The Savings of Corporate Giants*

Olivier Darmouni
Columbia Business School

Lira Mota
MIT

March 15, 2023

Abstract

We construct a novel panel dataset to provide new evidence on how the largest non-financial firms manage their financial assets. Our granular data shows that, over the past decade, bond portfolios have grown to be at least as large as cash-like instruments, driven by the meteoric rise of corporate bond holdings. To shed light on the drivers of this growth, we conduct a pair of event studies around the 2017 tax reform and the 2020 liquidity crisis. Large holdings of marketable securities are primarily driven by cross-border tax incentives, while cash-like instruments are driven by liquidity motives.

Keywords: superstar firms, corporate cash, corporate bonds, repatriation tax, liquidity management
JEL codes: G32, G35, G11, E440

*Contact: Olivier Darmouni omd2109@columbia.edu; Lira Mota liramota@mit.edu. The hand-collected data used in this paper can be found at `www.fanfrepo.com`. For helpful comments, we would like to thank Simcha Barkai, Juliane Begenau, Charles Calomiris, Murillo Campello, Nicolas Crouzet, Xavier Giroud, Deborah Lucas, Wei Jiang, Narayana Kocherlakota, Harry Mamaysky, Tano Santos, Martin Schmalz, Jesse Schreger, Amir Sufi, Paul Tetlock, Neng Wang, Toni Whited, and Kairong Xiao. Ella Epstein, Clement Herman, Thibault Kopp, Johannes Magdowski, Jason McGourty, Maria Velicu, and Yi Yao provided excellent research assistance.

1 Introduction

The world economy is increasingly shaped by firms at the top of the size distribution. The scale and the global nature of their activities have led many observers to question whether they operate like other firms and to examine implications for labor and product markets.[1] In this paper, we ask: how do these large nonfinancial corporations manage their financial arm? What does it reveal about their operations?

There is a tension in answering these questions. A common view is that firms hold cash because of financial constraints: Because capital markets can shut down, cash provides self-insurance against cash-flow shocks or the arrival of new investment opportunities. This logic would thus suggests that a large profitable firm like Apple, which maintains a pristine credit rating, should not hold much cash or other financial assets. However, the largest firms happen to hold staggering amount of financial assets, representing a large share of aggregate holdings. In fact, Apple leads the pack with $260 billions in 2017, which is more than PNC and Bancorp combined, the 6th and 7th largest banks in the U.S. Why then do these large firms hold so much financial assets?

This paper sheds new light on this question by providing new data and new facts. In particular, our main contribution is to construct a novel panel data set on the *composition* of corporate financial assets and their *dynamics* over the past twenty years. The panel nature of our data enables us to uncover two sets of facts. First, we unveil the true nature of trends in financial assets accumulation ("the corporate savings glut"), and in particular the meteoric rise of corporate bond holdings issued by other firms, not cash.[2] Second, we shed light on the underlying mechanism behind these trends by conducting two event studies around the

[1] A growing body of literature in economics examine the role of "superstar firms" or "mega-firms" in many important areas, including business cycles (Gabaix, 2011; Crouzet et al., 2017), market power (De Loecker et al., 2020; Liu et al., 2019), investment (Gutiérrez and Philippon, 2017), inequality (Song et al., 2019; Gomez and Gouin-Bonenfant, 2020), growth (Aghion et al., 2019), and labor and capital shares (Autor et al., 2020; Hartman-Glaser et al., 2019).

[2] Note that the terminology "savings" has been used to denote a flow measure (Chen et al., 2017), but also occasionally the stock of savings accumulated through cash or other financial assets. Our data is on the later, and the paper uses the terminology of "financial assets" to avoid any ambiguity.

2017 tax reform and the liquidity crisis following the 2020 COVID-19 outbreak. This evidence can inform the debate on the driver of the "cash" of corporate giants: holdings of marketable securities like corporate bonds are large and primarily driven by cross-border tax incentives. Cash-like instruments, driven by liquidity motives, are smaller. Our hand-collected data are publicly available at `www.fanfrepo.com`.

Our panel is constructed by manually collecting data from annual reports, following the approach of Duchin et al. (2017). Conceptually, we want our measure of financial assets to include both cash-like instruments as well as marketable securities held by a firm. Conventional data sources, such as Compustat, do not accurately separate cash from marketable securities. In the case of Compustat, the share of financial assets reported in non-current assets is not recorded at all. The footnotes of annual reports (10-K), however, include details on the firms' holdings of major asset classes, ranging from cash and money market funds to various types of bonds and equities. We build a sample of large U.S. public firms' holdings by collecting these data from 2000 to 2021 for two hundred firms, covering a variety of sectors and time periods.

Our first key finding is that marketable securities are responsible for the majority of the growth in aggregate financial assets, which peaked in 2017, not cash. Since 2007, total financial assets have grown by $1 trillion in our sample. Cash-like instruments grew by only $350 billion, or only a third of total growth.[3] In fact, in recent years bond portfolios are at least as large as cash balances. Figure 1 shows the composition of financial assets in 2017. Corporate bonds represent 45% of financial assets in 2017, while cash-like instruments account for 43%, a ten percentage point decrease since 2000. In particular, we document the meteoric rise of corporate bonds in the aggregate portfolio. They have outgrown U.S. Treasuries and agency securities whose share has been stable since 2012 at 22%.

To better understand the drivers of this growth, we present two recent event studies.

[3]In our baseline classification, we define cash-like instruments as the sum of cash, money market funds, deposits, and commercial paper, when reported. When no detailed breakdown is reported, we conservatively label all "cash and cash equivalents" as cash-like.

First, we document a sharp reversal and portfolio shift following the 2017 repatriation tax reform. Recent works have argued that tax incentives drive the growth in "cash" holdings: multinationals shift earnings abroad and hold them in financial assets instead of distributing them to avoid paying U.S. taxes[4]. The Tax Cuts and Jobs Act aimed to reduce tax incentives for keeping "cash" abroad starting in 2018. Between 2017 and 2019, total financial assets dropped by $400 billion: a third of the previous ten years' growth disappeared in just two years. Moreover, we observe a drastic portfolio shift post-reform: firms liquidated bond portfolios, especially corporate bonds, rather than cash balances. About three-quarters of this drop was redistributed to shareholders in the form of increased share repurchases and have thus left corporate balance sheets.

Finally, we examine firms' responses to the liquidity crisis triggered by the outbreak of COVID-19 in early 2020. The prospect of declining revenues lead to a "corporate dash for cash" to build precautionary liquidity buffers. Observing firms' active management of their financial portfolio in this period is particularly interesting because it reveals which assets are deemed most appropriate for liquidity management. Our micro-data show a dramatic shift toward cash-like instruments. We observe however no increase in corporate bond holdings, in line with their becoming extremely illiquid in this period (Haddad et al., 2020; Kargar et al., 2020).

This evidence can help shed light on the debate on whether the "cash" of corporate giants is driven by cross-border tax incentives or liquidity motives. By observing *changes* in portfolio *composition*, the panel structure of our data uncovers that different financial assets play different roles, with different economic magnitudes. Holdings of marketable securities are large and primarily driven by cross-border tax incentives. Cash-like instruments, driven by liquidity motives, have grown at a slower rate until the 2020 crisis. More generally, our data can help better understand the role of these firms for corporate finance and macroeconomics.

[4]See for instance Foley et al. (2007); Faulkender et al. (2019); De Simone et al. (2019); Harford et al. (2017).

Related Literature Our paper relates to the behavior of the largest corporations, sometimes referred as "superstar firms" or "mega-firms." We focus on their financial arms and show that these firms are key players not only in labor and product markets but also in financial markets. Our data help to paint a granular picture of the corporate savings glut by focusing on the largest firms, an approach that is gaining ground in macroeconomics. Li (2019) provides a theory of the macroeconomic causes and consequences of the enormous amount of liquid assets held by intangible-intensive firms. Some of our results relate to Begenau and Palazzo (2021) that study the role of selection effects behind aggregate cash increase and highlight the role of R&D-intensive firms. Chen et al. (2017) document that the rise of corporate savings is a global and pervasive phenomenon, while we focus on the very largest U.S. firms and the composition of their financial assets. The composition of corporate financial assets also has implications for the macroeconomic consequences of inequality. Mian et al. (2020) provide evidence of a "saving glut of the rich" working mostly through financial asset accumulation, including equity holdings of businesses which in turn hold claims on the non-corporate sector. Moreover, multinational taxation has become a central issue for policy-makers worldwide and our new data on the financial side of corporate balance sheets can help complement existing work on income and profits.[5]

Our data represent the first large panel data set of its kind that is made widely available. Our approach to data collection builds on Duchin et al. (2017). We extend their approach to obtain a panel that spans from 2000 to 2021, allowing to study both the aggregate growth as well as the latest reversal. We contribute to a growing literature on firms' financial assets holdings (Chen and Duchin, 2019; Ferreira, 2021; Huang and Sacchetto, 2022). This paper also relates to the classical literature on corporate cash holdings. While a large body of work has documented the rise in cash holdings, there is still considerable debate concerning its drivers, including liquidity motives and financial frictions, intangibles, skilled labor, interest

[5]For instance, while Garcia-Bernardo et al. (2020) find that the TCJA did not alter the location of firms' profits, we show that it lead firms to liquidate bond portfolios to increase shareholders' payouts. Other works on mutlinational taxation and mutlinationals include Erel et al. (2020); Garcia-Bernardo and Janskỳ (2022); Fernandes and Gonenc (2016); Beyer et al. (2021); Albertus et al. (2022); Borochin et al. (2021); Olson (2019).

rates, and taxes.[6] We argue that the *composition* of financial assets portfolios and their *dynamics* can help shed light on the motives behind these trends. For instance, Duchin et al. (2017) emphasize that risky assets are held by poorly governed firms and are discounted by the stock market relative to safe assets. On the other hand, other papers have argued that timing tax holidays can generate value for multinational firms.[7] Empirically, we estimate a large sensitivity of marketable securities holdings to the 2017 tax reform.

2 Data Construction

Understanding the composition of firms' financial assets using conventional data sources such as Compustat is difficult. These data are based on common balance sheet items such as "cash and cash equivalents" and "short-term investments." There are two related issues: (i) firms' holdings of financial assets are sometimes hidden in more opaque sections of the balance sheet such as "other assets"; and (ii) balance sheet data do not accurately separate cash from marketable securities and do not break down firms' holdings by asset classes. For instance, Almeida et al. (2014) discusses the case of Apple in 2011 to show that Compustat "cash" underestimates the size of the firm's actual financial assets. Detailed micro-data are important to understand how large nonfinancial corporations manage their financial arms.

To this end, we build a panel by manually collecting data from annual reports. The footnotes of annual reports (10-K) include details on the firms' holdings of major asset classes. Regulations have required that companies disclose their financial assets since 2009, this change was first exploited by Duchin et al. (2017). Statement of Financial Accounting Standards No 157 requires all U.S. public firms to report the "fair value" of financial instruments on their balance sheet. We can thus observe the outstanding amounts of different types of financial

[6]See for instance Bates et al. (2009); Graham and Leary (2018); Chen et al. (2017); Eisfeldt (2017); Almeida et al. (2004); Denis and Sibilkov (2010); Harris and Raviv (2017); Cunha and Pollet (2015); Eisfeldt and Muir (2016); Bolton et al. (2011); Falato et al. (2022); Döttling et al. (2018); Azar et al. (2016); Gao et al. (2018); Foley et al. (2007); Pinkowitz et al. (2016); Faulkender et al. (2019); De Simone et al. (2019).

[7]See for example Faulkender et al. (2019) or Albertus et al. (2022) among many others. Note also that Duchin et al. (2017) explicitly discuss tax effects on financial assets composition in their Appendix C.

assets held by firms over time. Although the exact labeling of asset classes varies across firms and time, we can often directly see a rather detailed breakdown, ranging from cash and money market funds to various type of bonds and equities.

Figure 2 illustrates an example of such a Financial Instrument table for Apple in 2017. The "Fair Value" columns captures the best estimates of the market value of positions for different types of financial assets. In this example, the categories are easy to parse, including "cash," "money market funds," "U.S. Treasuries," and "Corporate securities." We see that Apple holds a large amount of financial assets, as much as $268 billion, across many different types of assets. This amount is much larger than the $75 billion of "cash and short-term investments" reported on its balance and recorded in Compustat.

