Depositing Corporate Payout*

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Abstract

The past two decades have witnessed a sharp increase in corporate equity payout. The annual net equity payout of non-financial public companies in the U.S. averaged $525 billion (in 2010 dollars) per year from 2004 to 2019, compared to only $141 billion during the prior 17-year period. This paper provides evidence that a significant amount of the net corporate payout flows into the banking sector in the form of deposits. Aggregate deposit growth exhibits a robust and strong positive relation with aggregate net equity payout by the non-financial business sector. An increase in local dividend income driven by aggregate dividend payout is associated with a significant increase in local bank branch deposits. Estimation using bank level data shows that the inflow of deposits leads to a significant increase in bank loans, while having no significant effect on bank holdings of securities. The findings highlight the importance of considering the linkage of financial sectors and the flow of capital in the financial system, and suggest that policies aimed at restricting payouts may distort capital allocation by limiting capital flows from large and profitable corporations to small bank-dependent firms and households.

Keywords: Corporate payout, dividends, share repurchases, deposits, capital flow

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1 Introduction

Over the last few decades, the corporate sector has become a net provider of capital in many advanced economies (André, Guichard, Kennedy and Turner, 2007; Chen, Karabarbounis and Neiman, 2017; Falato, Kadyrzhanova, Sim and Steri, 2020). In the U.S., this shift has been accompanied by a rapid surge in corporate net payouts and savings. Figure 1 shows that dividends and net share repurchases have risen substantially over the last two decades. During the 17-year period from 1987 to 2003, the aggregate net equity payout (dividends plus net share repurchases) of U.S. publicly traded non-financial firms was \$141 billion per year (in 2010 dollars). In the 16 years that followed (from 2004 to 2019), the average annual payout rose to \$525 billion. Figure 1 also shows that the rise in payout far outpaced the expansion of the overall economy, the growth of total assets or total income of public companies.

This rise in corporate payouts has received much attention from not only researchers in both finance and macroeconomics, but also from the popular press and policy makers. Many people have expressed concerns that corporate equity payouts, especially share repurchases, may enrich shareholders and managers at the expense of workers and long-term growth of firms and the economy, with some politicians proposing restrictions on or even an outright ban of share repurchases.[1] Proponents of such restrictions often highlight the fact that when corporations are provided tax incentives (e.g., to repatriate foreign profits), they frequently spend tax savings on payouts instead of on new investment or worker salaries. Opponents to such restrictions argue that they would limit the natural flow of capital in the financial system. For example, then Chairman of the Council of Economic Advisers Kevin Hassett said that buybacks are "a natural way our economy recycles cash from old successful firms to new

[1]Notably, in a New York Times Op-Ed in 2019, Senators Chuck Schumer and Bernie Sanders said they would introduce legislation that "will prohibit a corporation from buying back its own stock unless it invests in workers and communities first...", and in the meantime "also seriously consider policies to limit the payout of dividends, perhaps through the tax code" (NYT, Feb 3, 2019). Recently, as part of the nearly \$2 trillion "Build Back Better" framework, the Biden administration proposed a 1% surcharge on corporate buybacks, which the administration believes, "corporate executives too often use to enrich themselves rather than investing workers and growing their businesses." Republican Senator Marco Rubio has also been critical of share repurchases and had planned to introduce legislation to curb share buybacks. An interesting contrast is that in the years following the Great Depression the government imposed a surtax on undistributed profits (SUP) to encourage firms to distribute earnings (See, e.g., Calomiris and Hubbard, 1995; Graham and Leary, 2018).

entrepreneurial firms" during an interview in 2019. However, there has been little attempt to investigate the flow of payout money in the financial system. Such an investigation is not only useful for understanding the potential consequences of restrictions on corporate payout,[2] but can also help understanding the linkage of financial sectors and the flow of capital in the financial markets (Brainard and Tobin, 1968; Gabaix and Koijen, 2021).

In this paper, I take a first step to investigate the flow of payout money in the financial system. Using aggregate as well as county and bank level data, I provide evidence that a substantial amount of payout flows to the banking sector in the form of deposits and then eventually to bank borrowers. Figure 2 plots the quarterly net payout of the non-financial corporate sector and the flow of bank deposits from 1987 to 2019. It shows a clearly positive relation between the two variables. I show that the positive relation persists when I control for other macroeconomic conditions such as GDP growth, changes in stock market value, changes in federal funds rates, and changes in credit spread. With these controls, the estimation using quarterly aggregate data suggests that a \$1 increase in total net payout is associated with a \$0.4-0.5 increase in deposits. To further address concerns about omitted variables, I show that the results persist when I use large, idiosyncratic increases in individual firms' payout as an instrument for aggregate payout, in the spirit of the granular instrumental variable approach proposed by Gabaix and Koijen (2020).

I next turn to micro level data to try to further establish a causal relation. Using dividend income data from the IRS and deposit data from FDIC at the county level, I compare deposit growth across counties that receive differential amounts of dividends. The estimation includes year fixed effects, which control for aggregate shocks that are common to all counties. The estimation also controls for county fixed effects so that the estimate is identified using time-series variation in the amount of dividend income and deposit flow within counties. I find that, controlling for county level observables such as non-dividend income and population growth, the baseline equal-weighted estimation suggests that a \$1 increase in taxable dividend income is associated with a \$0.32 increase in county deposits.

[2] See a series of articles published by the Harvard Business Review for opposing views on corporate share buybacks (Lazonick, 2014; Edmans, 2017; Fried and Wang, 2018a; Lazonick, Sakinç and Hopkins, 2020).

The point estimate increases substantially when counties are weighted by population, which reflects the fact that the effect is significantly larger in larger counties. In comparison, a \$1 increase in non-dividend income is associated with an increase in deposits by about \$0.03.

Variation in county level dividend income could reflect confounding local economic shocks. Thus I adopt a shift-share type IV estimation strategy where the IV is the projected dividend income based on the interaction between a county's lagged share of dividend income in aggregate dividends and contemporaneous aggregate dividend income. The identifying assumption is that unobserved, contemporaneous local shocks are not correlated with a county's lagged dividend share or variation in aggregate dividend payout. In the first stage, I show that almost all of the variation in county dividend income can be explained by variation in the projected dividend income and county and year fixed effects. Compared to the OLS estimation, the IV strategy produces point estimates that are slightly larger and similarly precisely estimated.

Additional analyses show that the results are robust to many different model specifications and estimations. These include using state$\times$year fixed effects to control for common unobserved shocks at the state level, analyzing variation in deposit growth and dividend income across zip-codes within the same county, and analyzing deposit growth across branches owned by the same bank but located in different counties.

I last examine how the inflow of deposits impacts loan growth at the bank level, as well as bank investment in securities. I find that the dividend-driven deposit inflow leads to a significant increase in the amount of bank loans. More than a third of the increase in loans is attributed to real estate loans (which include both commercial and residential mortgages, as well as business loans secured by real estate), and a similar amount to other commercial and industrial loans. The increase in depositor dividend income, however, does not lead to a significant change in bank holding of securities.

The main contribution of the paper is to provide evidence on the flow of payout money through the banking sector. In a frictionless world, changes in corporate financial policy do not have real consequences (Stiglitz, 1974). However, in the real world where capital markets are segmented due to various frictions (e.g., Bolton and Freixas, 2000, 2006), fluctuations in corporate payouts could alter the supply of capital to different segments of the economy. The findings in this paper suggest that when large and profitable corporations increase payouts, a substantial amount of the money received by shareholders eventually flows to bank borrowers, which include both households and bank dependent corporate borrowers. The findings are useful for understanding the potential reallocation of capital when the non-financial corporate sector as a whole becomes net lenders in the economy. In the presence of capital market segmentation, even if investors can "pierce through the corporate veil" (Poterba, Hall and Hubbard, 1987), whether savings are held by corporations or households matter. Policies aimed at restricting payouts may distort capital allocation by limiting capital flow from large and profitable corporations to bank-dependent firms and households.

The paper is related to several strands of literature. First, the paper is related to studies documenting the rise in corporate savings and payouts (e.g., André et al., 2007; Chen et al., 2017; Behringer, 2019; Falato et al., 2020; Kahle and Stulz, 2020). Kahle and Stulz (2020) show that public firms have higher payouts in the 2000s not only because they are older, larger, and have more free cash flows, but also because they pay out more of their free cash flows. Chetty and Saez (2005) and Yagan (2015) find that the Jobs and Growth Tax Relief Reconciliation Act of 2003 lead to a significant increase in dividend payouts. Blouin and Krull (2009) and Dharmapala, Foley and Forbes (2011) find that the American Jobs Creation Act (AJCA) of 2004 lead to a significant increase in corporate payouts in the following year. The rise in payout coincides with an increase in corporate income and a decline in investment and capital expenditure (Gutiérrez and Philippon, 2017; Kahle and Stulz, 2020).[3]

Second, the paper is related to studies examining the differences and connections between the stock market and the banking sector (e.g., Allen and Gale, 1997; Boot and Thakor, 1997; Parlour, Stanton and Walden, 2012; Lin, 2020), and more broadly, to recent literature studying the driver and implication of capital flows in the financial system. Gabaix and Koijen (2021) study the price impact of such flows in the stock market and emphasize the importance of understanding demand shocks and flows. Corporate payout is one important example of

[3]The rise in corporate income is itself an important subject of study, with some pointing to the shift in factor shares or declining competition as important explanations (e.g., Greenwald, Lettau and Ludvigson, 2019; Behringer, 2019; Corhay, Kung and Schmid, 2020).

flow shocks that they discuss. This paper's results show that flow shocks propagate across sectors and asset classes through market clearing and portfolio rebalancing and could have an impact on the real economy beyond the price impact that Gabaix and Koijen (2021) focus on.[4]

Lastly, the paper is related to the literature that studies the consumption effects of stock capital gain and dividend income, and the reinvestment of dividend income.[5] This paper highlights the fact that reinvested dividends and share sale income eventually flows back to shareholders if they are not absorbed by net corporate equity issuances. Shareholders as a whole cannot reinvest, and the unconsumed net payout money necessarily flows to other sectors of the financial markets.

2 Data, measurement, and summary statistics

In this section, I begin by describing the data sources, measures, and summary statistics of aggregate corporate equity payout and deposit flow. I then discuss the dividend, deposit, and other data at the county and bank level. Lastly, I describe the ownership of U.S. corporate equities and household ownership of financial assets.

