defined in Appendix A. The control variables include the market-to-book ratio (*MB*); the natural log of the book value of assets (*Ln*(*Assets*)); the annual sales growth rate (*SalesG*); the net property, plant, and equipment-to-assets ratio (*PPE*/*Assets*); and the leverage ratio (*Leverage*). Firm and year fixed effects are included, and the standard errors are clustered at the firm level. Coefficients significant at the 10%, 5%, and 1% levels are indicated by *, **, and ***, respectively. The *t*-statistics are presented in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variables	INV_t	ΔWC_t	$\Delta Cash_t$	ΔD_t	ΔE_t	DIV_t
CF_t	0.269***	0.251***	0.190***	0.092***	0.190***	0.008***
	(50.3)	(65.3)	(37.6)	(19.8)	(28.5)	(20.8)
MB_{t-1}	0.019***	0.003***	0.002***	−0.007***	−0.018***	0.001***
	(31.1)	(9.5)	(4.7)	(−16.6)	(−27.4)	(21.2)
$SalesG_{t-1}$	0.016***	0.006***	−0.001	−0.010***	−0.010***	−0.001***
	(13.2)	(8.0)	(−1.1)	(−10.7)	(−7.3)	(−13.9)
$Ln(Assets)_{t-1}$	−0.014***	−0.007***	−0.012***	0.005***	0.027***	0.001***
	(−17.2)	(−14.1)	(−18.3)	(7.6)	(35.8)	(11.7)
$Leverage_{t-1}$	−0.113***	−0.020***	0.027***	0.168***	−0.054***	−0.009***
	(−31.3)	(−9.1)	(10.3)	(48.4)	(−17.3)	(−26.4)
$PPE/Assets_{t-1}$	0.024***	−0.009***	0.086***	−0.064***	−0.036***	−0.000
	(4.2)	(−2.8)	(20.9)	(−13.3)	(−7.7)	(−1.0)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	103,246	103,246	103,246	103,246	103,246	103,246
Adjusted R-squared	0.28	0.23	0.09	0.13	0.36	0.64

Table 3. Time trends of cash-flow allocations

This table reports the time trends in cash flow allocated to various uses detected using an Augmented Dickey–Fuller (ADF) model. The dependent variables are the changes in cash flow allocation coefficients ($\alpha^{INV}, \alpha^{\Delta WC}, \alpha^{\Delta CASH}$, $\alpha^{\Delta D}$, $\alpha^{\Delta E}$, and α^{DIV}) from year *t* to *t* + 1. The time trend variable (*trend*) is the fiscal year minus 1988. Panel A reports the estimates for the entire sample. Dependent variables in Panel B are the changes in cash flow allocation coefficients related to the components of investment (*INV*) from Equations (11) to (14) ($\alpha^{NCE}, \alpha^{ACQ}, \alpha^{OINV}$, α^{OILT}, and α^{OIST}). Dependent variables in Panel C are the changes in cash flow allocation coefficients related to the components of the change in working capital (ΔWC) from Equations (15) ($\alpha^{\Delta AR}, \alpha^{\Delta IV}, \alpha^{\Delta AP}$, and $\alpha^{\Delta OP}$). The dependent variables in Panel D are the changes in cash flow allocation coefficients related to equity reduction (*ER*), equity issuance (*EI*), debt reduction (*ER*), and debt issuance (*DI*) ($\alpha^{ER}, \alpha^{EI}, \alpha^{DR}$, and α^{DI}). MacKinnon approximate *p*-values for the ADF test of the unit root are reported in Panels A, B, C, and D. The *p*-values are based on the interpolated critical values from Fuller's (1996) table of values. The *t*-statistics are reported in parentheses. Statistical significance at the 1%, 5%, or 10% level is marked by ***, **, and *, respectively.

Panel A. The whole sample

Dependent variables	(1) $\Delta\alpha^{INV}$	(2) $\Delta\alpha^{\Delta WC}$	(3) $\Delta\alpha^{\Delta CASH}$	(4) $\Delta\alpha^{\Delta D}$	(5) $\Delta\alpha^{\Delta E}$	(6) $\Delta\alpha^{DIV}$
Trend	−0.001	−0.004**	0.0002	−0.001	0.008***	0.0001**
	(−1.47)	(−2.44)	(0.24)	(−1.68)	(3.91)	(2.09)
Lagged α	−1.028***	−0.564**	−0.369*	−0.875***	−0.967***	−0.187
	(−3.47)	(−2.58)	(−1.80)	(−3.58)	(−4.32)	(−1.54)
Lagged Δα	−0.118	−0.135	−0.367*	0.096	0.361*	−0.468**
	(−0.62)	(−0.72)	(−1.87)	(0.48)	(1.88)	(−2.63)
MacKinnon *p*-value in ADF test	0.043	0.291	0.703	0.031	0.003	0.814
Observations	30	30	30	30	30	30
Adjusted R-squared	0.543	0.252	0.284	0.339	0.362	0.263

Panel B. Allocation of cash flow to the three components of investment

Dependent variables	(1) $\Delta\alpha^{NCE}$	(2) $\Delta\alpha^{ACQ}$	(3) $\Delta\alpha^{OINV}$
Trend	−0.0003	0.0003	−0.001
	(−0.88)	(0.90)	(−1.28)
Lagged α	−0.641***	−1.234***	−0.891***
	(−3.18)	(−4.60)	(−3.50)
Lagged Δα	−0.264	0.266	0.037
	(−1.62)	(1.38)	(0.20)
MacKinnon *p*-value in ADF test	0.088	0.001	0.039
Observations	30	30	30
Adjusted R-squared	0.417	0.459	0.372