For clarity of exposition, it is often convenient to try to distinguish cash-like instruments from marketable securities, although the line is admittedly not easy to draw. In our baseline classification, we define cash-like instruments as the sum of cash, money market funds, deposits, and commercial paper, if this information is reported; and "cash and cash equivalents" otherwise. To keep the exposition simple, we label the rest of financial assets as "marketable securities."[8] According to this classification, Apple's cash-like instruments amount to $24 billion, or less than 10% of its total financial assets. In any case, we always keep track of each component separately.

While this micro-data gives unprecedented insight into firms' financial assets portfolios, there are some limitations. Specifically, only the disclosure of outstanding values are mandated and thus reported systematically. There is virtually no security-level data such as risk, maturity or yield that are reported consistently.[9] We also collect data preceding the 2009 reform and, although many firms voluntarily disclose information on their financial assets, the

[8]Because our focus is not on risk-taking per se, this classification is slightly different from Duchin et al. (2017): our "cash-like instruments" do not include U.S. government securities, whereas their "safe assets" include them. We do not think that represents any contradiction, as Treasuries are safe marketable securities that represent an interesting middle ground between money market instruments and corporate bonds or equities, and are potentially used differently by different firms.

[9]Since 2009, firms must disclose the share of Level 1, Level 2, and Level 3 assets. However, this classification is based on the existence of a market price, rather than the underlying risk or return.

data are significantly less detailed in these earlier years.

Our sample is based on data collected for from 2000 to 2021 for two hundred large firms.[10] To mitigate composition bias, we select the hundred largest firms in Compustat in terms of total assets in 2017, 2009, and 2000. The union gives us 166 firms. We complete the list by adding an extra 44 firms with the largest total assets in 2017 that were not covered previously. We only consider firms that are publicly traded in one of the three main U.S. stock exchanges (NYSE, Nasdaq, and Amex). Table A.4 in the Internet Appendix lists all the firms in our sample. We exclude regulated utilities (Standard Industrial Classification codes 4900–4999), financial firms (6000–6999), and firms categorized as public service, international affairs, or non-operating establishments (9000+). Following Duchin et al. (2017), we do not consider restricted assets, pension assets, deferred executive compensation, and derivatives as part of our baseline measure of financial assets. In recent years, firms in our sample capture around 66% of aggregate "cash and short-term investments" in the Compustat universe. In earlier years, this share is smaller, from 60% in 2010 to 53% in 2002. Note finally that the vast majority of our sample consist of multinationals, in the sense that they report non-trivial foreign earnings.

Our data provide information beyond the CH and CHE aggregate of Compustat in 67% of the firm-year observations. In the years after 2009, after the disclosure requirements changed, 73% of firm-year observations contain some information about the composition of the financial portfolio of firms, compared to 61% before 2009. When we cannot find information beyond the aggregate, we report total cash and cash equivalents as cash-like and the total cash, cash equivalents, and marketable securities as total financial assets. Information on the breakdown of cash and cash equivalents is only available for 30% of firm-year observations.[11]

All of the hand-collected data are publicly available in the following repository: `www.`

[10] To zoom in the Covif-19 crises, for the year 2020 we collected quarterly data.

[11] Due to the likely selection of firms that actually report the break down of cash-like instruments, we avoid drawing conclusions about the cash-like portfolio composition of firms. In the cases in which there is no breakdown for this category, we conservatively assign the cash and cash equivalents as cash-like instruments. Our measure of cash-like instrument thus track the Compustat variable CH closely for most firms.

fanfrepo.com.

3 The Growth in Financial Assets of Corporate Giants

3.1 Large Aggregate Growth until 2017

Figure 3 displays the growth in financial assets in our sample. The fast growth is in line with existing evidence on aggregate "cash" holdings and the rise in corporate savings (Chen et al., 2017). Aggregate financial assets stand at $1.6T in 2017, compared to $1.1T in 2012 and $630B in 2004. (There is a noticeable reversal in 2018 following the tax reform. We explore this issue in detail in Section 4.1.) The growth is even larger than what conventional databases would suggest, as financial assets are consistently larger than "cash and short-term investment" as reported in Compustat ("CHE" variable). In 2012, CHE accounted for only 83% of financial assets, a ratio that drops to 79% in 2015.

On a similar note, the first striking finding is that marketable securities are responsible for the majority of the growth in aggregate financial assets. Since 2007, total financial assets have grown by $1T in our sample. Cash-like instruments grew by $340B, or only a third of total growth. Moreover, Panel (b) of Figure 3 shows that financial asset growth has been faster than firm growth: the aggregate financial assets to assets ratio has risen from 12% in 2004 to 17% in 2017.[12] Figure A.1 in the Internet Appendix illustrates this pattern for four of the largest holders of financial assets: Apple, Microsoft, Alphabet, and Amgen. In all cases, it is clear that the growth in cash-like instruments has been strikingly small compared to the explosive growth in marketable securities.

A last important observation is that this aggregate growth is largely driven by a composition effect, namely the rise of "Tech" and "Pharma" (broadly defined, see Table A.4 for a list) as dominating sectors in the past fifteen years. Indeed, Figure 4 shows that firms in these

[12]The growth over the past two decades is also apparent when scaling by other measures of firm size to better account for market valuations.

sectors always had a significantly larger ratio of financial assets over assets relative to other sectors. The magnitude of these differences is strikingly large: "Tech" and "Pharma" financial assets consistently represented over 20% and 30% of their book assets, respectively, whereas this ratio is below 10% for other sectors. Moreover, firms in these sectors have been growing at a significantly higher rate than the rest of the economy. Therefore, most of the aggregate growth comes from firms with more financial assets growing faster, as opposed to firms accumulating increasingly more financial assets relative to their size.[13] This composition effect is related to some of the evidence of Begenau and Palazzo (2021) and Gu (2017). Interestingly, these sectors are also the ones that have the largest physical "investment gap" (Crouzet and Eberly, 2020), suggesting a potential connection between real and financial investment decisions.

3.2 The Rise of (Corporate) Bonds

Our micro-data allow us to delve deeper into the composition of financial assets. Strikingly, in recent years, bond portfolios are at least as large as cash balances. Table 1 shows that when U.S. government debt and corporate bonds are added, they represent together 45% of financial assets in 2017, whereas cash-like instruments account for 43%. In 2012, the proportions were inverted, with 33% in bonds versus 50% in cash-like instruments. The share of cash-like instruments to financial assets has fallen ten percentage points between 2000 and 2017.

Moreover, we document the meteoric rise of corporate bonds in the aggregate portfolio. Corporate bond holdings have tripled in value between 2012 and 2017 to reach $400 billion. They constitute almost 25% of aggregate financial assets, which makes them the single largest asset class, according to our classification. In particular, they have outgrown U.S. Treasuries and agencies whose share has been stable since 2012 at 21%.

Interestingly, our data paints a very different from what is reported in the U.S. Financial Accounts (previously named Flow of Funds). A key difference is that our consolidated firm-

[13] A similar pattern holds if one uses enterprise value as a proxy for size instead of book assets to better account for market values.

level data captures the full holdings of financial assets of large multinational corporations, while the Financial Accounts typically exclude foreign affiliates and only reports holdings of domestic entities. For example, the 2017Q4 Financial Accounts Table L.102 vastly underestimates firms' holdings of bonds relative to the figures in Table 1. Total debt securities (excluding commercial paper) are as low as $113B, broken down between being Treasuries, Agencies or MBS. Corporate bonds are not listed at all. In our sample, Treasuries amounted to $350B and corporate bonds to $396B alone at this point in time. Moreover, the Financial Accounts do not display the same dramatic growth in debt securities over our sample period. These differences in both levels and trends in financial assets accumulation are consistent with the evidence that the majority of financial assets are held by foreign subsidiaries and thus excluded from the U.S. Financial Accounts, in line with Faulkender et al. (2019).[14]

This is surprising, as these bonds are issued by other corporations. This implies that nonfinancial firms significantly contribute to the credit supply. In contrast, the textbook view assumes that firms only demand credit through borrowing. However, Apple was a *net lender* to the corporate sector during our sample period due to its massive holdings of corporate bonds and low debt levels. Until very recently, Apple had been lending as much as $60 billion in net, while Alphabet has become the largest net lender at about $20 billion.[15]

Finally, somewhat unsurprisingly, there is a large amount of concentration in financial assets holdings. Figure A.3 in the Internet Appendix plots the aggregate share of the ten, twenty and thirty largest firms over time. For reference, Table A.1 presents the twenty largest holders of financial assets as of 2017, which is very similar to the ranking in Duchin et al. (2017) who used data from earlier years. It is clear that the firms at the top hold a disproportionate fraction of the total and that they are responsible for almost all of the aggregate growth. For instance, in 2017, the top ten firms held over half of the total, and the top twenty held 76%.

[14]The comparison of Figures 1 and 2 in Faulkender et al. (2019) is consistent with this interpretation. Data that explicitly accounts for foreign affiliates estimate financial assets that are significantly larger than what is reported in the Financial Accounts ($3.5T vs $2.5T in 2008 for example).

[15]Our definition of net lending is based on stocks of financial assets and financial debt. The amount of net lending by corporate sector is larger if one uses a definition based on flows (Chen et al., 2017).

The concentration is even more pronounced when looking at marketable securities separately from cash-like instruments. For instance, in 2017, the top ten firms held over 70% of the aggregate, and Apple on its own held 40% of total corporate bonds positions in 2017.

3.3 Potential Channels

What are the potential economic forces behind the accumulation of financial assets by corporate giants? There are two main (non-exclusive) explanations emphasized in existing works, with some outstanding debate about their relative importance.

The first is related to liquidity motives. Because capital markets are imperfect, firms have incentives to hoard liquid assets to self-insure against future shocks, such as negative cash-flow shocks or the arrival of an investment opportunity. This explanation would suggest that, *ceteris paribus*, firms with the most difficulty in accessing capital markets would hold more financial assets. A complementary argument is that firms with high intangible capital might find it harder to raise external financing, as these assets are poor collateral (Falato et al., 2022; Li, 2019). However, some have argued that this picture is likely incomplete when looking at the largest firms in the economy. Anecdotally, the largest holders of financial assets rarely have difficulty accessing capital markets. For instance, Apple has a pristine AA credit rating and carried out large debt issuances as well as payouts during this time.

The second main explanation is related to cross-border tax incentives (Foley et al., 2007; Faulkender et al., 2019; Harford et al., 2017; Graham and Leary, 2018). To avoid paying U.S. taxes, multinationals can shift earnings abroad and hold them in financial assets instead of distributing them. This gives them the option to defer taxes until a tax reform or a tax holiday would occur at some future date (Albertus et al., 2022). A complementary argument is that shifting earnings across jurisdictions is relatively easier for firms with more intangible assets, such as software and patents, that are not attached to a physical location (Desai et al., 2006).

Disentangling the relative importance of these (non-mutually exclusive) forces is difficult.

Looking at simple correlations, simple reduced-form proxies for financial constraints tend not to correlate strongly with the marketable securities portion of firms' financial portfolios, as shown in Figure A.2a in the Internet Appendix. On the other hand, in line with the role of firms in the "Tech" and "Pharma" sectors pointed above, Figure A.2b in the Internet Appendix confirms that firms with a lower share of fixed assets, lower fixed capital expenditures, higher R&D expenditures, or lower book-to-market ratios have more financial assets (the differences in marketable securities are even more pronounced).[16]

Nevertheless, we cannot draw definitive conclusions from these simple correlations alone. For example, Gu (2017) argues that firm characteristics can lead to a joint determination of financial assets, foreign operations, and intangible capital.[17] To go beyond correlations, the next two sections study portfolio dynamics in two recent "event studies": (i) the 2017 tax reform that aimed to reduce incentives to hoard assets abroad for tax reasons, and (ii) the COVID-19 shock that induced firms to increase financial assets for liquidity reasons. An advantage of this approach is that it exploits within-firm variation around two large events each directly related to the two main forces at play. Moreover, our data is ideal to look at changes in the *composition* of financial assets, not just their level. This is valuable as it is entirely plausible that different financial assets play different roles.