2.1 Measures of aggregate net payout and deposit flow

For the aggregate time-series analyses, the sample period is from 1987 to 2019. The starting year 1987 was chosen because the prior year, 1986, marked the end of the phase-out of interest rate ceilings on deposits, known as Regulation Q. Deposits growth fluctuated

[4]Though this paper's focus is not asset prices, the findings provide useful information for "an integrated model of asset prices, investors' portfolio holdings, macro quantities, and firms' corporate policies" that Ralph Koijen calls for (Brunnermeier et al., 2021). In macro-finance models without market segmentation such as Jermann and Quadrini (2012), optimal payout is often determined by both real shocks (e.g., productivity) and financial shocks (e.g., enforcement constraint), and does not play any special role in the economy. However, in models that feature firm or household heterogeneity in accessing external capital and the specialness of bank lending and deposit funding, the paper's evidence suggests that it could be important to consider explicitly the linkage between non-financial sector's equity payout and bank deposit funding and lending.

[5]See, among others, Poterba (2000); Baker, Nagel and Wurgler (2007); Di Maggio, Kermani and Majlesi (2020); Chodorow-Reich, Nenov and Simsek (2021); Bräuer, Hackethal and Hanspal (2020); Hartzmark and Solomon (2019); Meyer and Pagel (2021); Hartzmark and Solomon (2021).

widely in prior years, partly due to the appeal of Regulation Q that started in late 1970s and the rapidly evolving inflation environment (Drechsler, Savov and Schnabl, 2020). I measure quarterly aggregate net corporate equity payout using two data sources: the Federal Reserve's Financial Accounts of the United States (FAUS) and Compustat. Using the FAUS data, net payout is measured as net dividends plus net share repurchases and is computed using Table F.103 (nonfinancial corporate business sector) by subtracting net equity issuance (FA103164103) from net dividends (FA106121075) (Bianchi, Lettau and Ludvigson, 2016; Greenwald et al., 2019). Using Compustat data, net payout is measured as the purchase of common and preferred stocks (PRSTKC) minus any reduction in the value of the net number of preferred stocks outstanding (PSTKRV) minus the issuance of stocks (SSTK) plus dividends (DV) (Bliss, Cheng and Denis, 2015; Eisfeldt and Muir, 2016; Kahle and Stulz, 2020). I then aggregate the net payout of all non-financial firms incorporated in the U.S.[6] Because my focus is on the cash flow between the corporate sector and the household sector, when measuring net share repurchases, I do not include indirect issuance such as the issuance of stocks for employees compensation (e.g., Fama and French, 2005; Boudoukh, Michaely, Richardson and Roberts, 2007; Fried and Wang, 2018b).[7] The values of aggregate net repurchase and dividends in FAUS are generally higher and more volatile than those from Compustat. In addition to the fact that FAUS data include payout made by both public and private companies, there are various other important differences between the two measures.[8] In the estimation using quarterly aggregate data, I use net payout from FAUS

[6]Some of the largest dividend payers that are in Compustat but not incorporated in the U.S. include Royal Dutch Shell, China Mobile, BHP, Vodafone, etc.

[7]Fried and Wang (2018b) argue that it is important to account for indirect issuance when measuring capital flows from firms to shareholders. However, a firm issuing new shares for employee stock compensation does not result in cash flows between the firm and shareholders (including employees). Similarly, when a firm repurchases shares and uses the repurchased shares to pay employees, it results in net cash flow from the firm to its shareholders. From an economic point of view, Fried and Wang (2018b)'s point is valid in that if an important motive behind share repurchases is employee compensation (input of production), it is difficult to make the case that share repurchases are driven by short-termism, which is the focus of their paper. From a cash flow perspective, which is the focus of this paper, what a firm does with repurchased shares is less relevant.

[8]For net share repurchases, FAUS data include equity issuance through initial public offerings (IPOs) as well as equity retirement through cash-financed mergers and acquisitions, which is an important contributor to overall equity retirements (Kuchinski, Ogden, Thomas and Warusawitharana, 2017). For dividends, FAUS' net dividends are from BEA's National Income and Product Accounts (NIPA). NIPA dividends start with the total corporate distribution in "cash and property except own stock" from IRS's Corporation Income and

as the main measure, but also report results using Compustat payout as a robustness check.

I measure quarterly aggregate deposit flow using both the FAUS data and data from FDIC's Quarterly Banking Profile (QBP). Using the FAUS data, deposit flow, $\Delta Deposits$, is the sum of flow of checkable deposits and currency (FA153020005) and time and savings deposits (FA153030005) held by households and nonprofit organizations. Using the QBP data, deposit flow is simply the difference in total domestic deposits between two consecutive quarters.

Part of the paper also uses aggregate dividend and deposit data at the monthly frequency. Monthly deposits of all commercial banks (B1058NCBAM) are from Federal Reserve's Table H.8—Assets and Liabilities of Commercial Banks in the United States. Monthly dividend income and disposable personal income data are from BEA's NIPA Table 2.6. I also create a measure of aggregate monthly dividend payment using data from CRSP. Following the literature (e.g., Boudoukh et al., 2007; Kahle and Stulz, 2020), I require stocks to be traded on NYSE, AMEX, or NASDAQ with CRSP shares codes of 10 or 11 and the first two digit distribution code (distcd) of 12. I then aggregate monthly dividend payments (divamt*shrout) based on payment dates (paydt).

All the time series data from FAUS and BEA are seasonally adjusted. To ensure consistency and that the results are not driven by seasonality, I perform similar seasonal adjustments of series that have not been seasonally adjusted. These include quarterly aggregate dividend, share issuance, and share repurchase data from Compustat, quarterly deposit data from FDIC, and monthly aggregate dividend payment data from CRSP. I use SAS's X11 procedure to perform the seasonal adjustments, which is an adaptation of the U.S. Bureau of the Census X-11 Seasonal Adjustment program.

Tax Returns. Some important adjustments made by NIPA include adding dividends paid by Federal Reserve banks and other federally sponsored credit agencies, and measures of U.S. receipts of dividends from abroad net of payments to abroad from BEA's international transactions accounts, and subtracting capital gains distributions of regulated investment companies, interest payments of regulated investment companies, and dividends received by U.S. corporations (See Petrick, 2002). These adjustments sometimes lead to drastic changes in NIPA's dividend measure. For example, there was a sharp increase in the amount of dividend received by companies from the rest of the world in the first quarter of 2018 that lead to a sharp decline in net dividend and net payout in the FAUS data. The abnormal increase in dividend received by U.S. companies from the rest of the world appears to be caused by companies repatriating foreign profits following the Tax Cut and Jobs Act of 2017 (Greenwald et al., 2019).

Panel A of Table 1 reports the summary statistics of the main variables used in the time-series estimation of the relation between deposit flow and net payout. On average, deposits increase by $71 billion per quarter, and quarterly net payout is $143 billion. All dollar amounts in the paper are in 2010 dollars. When scaled by lagged GDP, deposit flow, net payout, and change in stock value is 0.5%, 1.0%, and 1.7% of lagged GDP on average.

Figure 1 plots the time series of various measures of aggregate payouts since 1987. Figure (a) shows that dividends paid by non-financial firms in the Compustat/CRSP universe increased dramatically since early 2000s, as documented by Kahle and Stulz (2020). It also shows that the sharp increase in dividend payment is not simply due to the growth of the overall economy—dividends paid by public companies as a share of GDP also rose substantially since early 2000s. Figure (b) shows a similar trend in net share repurchases, which also exhibit greater variability than dividends. In Figure (c), I scale total net payout (dividends+net share repurchases) by total assets and total operating income (OIBDP). It shows that net payout as a share of total assets or total income increased dramatically in the past two decades, suggesting that corporations have been paying out more of the income that they generate (Kahle and Stulz, 2020). Finally, I look at the net payout data from the FAUS. As noted above, Figure (d) shows that net payout from FAUS is substantially higher than that of Compustat. But the two series generally track each other and FAUS data also show a substantial increase in net payout after 2004.

2.2 Dividend income, deposits, and other county- and bank-level data

The dividend income data at the county and zip-code level are from the IRS's Statistics of Income (SOI). The county level data are available from 1989 through 2018, while the zip-code level dividend income are available since 2004. The IRS data cover all households that file tax returns, which allows for measuring dividend income at a very granular level. While most dividends received by households are distributed by publicly traded companies, a small fraction could also come from privately owned C corporations.[9] The dividend income data do not capture dividend received through nontaxable accounts such as retirement plans. These dividends are typically reinvested and thus are unlikely to directly affect deposit flow at the county level.

For deposit growth at the county level, I aggregate deposits of branches by county using the Summary of Deposits data from the FDIC. The data set reports the amount of branch deposits for FDIC-insured institutions as of June 30 every year since 1994. Deposit data are obtained for the period of 1994 to 2018. I obtain total income and population data at the county level from the Bureau of Economic Analysis. I take the difference between BEA income and IRS dividend income to create a measure of non-dividend income.

Panel B of Table 1 reports the summary statistics at the county level. The average real annual deposit growth rate is 1.2%. Dividends scaled by lagged deposits has an average of 2.1%. Non-dividend income is about 2.4 times the value of total county deposits. Dividend as a share of total adjusted gross income is 1.8% on average.

I obtain bank balance sheet data for the period of 1994 to 2018 from the Consolidated Report of Condition and Income filed by banks, commonly known as "call reports." I limit the sample to commercial banks (rssd9048=200). I obtain deposits (rcon2200), loans (rcon1400, or rcon1763+rcon1764 if rcon1400 is missing), C&I loans (rcon1766), real estate loans (rcon1410), total assets (rcon2170), equity (rcon3210), and income (riad4340). Securities are measured as the sum of held to maturity securities (rcon1754) + available for sale securities (rcon1773). I exclude banks with negative or missing deposits, loans, or equity, or if these values are greater than total assets. The summary statistics of the main variables used in the bank-level estimation are reported in Panel C of Table 1.

[9] Distributions by other forms of business, such as sole proprietors and S corporations, are usually taxed as regular income and thus are not included in the IRS dividend income. Chodorow-Reich et al. (2021) note that equity held in privately owned C corporations is very small (less than 7% of total C-corporation equity), suggesting that dividends paid by private companies likely account for a very small share of total dividends in the IRS data.

2.3 Accounting for net equity payout

This section presents and discusses some facts about the ownership of U.S. corporate equities and household ownership of financial assets. They serve as a useful context and motivation for the main analyses in the next section.