Panel C. Allocation to the components of change in working capital

Dependent variables	(1) $\Delta\alpha^{\Delta AR}$	(2) $\Delta\alpha^{\Delta IV}$	(3) $\Delta\alpha^{\Delta AP}$	(4) $\Delta\alpha^{\Delta OP}$
Trend	−0.004***	−0.002***	−0.001**	−0.0001
	(−3.11)	(−2.89)	(−2.41)	(−0.23)
Lagged α	−0.810***	−0.745***	−1.425***	−1.024***
	(−3.34)	(−3.03)	(−5.15)	(−3.65)
Lagged Δα	0.098	−0.089	0.354**	0.004
	(0.48)	(−0.46)	(2.41)	(0.0)
MacKinnon *p*-value in ADF test	0.061	0.123	0.000	0.026
Observations	30	30	30	30
Adjusted *R*-squared	0.279	0.345	0.517	0.467

Panel D. Allocation to the components of change in equity and debt issuance

Dependent variables	(1) $\Delta\alpha^{ER}$	(2) $\Delta\alpha^{EI}$	(3) $\Delta\alpha^{DR}$	(4) $\Delta\alpha^{DI}$
Trend	0.001***	0.007***	−0.001*	0.0003
	(2.91)	(3.66)	(−1.70)	(0.37)
Lagged α	−0.610***	−1.020***	−0.703***	−0.655***
	(−2.77)	(−4.31)	(−2.81)	(−2.70)
Lagged Δα	−0.134	0.316	−0.147	−0.190
	(−0.65)	(1.61)	(−0.77)	(−0.97)
MacKinnon *p*-value in ADF test	0.210	0.003	0.193	0.237
Observations	30	30	30	30
Adjusted *R*-squared	0.309	0.376	0.369	0.353

Table 4. Additional analyses

This table reports the estimated time trends in the allocations of cash flow for incumbents and new entrants (Panel A) and for firms in different industries (Panel B). The time trends are estimated using the Augmented Dickey–Fuller (ADF) model specified in Equation (11). The dependent variable in each column is ΔY_t and the independent variables include a time trend variable (*trend*), Y_{t-1} and ΔY_{t-1}. Y stands for coefficient estimates from Equations (3) to (8) ($\alpha^{INV}, \alpha^{\Delta WC}, \alpha^{\Delta CASH}, \alpha^{\Delta D}, \alpha^{\Delta E}$, and α^{DIV}). Uses of cash flow include investment (*INV*), the change in working capital (*ΔWC*), the change in cash holdings (*ΔCASH*), net debt reduction (*ΔD*), net equity reduction (*ΔE*), and cash dividends (*Div*). Statistical significance at the 1%, 5%, or 10% level is marked by ***, **, and *, respectively.

Panel A. The incumbents vs. new entrants

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variables	$\Delta\alpha^{INV}$	$\Delta\alpha^{\Delta WC}$	$\Delta\alpha^{\Delta CASH}$	$\Delta\alpha^{\Delta D}$	$\Delta\alpha^{\Delta E}$	$\Delta\alpha^{DIV}$
Incumbents: firms listed before 1980						
Trend	0.007**	−0.007***	−0.001	−0.004	0.005**	0.001***
	(2.39)	(−3.52)	(−0.29)	(−1.54)	(2.07)	(2.90)
Entrants: firms listed since 1980						
Trend	−0.002**	−0.004**	0.000	−0.001	0.008***	0.0001*
	(−2.62)	(−2.64)	(0.46)	(−1.55)	(4.38)	(1.85)

Panel B. Cross-industry analysis

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variables	$\Delta\alpha^{INV}$	$\Delta\,\alpha^{\Delta WC}$	$\Delta\,\alpha^{\Delta CASH}$	$\Delta\alpha^{\Delta D}$	$\Delta\alpha^{\Delta E}$	$\Delta\alpha^{DIV}$
Coefficients of *trend* in Fama and French's (1997) industries						
Consumer nondurables	0.006**	−0.012***	−0.000	−0.007***	0.002	0.001**
	(2.32)	(−4.76)	(−0.12)	(−2.81)	(0.54)	(2.72)
Consumer durables	−0.016***	−0.004	0.003	0.004	0.003	0.000
	(−3.29)	(−0.95)	(1.25)	(1.00)	(0.78)	(1.14)
Manufacturing	0.006	−0.006***	0.002	−0.006**	0.005*	0.001
	(1.46)	(−3.26)	(1.47)	(−2.29)	(1.80)	(1.54)
Energy	0.003	−0.001	0.004*	−0.007*	0.002	0.000
	(0.61)	(−0.23)	(1.76)	(−2.01)	(0.62)	(1.28)
Chemicals	0.002	−0.000	0.010***	−0.002	−0.006	0.000

	(0.36)	(−0.09)	(3.17)	(−0.45)	(−1.52)	(1.05)
Business equipment	−0.002	−0.005**	0.003**	0.001	0.006***	0.000
	(−1.53)	(−2.53)	(2.23)	(1.34)	(6.13)	(1.69)
Telecommunications	0.008**	−0.009**	0.007*	−0.004	−0.003	0.001*
	(2.14)	(−2.43)	(2.01)	(−0.99)	(−0.73)	(1.76)
Wholesale and retail	−0.002	−0.011**	0.003**	−0.003	0.011**	0.000**
	(−0.61)	(−2.52)	(2.17)	(−1.47)	(2.54)	(2.25)
Health	−0.005**	−0.004**	−0.002	0.002	0.013*	−0.000
	(−2.10)	(−2.12)	(−0.91)	(0.81)	(2.02)	(−1.67)
Others	−0.004**	−0.005***	0.000	−0.000	0.005*	0.000*
	(−2.10)	(−3.94)	(0.10)	(−0.15)	(1.91)	(1.95)