[16]Table A.2 in the Internet Appendix shows that these correlations are broadly confirmed in a multivariate panel regression setting. These patterns are broadly in line with Duchin et al. (2017) who use a 2SLS approach using unexpected cash-flow shocks. They are also consistent with Pinkowitz et al. (2016) who show that U.S. firms hold more cash on average due to the firms at the tail of the U.S. distribution of R&D, which are also the firms at the tail of the U.S. distribution of cash/assets. Li (2019) also shows that corporate savings are concentrated in intangible-intensive sectors.

[17]Moreover, how to appropriately measure financial constraints at the firm-level is one of the central issues in corporate finance research. The use of reduced-form proxies has been subject to considerable debate (Farre-Mensa and Ljungqvist, 2016).

4 Reversal and Portfolio Shift Since 2017

4.1 The Tax Reform of 2017

To explore the role of cross-border tax incentives in financial assets accumulation, we exploit the drastic change in corporate taxation introduced by the recent tax reform. More specifically, the Tax Cuts and Jobs Act (TCJA) aimed to reduce the tax incentives to keep "cash" abroad.[18] Importantly, multinational taxation has become a central issue for policy-makers worldwide and our new data on the financial side of corporate balance sheets can help shed new light on the phenomenon.[19]

There is anecdotal evidence that corporations adjusted their financial assets portfolios in response to this reform. The most striking instance is Apple's announcement in February 2018 that it would pursue a "cash-neutral" policy going forward. Although the horizon of this reduction was not made explicit, the motives behind it were transparently linked to the tax reform:

> *The tax reform will allow us to pursue a more optimal capital structure for our company. Our current net cash position is $163 billion, and given the increased financial and operational flexibility from the access to our foreign cash, we are targeting to become approximately net cash neutral over time.*

Firms' natural response to such change tax incentives would imply a reversal in the growth of financial assets. Such a reversal is strikingly visible in the aggregate, as can be seen in Figure 3 above: total financial assets dropped by $300B between 2017 and 2019. Importantly, the panel nature of our data allows us to examine which firms were more responsive and how the

[18]The Tax Cuts and Jobs Act of 2017 lowered the U.S. federal corporate income tax rate from 35 to 21 percent and switched from a worldwide tax system to a territorial system. To reduce the incentives to shift profits to tax havens, the Act introduced three provisions: a U.S. tax on foreign income subject to low tax rates abroad; a reduced rate on foreign income derived from intangibles booked in the United States; and measures to limit the deductibility of certain payments suspected to shift income out of the United States.

[19]For instance, Garcia-Bernardo et al. (2020) find that the TCJA did not alter location of firms' profits or economic activity. Other works studying the impact of the TCJA on firms include Borochin et al. (2021); Beyer et al. (2021); Olson (2019).

composition of their portfolios was affected.[20]

As a first illustration, Apple experienced a drastic portfolio shift post-reform, in line with its announcement. Between 2017 and 2019, Apple's total financial assets shrank by over $60B, equivalent to an annual rate of decrease of about 12%. Importantly, this reversal was driven by running down its bond portfolio: its corporate bond holdings fell by $67B, while its U.S. Government bond holdings decreased by $20B. Apple's cash-like instruments rose modestly in comparison by $21B, with its actual cash being virtually unchanged. The largest share of this reduction in financial assets was paid to shareholders, and Apple's book assets fell by almost $40B over that period, a 10% drop. Apple was far from an isolated case, we saw drastic portfolio shifts at other large firms, including Cisco, Microsoft, Amgen, Gilead Sciences, and Pepsi Co, with Alphabet being an exception. Cash-like instruments remain stable as firms actively run down large fractions of their bond portfolios.

Figure 5 displays the aggregate effects of the reform. In total, financial assets fell by $300B, eliminating one-third of the previous ten years' growth in just two years. Beyond the level, there was a drastic shift in composition as well: cash-like instruments did not change, and the liquidation of corporate bonds can explain two-thirds of the total drop on its own. Moreover, the rundown of these bond portfolios was associated with a sharp rise in payouts to shareholders of about $254B, mostly through massive share repurchase programs.[21] In other words, a significant share of the financial assets accumulated in the previous decades left corporate balance sheets over a short timeframe.[22]

Finally, we conduct a difference-in-difference analysis to isolate the differential effect on Tech and Pharma firms. As noted above, shifting earnings across jurisdictions is relatively easier with firms with more intangible assets, such as software and patents, that are not

[20] Given existing work, it is not surprising that the *level* of financial assets fell, see for instance Foley et al. (2007) or Faulkender et al. (2019).

[21] This is in line with the classical literature on payouts and repatriation tax (Hines and Hubbard, 1990; Grubert, 1998; Grubert and Mutti, 2001; Desai et al., 2001, 2007).

[22] Note that it is unclear whether these payouts represent genuine new cross-border flows since they were largely financed by selling existing holdings U.S. assets. Our data only measures consolidated firm assets, so, unfortunately, we cannot directly trace flows across geographies.

attached to a physical location (Desai et al., 2006; Foley et al., 2007; Faulkender et al., 2019; Harford et al., 2017; Graham and Leary, 2018). If cross-border tax incentives are important drivers of some financial asset accumulation, we should observe within-firm changes around the reform. On the other hand, if some financial assets are primarily driven by intrinsic features of these intangibles-intensive firms ("selection" in the words of Gu (2017)), these effects would largely be differenced-out.

To estimate the responses of Tech and Pharma firms relative to other sectors, we run the following regression:

$$y_{i,t} = Post_t \times \mathbf{1}_i\{Tech\} + Post_t \times \mathbf{1}_i\{Pharma\} + \alpha_i + \nu_t + \varepsilon_{i,t}$$

where $y_{i,t}$ is an outcome variable for firm i in year t, $Post_t$ is a dummy equal to 1 for years 2018 and 2019 and 0 for years 2012–2017, and (α_i, ν_t) are firm and year fixed effects, respectively. Table 2 reports the results for the financial assets level and composition, as well as balance sheet adjustments. The results confirm the key role played by these sectors in driving the aggregate pattern. Column (1) shows a decline in financial assets relative to other sectors, and columns (2) and (3) reveal that the decline is entirely driven by a rundown of marketable securities, while cash-like instruments did not change significantly. Columns (4) and (5) highlight the sharp decrease in U.S. government bonds and corporate bonds. Column (7) reveals a large increase in payouts, which are especially strong in the tech sector.[23] The different effects across asset classes suggest they play different roles.

A dynamic corporate finance perspective is helpful to understand why firms decided to liquidate their bonds rather than their cash. Indeed, if bonds were simply understood as a cash substitute with higher yield, they should not have been liquidated. Instead, bonds are one type of assets that firms managed actively, with different attributes from cash or capital.

[23]Unreported dynamic coefficient plots show that the majority of the effects occurred in 2018 immediately after the reform. Note that our findings differ from Duchin et al. (2017) who show that tax costs of repatriating earnings are not significantly related to the composition of financial assets toward riskier assets. Two potential sources behind this discrepancy include the fact that we examine a different time period, and that U.S. government securities are classified as safe in that study's analysis.

Importantly, bonds are not as good store of values as cash: they are harder to sell quickly and to pledge as collateral. Thinking about offshore bonds as an investment in a multi-faceted asset, the tax reform should lead to disinvestment in these assets, since worldwide taxation encourages overinvestment abroad (Albertus et al., 2022).

4.2 The 2020 Liquidity Shock: Cash is Back

Finally, we examine firms' responses to the liquidity crisis triggered by the outbreak of COVID-19 in early 2020. In February 2020, it became clear that the pandemic would have large economic effects and expose many firms to a sharp drop in revenues. In what was labeled as a "corporate dash for cash" (Acharya and Steffen, 2020), this period witnessed historic efforts by corporations to increase their liquidity buffers, which often fell after the tax reform, to prepare for difficult times ahead. Anecdotally, many firms explicitly cited precautionary reasons and a desire to strengthen their balance sheets when explaining the "dash."[24] Our data allow to go one step further and study the shift in the composition of financial portfolios. Observing firms' active management of their financial portfolios in this period is particularly interesting because it reveals which assets are deemed most appropriate for liquidity management.[25]

We observe a clear shift toward cash-like instruments and the safest types of securities such as Treasuries. Figure 5 shows aggregate dynamics all the way to 2021Q4. In one quarter, financial assets grew by $100 billion while cash-like instruments grew even more, by $150 billion. This amounted to a drastic portfolio shift: the share of cash-like instruments jumped to 57%, as opposed to 50% three months earlier and only 43% in 2017 on the eve of the tax reform. Lastly, it is strikingly clear that we do not observe any spike in corporate bonds holdings. This is line with these assets being less attractive for the purpose of liquidity management, as they are more risky and less liquid relative to other assets. In fact, there

[24]For example, Chevron's CEO said: "We are taking actions expected to preserve cash, support our balance sheet strength, lower short-term production, and preserve long-term value." A large share of increased liquidiy buffers were financed by issuing new debt (Acharya and Steffen, 2020; Darmouni and Siani, 2022).

[25]Cardella et al. (2021) use the cash and cash equivalents versus short-term investments in Compustat to study the role of liquidity management in influencing firms' composition of financial assets. Nevertheless, we acknowledge that other factors might also have been at play in 2020.

is extensive evidence that corporate bonds specifically became extremely illiquid during this episode (Haddad et al., 2020; Kargar et al., 2020).

We formally test whether firms most affected by the COVID-19 shock reacted differently by estimating the following regression:

$$y_{i,t} = Post_t \times Covid_Exp_i + \alpha_i + \nu_t + \varepsilon_{i,t}$$

where $y_{i,t}$ are financial assets of firm i in year t, $Post_t$ is a dummy equal to 1 for quarters from 2020Q1 to 2020Q4 and 0 for quarters 2018Q4–2019Q4, and (α_i, ν_t) are firm and quarter fixed effects, respectively. $Covid_Exp_i$ measures the exposure to COVID-19 cash-flow shock. Our measure is the abnormal change in industry employment from Chodorow-Reich et al. (2022), calculated as the negative of the percent change in national employment in the firm's three-digit NAICS industry between 2019Q2 and 2020Q2 less the trailing five-year change. Table 3 reports the results for different financial assets. The results confirm the hypothesis that firms most affected by the COVID-19 shock increased savings in liquid assets.

Column (1) shows the increase in financial assets relative to other industries, and columns (2) to (5) reveal that the increase is mostly driven by the accumulation of cash-like instruments. Although there is some increase in US government bond holding as shown in Column (4), the increase is less than one-fourth of the cash-like assets in Column (2). Column (5) reveals that corporate bond holdings are not affected. This portfolio shift suggests cash plays a different role than less liquid assets, and it is a better liquidity buffer for hard times.

4.3 Discussion

Taken together, our novel data and evidence help us better understand the behvaior of corporate giants. Instead of simple cash balances, these firms actively manage financial portfolios to meet their needs. We have shown that firms do not just manage the levels, but also the composition of these portfolios. Indeed, the shifts between cash-like instruments and marketable

securities we document reveal clear patterns.

Importantly, liquidity motives alone cannot fully explain trends in financial assets accumulation. The trajectory of corporate bond holdings is particularly emblematic. After a sustained rise since the mid–2000s, corporate bonds and marketable securities started to leave corporate balance sheets immediately after the 2017 tax reform, a shift that did not reverse when the liquidity crisis of 2020 struck. When in need of precautionary buffers, firms prefer cash-like instruments to riskier, less liquid assets like corporate bonds. On the other hand, firms' management of their marketable securities portfolio is consistent with tax optimization. Firms have incentives to delay repatriating offshore earnings by hoarding financial assets until a tax holiday arrives. Given that these assets are not used to manage liquidity, securities like corporate bonds are appealing: although they are more illiquid, their higher yield reduces the cost of carry in a low interest rate environment.[26] Our findings suggests that a combination of tax incentives and reach for yield is a plausible explanation for the rise and fall of corporate bond holdings. Interestingly, U.S. government bonds form an intermediate category between cash-like instruments and corporate bonds and are used differently by different firms.