By a simple cash flow accounting identity, when corporations as a whole pay out \$1 of dividend or repurchase \$1 of shares, equity owners as a whole must receive the \$1. If all owners have the same propensity to reinvest dividend or sell shares back to companies, the money flows to each sector of owners proportional to its ownership share. If some owners are more passive (i.e., more likely to reinvest dividends and less likely to sell shares), the other more active sectors receive more than their ownership share. Figure 3 plots the ownership of the U.S. corporate equity from 1987 to 2019, using data from FAUS.[10] It shows that household ownership of total U.S. equity (excluding retirement accounts) has declined from around 50% to just below 40% during this period. About one third is owned by retirement plans including both defined contribution, defined benefit pension plans, and individual retirement accounts (IRAs). Foreign investors' share has been increasing steadily during the period, reaching almost 15% as of 2019. Only a small fraction is owned by non-financial corporations and by financial corporations such as banks and insurance companies. Although one might expect some groups of investors such as pension funds to be more passive, there is no significant correlation between corporate net equity payout and changes in sector ownership at the quarterly frequency.[11]

[10] The data mostly come from FAUS' Table L.223 (Corporate Equities). One caveat is that the corporate equity data in Table 223 include shares of exchange-traded funds, closed-end funds, real estate investment trusts, as well as foreign corporate equities and investment fund shares owned by U.S. residents.

[11] Appendix Table A2 reports the results of regressing changes in quarterly equity ownership share of the household sector, pension and life insurance, and the rest of the world on contemporaneous as well as lagged payout and net share repurchases. While there is some evidence that the household sector's ownership declines as quarterly payout rises, the correlation is not statistically significant, neither is any of the other coefficients on payout or share repurchase. In Appendix Figure A2, using data from Table F.223 of FAUS, I plot the annual net purchases of corporate equities from 1987 to 2019 by the household sector (not including indirect ownership through mutual funds), pension and insurance companies, mutual and close-end funds and ETFs, and the rest of the world. There does not appear to be any obvious relation between any sector's net purchases and aggregate corporate payout shown in Figure 1. Confirming the visual impression, untabulated regression results show that there is no robust relation between annual non-financial corporate payout (or net share repurchases) and net purchases of corporate equities by any of the four sectors.

How might shareholders use the payout money that are not reinvested in stocks? Investors can use the money to increase consumption, pay down debt, or save the money in other forms of financial assets. In a frictionless world, whether a dollar is paid out or saved by corporations on behalf of households should not matter for households' consumption or saving decisions. In the real world, however, due to various frictions or behavioral reasons, households may choose to increase consumption when they receive the payout money (Baker et al., 2007), and they may choose to save the money in other financial assets than what corporations tend to hold. Figure A1 shows the composition of non-retirement financial assets held by U.S. households using the FAUS data. The composition varies substantially overtime, mostly driven by fluctuations in stock returns. On average, stocks (including both directly held and indirectly held through mutual funds) account for 42% of total non-retirement financial assets, while deposits account for 30%, followed by other fixed income investments such as government and corporate bonds, loans, and money market mutual funds. One limitation of the FAUS data is that they are aggregated and as a result we do not know the joint ownership of these different types of assets at the household level. Examining disaggregated data reveals that there does not appear to be a large overlap between stock and bond ownership. For example, according to the 2016 Survey of Consumer Finance (SCF) data, of the nearly 20% households that own stocks in non-retirement accounts (either directly or indirectly through mutual funds), only a third report any ownership of bonds or bond mutual funds. Even among the top quartile of stock owners (with a market value of stocks over a quarter million), only about half report owning any bonds. In contrast, nearly all stock owners also report an ownership of deposits.[12] Thus deposits emerge naturally as a potentially important destination for the payout money.[13]

[12] These facts are consistent with the view that government securities and deposits are not perfect substitutes (Krishnamurthy and Vissing-Jorgensen, 2015; Drechsler, Savov and Schnabl, 2017; Bolton, Li, Wang and Yang, 2020; Li, 2020; Li, Ma and Zhao, 2020).

[13] In the next section, I also provide some evidence on the relation between aggregate corporate payout and household holdings of non-deposit fixed-income assets.

3 Results

This section presents the main results of the paper. I first document the relation between deposit flow and payout using aggregate data. I then estimate the effect of dividend income on deposit growth at the county level. Lastly, I examine how the deposit growth driven by dividend payout impacts bank loans and bank holding of securities using bank level data.

3.1 Aggregate payout and deposit flow

In this section I examine the relation between deposit flow and payout using aggregate data. I first analyze quarterly data and then proceed to examine the relation at the monthly frequency. I present results from the OLS estimation as well as an IV strategy instrumenting aggregate payout with large, idiosyncratic firm-level payouts.

3.1.1 Quarterly payout and deposit flow

I start by examining the relation between aggregate net payout and aggregate deposit flow using data from FAUS. Figure 2 shows the scatter plot of the quarterly deposit flow of the household sector against the net payout of the non-financial corporate business sector during the period of 1987 to 2019. The two variables exhibit a clearly positive relation. I next examine the relation formally by regressing deposit flow on net payout, both scaled by lagged GDP, and controlling for other macroeconomic factors. The model estimated is,

$$\Delta Deposits_t/GDP_{t-1} = \alpha + \beta Payout_t/GDP_{t-1} + \gamma X_t + \epsilon_t, \tag{1}$$

where $\Delta Deposits_t$ is the change in quarterly deposits held by the household sector. $Payout_t$ is the total amount of net equity payout. GDP is the GDP in the previous quarter. X is a vector of control variables.

Table 2 reports the estimation results. Column (1) shows that, without any controls, the coefficient of net payout is 0.5, suggesting that a \$1 increase in net payout is associated with a \$0.5 increase in total deposits. The R-squared of 17.5% of this univariate regression also suggests an important role of payout in explaining changes in deposits. Obviously this positive relation could simply be due to macroeconomic variables omitted from the estimation, such as the growth of the overall economy. Thus I next control for various measures of macroeconomic conditions such as contemporaneous GDP growth, changes in stock values (scaled by lagged GDP), changes in federal funds rate, and changes in credit spread. With these additional controls, column (2) shows that the coefficient of net payout stays almost the same and remains highly significant. The finding suggests that the positive relation between deposit flow and corporate equity payout observed in Figure 2 cannot be explained by these macro observables.[14]

Column (3) adds lagged payout scaled by GDP as well as the lagged dependent variable in the estimation. Deposit growth does not exhibit a significant first-order autocorrelation at the quarterly frequency. Lagged payout during quarter $t-1$ has an insignificant effect on deposit growth in quarter t, while the coefficient of payout in quarter t becomes slightly smaller. Thus it appears that deposit growth is significantly associated with only contemporaneous net corporate payout.

I next use data from different sources to construct alternative measures of payout and deposit growth. I first use the aggregate payout of publicly traded non-financial firms in Compustat as an alternative to FAUS payout, which includes the payout of both public and private companies. Column (4) shows that the coefficient of Compustat payout scaled by GDP is 0.58, somewhat larger than 0.49 reported in column (2) when FAUS payout is used.

The evidence so far shows a strong positive association between net equity payout and household deposits. One might wonder whether the rise in equity payout is associated with a decline in corporate deposits, to the extent that firms use their deposit holding to fund

[14]Appendix Table A1 reports the results of several robustness checks. First, to show that the positive relation between deposit flow and net payout is not driven by the fact that both variables are scaled by lagged GDP, columns (1) and (2) show that the coefficient is similar if neither variable is scaled or if both variables are scaled by lagged deposits. Second, because both the change in deposit and net payout from FAUS have been seasonally adjusted, I do not further control for quarter of the year dummies. Column (3) shows that the coefficient on net payout changes little if quarter dummies are included. Lastly, because the dependent variable does not display an obvious trend, I do not control for any trend effect in the main estimation. Column (4) shows that when a quadratic trend is added to the estimation, the coefficient of net payout declines slightly to 0.41.

some of payout.[15] In the last column, I use total domestic deposits reported in FDIC's QBP, which includes household and corporate deposits at all FDIC insured institutions (and are on average about 14% larger than deposits held by the household sector as reported by the Federal Reserve). It reports a coefficient on payout of 0.54, and slightly larger than 0.49 reported in column (2). This finding provides further evidence that any decline in corporate deposits is small relative to the increase in household deposits as corporate equity payout rises.[16]

Lastly, I examine the correlation between net equity payout and the flow of household holding of non-deposit fixed income assets at the quarterly frequency. The paper's focus is on the flow of payout money into the banking sector in the form of deposits. However, the household sector could also reinvest the equity payout money in other fixed income assets.[17] Figure A3 plots the quarterly flow of household holding of non-deposit fixed income assets (including debt securities, loans, and money market funds) against quarterly net equity

[15]There is limited evidence on the importance of deposits for corporate financial investment. For instance, Duchin, Gilbert, Harford and Hrdlicka (2017) show that in aggregate, deposits that are not part of cash and cash equivalents represent less than 4% of total financial assets for S&P 500 firms as of 2012 (Table I). Their Appendix Table AII through AIV show that Apple and Intel report no bank deposits (likely due to an insignificant amount relative to total financial assets), whereas Google reports a time deposit of $984 million, out of $47 billion total financial assets. The FAUS data show that as of the end of 2019, the amount of domestic deposits held by the non-financial corporate business sector is around $1.5 trillion, about 10% of total commercial bank deposits. The vast majority of it is checkable deposits and currency (FL103020000), which is usually held to meet operational or precautionary needs (Gao, Whited and Zhang, 2021). The amount of time and savings deposits (FL103030003) is only around $200 billion. See also Li (2021) and Mian, Straub and Sufi (2020) for discussion of corporate deposits.

[16]I provide further and direct evidence on the relation between corporate equity payout and changes in corporate deposits in the Appendix Table A3. The first three columns show that total non-financial corporate deposits have a weakly significantly negative association with quarterly net payout, which is driven by time and savings deposits. The last three columns use quarterly payout data from Compustat. Time and savings deposits continue to have a significantly negative association with payout, but this effect is offset by a similar but marginally insignificant increase in checking deposits, resulting in an effect on total corporate deposits that is indistinguishable from 0. Overall it does not appear that the drawing down of corporate deposits is an important funding source for corporate equity payout.

[17]For example, it is likely that some of the equity payout money received by households finds its way back to the corporate sector through an increase in household holding of corporate bonds. While this is likely, it should be noted that the household sector holds a much smaller share of corporate bonds than corporate equity and corporate bonds account for a much smaller share of household financial assets than equity. According to FAUS data, during the period of 1987 to 2019, corporate and foreign bonds held by the household sector both directly and indirectly through bond mutual funds make up about 5% of total non-retirement financial assets held by the household sector, while corporate equities make up more than 40%.

payout.[18] It shows that the two variables have a weakly positive relation. Appendix Table A4 reports the results of regressing changes in households' holding of fixed income assets on net payout, controlling for the same variables in Table 2. Column (1) shows that the change in households' holding of fixed income assets is positively associated with net payout, but the relation is statistically insignificant. Column (2) reports the results using payout from Compustat. The coefficients on net payout is close to zero and not statistically significant. Taken together, there does not appear to be robust evidence that an increase in net corporate equity payout is significantly associated with household holding of non-deposit fixed income assets.