Internet Appendix

to

the Evolution of Corporate Uses of Cash Flow

Figure A1. The allocation of cash flow from 1967 to 2019 based on the methodology of Chen and Chen (2012)

This figure replicates Figure 2 of Chen and Chen (2012) and depicts by year the investment-cash flow sensitivity of our sample of nonfinancial U.S. firms in Compustat. That is, it plots the estimated coefficients on cash flow with respect to the annual regressions of investment on Tobin's q and cash flow. Following Chen and Chen (2012), we define investment as the firm's capital expenditure, deflated by its beginning-of-period net property, plant, and equipment (PPE); and cash flow as the firm's internal cash flow. This is defined as income before extraordinary items plus depreciation and amortization, also deflated by its beginning-of-period PPE. All variables are demeaned by the firm to remove the firm fixed effects.

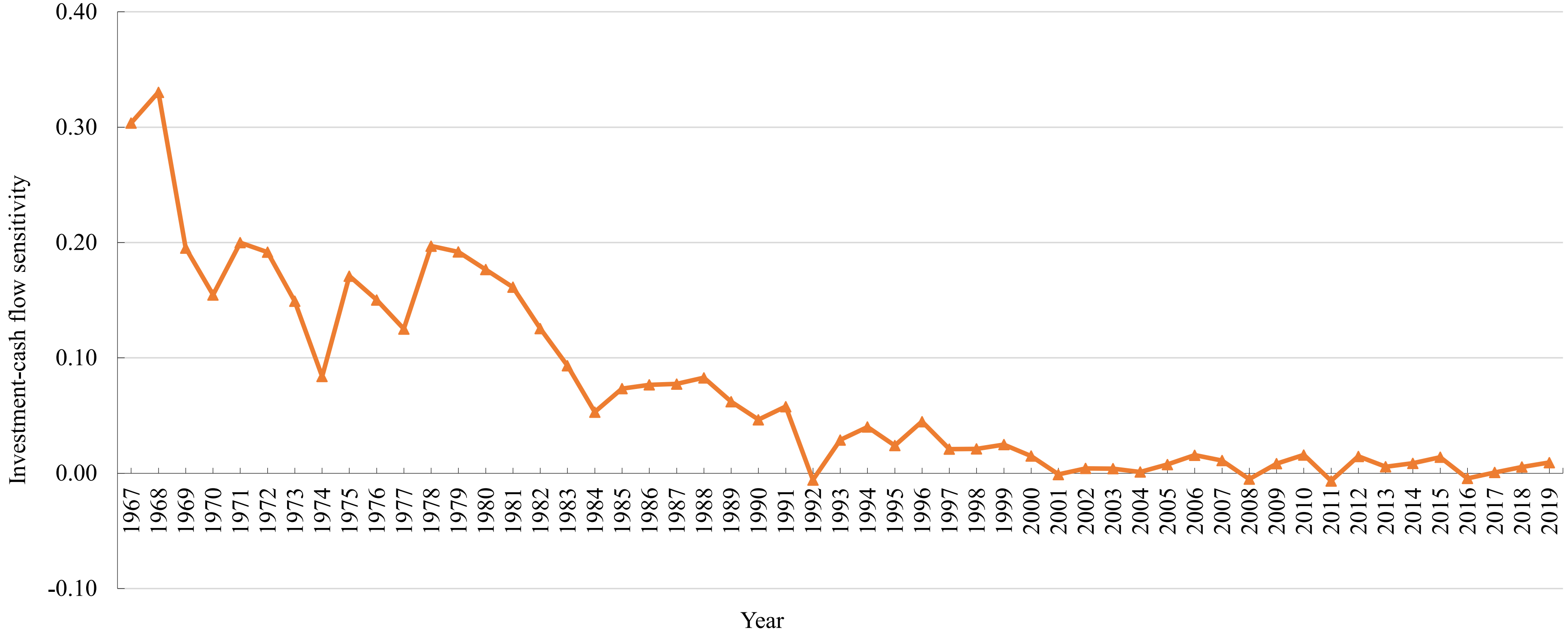


Figure A2. The allocation of cash flow: The cycle and trend components of cash flow

This figure depicts the allocation of the Beveridege-Nelson cash flow components of cash flow (*CF*) to the various uses of funds for nonfinancial U.S. firms in Compustat. To implement Beveridge and Nelson decomposition, we restrict the sample to firms having at least eight consecutive years of annual cash flows. The rates of allocation are based on the ordinary least squares regression coefficients on the *cycle* and *trend* components of cash flow as listed in Equations (3) to (8), that is, $\alpha^{INV}, \alpha^{\Delta CASH}, \alpha^{\Delta WC}, \alpha^{DIV}, \alpha^{\Delta D}$ and $\alpha^{\Delta E}$, respectively, estimated with eight consecutive panels: 1988 to 1991, 1992 to 1995, 1996 to 1999, 2000 to 2003, 2004 to 2007, 2008 to 2011, 2012 to 2015, and 2016 to 2019. Uses of funds include investment (*INV*), the change in cash holdings *(ΔCASH*), the change in working capital (*ΔWC*), cash dividends (*Div*), net debt reduction (*ΔD*), and net equity reduction (*ΔE*). The variables are normalized by lagged total assets, and their definitions are contained in Appendix A. Control variables are included in the regressions to account for various firm characteristics. They include the market-to-book ratio (*MB*), defined as (total assets + market value of equity – book value of equity)/total assets; the natural log of the book value of assets (*Ln*(*Assets*)); the annual sales growth rate (*SalesG*), which is the change in net sales scaled by lagged net sales; the net property, plant, and equipment-to-assets ratio (*PPE*/*Assets*); and the leverage ratio (*Leverage*), that is, total debt (sum of short-term and long-term debt) divided by total assets. As a robustness check, the lagged values of the uses of funds are included in the regressions as additional control variables.