This evidence can help shed light on the debate on the drivers of the "cash" of corporate giants. The panel structure of our data on financial assets composition uncovers that different financial assets play different roles, with different economic magnitudes. Holdings of marketable securities are large and primarily driven by cross-border tax incentives. Cash-like instruments, driven by liquidity motives, have grown at a much slower rate until the 2020 liquidity crisis. Our data represents the richest publicly available source on this dimension, and we hope it can help future research to achieve a better understanding the role of these large firms for crucial topics such as regulation, taxation and macro-finance.

[26]Duchin et al. (2017) show formally that unconstrained firms have incentives to invest in illiquid assets because they carry a liquidity premium. Additional analysis shows evidence that firms with a smaller share of cash-like instruments have larger financial income, giving credence to the reach for yield hypothesis. While there is no comprehensive data on returns on firms' financial portfolios, we study five important firms: Apple, Microsoft, Alphabet, Amazon, and Ford. We carefully investigate their financial statements to estimate financial income, defined as the sum of interest and dividends income, net realized gains, and net unrealized gains on marketable securities, divided by lagged financial assets. See Table A.3 in the Internet Appendix for more details.

References

Acharya, Viral V, and Sascha Steffen, 2020, The risk of being a fallen angel and the corporate dash for cash in the midst of covid, *CEPR COVID Economics* 10.

Aghion, Philippe, Antonin Bergeaud, Timo Boppart, Peter J Klenow, and Huiyu Li, 2019, A theory of falling growth and rising rents, Technical report, National Bureau of Economic Research.

Albertus, James F, Brent Glover, and Oliver Levine, 2022, Foreign investment of us multinationals: The effect of tax policy and agency conflicts., *Journal of financial economics* 144, 298–327.

Almeida, Heitor, Murillo Campello, Igor Cunha, and Michael S Weisbach, 2014, Corporate liquidity management: A conceptual framework and survey, *Annu. Rev. Financ. Econ.* 6, 135–162.

Almeida, Heitor, Murillo Campello, and Michael S Weisbach, 2004, The cash flow sensitivity of cash, *The Journal of Finance* 59, 1777–1804.

Autor, David, David Dorn, Lawrence F Katz, Christina Patterson, and John Van Reenen, 2020, The fall of the labor share and the rise of superstar firms, *The Quarterly Journal of Economics* 135, 645–709.

Azar, José A, Jean-Francois Kagy, and Martin C Schmalz, 2016, Can changes in the cost of carry explain the dynamics of corporate "cash" holdings?, *The Review of Financial Studies* 29, 2194–2240.

Bates, Thomas W, Kathleen M Kahle, and René M Stulz, 2009, Why do us firms hold so much more cash than they used to?, *The journal of finance* 64, 1985–2021.

Begenau, Juliane, and Berardino Palazzo, 2021, Firm selection and corporate cash holdings, *Journal of Financial Economics* 139, 697–718.

Beyer, Brooke, Jimmy Downes, Mollie Mathis, and Eric T Rapley, 2021, Early evidence on the use of foreign cash following the tax cuts and jobs act of 2017, *Available at SSRN 3818149* .

Bolton, Patrick, Hui Chen, and Neng Wang, 2011, A unified theory of tobin's q, corporate investment, financing, and risk management, *The journal of Finance* 66, 1545–1578.

Borochin, Paul, Murat Alp Celik, Xu Tian, and Toni M Whited, 2021, Identifying the heterogeneous impact of highly anticipated events: Evidence from the tax cuts and jobs act, *Available at SSRN 3806560* .

Cardella, Laura, Douglas Fairhurst, and Sandy Klasa, 2021, What determines the composition of a firm's cash reserves?, *Journal of Corporate Finance* 68, 101924.

Chen, Peter, Loukas Karabarbounis, and Brent Neiman, 2017, The global rise of corporate saving, *Journal of Monetary Economics* 89, 1–19.

Chen, Zhiyao, and Ran Duchin, 2019, Do nonfinancial firms use financial assets to risk-shift? evidence from the 2014 oil price crisis, Technical report, Working paper, University of Washington.

Chodorow-Reich, Gabriel, Olivier Darmouni, Stephan Luck, and Matthew Plosser, 2022, Bank liquidity provision across the firm size distribution, *Journal of Financial Economics* 144, 908–932.

Crouzet, Nicolas, and Janice Eberly, 2020, Rents and intangible capital: A q+ framework, *Unpublished manuscript, Northwestern University* .

Crouzet, Nicolas, Neil Mehrotra, et al., 2017, Small and large firms over the business cycle, *Unpublished working paper* 101.

Cunha, Igor, and Joshua Pollet, 2015, Why do firms hold cash? evidence from demographic demand shifts, *The Review of Financial Studies* .

Darmouni, Olivier, and Kerry Siani, 2022, Bond market stimulus: Firm-level evidence from 2020-21 .

De Loecker, Jan, Jan Eeckhout, and Gabriel Unger, 2020, The rise of market power and the macroeconomic implications, *The Quarterly Journal of Economics* 135, 561–644.

De Simone, Lisa, Joseph D Piotroski, and Rimmy E Tomy, 2019, Repatriation taxes and foreign cash holdings: The impact of anticipated tax reform, *The Review of Financial Studies* 32, 3105–3143.

Denis, David J, and Valeriy Sibilkov, 2010, Financial constraints, investment, and the value of cash holdings, *The Review of Financial Studies* 23, 247–269.

Desai, Mihir A, C Fritz Foley, and James R Hines Jr, 2001, Repatriation taxes and dividend distortions, Technical report, National Bureau of Economic Research.

Desai, Mihir A, C Fritz Foley, and James R Hines Jr, 2006, The demand for tax haven operations, *Journal of Public economics* 90, 513–531.

Desai, Mihir A, C Fritz Foley, and James R Hines Jr, 2007, Dividend policy inside the multinational firm, *Financial management* 5–26.

Döttling, Robin, Tomislav Ladika, and Enrico C Perotti, 2018, The (self-) funding of intangibles .

Duchin, Ran, Thomas Gilbert, Jarrad Harford, and Christopher Hrdlicka, 2017, Precautionary savings with risky assets: When cash is not cash, *The Journal of Finance* 72, 793–852.

Eisfeldt, Andrea L, 2017, Comment on the global rise of corporate saving by peter chen, loukas karabarbounis, and brent neiman, *Journal of Monetary Economics* 89.

Eisfeldt, Andrea L, and Tyler Muir, 2016, Aggregate external financing and savings waves, *Journal of Monetary Economics* 84, 116–133.

Erel, Isil, Yeejin Jang, and Michael S Weisbach, 2020, The corporate finance of multinational firms, Technical report, National Bureau of Economic Research.

Falato, Antonio, Dalida Kadyrzhanova, Jae Sim, and Roberto Steri, 2022, Rising intangible capital, shrinking debt capacity, and the us corporate savings glut, *The Journal of Finance* 77, 2799–2852.

Farre-Mensa, Joan, and Alexander Ljungqvist, 2016, Do measures of financial constraints measure financial constraints?, *The Review of Financial Studies* 29, 271–308.

Faulkender, Michael W, Kristine W Hankins, and Mitchell A Petersen, 2019, Understanding the rise in corporate cash: Precautionary savings or foreign taxes, *The Review of Financial Studies* 32, 3299–3334.

Fernandes, Nuno, and Halit Gonenc, 2016, Multinationals and cash holdings, *Journal of Corporate Finance* 39, 139–154.

Ferreira, Miguel H, 2021, Aggregate implications of corporate lending by nonfinancial firms .

Foley, C Fritz, Jay C Hartzell, Sheridan Titman, and Garry Twite, 2007, Why do firms hold so much cash? a tax-based explanation, *Journal of financial economics* 86, 579–607.

Gabaix, Xavier, 2011, The granular origins of aggregate fluctuations, *Econometrica* 79, 733–772.

Gao, Xiaodan, Toni M Whited, and Na Zhang, 2018, Corporate money demand, *Available at SSRN 3165532* .

Garcia-Bernardo, Javier, P Janskỳ, and Gabriel Zucman, 2020, Did the tax cuts and jobs act reduce profit shifting by us multinational companies, Technical report, Working paper.

Garcia-Bernardo, Javier, and Petr Janskỳ, 2022, Profit shifting of multinational corporations worldwide, *arXiv preprint arXiv:2201.08444* .

Gomez, Matthieu, and Emilien Gouin-Bonenfant, 2020, A q-theory of inequality .

Graham, John R, and Mark T Leary, 2018, The evolution of corporate cash, *The Review of Financial Studies* 31, 4288–4344.

Grubert, Harry, 1998, Taxes and the division of foreign operating income among royalties, interest, dividends and retained earnings, *Journal of Public economics* 68, 269–290.

Grubert, Harry, and John Mutti, 2001, *Taxing International Business Income* (American Enterprise Institute).

Gu, Tiantian, 2017, Us multinationals and cash holdings, *Journal of Financial Economics* 125, 344–368.

Gutiérrez, Germán, and Thomas Philippon, 2017, Declining competition and investment in the us, Technical report, National Bureau of Economic Research.

Haddad, Valentin, Alan Moreira, and Tyler Muir, 2020, When selling becomes viral: Disruptions in debt markets in the covid-19 crisis and the fed's response, Technical report, National Bureau of Economic Research.

Harford, Jarrad, Cong Wang, and Kuo Zhang, 2017, Foreign cash: Taxes, internal capital markets, and agency problems, *The Review of Financial Studies* 30, 1490–1538.

Harris, Milton, and Artur Raviv, 2017, Why do firms sit on cash? an asymmetric information approach, *The Review of Corporate Finance Studies* 6, 141–173.

Hartman-Glaser, Barney, Hanno Lustig, and Mindy Z Xiaolan, 2019, Capital share dynamics when firms insure workers, *The Journal of Finance* 74, 1707–1751.

Hines, James R, and R Glenn Hubbard, 1990, Coming home to america: Dividend repatriations by us multinationals, in *Taxation in the global economy*, 161–208 (University of Chicago Press).

Huang, Teng, and Stefano Sacchetto, 2022, Surfing the cycle: Cyclical investment opportunities and firms' risky financial assets, *Available at SSRN 4010801* .

Kargar, Mahyar, Benjamin T Lester, David Lindsay, Shuo Liu, and Pierre-Oliver Weill, 2020, Corporate bond liquidity during the covid-19 crisis .

Li, Ye, 2019, Fragile new economy: The rise of intangible capital and financial instability, *Columbia Business School Research Paper* 2018–19.

Liu, Ernest, Atif Mian, and Amir Sufi, 2019, Low interest rates, market power, and productivity growth, Technical report, National Bureau of Economic Research.

Mian, Atif, Ludwig Straub, and Amir Sufi, 2020, The saving glut of the rich .

Olson, Erik, 2019, Unlocking trapped foreign cash, investor types, and firm payout policy, *Investor Types, and Firm Payout Policy (November 1, 2019)* .

Pinkowitz, Lee, René M Stulz, and Rohan Williamson, 2016, Do us firms hold more cash than foreign firms do?, *The Review of Financial Studies* 29, 309–348.

Song, Jae, David J Price, Fatih Guvenen, Nicholas Bloom, and Till Von Wachter, 2019, Firming up inequality, *The Quarterly journal of economics* 134, 1–50.