3.1.2 IV estimation based on large idiosyncratic payouts

In December 2004, Microsoft paid out \$33.5 billion of dividend, of which \$32 billion was a one-time special dividend. This is compared to the regular dividend of less than \$1 billion that Microsoft paid out in September of the same year, and it accounted for more than 50% of all dividend paid out by CRSP firms in December 2004. Microsoft's special dividend payout represents a large shock to aggregate dividend in December 2004 that can also be considered to be plausibly exogenous to aggregate deposit growth during that month. Importantly, not all firms increased dividend substantially during that month. In fact, the median firm maintained the same amount of dividend between September and December. The 75th percentile dividend growth rate is merely 1%.

In this section, I exploit these large, idiosyncratic dividend payouts and use them to construct an IV in the spirit of the granular instrumental variable (GIV) of Gabaix and Koijen (2020). I start by defining a simple measure of abnormal changes in dividend payments at

[18] Note that the holdings here do not include indirect holdings of fixed income assets through bond mutual funds. The FAUS data do not report this figure and it is not possible to construct an accurate measure using existing series. One can potentially measure it by multiplying the total mutual fund flow of debt securities reported in Table F.122 and the household share of mutual funds (lm153064205/lm653164205). However, this measure is likely to contain large errors because household holding of mutual funds is calculated as a residual in FAUS data and it assumes that the household share of all mutual funds is the same as household share of bond mutual funds.

the firm level:

$$\Delta Div_{i,t} = Div_{i,t} - Div_{i,t-3} \times Median(\frac{\Delta Div_{j,t}}{Div_{j,t-3}})_t \tag{2}$$

where $Median(\frac{\Delta Div_{j,t}}{Div_{j,t-3}})_t$ is the median dividend growth rate from month $t-3$ to month t of all dividend-paying firms, and is used as the benchmark for the "normal" dividend growth rate (As noted below, the results are robust to using dividend growth at the 75th or 90th percentile as the benchmark.) I then aggregate the abnormal dividend payments of top payers every month and use it as an instrument for the actual dividend payout in that month. The total abnormal dividend payments is large if some large dividend payers decide to raise their dividends substantially relative to other dividend-paying firms in the same month. If these large increases in dividends are idiosyncratic and uncorrelated with other determinants of aggregate deposits, as appears to be the case for Microsoft's special dividend in 2004, the exclusion condition will be satisfied. The cutoff that one should use to select top payers is not clear-cut. The smaller number of firms included, the more likely their behavior is idiosyncratic, but the less likely their behavior influences aggregate dividend payments. In what follows, I report results based on abnormal dividend payments that are in the top 3% every month, but note below that the results are not sensitive to the choice of cutoffs.[19]

Figure 4 plots the aggregate monthly dividend payments of publicly traded firms in CRSP and the total abnormal dividend payments that are in the top 3% in a given month, both scaled by lagged GDP. It shows that sharp increases in aggregate dividend payment, such as in December 2004 and 2012, are frequently driven by large idiosyncratic increases in dividends by individual firms. The sharp increase in December 2004 was almost entirely driven by Microsoft's special dividend payment discussed above, while the increase in December

[19] Firms tend to pay dividends on a quarterly basis, with the payment dates falling on different months throughout the year. The number of firms paying dividend in a given month ranges from 500 to 2109, with a median of 1164 and a mean of 1240. Thus the 3% cutoff selects fewer than 40 firms on average in a given month. The total top 3% abnormal dividends scaled by total dividend paid by all firms three months before ranges from -0.1% to 244%, with a mean of 4.0% and a median of 2.1%. In a similar fashion, Chodorow-Reich, Ghent and Haddad (2020) use large idiosyncratic bond returns as an instrument for insurers' bond portfolio returns. They define large abnormal returns as those roughly in the top 1% of all bond returns (See P. 1518).

2012 was driven by a number of firms' actions to raise dividends ahead of a potential dividend income tax rate hike in 2013. In the meantime, there are times when a sharp rise in total dividends is not accompanied by large idiosyncratic dividend payments (e.g., February 1988) and vice versa (e.g., August 2018). The precise timing of dividend payment at the monthly frequency also helps rule out alternative explanations. For example, while changes in dividend income tax rate could affect the amount of bank deposits in some other ways, there is no obvious reason to expect any such impact to take place during exactly the same month when some firms paid out a large special dividend right before a potential change in the tax rate.

The model estimated is,

$$\Delta Deposits_t/GDP_{t-1} = \alpha + \beta_1 Dividend_t/GDP_{t-1} + \beta_2 Income_t/GDP_{t-1} + \gamma X_t + \epsilon_t, \quad (3)$$

where $\Delta Deposits_t$ is the change in monthly deposits held by all commercial banks. $Dividend_t$ is the total amount of monthly dividend payment. Results using dividend from BEA's NIPA are reported in the main text, while those using CRSP dividend are reported in the Appendix. Because GDP data are not available at the monthly frequency, both the change in deposits and dividend payments are scaled by GDP in the previous quarter (The results are robust to using alternative scaling variables such as lagged total monthly personal income from the BEA.) $Income$ is the disposable personal income from the BEA. X includes other control variables such as monthly stock returns and changes in federal funds rate. I again do not control for month of the year dummies because the data have been seasonally adjusted. But Panel B of Appendix Table A1 shows that the results are robust to the inclusion of month dummies.

Before proceeding to the IV estimation, I first report the results of the OLS estimation of Eq. (3). The first column of Panel A of Table 3 shows that the coefficient of dividend income is 0.56 and highly statistically significant. The magnitude of the effect is in line with the estimates from Table 2 where aggregate quarterly payout is used.

The second column reports the first stage result of the IV estimation. It shows that the abnormal monthly dividend payments of the top 3% has a significantly positive effect on aggregate monthly dividend. The second column presents the second stage results. The instrumented dividend payout has a significantly positive effect on deposit growth. A one-dollar incremental dividend is associated with a $0.98 change in aggregate deposits held by all commercial banks.[20] While the point estimate is substantially larger than the OLS counterpart reported in column (1), the estimate is also less precise with a much larger standard error, and is not statistically significantly different from the OLS estimate.[21]

I next apply the same IV strategy to estimate the relation between quarterly net payout and deposit flow that Section 3.1.1 explores using the OLS estimation. The IV is the aggregate abnormal payout that are in the top 3% among all non-financial publicly traded firms in the Compustat/CRSP universe, scaled by lagged GDP. The only difference from Eq. (2) is that the 75th percentile, instead of the median, payout growth is used as the benchmark for normal payout growth because the median values are mostly negative. Panel B reports the first- and second-stage results where the instrumented variable is the net payout from FAUS divided by lagged GDP. Column (2) shows that the estimated coefficient on payout is 0.73. It is larger than but not significantly different than the OLS estimate of 0.49 reported in column (2) of Table 2.[22]

3.2 County level dividend income and deposit growth

In this section, I switch to micro data at the county level to try to further establish a causal relation between corporate equity payout and deposit growth. Specifically, I compare deposit growth across counties that receive varying amounts of dividend income. As shown below,

[20]Results are robust to alternative cutoffs for selecting top payers. For example, using a 5% cutoff produces an estimated effect of 0.99 with the same specification, significant at the 5% level, while using a 1% cutoff produces an estimated effect of 0.96, significant at the 10% level. Alternatively, if I use dividend growth at the 75th percentile (instead of the median) as the benchmark in Eq. (2), the estimation produces a coefficient of 0.99, significant at the 5% level. Using the 90th percentile produces a coefficient of 1.06, significant at the 10% level.

[21]Panel B of Appendix Table A1 shows that when total monthly dividend payments from CRSP (based on payment dates) are used, both the OLS and IV estimates are larger than the corresponding estimates using NIPA dividend.

[22]If the net payout by non-financial firms in the Compustat/CRSP universe is used (instead of net payout from FAUS), the second stage estimation produces a coefficient of 1.07, with a standard error of 0.44.

the within-county variation in the amount of dividend income is mostly driven by variation in aggregate dividend payment. The estimation is similar in spirit to a difference-in-differences estimation—when the corporate sector pays out a much greater amount of dividends in year t relative to year $t-1$, do we see a greater inflow of deposits in counties with greater stock market participation in year t, relative to year $t-1$? The estimation removes the effect of any confounding macro shocks that are correlated with aggregate payouts but do not affect deposit flow in the same heterogeneous way as dividend payout. In what follows, I first present the results of the OLS estimation controlling for county fixed effects and county observables such as non-dividend income and population growth. To further address the concern that county-level dividend income could be correlated with unobserved local economic shocks that also affect local deposit growth, I then conduct several additional tests. These include an IV estimation that exploits variation in dividend income within counties that is driven by variation in aggregate dividend payouts, examining deposits growth across branches of the same bank located in different counties, and examining deposit growth and dividend income across zip-codes within the same county.

3.2.1 OLS estimation

As in the aggregate estimation, I again regress the change in deposits on the amount of dividend at the county level. Both variables are scaled by lagged deposits but as noted below that the results are robust to using alternative scaling variables. Specifically, the model estimated is,

$$\begin{aligned}\Delta Deposits_{i,t}/Deposits_{i,t-1} =& \alpha_i + \beta_1 Dividend_{i,t}/Deposits_{i,t-1} + \beta_2 Other\ income_{i,t}/Deposits_{i,t-1} \\ &+ \beta_3 Div\_ratio_i \times ret_t + \beta_4 Pop\_g_{i,t} + \mu_t + \epsilon_{i,t}, \end{aligned} \quad (4)$$

Given that deposits are measured as of June 30 of each year in the SOD data, I use the average IRS dividend income in year t and $t-1$ to proxy for the dividend received by each county between July of year $t-1$ and June of year t in the main independent variable. *Other income* is the total income from the BEA minus IRS's dividend income, again averaged over year $t-1$ and year t. Other control variables include population growth and the interaction between stock returns and the average of a county's dividend income to adjusted gross income ratio.[23] This interaction term is included to control for the effect documented by Lin (2020) that there is a stronger negative association between deposit growth and stock returns in counties with greater stock participation (as proxied by dividend income ratio). Controlling for this effect is potentially important because corporate equity financing and payout activities are correlated with market valuation (Baker and Wurgler, 2002). α_i is county fixed effects to control for the average of county-level dividend income and deposit growth rates. Standard errors are clustered by county to allow for correlations across years within a county, as in Drechsler et al. (2017).