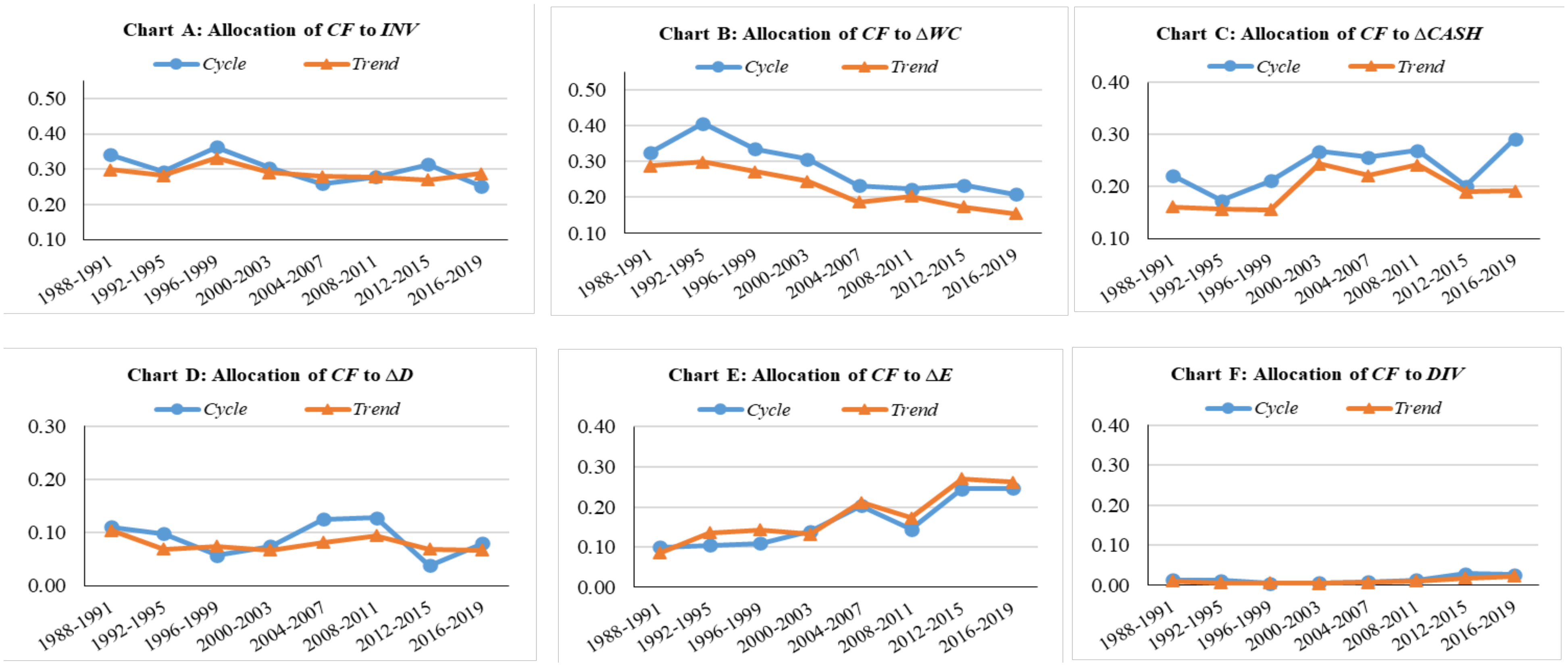


Chart A: Allocation of *CF* to *INV*
Cycle
Trend
0.50
0.40
0.30
0.20
0.10
1988-1991
1992-1995
1996-1999
2000-2003
2004-2007
2008-2011
2012-2015
2016-2019
Chart B: Allocation of *CF* to Δ*WC*
Cycle
Trend
0.50
0.40
0.30
0.20
0.10
1988-1991
1992-1995
1996-1999
2000-2003
2004-2007
2008-2011
2012-2015
2016-2019
Chart C: Allocation of *CF* to Δ*CASH*
Cycle
Trend
0.40
0.30
0.20
0.10
1988-1991
1992-1995
1996-1999
2000-2003
2004-2007
2008-2011
2012-2015
2016-2019
Chart D: Allocation of *CF* to Δ*D*
Cycle
Trend
0.30
0.20
0.10
0.00
1988-1991
1992-1995
1996-1999
2000-2003
2004-2007
2008-2011
2012-2015
2016-2019
Chart E: Allocation of *CF* to Δ*E*
Cycle
Trend
0.40
0.30
0.20
0.10
0.00
1988-1991
1992-1995
1996-1999
2000-2003
2004-2007
2008-2011
2012-2015
2016-2019
Chart F: Allocation of *CF* to *DIV*
Cycle
Trend
0.40
0.30
0.20
0.10
0.00
1988-1991
1992-1995
1996-1999
2000-2003
2004-2007
2008-2011
2012-2015
2016-2019