Figures and Tables

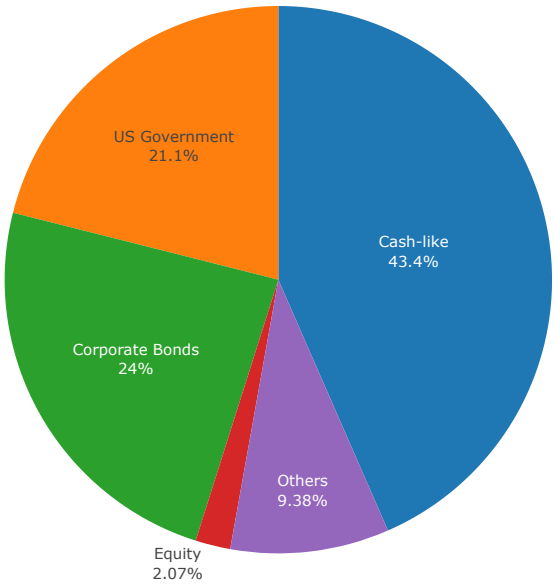


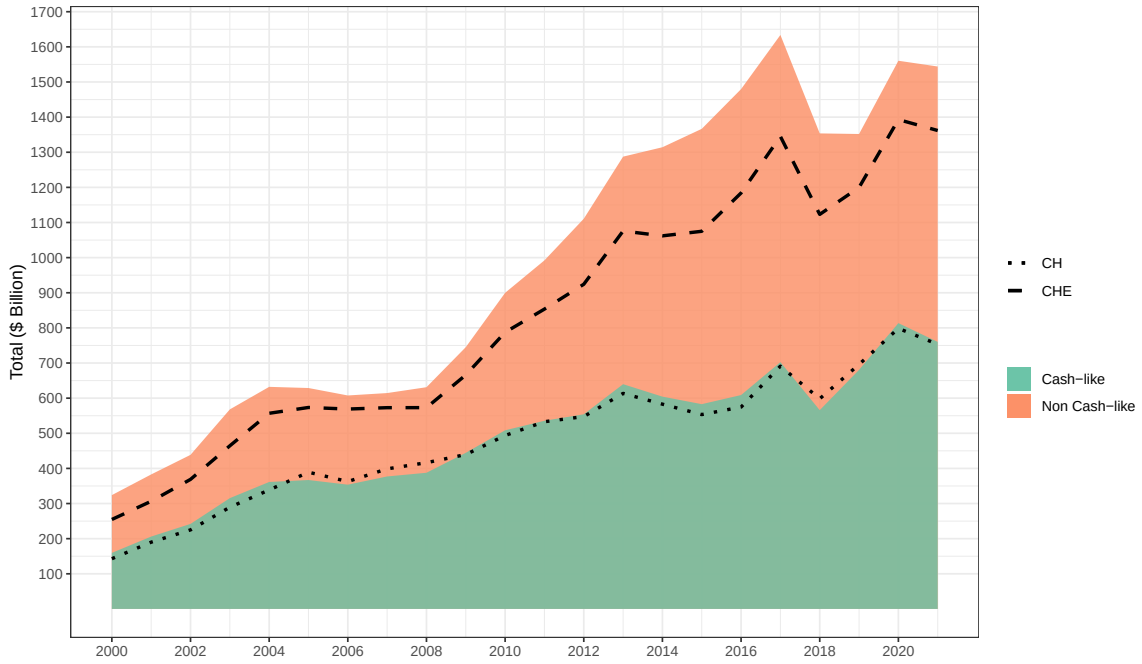
Figure 1 – Financial Assets Portfolio Composition of Nonfinancial Corporations in 2017

This financial assets portfolio composition for our sample of firms in 2017. "Cash-like" is defined as the sum of cash, MMF, deposits, and commercial paper if this information is reported, and "cash and cash equivalents" otherwise. "U.S. Government" bonds include Treasuries and Agency securities.

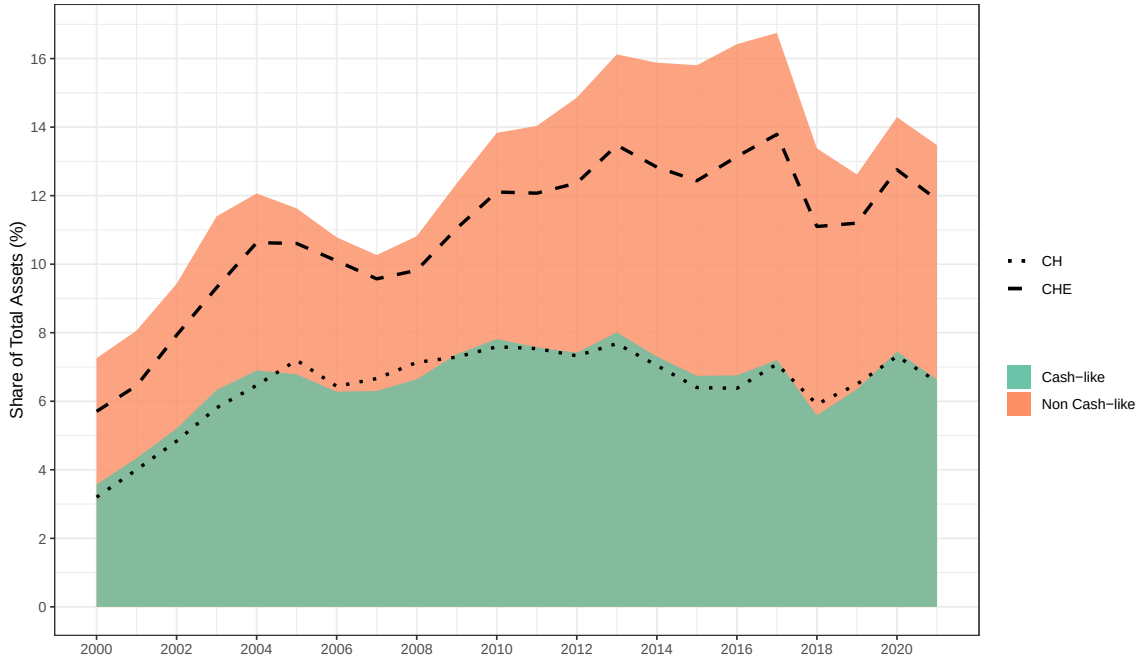
	2017			
	Adjusted Cost	Unrealized Gains	Unrealized Losses	Fair Value
Cash	$ 7,982	$ —	$ —	$ 7,982
Level 1:				
Money market funds	6,534	—	—	6,534
Mutual funds	799	—	(88)	711
Subtotal	7,333	—	(88)	7,245
Level 2:				
U.S. Treasury securities	55,254	58	(230)	55,082
U.S. agency securities	5,162	2	(9)	5,155
Non-U.S. government securities	7,827	210	(37)	8,000
Certificates of deposit and time deposits	5,832	—	—	5,832
Commercial paper	3,640	—	—	3,640
Corporate securities	152,724	969	(242)	153,451
Municipal securities	961	4	(1)	964
Mortgage- and asset-backed securities	21,684	35	(175)	21,544
Subtotal	253,084	1,278	(694)	253,668
Total	$ 268,399	$ 1,278	$ (782)	$ 268,895

Figure 2 – Apple Financial Instruments Table

This figure displays the Financial Instrument Table for Apple in 2017. Available on the SEC website.



(a) Aggregate Financial Assets



(b) Financial Assets over Assets

Figure 3 – The Growth in Financial Assets

This figure plots the growth in financial assets for our sample of firms. Panel (a) plots aggregate financial assets, while panel (b) plots total financial assets over total assets. "Cash-like" is defined as the sum of cash, MMF, deposits, and commercial paper if this information is reported, and "cash and cash equivalents" otherwise. "CH" is Cash and "CHE" is Cash and Short-Term investment from Compustat.

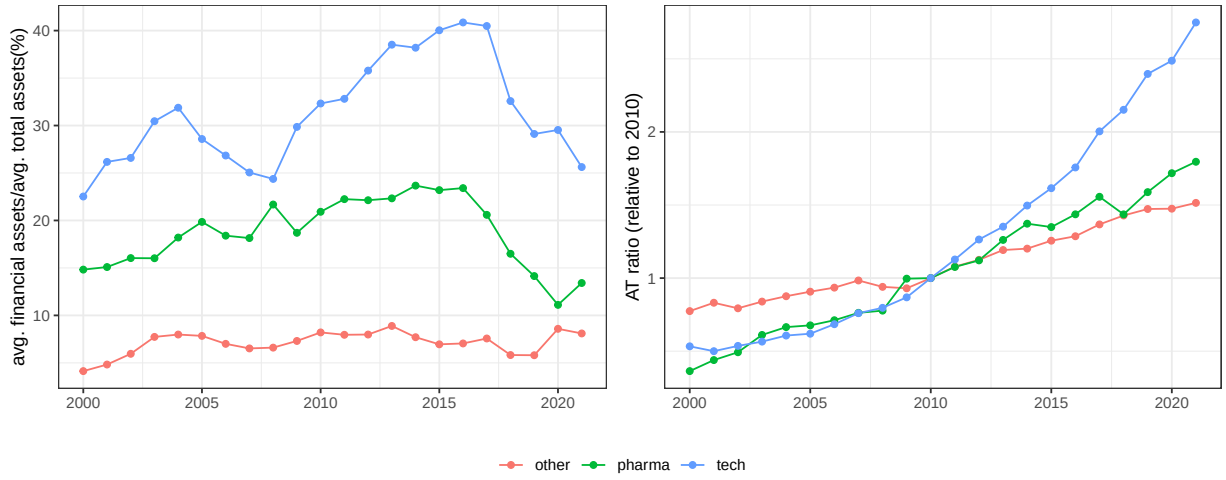


Figure 4 – Sectoral Composition Effects Behind Aggregate Growth

This figure plots the aggregate growth for three sectors in our sample: pharmaceutical firms, technological firms, and others, as defined in Table A.4 in the Internet Appendix. The left panel presents the growth in the ratio of average financial assets over average assets within each industry. The right panel shows the growth of aggregate total assets within each industry relative to 2010.

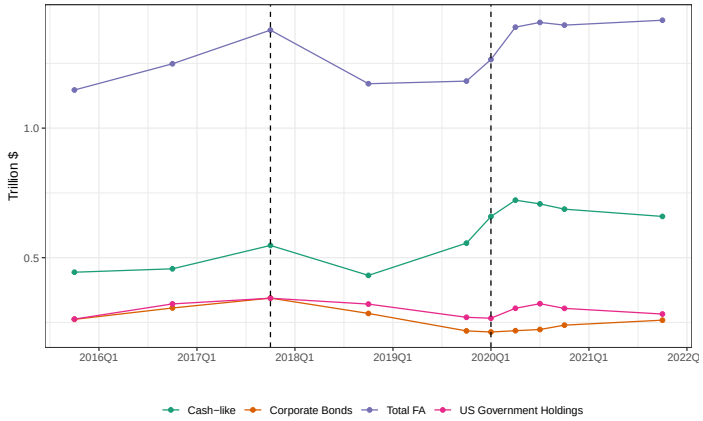


Figure 5 – Aggregate Portfolio Dynamics: 2015–2021

This figure plots the aggregate dynamics of different asset classes from 2015 to 2020Q1 in our sample. The first vertical dash line corresponds to the TCJA. The second vertical dash line corresponds to COVID-19liquidity crisis. "Cash-like" is defined as the sum of cash, MMF, deposits, and commercial paper if this information is reported, and "cash and cash equivalents" otherwise. "U.S. government holdings" include Treasuries and agency debt.

	Total in USD Bi			Share of Financial Assets (%)			Share of Total Assets (%)		
	2000	2012	2017	2000	2012	2017	2000	2012	2017
Cash-like instruments	159.53	552.19	715.33	49.24	49.80	43.44	3.57	7.37	7.28
U.S. government debt	26.22	226.17	346.89	8.09	20.40	21.07	0.59	3.02	3.53
Corporate bonds	29.18	143.37	396.03	9.01	12.93	24.05	0.65	1.91	4.03
Equities	28.73	27.29	34.04	8.87	2.46	2.07	0.64	0.36	0.35
Others	80.35	159.77	154.46	24.80	14.41	9.38	1.80	2.13	1.57
Total	324.01	1,108.79	1,646.74	–	–	–	7.24	14.79	16.75

Table 1 – The Composition of Financial Assets

This table displays the composition of financial assets in our sample. "Cash-like" is defined as the sum of cash, MMF, deposits, and commercial paper if this information is reported, and "cash and cash equivalents" otherwise. "U.S. government" includes Treasuries and agency debt. "Others" contain all items that are either clearly not cash-like instrument, U.S. government securities, corporate debt or equities, or are difficult to classify due to ambiguous language (e.g. "Other securities").