Table 4 reports the results. The first column reports the result of the estimation where counties are equally weighted. The coefficient of dividend income is 0.32 and significant at the 1% level, indicating that a $1 increase in county dividend income is associated with a $0.32 increase in deposits. In column (2), the regression is weighted by a county's average population. The point estimate increases markedly to 0.69. The large difference between the weighted and unweighted estimates suggests that the effect could be heterogeneous across counties of different sizes (Solon, Haider and Wooldridge, 2015). To explore this, the estimation is performed separately using the subset of large and small counties, defined as those in the top 5% and bottom 95%, respectively, of average population during the sample period. Columns (3) and (4) show that the effect is indeed larger for large counties. The point estimate is 0.89 for large counties, compared to 0.27 for smaller counties, and the difference is significant at the 5% level. The larger point estimate for larger counties could reflect the possibility that non-reinvested dividend income is more likely to flow to bank branches located in large cities.

Non-dividend income has a coefficient of 0.02–0.04 and is also statistically significant, suggesting that a $1 increase in non-dividend income is associated with an increase in deposits by 2–4 cents, in line with personal savings rate during this period and the share of savings

[23]The average dividend income ratio is absorbed by county fixed effects and is thus not separately included in the estimation.

in deposits. The interaction between dividend income ratio and stock returns is significantly negative, confirming the findings in Lin (2020).

I next examine the robustness of the results to alternative scaling variables when estimating Eq. (4). Column (5) reports the results where deposit flow, dividend income, and non-dividend income are scaled by lagged population. The coefficient of dividend income becomes 0.85, slightly larger than that in column (2). Alternatively, if these variables are scaled by the average county population so that the within-county variation is entirely driven by changes in the numerator, the coefficient of dividend income is 0.84 and is significant at the 1% level.

Lastly, I include state×year fixed effects to account for any unobserved common shocks at the state level. Column (6) shows that the point estimate increases slightly to 0.75 from 0.69 in column (2), suggesting that within the same state, deposits also grow faster in places where the residents receive more dividends. Overall, the evidence from the county level estimation provides strong indication that the positive relation between aggregate payout and deposit flow documented in the previous section is not simply driven by confounding macro factors omitted from the estimation.

3.2.2 IV estimation

One concern about the OLS estimation is that the dividend income at the county level is correlated with omitted county economic shocks that affect deposit growth. For example, it is possible that a positive local economic shock (not captured by the level of non-dividend income and population growth) causes both deposits and dividend income (e.g., from locally headquartered public companies and private C-corporations) to increase, resulting in an upward bias in the OLS estimate. To address this concern, I adopt an IV estimation, similar in spirit to a shift-share IV, where the instrument for actual dividend income is projected dividend income based on a county's lagged dividend income share and aggregate dividend income. That is,

$$Dividend\_proj_{i,t} = \frac{Dividends_{i,t-2}}{\sum Dividends_{i,t-2}} \times \sum Dividends_{i,t} \tag{5}$$

Intertemporal variation in projected dividends within counties is largely driven by variation in the amount of aggregate dividends, which should be exogenous to a given county. As in the OLS estimation, county fixed effects are included to control for the cross-county variation in dividend income share. Similar to the measurement of dividend income in Eq. (4), the amount of total dividend in Eq. (5), $\sum Dividends_{i,t}$, is the average of total dividend in year t and $t-1$. County dividend share is lagged by two years in Eq. (5) to ensure that the IV does not contain dividends in year $t-1$, which is part of the instrumented variable. As discussed below, the results are robust to using a county's average dividend share in Eq. (5) (in which case all of the within-county variation in projected dividend is driven by variation in the amount of aggregate dividends).

Columns (1)-(3) of Table 5 report the first stage results. Column (1) shows that with county and year fixed effects and no other controls, the coefficient of projected dividends is 0.6 and highly statistically significant, suggesting that a \$1 increase in projected dividends is associated with a \$0.6 increase in actual dividend income at the county level. The R-squared is 0.93, suggesting that almost all of the variation in county dividend income can be explained by the projected dividend income and county and year fixed effects. In column (2) where control variables are included, the coefficient of projected dividend drops to 0.54 and remains highly statistically significant. In column (3), where counties are weighted by population, the coefficient rises to 0.62.

Columns (4) and (5) report the second stage results of the unweighted and weighted estimation where the same controls in Table 4 are included. The coefficient estimate of the unweighted estimation is 0.53, which is larger than the unweighted OLS estimate of 0.32 reported in column (1) of Table 4. The coefficient in the population-weighted estimation is 0.86, again larger than the OLS estimate of 0.69 reported in column (2) of Table 4. The findings are reassuring and suggest that unobserved confounding county-level factors do not appear to be correlated with dividend income and deposit growth in a systematic way that leads to an upward bias in the OLS estimation.[24]

3.2.3 Within-bank estimation

I next conduct a within-bank estimation of the relation between dividend income and deposit growth. Specifically, I estimate a model similar to Eq. (4), but use only multi-county banks, while including bank×year fixed effects. The inclusion of bank×year fixed effects wipes out any shocks at the bank level in a given year and compares deposit growth across a bank's branches located in different counties. This estimation helps further rule out some alternative explanations of the results, such as that areas experiencing high dividend income growth also experience high loan demand shocks, which leads banks to increase deposit supply. This is because banks tend to reallocate funds across branches in response to loan demand shocks, which should cause relatively homogeneous deposit growth across counties (Drechsler et al., 2017; Lin, 2020). In contrast, differential shocks to household deposit demand in counties where a bank operates will cause observed branch deposits to grow differentially across counties even if banks use internal capital markets to reallocate these deposits. The model estimated here is

$$\begin{aligned} \Delta Deposits_{i,b,t}/Deposits_{i,t-1} = & \alpha_{i,b} + \beta_1 Dividend_{i,b,t}/Deposits_{i,t-1} \\ & + \gamma X_{i,t} + u_{b,t} + \epsilon_{i,b,t}, \end{aligned} \tag{6}$$

where $\Delta Deposits_{i,b,t}$ is the change of bank b's deposits in county i, $Dividend_{i,b,t}$ is the amount of dividend (averaged over year t and t-1) in county i assigned to bank b, measured as county i's total dividend multiplied by bank b's average deposit share in the county. The average deposit share is used to ensure that the amount of dividend assigned to a bank is not affected by changes in a bank's market share in a county, which would cause the dividend

[24]If a county's average dividend share, as opposed to dividend share lagged by two years, is used in Eq. (5), the unweighted and weighted estimation produces an estimate of 0.68 and 0.56, with a p-value of 0.005 and 0.137, respectively. Using the average dividend share, while strengthening the exogeneity of the instrument, introduces additional noise in the projected dividend income in a given year.

measure to be mechanically correlated with the dependent variable. The control variables, X, include population growth and non-dividend income, calculated similarly as the county total non-dividend income multiplied by a bank's average deposit share in the county. $\alpha_{i,b}$ is bank×county fixed effects, and $u_{b,t}$ is bank×year fixed effects.

Panel A of Table 6 reports the results. To facilitate the comparison of the effects, column (1) first presents the estimation results not controlling for bank×year fixed effects but using only multi-county banks. The point estimate is 0.53, which is larger than the unweighted OLS estimate reported in Table 4 and the same as the unweighted IV estimate in Table 5. Column (2) shows that when bank×year fixed effects are added to remove any confounding shocks at the bank level, the point estimate drops slightly to 0.51. The results suggest that, even within the same bank, deposits grow faster in branches in areas of high dividend growth. This within-bank identification strategy strongly supports the view that payouts influence deposit growth through deposit demand as oppose to loan demand.

3.2.4 Zip-code level estimation

In this section, I estimate a within-county estimation using deposit growth and dividend income at the zip-code level. For this analysis, I match the zip codes of bank branches in FDIC's Summary of Deposits to the zip codes in the IRS SOI data. I then use county×year fixed effects to control for common shocks at the county level that affect deposit growth. The estimation thus compares how deposit growth in different zip codes of the same counties varies as a function of the zip-code level dividend income. The identification assumption is that while deposits tend to be localized (people tend to put money in nearby branches), any effects of confounding local shocks, such as local productivity or loan demand shocks, should be more spread out across the whole county. Because the zip-code level dividend income data are only available since 2004, the sample period is from 2004 to 2018. The model estimated here is

$$\begin{aligned}Deposits_{i,j,t}/Deposits_{i,j,t-1} =& \alpha + \beta_1 Dividend_{i,j,t}/Deposits_{i,j,t-1} + \beta_2 Other\ income_{i,j,t}/Deposits_{i,j,t-1} \\ &+ \gamma X_{i,j,t} + \mu_j + u_{i,t} + \epsilon_{i,j,t}, \qquad (7)\end{aligned}$$

where $Deposits_{i,j,t}/Deposits_{i,j,t-1}$ is the deposit growth in zip code j within county i, $Dividend_{i,j,t}$ is the average amount of deposits in zip code j in year t and $t-1$, μ_j is zip-code fixed effects, and $u_{i,t}$ is the county×year fixed effects. The control variables include non-dividend income at the zip code level, measured as adjusted gross income minus dividend income, and the interaction between stock returns and dividend income ratio at the zip-code level.

Panel B of Table 6 reports the results of the estimation. Without *county* × *year* fixed effects, the estimated effect is 0.32, which happens to be the same as the estimate reported in column (1) of Table 4 that uses county level data. With *county* × *year* fixed effects, the estimate increases slightly to 0.37. These findings suggest that deposits growth is faster when a zip code receives more dividend income, compared to other zip codes located in the same county, and help alleviate concerns that unobserved local economic shocks are driving the results at the county-level.