Figure A3. The allocation of cash flow: Impact of lagged cash flow variables

This figure depicts the allocation of cash flow (*CF*) to the various uses of funds for nonfinancial U.S. firms in Compustat. The rates of allocation are based on the ordinary least squares regression coefficients on CF as listed in Equations (3) to (8), that is, $\alpha^{INV}, \alpha^{\Delta CASH}, \alpha^{\Delta WC}, \alpha^{DIV}, \alpha^{\Delta D}$ and $\alpha^{\Delta E}$, respectively, estimated with eight consecutive panels: 1988 to 1991, 1992 to 1995, 1996 to 1999, 2000 to 2003, 2004 to 2007, 2008 to 2011, 2012 to 2015, and 2016 to 2019. As a robustness check, the lagged-one and lagged-two values of cash flow are included in the regressions as additional control variables. Uses of funds include investment (*INV*), the change in cash holdings *(ΔCASH*), the change in working capital (*ΔWC*), cash dividends (*Div*), net debt reduction (*ΔD*) and net equity reduction (*ΔE*). The variables are normalized by lagged total assets, and their definitions are contained in Appendix A. Control variables are included in the regressions to account for various firm characteristics. They include the market-to-book ratio (*MB*), defined as (total assets + market value of equity – book value of equity)/total assets; the natural log of the book value of assets (*Ln*(*Assets*)); the annual sales growth rate (*SalesG*), which is the change in net sales scaled by lagged net sales; the net property, plant, and equipment-to-assets ratio (*PPE*/*Assets*); and the leverage ratio (*Leverage*), that is, total debt (sum of short-term and long-term debt) divided by total assets.