	Dependent variable:							
	total FA / AT(%)	cash-like / AT(%)	marketable securities/AT(%)	US government bonds/AT(%)	corporate bonds/AT(%)	AT growth (%)	payouts / lagged AT(%)	debt issuance / lagged AT(%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
post:tech	-7.060^{***}	-0.676	-6.385^{***}	-2.196^{***}	-1.889^{***}	-7.090	4.119^{***}	-1.618
	(0.967)	(0.751)	(0.750)	(0.350)	(0.468)	(5.525)	(0.835)	(1.715)
post:pharma	-4.269^{***}	0.113	-4.382^{***}	-0.937^{**}	-1.818^{***}	2.391	2.009^{*}	0.879
	(1.289)	(1.001)	(0.999)	(0.467)	(0.623)	(7.274)	(1.100)	(2.257)
Observations	1,267	1,267	1,267	1,267	1,267	1,247	1,247	1,247
R^2	0.868	0.615	0.885	0.929	0.790	0.175	0.634	0.165
Adjusted R^2	0.846	0.551	0.865	0.917	0.755	0.035	0.573	0.024
Note:								*p<0.1; **p<0.05; ***p<0.01

Table 2 – Effects of Tax Reform: Difference-in-Difference Regressions

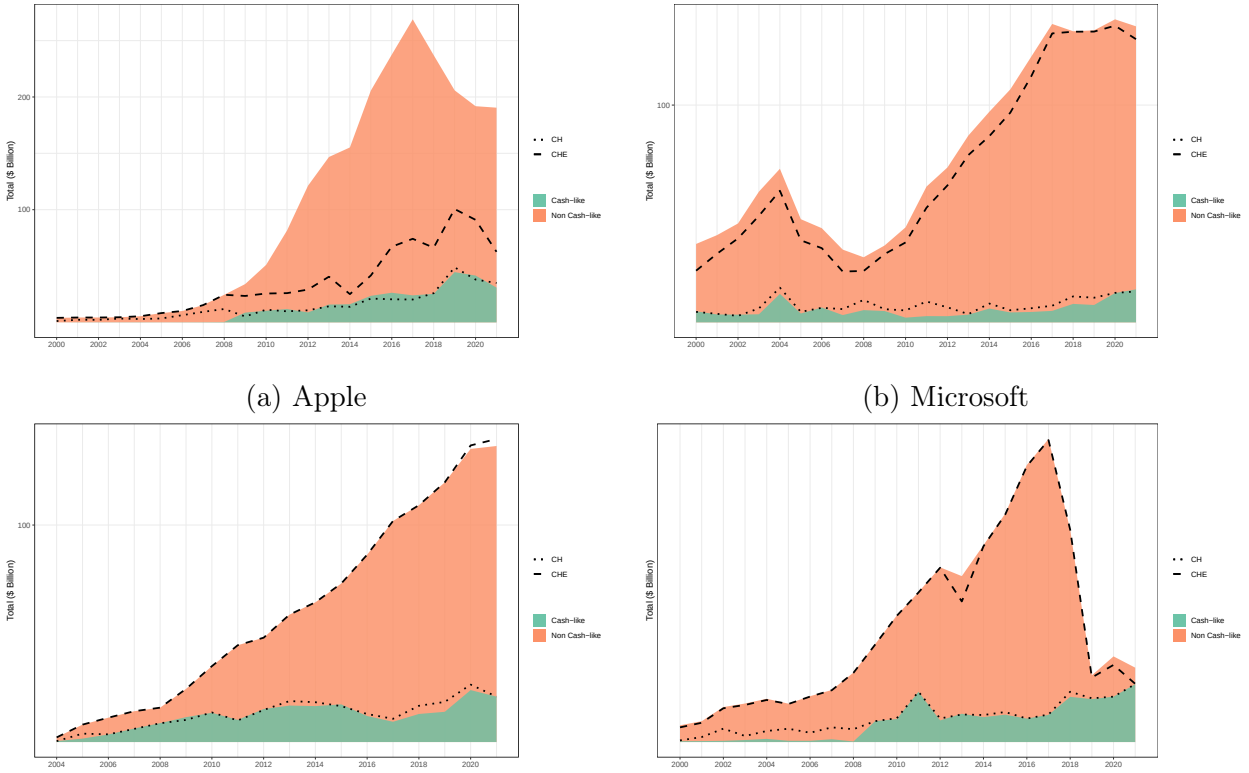
This table displays estimated coefficients of difference-in-difference regression of the components of financial assets shares on sector dummies with year and firm fixed effects. "Post" is a dummy variable, defined as 1 for year 2018 to 2019, as 0 for year 2012 to 2017. Only data from 2012 to 2019 in our sample are included in the regressions. "Tech" and "pharma" are dummy variables defined as 1 for technological and pharmaceutical firms, respectively. Details about the classification of industries could be found in Table 5. "Cash-like" is defined as the sum of cash, MMF, deposits, and commercial paper if this information is reported, and "cash and cash equivalents" otherwise. "Marketable securities" are non-cash-like financial assets. "U.S. government" includes Treasuries and Agency debt. All columns include firm and year fixed effects. Columns (6), (7) and (8) examine asset growth, payouts (dividends + net equity repurchases) over lagged assets, and net debt issuance over lagged assets, all from Compustat. Standard errors are in parenthesis.

	Dependent variable:				
	total FA / AT(%)	cash-like / AT(%)	marketable securities/AT(%)	US government bonds/AT(%)	corporate bonds/AT(%)
	(1)	(2)	(3)	(4)	(5)
post:covid_exposure	0.019***	0.013***	0.006**	0.003**	0.003
	(0.005)	(0.004)	(0.003)	(0.001)	(0.002)
Observations	720	720	720	720	720
R^2	0.918	0.757	0.945	0.979	0.858
Adjusted R^2	0.901	0.706	0.934	0.974	0.828
Note:					*p<0.1; **p<0.05; ***p<0.01

Table 3 – Effects of COVID-19 Shock: Difference-in-Difference Regressions

This table displays estimated coefficients of difference-in-difference regression of the components of financial assets shares on COVID-19 exposure with year and firm fixed effects. "Post" is a dummy variable, defined as 1 for quarters 2020Q1 to 2021Q4, as 0 for 2018Q4 to 2019Q4. Only quarterly data from 2018Q4 to 2011Q4 in our sample are included in the regressions. "covid_exposure" is the abnormal change in industry employment as in Chodorow-Reich et al. (2022), calculated as the negative of the percent change in national employment in the firm's three-digit NAICS industry between 2019Q2 and 2020Q2 less the trailing five-year change. "Cash-like" is defined as the sum of cash, MMF, deposits, and commercial paper if this information is reported, and "cash and cash equivalents" otherwise. "Marketable securities" are non-cash-like financial assets. "U.S. government" includes Treasuries and Agency debt. All columns include firm and quarter fixed effects. Standard errors are in parenthesis.

Internet Appendix



(a) Apple

(b) Microsoft

(c) Alphabet

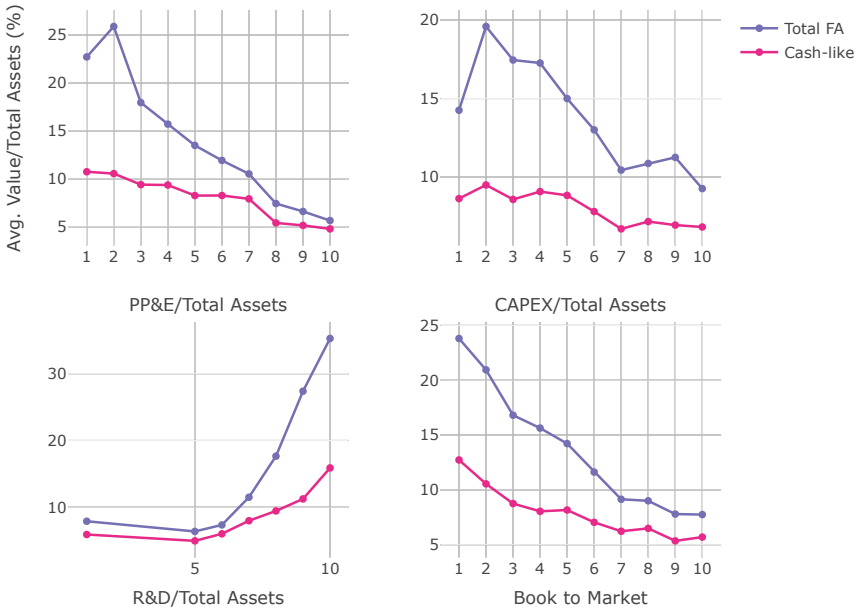
(d) Amgen

Figure A.1 – The Growth in Financial Assets: Four Examples

This figure plots the growth in financial assets for four firms in our sample: Apple, Microsoft, Alphabet and Amgen. "Cash-like" is defined as the sum of cash, MMF, deposits, and commercial paper if this information is reported, and "cash and cash equivalents" otherwise. "CHE" is the variable Cash and Short-Term investment from Compustat.



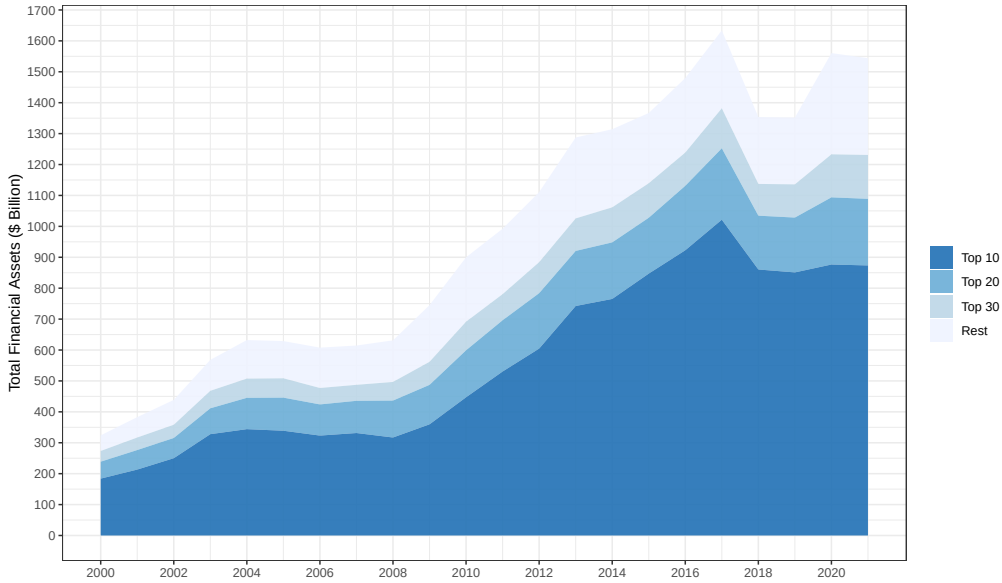
(a) Credit Constraints



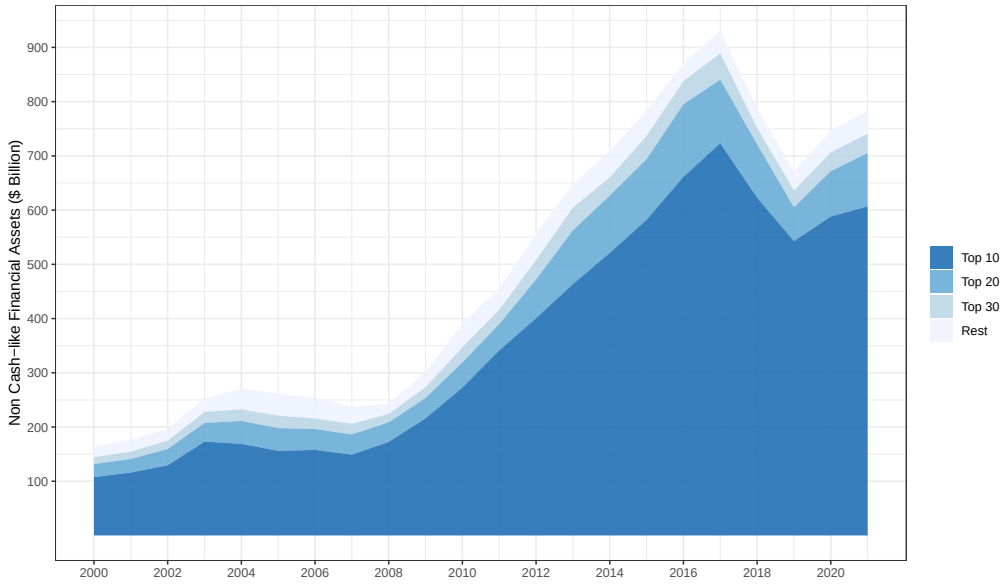
(b) Intangibles

Figure A.2 – Bi-variate Correlations with Firm Characteristics

This figure plots the bi-variate correlations with firm characteristics in our sample, using deciles for the x-axis. Panel (a) examines four proxies of credit constraints: ROA (EBITDA/lagged assets), ROE (net income/lagged book equity), the sum of dividends and share repurchases relative to EBITDA, and credit spreads. Panel (b) examines four proxies of intangibles: PP&E, CAPEX, and R&D relative to total assets, and book to market ratio. "Cash-like" is defined as the sum of cash, MMF, deposits, and commercial paper if this information is reported, and "cash and cash equivalents" otherwise.