3.3 Dividend income and loan growth: bank level evidence

In this section, I use bank-level data to examine to what extent the payout-induced shocks to deposits are transmitted to lending and bank holding of securities. To the extent that banks can substitute other type of funding for deposits, shocks to deposit demand may not affect lending. However, deposits generally represent a more stable and cheaper source of funding than other types of bank debt or equity. Consistent with this notion, a large literature has shown that shocks to deposits affect bank supply of credit.[25]

For this analysis, I need a proxy for the amount of dividend income applicable to each bank. As is done in the within-bank analysis in Section 3.2.3, for dividend income of single-county banks, I simply use a county's total dividends income multiplied by the bank's share of deposits in that county. For multi-county banks, it is the sum of dividends at the county level across all counties where the bank has branches, where the dividends at the county level is again the county's total dividends multiplied by the bank's share of deposits in that

[25] Some recent studies include Acharya and Mora (2015), Gilje, Loutskina and Strahan (2016), Drechsler et al. (2017), and Lin (2020).

county. As in Section 3.2.3, to ensure that this dividend amount is not driven by time-series variation in bank-specific growth in counties, for a bank's deposit share in a county, I use the average of the bank's deposit share in a given county across all years. The within-bank variation in the amount of dividend is thus driven by variation in county dividends only. To put the non-dividend income control on an equal footing, I calculate non-dividend income applied to each bank the same way as dividend income. Lastly, I scale dividend income, non-dividend income, as well as the dependent variable (change in deposit or loan amount) by the lagged amount of county deposits applied to each bank, which is calculated similarly as dividend and non-dividend income.

I estimate the following model,

$$\begin{aligned}\Delta Y_{i,t}/Deposits^c_{i,t-1} =& \alpha_i + \beta_1 Dividend^c_{i,t}/Deposits^c_{i,t-1} + \beta_2 Other\ income^c_{i,t}/Deposits^c_{i,t-1} \\ &+ \beta_3 X_{i,t} + \beta_4 Z_{i,t-1} + \mu_t + \epsilon_{i,t}, \end{aligned} \tag{8}$$

where $\Delta Y_{i,t}$ is the change in deposits and loans from December of year $t-1$ to year t. $Dividend^c$, $Other\ income^c$, and $Deposits^c$ is the imputed county dividend income, non-dividend income, and deposits applied to each bank. X is a vector of county-level control variables including lagged log deposit-weighted county income and county population, and contemporaneous deposit-weighted county population growth. Z is a vector of lagged bank level controls, including log total assets, income-to-asset ratio, equity-to-asset ratio, and deposit-to-asset ratio. μ_t is year fixed effects. α_i is bank fixed effects. To mitigate the effect of abnormal changes in bank size due to mergers or divestitures, I exclude bank-year observations for which bank asset growth is in the top or bottom percentile.

I first examine whether the effect of dividend payout on deposits persists at the bank level. Column (1) of Table 7 shows that this is indeed the case—the point estimate is 0.42 and significant at the 1% level. This coefficient is comparable to the estimates reported in Table 4 using county-level data or in Panel A of Table 6 using within-bank estimation.

Column (2) shows that the increase in deposits due to rising depositor dividend income is indeed transmitted to lending. The coefficient estimate of total loans is similar to that of deposits, and suggests that a \$1 of additional dividend income is associated with a \$0.41 increase in loan amount. I next examine different loan categories. Columns (3) shows that more than a third of the increase in lending is attributed to the increase in real estate loans, which includes both commercial and residential mortgages as well as business loans secured by real estate. Column (4) shows a same increase in other commercial and industrial loans. These findings provide evidence that equity payout made by large and profitable corporations partly flows to bank borrowers.[26] Lastly, column (5) shows that banks' holding of securities, which is mostly comprised of government and agency securities, has a statistically insignificant relation with dividend income. This finding is suggestive that purchasing government securities has not been an important use of payout-induced deposit inflow during this period.

4 Conclusion

When firms distribute cash flows to shareholders through share buybacks and dividends, where does the money go? In this paper I present evidence that a substantial amount of corporate equity payout over the last two decades flows into the banking sector when households deposit the payout money. Using aggregate data, I find that quarterly deposit growth and net equity payout by the non-financial corporate sector are significantly positively related, controlling for several observed macroeconomic conditions such as GDP growth, changes in stock market value, and changes in federal funds rates. Using large, idiosyncratic payouts as an instrument for aggregate payouts confirms the positive effect of equity payout on deposit flow. To further establish a causal effect, I use county level data and show that deposits grow faster when the residents receive greater amounts of dividend income. This effect is robust to various model specifications, including examining counties within the same state, zip-codes within the same county, and branches of the same bank located in

[26] It should be noted that any effect on lending potentially reflects the impacts of both credit demand and credit supply. It is possible that loan demand also increases in places that experience an increase in dividend income through a potential local general equilibrium effect. However, the results from the within-bank and within-county estimation in Section 3.2.3 and 3.2.4 suggest that it is unlikely that the loan and deposit growth is driven by loan demand.

different counties. The effect persists in an IV estimation where the county level dividend is instrumented using a county's lagged dividend share and the amount of aggregate dividends. Analyses using bank level data show that the increased deposit inflow driven by increased payout results in a significant expansion of loans, but has an insignificant effect on banks' holding of securities. Overall, the findings are useful for understanding capital flow in the financial system, the implications of increased payout activities over the last two decades, and the potential consequences of policies aiming at restricting such payout.

References

Acharya, V.V., Mora, N., 2015. A crisis of banks as liquidity providers. The journal of Finance 70, 1–43.

Allen, F., Gale, D., 1997. Financial markets, intermediaries, and intertemporal smoothing. Journal of Political Economy 105, 523–546.

André, C., Guichard, S., Kennedy, M., Turner, D., 2007. Corporate Net Lending: A Review of Recent Trends. OECD Economics Department Working Papers 583. OECD Publishing.

Baker, M., Nagel, S., Wurgler, J., 2007. The Effect of Dividends on Consumption. Brookings Papers on Economic Activity 38, 231–292.

Baker, M., Wurgler, J., 2002. Market timing and capital structure. The journal of finance 57, 1–32.

Behringer, J., 2019. Factor shares and the rise in corporate net lending. IMK Working Paper 202-2019. IMK at the Hans Boeckler Foundation, Macroeconomic Policy Institute.

Bianchi, F., Lettau, M., Ludvigson, S.C., 2016. Monetary Policy and Asset Valuation. Working Paper 22572. National Bureau of Economic Research.

Bliss, B.A., Cheng, Y., Denis, D.J., 2015. Corporate payout, cash retention, and the supply of credit: Evidence from the 2008–2009 credit crisis. Journal of Financial Economics 115, 521–540.

Blouin, J., Krull, L., 2009. Bringing it home: A study of the incentives surrounding the repatriation of foreign earnings under the American Jobs Creation Act of 2004. Journal of Accounting Research 47, 1027–1059.

Bolton, P., Freixas, X., 2000. Equity, bonds, and bank debt: Capital structure and financial market equilibrium under asymmetric information. Journal of Political Economy 108, 324–351.

Bolton, P., Freixas, X., 2006. Corporate finance and the monetary transmission mechanism. The Review of Financial Studies 19, 829–870.

Bolton, P., Li, Y., Wang, N., Yang, J., 2020. Dynamic Banking and the Value of Deposits. Working Paper 28298. National Bureau of Economic Research.

Boot, A.W.A., Thakor, A.V., 1997. Financial system architecture. The Review of Financial Studies 10, 693–733.

Boudoukh, J., Michaely, R., Richardson, M., Roberts, M.R., 2007. On the importance of measuring payout yield: Implications for empirical asset pricing. The Journal of Finance 62, 877–915.

Brainard, W.C., Tobin, J., 1968. Pitfalls in financial model building. The American Economic Review 58, 99–122.

Brunnermeier, M., Farhi, E., Koijen, R.S.J., Krishnamurthy, A., Ludvigson, S.C., Lustig, H., Nagel, S., Piazzesi, M., 2021. Review Article: Perspectives on the Future of Asset Pricing. The Review of Financial Studies 34, 2126–2160.

Bräuer, K., Hackethal, A., Hanspal, T., 2020. Consuming dividends. SAFE Working Paper Series 280. Leibniz Institute for Financial Research SAFE.

Calomiris, C.W., Hubbard, R.G., 1995. Internal finance and investment: Evidence from the undistributed profits tax of 1936-37. The Journal of Business 68, 443–482.

Chen, P., Karabarbounis, L., Neiman, B., 2017. The global rise of corporate saving. Journal of Monetary Economics 89, 1–19.

Chetty, R., Saez, E., 2005. Dividend Taxes and Corporate Behavior: Evidence from the 2003 Dividend Tax Cut. The Quarterly Journal of Economics 120, 791–833.

Chodorow-Reich, G., Ghent, A., Haddad, V., 2020. Asset Insulators. The Review of Financial Studies 34, 1509–1539.

Chodorow-Reich, G., Nenov, P.T., Simsek, A., 2021. Stock market wealth and the real economy: A local labor market approach. American Economic Review 111, 1613–57.

Corhay, A., Kung, H., Schmid, L., 2020. Q: risk, rents, or growth? Working Paper .

Dharmapala, D., Foley, C.F., Forbes, K.J., 2011. Watch what i do, not what i say: The unintended consequences of the homeland investment act. The Journal of Finance 66, 753–787.

Di Maggio, M., Kermani, A., Majlesi, K., 2020. Stock market returns and consumption. The Journal of Finance 75, 3175–3219.

Drechsler, I., Savov, A., Schnabl, P., 2017. The deposits channel of monetary policy. The Quarterly Journal of Economics 132, 1819–1876.

Drechsler, I., Savov, A., Schnabl, P., 2020. The Financial Origins of the Rise and Fall of American Inflation. Working Paper.

Duchin, R., Gilbert, T., Harford, J., Hrdlicka, C., 2017. Precautionary savings with risky assets: When cash is not cash. The Journal of Finance 72, 793–852.

Edmans, A., 2017. The case for stock buybacks. Harvard Business Review 15.

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

Falato, A., Kadyrzhanova, D., Sim, J., Steri, R., 2020. Rising intangible capital, shrinking debt capacity, and the US corporate savings glut. Journal of Finance, forthcoming .

Fama, E.F., French, K.R., 2005. Financing decisions: who issues stock? Journal of Financial Economics 76, 549 – 582.

Fried, J.M., Wang, C.C., 2018a. Are buybacks really shortchanging investment? Harvard Business Review 96, 88–95.

Fried, J.M., Wang, C.C.Y., 2018b. Short-Termism and Capital Flows. The Review of Corporate Finance Studies 8, 207–233.

Gabaix, X., Koijen, R.S., 2021. In search of the origins of financial fluctuations: The inelastic markets hypothesis. Available at SSRN 3686935 .

Gabaix, X., Koijen, R.S.J., 2020. Granular Instrumental Variables. Working Paper 28204. National Bureau of Economic Research.

Gao, X., Whited, T.M., Zhang, N., 2021. Corporate Money Demand. The Review of Financial Studies 34, 1834–1866.