Chart A: Allocation of *CF* to *INV*

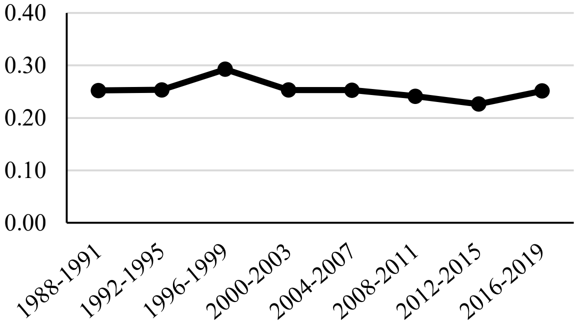


Chart B: Allocation of *CF* to Δ*WC*

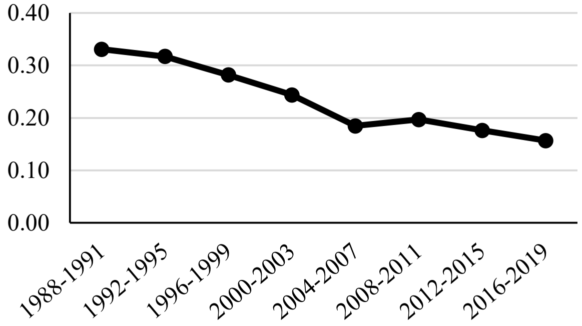


Chart C: Allocation of *CF* to Δ*CASH*

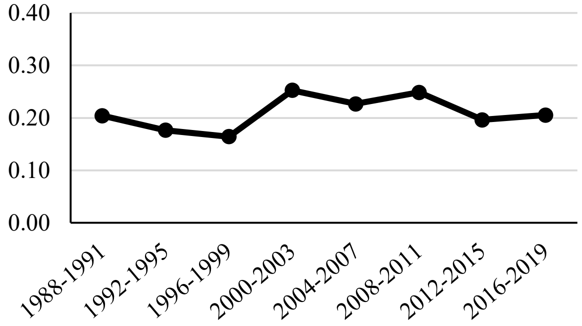


Chart D: Allocation of *CF* to Δ*D*

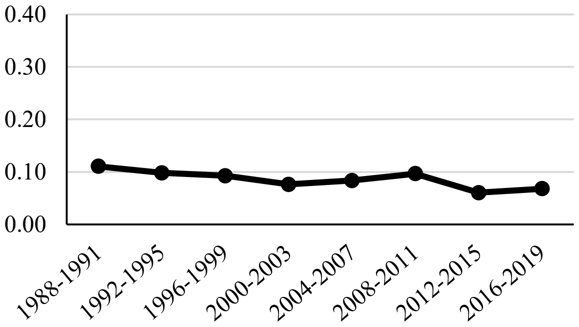


Chart E: Allocation of *CF* to Δ*E*

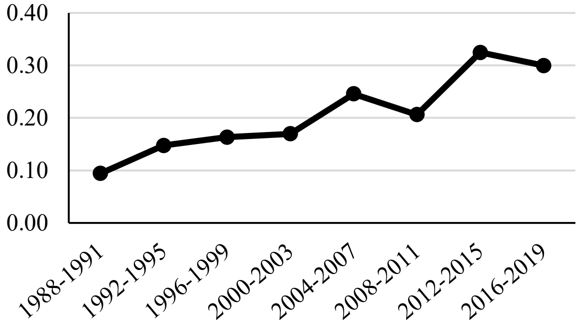


Chart F: Allocation of *CF* to *DIV*

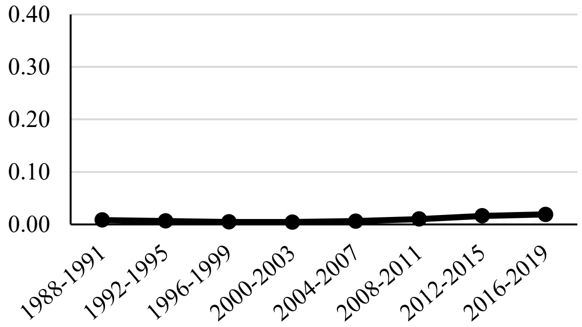


Figure A4. The allocation of cash flow: Alternative definition of cash flow

This figure depicts the allocation of an alternatively defined cash flow (*CF – ΔWC*) to the various uses of funds for nonfinancial U.S. firms in Compustat. The rates of allocation are based on the ordinary least squares regression coefficients on *CF – ΔWC* (*CF* minus the change in working capital *ΔWC*), estimated with eight consecutive panels: 1988 to 1991, 1992 to 1995, 1996 to 1999, 2000 to 2003, 2004 to 2007, 2008 to 2011, 2012 to 2015, and 2016 to 2019. Estimates of the allocation of cash flow to the various uses of funds are also included for comparison. Uses of funds include investment (*INV*), the change in cash holdings (*ΔCASH*), cash dividends (*Div*), net debt reduction (*ΔD*), and net equity reduction (*ΔE*). The variables are normalized by lagged total assets, and their definitions are contained in Appendix A. Control variables are included in the regressions to account for various firm characteristics. They include the market-to-book ratio (*MB*), defined as (total assets + market value of equity – book value of equity)/total assets; the natural log of the book value of assets (*Ln*(*Assets*)); the annual sales growth rate (*SalesG*), which is the change in net sales scaled by lagged net sales; the net property, plant, and equipment-to-assets ratio (*PPE*/*Assets*); and the leverage ratio (*Leverage*), that is, total debt (sum of short-term and long-term debt) divided by total assets.

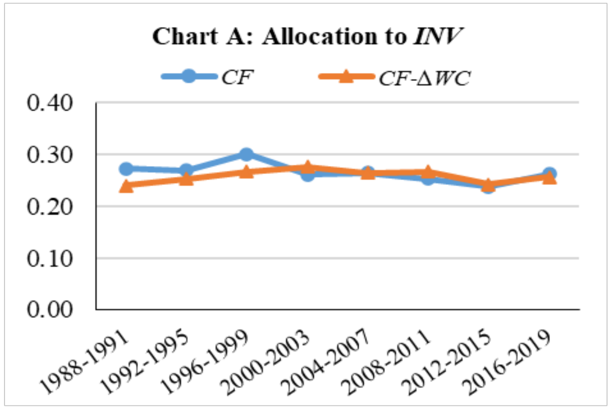


Chart A: Allocation to *INV*
CF
CF-ΔWC
0.40
0.30
0.20
0.10
0.00
1988-1991
1992-1995
1996-1999
2000-2003
2004-2007
2008-2011
2012-2015
2016-2019

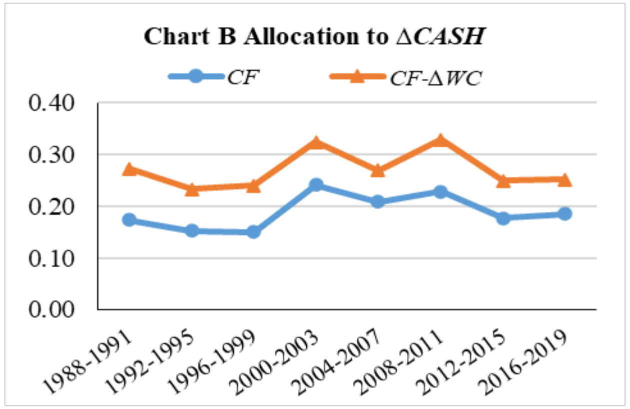


Chart B Allocation to Δ*CASH*
CF
CF-ΔWC
0.40
0.30
0.20
0.10
0.00
1988-1991
1992-1995
1996-1999
2000-2003
2004-2007
2008-2011
2012-2015
2016-2019

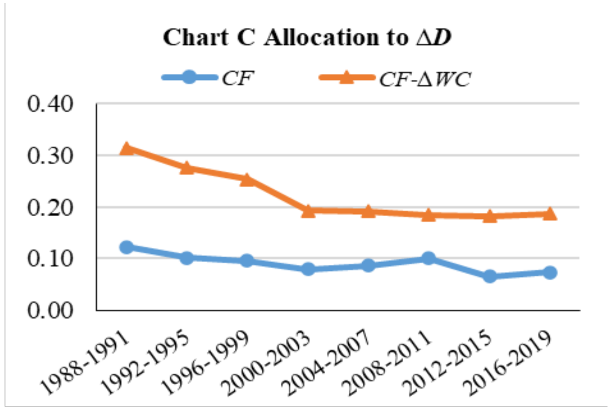


Chart C Allocation to Δ*D*
CF
CF-ΔWC
0.40
0.30
0.20
0.10
0.00
1988-1991
1992-1995
1996-1999
2000-2003
2004-2007
2008-2011
2012-2015
2016-2019

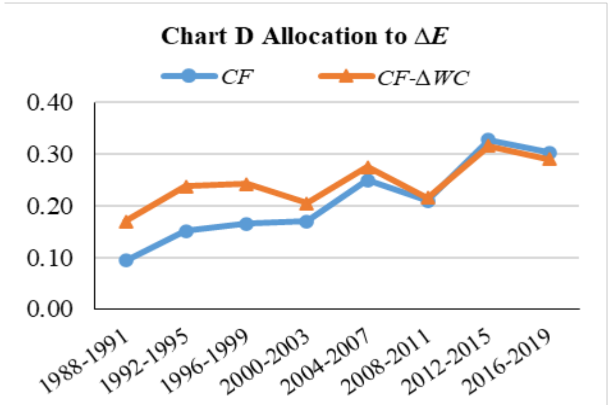


Chart D Allocation to Δ*E*
CF
CF-ΔWC
0.40
0.30
0.20
0.10
0.00
1988-1991
1992-1995
1996-1999
2000-2003
2004-2007
2008-2011
2012-2015
2016-2019