(a) Total Financial Assets



(b) Non-Cash Financial Assets

Figure A.3 – Concentration in Financial Assets

This figure plots the concentration in financial assets in our sample. In panel (a), firms are sorted by total financial assets in each year. In panel (b), firms are sorted by non-cash financial assets in each year. "Cash-like" is defined as the sum of cash, MMF, deposits, commercial paper if this information is reported, and "cash and cash equivalents" otherwise.

Rank	Name	Financial Assets	Non Cash-Like	Cash-Like	Sector	Total Assets	Mkt Cap
1	APPLE INC	269	245	24	Tech	375	861
2	MICROSOFT CORP	137	132	5	Tech	241	659
3	ALPHABET INC	102	93	9	Tech	197	680
4	CISCO SYSTEMS INC	70	58	13	Tech	130	189
5	ORACLE CORP	67	44	23	Tech	137	196
6	AT&T INC	53	2	50	Communication	444	239
7	AMGEN INC	42	38	4	Healthcare/Drug Manufacturers	80	126
8	FACEBOOK INC	42	34	8	Tech	85	423
9	FORD MOTOR CO	39	23	16	Auto	258	49
10	QUALCOMM INC	39	4	35	Tech	65	95
11	GILEAD SCIENCES INC	37	25	12	Healthcare/Biotechnology	70	94
12	AMAZON.COM INC	32	11	21	Consumer	131	564
13	PEPSICO INC	25	15	11	Beverages	80	170
14	GENERAL MOTORS CO	24	14	10	Auto	212	58
15	INTEL CORP	22	15	7	Tech	123	216
16	MERCK & CO	21	15	6	Healthcare/Drug Manufacturers	88	153
17	COCA-COLA CO	21	15	6	Beverages	88	195
18	PFIZER INC	20	17	3	Healthcare/Biotechnology	172	216
19	JOHNSON & JOHNSON	18	6	12	Healthcare/Drug Manufacturers	157	375
20	BOOKING HOLDINGS INC	18	15	3	Tech	25	84

Table A.1 – The Top 20 Firms by Largest Financial Assets in 2017

This table reports the largest holders of financial assets in 2017 in our sample. "Cash-like" is defined as the sum of cash, MMF, deposits, and commercial paper if this information is reported, and "cash and cash equivalents" otherwise.

	Dependent variable:					
	FA/AT	Cash-like/AT	Marketable Securities/AT	FA/AT	Cash-like/AT	Marketable Securities/AT
	industry FE			industry & year FE		
	(1)	(2)	(3)	(4)	(5)	(6)
Ln(firm sales)	-0.770^{***}	-0.611^{***}	-0.159	-0.968^{***}	-0.795^{***}	-0.173
	(0.222)	(0.133)	(0.193)	(0.229)	(0.137)	(0.200)
Bond rating BBB or below	-3.433^{***}	-1.687^{***}	-1.746^{***}	-3.548^{***}	-1.770^{***}	-1.779^{***}
	(0.541)	(0.325)	(0.472)	(0.542)	(0.324)	(0.474)
PPE to book assets(%)	-0.051^{***}	-0.018^{***}	-0.033^{***}	-0.050^{***}	-0.017^{***}	-0.033^{***}
	(0.007)	(0.004)	(0.006)	(0.007)	(0.004)	(0.006)
Return on assets(%)	0.158^{***}	0.010	0.148^{***}	0.172^{***}	0.016	0.155^{***}
	(0.027)	(0.016)	(0.023)	(0.027)	(0.016)	(0.024)
Return on equity(%)	0.001	0.001^{**}	-0.0001	0.001	0.001^{**}	-0.00005
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Vol(ln(sales))	7.954^{***}	2.323^{**}	5.631^{***}	8.114^{***}	2.455^{**}	5.659^{***}
	(1.847)	(1.110)	(1.610)	(1.847)	(1.104)	(1.616)
Payouts/lagged assets(%)	-0.056^{***}	-0.056^{***}	0.0004	-0.056^{***}	-0.057^{***}	0.001
	(0.009)	(0.005)	(0.008)	(0.009)	(0.005)	(0.008)
R&D to sales(%)	0.496^{***}	0.097^{***}	0.399^{***}	0.497^{***}	0.095^{***}	0.402^{***}
	(0.034)	(0.020)	(0.030)	(0.034)	(0.020)	(0.030)
Book to market(%)	-33.324^{***}	-19.386^{***}	-13.938^{***}	-29.159^{***}	-18.085^{***}	-11.075^{**}
	(6.150)	(3.696)	(5.363)	(6.347)	(3.793)	(5.551)
Book leverage(%)	-0.055^{***}	-0.006	-0.050^{***}	-0.065^{***}	-0.011	-0.054^{***}
	(0.018)	(0.011)	(0.015)	(0.018)	(0.011)	(0.016)
Capital Exp/sales(%)	0.001	0.001^{**}	-0.0001	0.001	0.001^{**}	-0.00003
	(0.001)	(0.0003)	(0.0005)	(0.001)	(0.0003)	(0.0005)
Observations	2,433	2,433	2,433	2,433	2,433	2,433
R^2	0.514	0.266	0.401	0.520	0.282	0.405
Adjusted R^2	0.510	0.260	0.396	0.513	0.272	0.396
Note:						*p<0.1; **p<0.05; ***p<0.01

Table A.2 – Financial Assets and Firm Characteristics: Panel Regressions

This table displays the estimated coefficient of regressing the components of financial assets on a set of firm characteristics. Only data from 2002 to 2017 in our sample are included in the regressions. "Cash-like" is defined as the sum of cash, MMF, deposits, and commercial paper if this information is reported, and "cash and cash equivalents" otherwise. "Marketable securities" are non-cash-like financial assets. "Payouts" are the sum of dividends and net equity repurchases. "return on assets" is EBITDA/lagged assets and "return on equity" is net income/lagged book equity, all from Compustat. Column (1) to (3) includes fixed effects for the twelve Fama-French industries. Column (4) to (6) contains both industry and year fixed effects. Standard errors are in parenthesis.

Firm name	Return spread over T-bill(%)	Cash-like share(%)
Alphabet Inc	1.68	27.96
Microsoft Corp	1.49	7.10
Apple Inc	1.21	11.98
Ford Motor Co	0.51	41.50
Amazon.com Inc	0.22	60.39

Table A.3 – The Average Return Spread of Five Firms: 2007–2019

This table displays the correlation between the average return spread over T-bill and the average cash-like share for Alphabet, Microsoft, Apple, Ford, and Amazon. Only data from 2007 to 2019 for these five firms are included in this table. Return spread over T-bill is the average difference between the firm's $r_{portfolio}$ and r_{Tbill}. The cash-like share is the average cash-like instruments as a share of total financial assets. "Cash-like" is defined as the sum of cash, MMF, deposits, and commercial paper if this information is reported, and "cash and cash equivalents" otherwise. While $r_{portfolio}$ is the sum of interest and dividends income, net realized gains, and net unrealized gains on marketable securities over the lagged financial assets, r_{Tbill} is the annually cumulative 3-months T-bill return from CRSP computed over each firm's fiscal year. Interest and dividends income are derived from the table for other income. Net realized gains and net unrealized gains on marketable securities are obtained from the statement of other comprehensive income, when available, along with the information from the statements for shareholders' equity, from the table for other income, and from the footnotes of the annual reports.

Table A.4 – Firms and Industry Classifications

Firm name	CIK	Valid years in sample	Tech/Pharma/Other	Most recent Fama French sector	SIC code
3M CO	66740	2000–2019	other	Manuf	2670
ABBOTT LABORATORIES	1800	2000–2019	pharma	Hlth	3845
ABBVIE INC	1551152	2013–2019	pharma	Hlth	2836
ADELPHIA COMMUN -CL A	796486	2000	other	Telcm	4841
ALBERTSON'S INC	3333	2000–2005	other	Shops	5411
ALPHABET INC	1652044	2004–2019	tech	BusEq	7370
ALTICE USA INC	1702780	2000–2015, 2017–2019	other	Telcm	4841
ALTRIA GROUP INC	764180	2000–2019	other	NoDur	2111
AMAZON.COM INC	1018724	2000–2019	tech	Shops	5961
AMERICAN AIRLINES GROUP INC	6201	2000–2010, 2013–2019	other	Others	4512
AMERISOURCEBERGEN CORP	1140859	2000–2019	pharma	Shops	5122
AMGEN INC	318154	2000–2019	pharma	Hlth	2836
ANADARKO PETROLEUM CORP	773910	2000–2018	other	Enrgy	1311
ANALOG DEVICES	6281	2000–2019	tech	BusEq	3674
ANDEAVOR	50104	2000–2017	other	Enrgy	2911
APACHE CORP	6769	2000–2019	other	Enrgy	1311
APPLE INC	320193	2000–2019	tech	BusEq	3663
APTIV PLC	1521332	2000–2004	other	Durbl	3714
ARCHER-DANIELS-MIDLAND CO	7084	2000–2019	other	NoDur	2070
AT&T CORP	5907	2000–2004	other	Telcm	4813
AT&T INC	732717	2000–2019	other	Telcm	4812
AT&T WIRELESS SERVICES INC	1138234	2000–2003	other	Telcm	4812
AUTOMATIC DATA PROCESSING	8670	2000–2019	tech	BusEq	7374
BAKER HUGHES CO	1701605	2017–2019	other	Enrgy	1389
BECTON DICKINSON & CO	10795	2000–2019	pharma	Hlth	3841
BELLSOUTH CORP	732713	2000–2005	other	Telcm	4813
BEST BUY CO INC	764478	2000–2019	other	Shops	5731
BIOGEN INC	875045	2000–2019	pharma	Hlth	2836
BOEING CO	12927	2000–2019	other	Manuf	3721
BOOKING HOLDINGS INC	1075531	2000–2019	tech	BusEq	7370
BOSTON SCIENTIFIC CORP	885725	2000–2019	pharma	Hlth	3845
BRISTOL-MYERS SQUIBB CO	14272	2000–2019	pharma	Hlth	2834
BROADCOM INC	1730168	2017–2019	tech	BusEq	3674
BURLINGTON NORTHERN SANTA FE	934612	2000–2009	other	Others	4011
CAESARS ENTERTAINMENT CORP	858339	2000–2007, 2012–2019	other	Others	7990
CARDINAL HEALTH INC	721371	2000–2019	pharma	Shops	5122
CATERPILLAR INC	18230	2000–2019	other	Manuf	3531
CELGENE CORP	816284	2000–2018	pharma	Hlth	2834
CENTURYLINK INC	18926	2000–2019	other	Telcm	4813
CHARTER COMMUNICATIONS INC	1091667	2000–2008, 2010–2019	other	Telcm	4841
CHENIERE ENERGY INC	3570	2000–2009, 2017–2019	other	Enrgy	1311
CHESAPEAKE ENERGY CORP	895126	2000–2019	other	Enrgy	1311
CHEVRON CORP	93410	2000–2019	other	Enrgy	2911
CISCO SYSTEMS INC	858877	2000–2019	tech	BusEq	3576
COCA-COLA CO	21344	2000–2019	other	NoDur	2086
COCA-COLA EUROPEAN PARTNERS	1650107	2000–2015	other	NoDur	2086
COMCAST CORP	1166691	2000–2019	other	Telcm	4841
COMPAQ COMPUTER CORP	714154	2000–2001	tech	BusEq	3571
CONAGRA BRANDS INC	23217	2000–2019	other	NoDur	2099
CONOCO INC	1066806	2000–2001	other	Enrgy	2911
CONOCOPHILLIPS	1163165	2000–2019	other	Enrgy	1311
CONSTELLATION BRANDS	16918	2000–2019	other	NoDur	2082
CORNING INC	24741	2000–2019	tech	BusEq	3679
COSTCO WHOLESALE CORP	909832	2000–2019	other	Shops	5399
COTY INC	1024305	2013–2019	other	Chems	2844
COX COMMUNICATIONS INC	25305	2000–2004	other	Telcm	4841
CSX CORP	277948	2000–2019	other	Others	4011
CVS HEALTH CORP	64803	2000–2019	other	Shops	5912
DANAHER CORP	313616	2000–2019	other	BusEq	3826
DEERE & CO	315189	2000–2019	other	Manuf	3523
DELL TECHNOLOGIES INC	1571996	2000–2012, 2018–2019	tech	BusEq	3571
DELTA AIR LINES INC	27904	2000–2004, 2007–2019	other	Others	4512
DEVON ENERGY CORP	1090012	2000–2019	other	Enrgy	1311
DIRECTV	1465112	2000–2014	other	Telcm	4841
DISCOVERY INC	1437107	2005–2019	other	Telcm	4841