Gilje, E.P., Loutskina, E., Strahan, P.E., 2016. Exporting liquidity: Branch banking and financial integration. The Journal of Finance 71, 1159–1184.

Graham, J.R., Leary, M.T., 2018. The Evolution of Corporate Cash. The Review of Financial Studies 31, 4288–4344.

Greenwald, D.L., Lettau, M., Ludvigson, S.C., 2019. How the Wealth Was Won: Factors Shares as Market Fundamentals. Working Paper 25769. National Bureau of Economic Research.

Gutiérrez, G., Philippon, T., 2017. Investmentless Growth: An Empirical Investigation. Brookings Papers on Economic Activity 48, 89–190.

Hartzmark, S.M., Solomon, D.H., 2019. The dividend disconnect. The Journal of Finance 74, 2153–2199.

Hartzmark, S.M., Solomon, D.H., 2021. Predictable price pressure. Available at SSRN 3853096 .

Jermann, U., Quadrini, V., 2012. Macroeconomic effects of financial shocks. American Economic Review 102, 238–71.

Kahle, K., Stulz, R.M., 2020. Why Are Corporate Payouts So High in the 2000s? Journal of Financial Economics, Forthcoming .

Krishnamurthy, A., Vissing-Jorgensen, A., 2015. The impact of treasury supply on financial sector lending and stability. Journal of Financial Economics 118, 571–600.

Kuchinski, W.R., Ogden, R.E., Thomas, D.R., Warusawitharana, M., 2017. Equity issuance and retirement by nonfinancial corporations. FEDS Notes .

Lazonick, W., 2014. Profits without prosperity. Harvard Business Review 92, 46–55.

Lazonick, W., Sakinç, M., Hopkins, M., 2020. Why stock buybacks are dangerous for the economy. Harvard Business Review 7.

Li, W., 2020. Liquidity premium and the substitution between bank deposits and treasuries. Technical Report. mimeo.

Li, W., Ma, Y., Zhao, Y., 2020. The passthrough of treasury supply to bank deposit funding. Columbia Business School Research Paper, USC Marshall School of Business Research Paper .

Li, Y., 2021. Fragile new economy: intangible capital, corporate savings glut, and financial instability. Working Paper. Ohio State University.

Lin, L., 2020. Bank Deposits and the Stock Market. The Review of Financial Studies 33, 2622–2658.

Meyer, S., Pagel, M., 2021. Fully closed: Individual responses to realized gains and losses. Journal of Finance, forthcoming .

Mian, A.R., Straub, L., Sufi, A., 2020. The Saving Glut of the Rich. Working Paper 26941. National Bureau of Economic Research.

Parlour, C.A., Stanton, R., Walden, J., 2012. Financial flexibility, bank capital flows, and asset prices. The Journal of Finance 67, 1685–1722.

Petrick, K.A., 2002. Corporate profits: Profits before tax, profits tax liability, and dividends. Bureau of Economic Analysis, U.S. Department of Commerce, Washington, DC. .

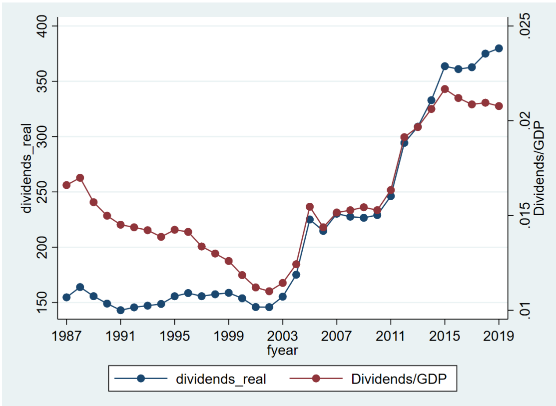
Poterba, J.M., 2000. Stock market wealth and consumption. Journal of Economic Perspectives 14, 99–118.

Poterba, J.M., Hall, R.E., Hubbard, R.G., 1987. Tax policy and corporate saving. Brookings Papers on Economic Activity 1987, 455–515.

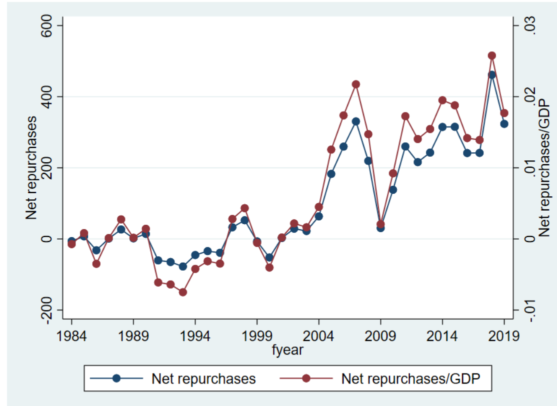
Solon, G., Haider, S.J., Wooldridge, J.M., 2015. What are we weighting for? The Journal of Human Resources 50, 301–316.

Stiglitz, J.E., 1974. On the irrelevance of corporate financial policy. The American Economic Review 64, 851–866.

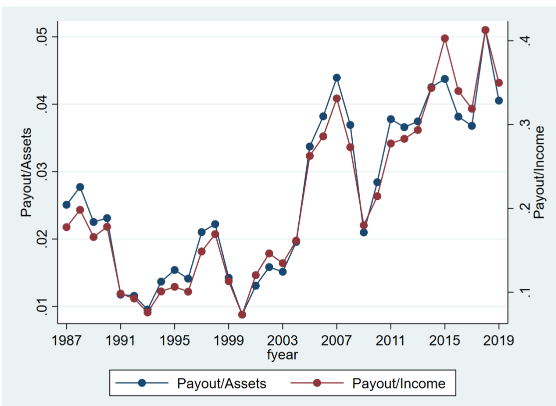
Yagan, D., 2015. Capital tax reform and the real economy: The effects of the 2003 dividend tax cut. American Economic Review 105, 3531–63.



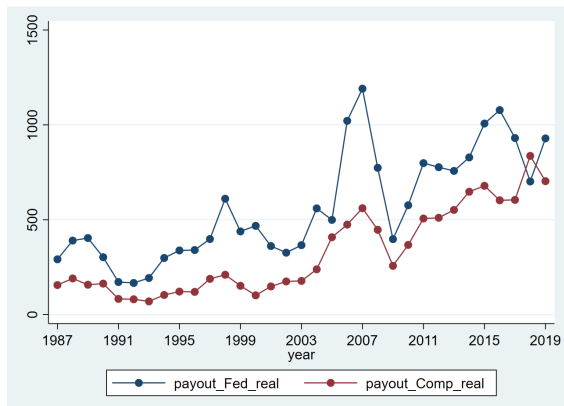
(a) Total dividends of non-financial Compustat firms



(b) Total net repurchases of non-financial Compustat firms



(c) Total net payout of non-financial Compustat firms over assets and income



(d) Total net payout of non-financial companies using data from Compustat and Fed flow of funds

Figure 1: Annual equity payouts, 1987-2019. These figures plot various measures of equity payouts from 1987 to 2019. Figure (a) plots the amount of total dividends (DV) by non-financial public companies. Figure (b) plots net share repurchases, measured as the purchase of common and preferred stocks (PRSTKC) minus any reduction in the value of the net number of preferred stocks outstanding (PSTKRV) minus the issuance of stocks (SSTK). Figue (c) plots the ratio of total net payout (dividends+net share repurchase) to total assets (AT) and total operating income (OIBDP). In figure (d), the Federal Reserve net payout is based on Table F.103 (nonfinancial corporate business sector) of the FAUS, and is measured as dividends (FA106121075) minus net equity issuance (FA103164103). All dollar amounts are in 2010 billion dollars.

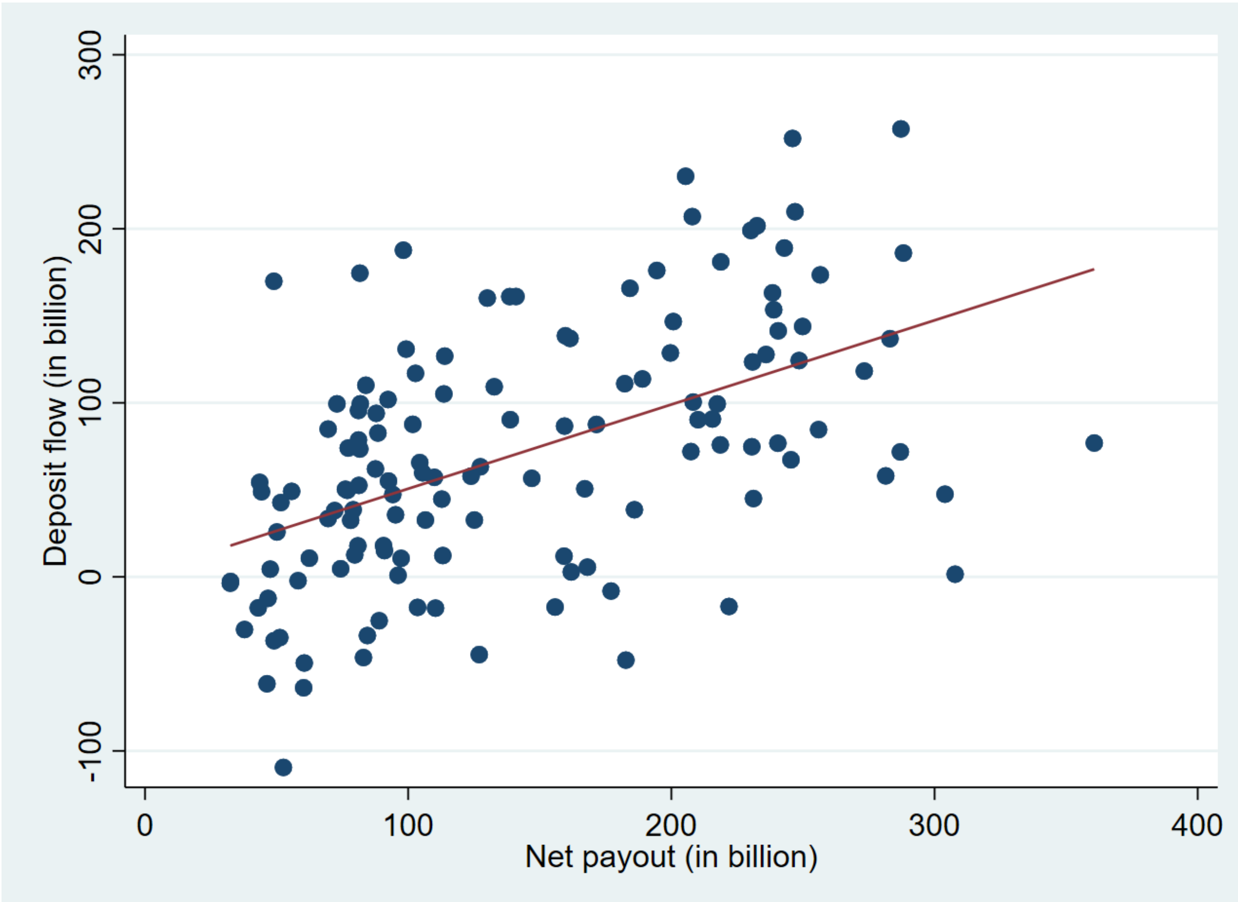


Figure 2: Quarterly payouts and deposit flow 1987–2019. This figure plots the quarterly flow of household deposits (FA153020005+FA153030005) against net corporate payout (FA106121075−FA103164103). All values are in 2010 dollars. Data source: Financial Accounts of the United States (FAUS).