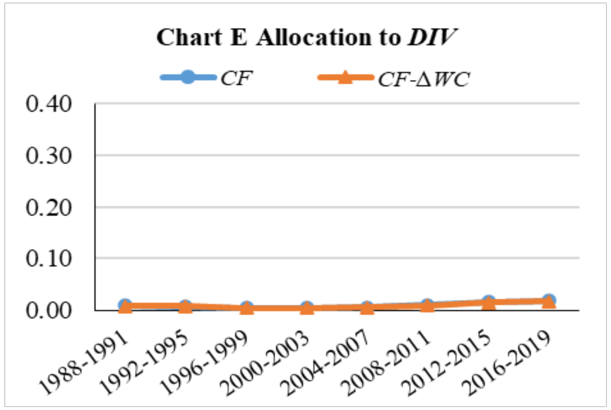


Chart E Allocation to *DIV*
CF
CF-ΔWC
0.40
0.30
0.20
0.10
0.00
1988-1991
1992-1995
1996-1999
2000-2003
2004-2007
2008-2011
2012-2015
2016-2019

Figure A5. The allocation of cash flow: R&D as a component of investment

This figure depicts the allocation of adjusted cash flow (*CF_ADJ*) to the various uses of funds, including R&D, for nonfinancial U.S. firms in Compustat. The rates of allocation are based on the ordinary least squares regression coefficients on *CF_ADJ* (*CF* plus R&D expenses), estimated with eight consecutive panels: 1988 to 1991, 1992 to 1995, 1996 to 1999, 2000 to 2003, 2004 to 2007, 2008 to 2011, 2012 to 2015, and 2016 to 2019. Uses of funds include investment (*INV*), the change in working capital (*ΔWC*), R&D expenses (*R&D*), the change in cash holdings *(ΔCASH*), net debt reduction (*ΔD*), and net equity reduction (*ΔE*). The variables are normalized by lagged total assets, and their definitions are presented in Appendix A. Control variables are included in the regressions to account for various firm characteristics. They include the market-to-book ratio (*MB*), defined as (total assets + market value of equity – book value of equity)/total assets; the natural log of the book value of assets (*Ln*(*Assets*)); the annual sales growth rate (*SalesG*), which is the change in net sales scaled by lagged net sales; the net property, plant, and equipment-to-assets ratio (*PPE*/*Assets*); and the leverage ratio (*Leverage*), that is, total debt (sum of short-term and long-term debt) divided by total assets.

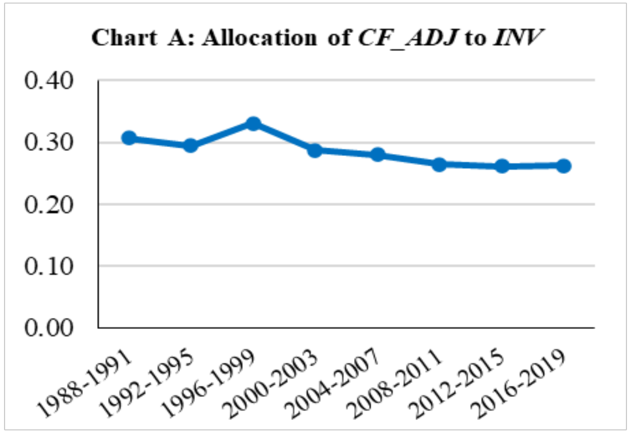


Chart A: Allocation of CF_ADJ to INV
0.40
0.30
0.20
0.10
0.00
1988-1991
1992-1995
1996-1999
2000-2003
2004-2007
2008-2011
2012-2015
2016-2019

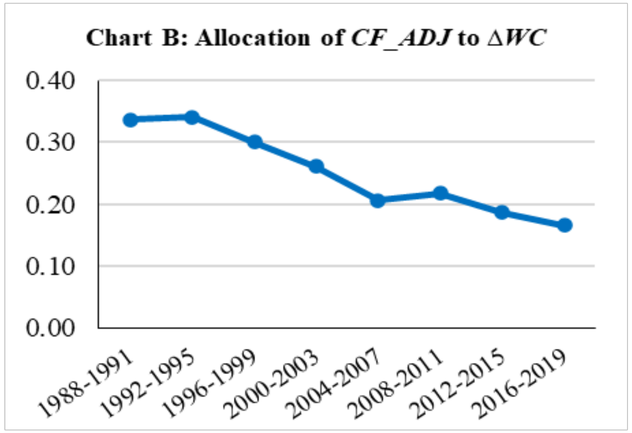


Chart B: Allocation of CF_ADJ to ΔWC
0.40
0.30
0.20
0.10
0.00
1988-1991
1992-1995
1996-1999
2000-2003
2004-2007
2008-2011
2012-2015
2016-2019

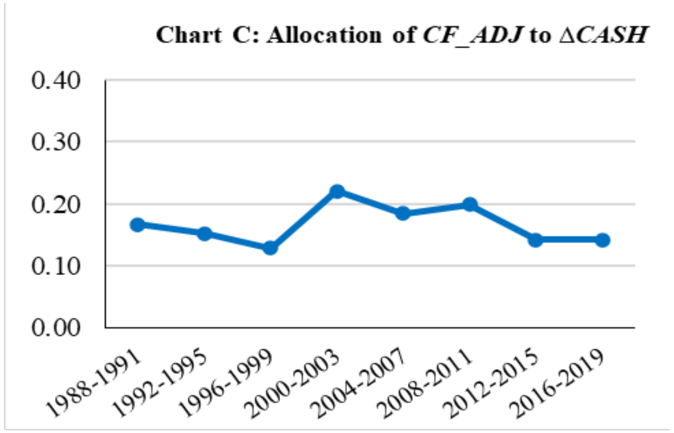


Chart C: Allocation of CF_ADJ to ΔCASH
0.40
0.30
0.20
0.10
0.00
1988-1991
1992-1995
1996-1999
2000-2003
2004-2007
2008-2011
2012-2015
2016-2019