DISH NETWORK CORP	1001082	2000–2019	other	Telcm	4841
DISNEY (WALT) CO	1744489	2000–2019	other	Telcm	4888
DU PONT (E I) DE NEMOURS	30554	2000–2016	other	Chems	2820
DUPONT DE NEMOURS INC	1666700	2000–2019	other	Chems	2860
DXC TECHNOLOGY CO	1688568	2000–2019	tech	BusEq	7370
DYNEGY INC	1379895	2000–2010	other	Enrgy	1311
EBAY INC	1065088	2000–2019	tech	BusEq	7370
EMC CORP/MA	790070	2000–2015	tech	BusEq	3572
EMERSON ELECTRIC CO	32604	2000–2019	other	BusEq	3823
ENRON CORP	1024401	2000	other	Shops	5172
EOG RESOURCES INC	821189	2000–2019	other	Enrgy	1311
EXPRESS SCRIPTS HOLDING CO	1532063	2013–2017	pharma	Shops	5912
EXXON MOBIL CORP	34088	2000–2019	other	Enrgy	2911
FACEBOOK INC	1326801	2012–2019	tech	BusEq	7370
FEDEX CORP	1048911	2000–2018	other	Others	4513
FIDELITY NATIONAL INFO SVCS	1136893	2006–2019	tech	BusEq	7374
FORD MOTOR CO	37996	2000–2019	other	Durbl	3711
FOX ENTERTAINMENT GROUP INC	1068002	2000–2004	other	Telcm	4833
FREEPORT-MCMORAN INC	831259	2000–2019	other	Others	1000
FRONTIER COMMUNICATIONS CORP	20520	2000–2019	other	Telcm	4813
GENERAL DYNAMICS CORP	40533	2000–2019	other	Manuf	3721
GENERAL MILLS INC	40704	2000–2018	other	NoDur	2040
GENERAL MOTORS CO	1467858	2000–2008, 2010–2019	other	Durbl	3711
GEORGIA-PACIFIC CORP	41077	2000–2004	other	Manuf	2600
GILEAD SCIENCES INC	882095	2000–2019	pharma	Hlth	2836
HALLIBURTON CO	45012	2000–2019	other	Enrgy	1389
HCA HEALTHCARE INC	860730	2000–2005, 2011–2019	pharma	Hlth	8062
HESS CORP	4447	2000–2019	other	Enrgy	1311
HEWLETT PACKARD ENTERPRISE	1645590	2016–2019	tech	BusEq	3571
HOME DEPOT INC	354950	2000–2019	other	Shops	5211
HONEYWELL INTERNATIONAL INC	773840	2000–2015	tech	BusEq	3822
HP INC	47217	2000–2019	tech	BusEq	3570
IHEARTMEDIA INC	1400891	2000–2007, 2019	other	Telcm	4832
INTEL CORP	50863	2000–2019	tech	BusEq	3674
INTL BUSINESS MACHINES CORP	51143	2000–2019	tech	BusEq	7370
INTL PAPER CO	51434	2000–2019	other	Manuf	2631
IQVIA HOLDINGS INC	1478242	2013–2019	tech	Others	8731
JOHNSON & JOHNSON	200406	2000–2019	pharma	Hlth	2834
JOHNSON CONTROLS INTL PLC	833444	2000–2015	other	Manuf	2531
KIMBERLY-CLARK CORP	55785	2000–2019	other	Manuf	2621
KRAFT HEINZ CO	1637459	2000–2012, 2015–2019	other	NoDur	2030
KROGER CO	56873	2000–2019	other	Shops	5411
LAS VEGAS SANDS CORP	1300514	2004–2019	other	Others	7990
LEVEL 3 COMMUNICATIONS INC	794323	2000–2016	tech	Telcm	4813
LIBERTY EXPEDIA HOLDINGS INC	1669600	2016–2018	tech	Others	4700
LIBERTY GLOBAL PLC	1570585	2004–2011	other	Telcm	4841
LILLY (ELI) & CO	59478	2000–2019	pharma	Hlth	2834
LOCKHEED MARTIN CORP	936468	2000–2019	other	Manuf	3760
LOWE'S COS INC	60667	2000–2019	other	Shops	5211
LUCENT TECHNOLOGIES INC	1006240	2000–2006	other	BusEq	7373
MACY'S INC	794367	2000–2019	other	Shops	5311
MARATHON OIL CORP	101778	2000–2019	other	Enrgy	1311
MARATHON PETROLEUM CORP	1510295	2011–2019	other	Enrgy	2911
MARRIOTT INTL INC	1048286	2000–2019	other	Others	7011
MCDONALD'S CORP	63908	2000–2019	other	Shops	5812
MCI INC	723527	2000–2001, 2004	other	Telcm	4813
MCKESSON CORP	927653	2000–2019	pharma	Shops	5122
MEDTRONIC PLC	1613103	2000–2013	pharma	Hlth	3845
MERCK & CO	310158	2000–2019	pharma	Hlth	2834
MGM RESORTS INTERNATIONAL	789570	2000–2019	other	Others	7990
MICRON TECHNOLOGY INC	723125	2000–2019	tech	BusEq	3674
MICROSOFT CORP	789019	2000–2019	tech	BusEq	7372
MOLSON COORS BEVERAGE CO	24545	2000–2019	other	NoDur	2082
MONDELEZ INTERNATIONAL INC	1103982	2001–2019	other	NoDur	2052
MONSANTO CO	1110783	2000–2017	other	NoDur	100
MOTOROLA SOLUTIONS INC	68505	2000–2019	tech	BusEq	3663
NATIONAL OILWELL VARCO INC	1021860	2000–2019	other	Manuf	3533
NEWELL BRANDS INC	814453	2000–2019	other	Durbl	3990
NEWMONT CORP	1164727	2000–2019	other	Others	1040

NEXTEL COMMUNICATIONS INC	824169	2000–2004	other	Telcm	4812
NIKE INC -CL B	320187	2000–2019	other	Manuf	3021
NOBLE ENERGY INC	72207	2000–2019	other	Enrgy	1311
NORFOLK SOUTHERN CORP	702165	2000–2019	other	Others	4011
NORTHROP GRUMMAN CORP	1133421	2000–2019	tech	BusEq	3812
OCCIDENTAL PETROLEUM CORP	797468	2000–2019	other	Enrgy	1311
OMNICOM GROUP	29989	2000–2019	other	Others	7311
ORACLE CORP	1341439	2000–2019	tech	BusEq	7370
PACCAR INC	75362	2000–2019	other	Durbl	3711
PAYPAL HOLDINGS INC	1633917	2015–2019	tech	BusEq	7374
PENNEY (J C) CO	1166126	2000–2019	other	Shops	5311
PEPSICO INC	77476	2000–2019	other	NoDur	2080
PFIZER INC	78003	2000–2019	pharma	Hlth	2834
PHARMACIA CORP	67686	2000–2002	pharma	Hlth	2834
PHILIP MORRIS INTERNATIONAL	1413329	2008–2019	other	NoDur	2111
PHILLIPS 66	1534701	2012–2019	other	Enrgy	2911
PROCTER & GAMBLE CO	80424	2000–2019	other	Chems	2840
QUALCOMM INC	804328	2000–2019	tech	BusEq	3674
QWEST COMMUNICATION INTL INC	1037949	2000–2010	other	Telcm	4813
RAYTHEON CO	1047122	2000–2019	tech	BusEq	3812
RAYTHEON TECHNOLOGIES CORP	101829	2000–2019	other	Manuf	3724
REYNOLDS AMERICAN INC	1275283	2000–2016	other	NoDur	2111
SAFEWAY INC	86144	2000–2013	other	Shops	5411
SALESFORCE.COM INC	1108524	2004–2019	tech	BusEq	7372
SEARS HOLDINGS CORP	1310067	2000–2001, 2003–2017	other	Shops	5311
SEARS ROEBUCK & CO	319256	2000–2004	other	Shops	5311
SHERWIN-WILLIAMS CO	89800	2000–2019	other	Chems	2851
SOUTHWEST AIRLINES	92380	2000–2019	other	Others	4512
SPECTRUM BRND HLDG INC	109177	2000–2005, 2011–2019	other	Manuf	3420
SPRINT CORP	101830	2000–2018	other	Telcm	4812
STARZ	1507934	2000–2015	other	Telcm	4833
STRYKER CORP	310764	2000–2019	other	Hlth	3842
T-MOBILE US INC	1283699	2013–2019	other	Telcm	4812
TARGET CORP	27419	2000–2019	other	Shops	5331
TEMPLE-INLAND INC	731939	2000–2010	other	Manuf	2631
TENET HEALTHCARE CORP	70318	2000–2019	other	Hlth	8062
TESLA INC	1318605	2010–2019	other	Durbl	3711
TEXACO INC	97349	2000	other	Enrgy	2911
TEXAS INSTRUMENTS INC	97476	2000–2019	tech	BusEq	3674
THERMO FISHER SCIENTIFIC INC	97745	2000–2019	tech	BusEq	3826
TIME WARNER CABLE INC	1377013	2007–2015	other	Telcm	4841
TIME WARNER INC	1105705	2000–2017	other	Telcm	4888
TRIBUNE MEDIA CO	726513	2000–2006, 2014–2018	other	Telcm	4833
TRW INC	100030	2000–2001	other	Durbl	3714
TWENTY-FIRST CENTURY FOX INC	1308161	2005–2018	other	Telcm	4888
TYSON FOODS INC -CL A	100493	2000–2019	other	NoDur	2011
UNION PACIFIC CORP	100885	2000–2019	other	Others	4011
UNITED AIRLINES HOLDINGS INC	100517	2000–2002, 2006–2019	other	Others	4512
UNITED PARCEL SERVICE INC	1090727	2000–2019	other	Others	4210
VALERO ENERGY CORP	1035002	2000–2019	other	Enrgy	2911
VERISIGN INC	1014473	2000–2019	tech	BusEq	7370
VERIZON COMMUNICATIONS INC	732712	2000–2019	other	Telcm	4812
VIACOM INC	1339947	2006–2019	other	Telcm	4833
VIACOMCBS INC	813828	2000–2019	other	Telcm	4888
VIAVI SOLUTIONS INC	912093	2000–2019	tech	BusEq	3576
VMWARE INC -CL A	1124610	2007–2019	tech	BusEq	7373
WALGREENS BOOTS ALLIANCE INC	1618921	2000–2019	other	Shops	5912
WALMART INC	104169	2000–2019	other	Shops	5331
WESTERN DIGITAL CORP	106040	2000–2019	tech	BusEq	3572
WESTROCK CO	1732845	2000–2019	other	Manuf	2650
WEYERHAEUSER CO	106535	2000–2008	other	Others	2400
WHIRLPOOL CORP	106640	2000–2019	other	Durbl	3630
WYETH	5187	2000–2008	pharma	Hlth	2834
XEROX HOLDINGS CORP	1770450	2000–2019	tech	BusEq	3577
XTO ENERGY INC	868809	2000–2006, 2008–2009	other	Enrgy	1311
ZIMMER BIOMET HOLDINGS INC	1136869	2001–2019	other	Hlth	3842