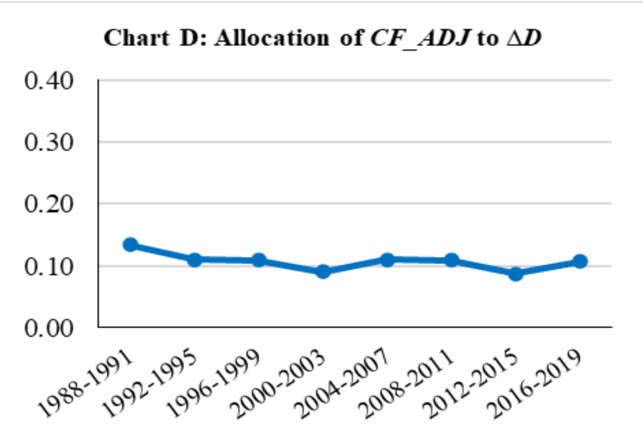


Chart D: Allocation of CF_ADJ to ΔD
0.40
0.30
0.20
0.10
0.00
1988-1991
1992-1995
1996-1999
2000-2003
2004-2007
2008-2011
2012-2015
2016-2019

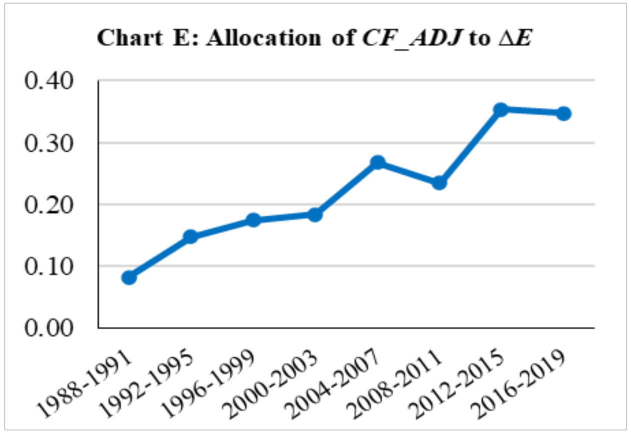


Chart E: Allocation of CF_ADJ to ΔE
0.40
0.30
0.20
0.10
0.00
1988-1991
1992-1995
1996-1999
2000-2003
2004-2007
2008-2011
2012-2015
2016-2019

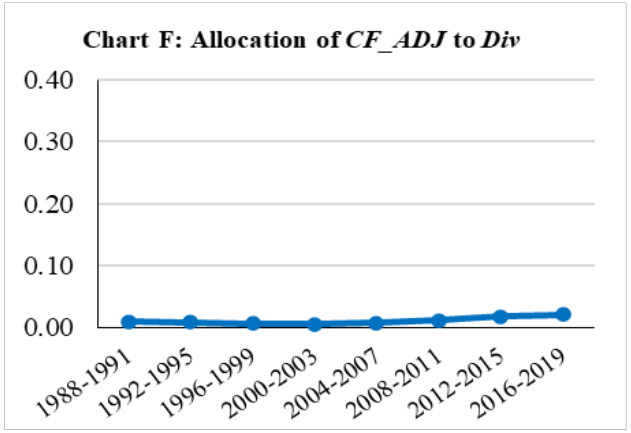


Chart F: Allocation of CF_ADJ to Div
0.40
0.30
0.20
0.10
0.00
1988-1991
1992-1995
1996-1999
2000-2003
2004-2007
2008-2011
2012-2015
2016-2019

Table A1. Time trends of cash flow allocation: Alternative definition of cash flow

This table reports the Augmented Dickey-Fuller (ADF) test results for cash flow (*CF-ΔWC)* allocation to the various uses of funds. The dependent variables are $\Delta Y_{[t,t+1]}$, the independent variables are a time trend variable (*Trend*), Y_{t-1}, and $\Delta Y_{[t-1,t]}$, *Y* are estimates from Equations (3) to (8) ($\alpha^{INV}, \alpha^{\Delta WC}, \alpha^{\Delta CASH}$, $\alpha^{\Delta D}$, $\alpha^{\Delta E}$ and α^{DIV}). Uses of cash flow include investment (*INV*), the change in cash holdings (*ΔCASH*), net debt reduction (*ΔD*), net equity reduction (*ΔE*), and cash dividends (*Div*). Panel A reports the testing results for the estimates of the allocation of cash flow (*CF*). The ADF test for unit root test statistics is reported in each panel, and MacKinnon approximate *p*-values are based on the interpolated critical values from the table of values in Fuller (1996). The *t*-statistics are reported in parentheses. Statistical significance at the 1%, 5%, or 10% level is marked by ***, **, and *, respectively.

	(1)	(2)	(3)	(4)	(5)
Dependent variables	$\Delta\alpha^{INV}$	$\Delta\,\alpha^{\Delta CASH}$	$\Delta\alpha^{\Delta D}$	$\Delta\alpha^{\Delta E}$	$\Delta\alpha^{DIV}$
Trend	0.0002	0.0001	−0.002	0.003**	0.0001
	(0.34)	(0.15)	(−1.48)	(2.08)	(1.70)
Lagged α	−1.056***	−0.435**	−0.477**	−0.847***	−0.174
	(−3.57)	(−2.23)	(−2.53)	(−3.69)	(−1.38)
Lagged Δα	0.039	−0.108	−0.116	0.111	−0.293
	(0.20)	(−0.43)	(−0.56)	(0.68)	(−1.46)
ADF test statistics	−3.57	−2.23	−2.53	−3.69	−1.38
MacKinnon approximate *p*-value	0.033	0.470	0.312	0.023	0.866
Observations	30	30	30	30	30
Adjusted *R*-squared	0.443	0.163	0.261	0.332	0.126