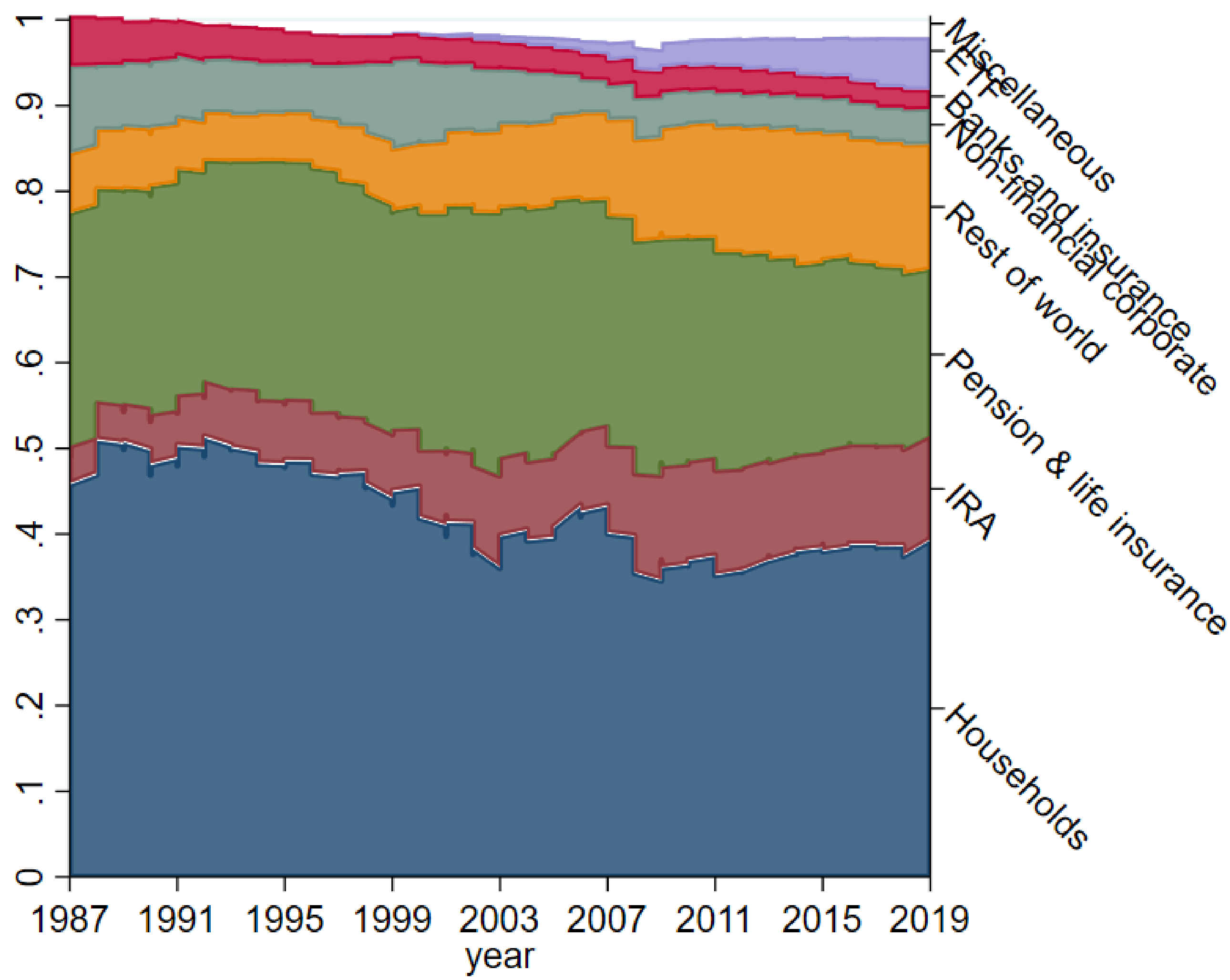


Figure 3: Ownership of U.S. corporate equities. Source: Financial Accounts of the United States (FAUS). Ownership by the household sector: direct ownership (LM153064105) + indirect ownership through mutual funds (LM653064155) − equity held in individual retirement accounts (IRAs). IRA: (mutual funds (LM653131573) and other self-directed accounts (LM153131575) in IRA) * 0.7. Pension: defined benefit pension plans: held directly (LM573064143+LM343064135+LM223064145) + indirectly through mutual funds ((LM573064243+LM223064243)*LM653064100/LM654090000) + private defined contribution pension funds; corporate equities held directly and indirectly through mutual funds (LM573064175) + federal government retirement funds; corporate equities held by thrift savings plan (LM343064125) + state and local government employee retirement funds; corporate equities held indirectly through mutual funds (LM223064213) + life insurance companies; corporate equities held directly and indirectly through mutual funds (LM543064153). Rest of the world: LM263064105. Non-financial corporations: LM103064103. Financial firms such as banks and insurance companies: LM763064105+LM543064105+LM513064105. ETF: LM563064100.

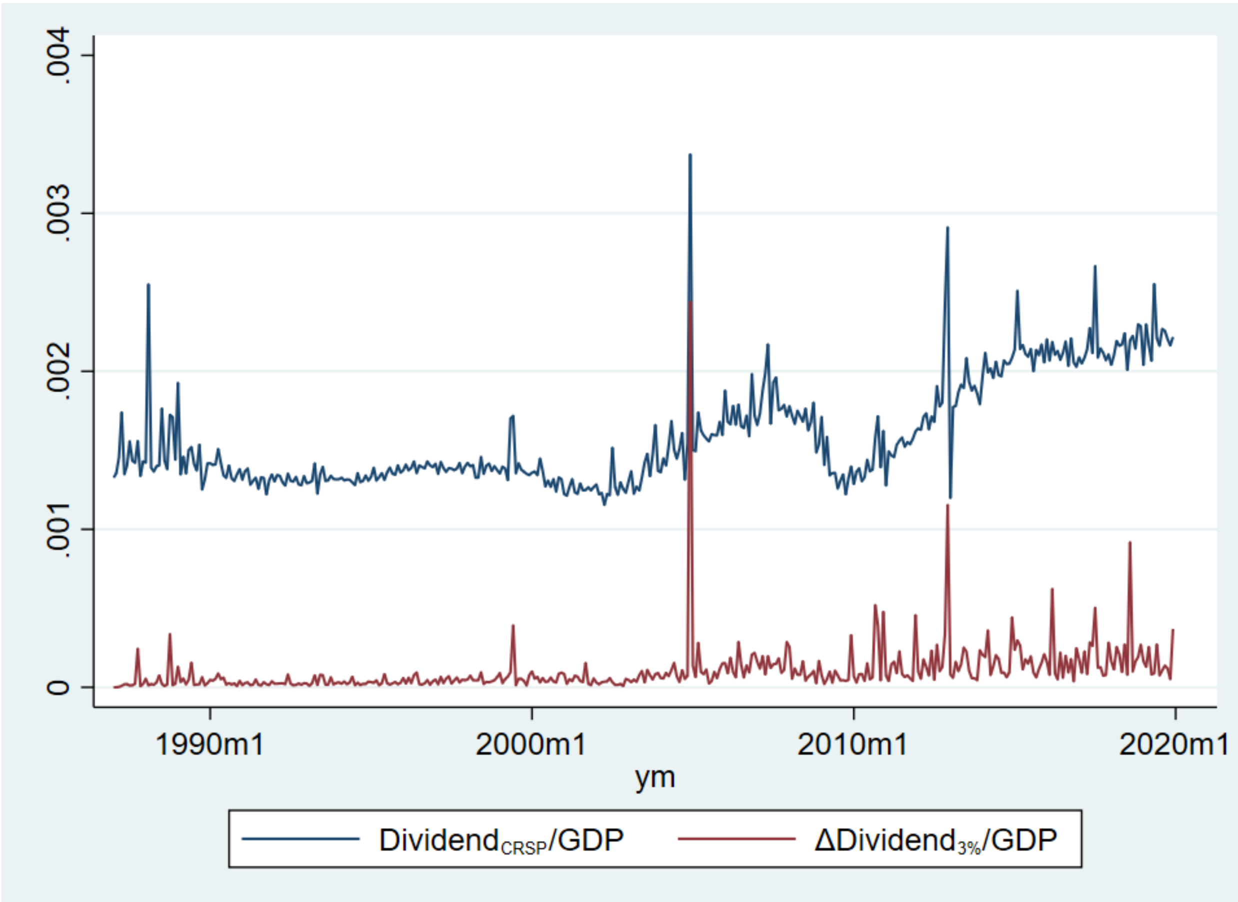


Figure 4: Aggregate monthly dividend income and aggregate abnormal large dividend payments. The figure plots the aggregate monthly dividend payment by firms traded on NYSE, AMEX, or NASDAQ with CRSP shares codes 10 or 11 and first two digit distribution code (distcd) 12, and the total top 3% abnormal increases in monthly dividend payments. Abnormal change in monthly dividend payment is defined as $\Delta Div_{i,t} = Div_{i,t} - Div_{i,t-3} \times Median(\frac{\Delta Div_{j,t}}{Div_{j,t-3}})_t$, where $Median(\frac{\Delta Div_{j,t}}{Div_{j,t-3}})_t$ is the median dividend growth rate from month $t-3$ to month t of all dividend-paying firms.

Table 1: Summary statistics

This table presents the summary statistics of the main variables used in the estimation. The sample period for quarterly aggregate data is 1987-2019, and for county level data 1994-2018, and for bank level data 1989-2018. In Panel A, $\Delta Deposits$ is the flow of household deposits from FAUS. $Payout$ is net equity payout defined as total dividends minus net share issuance of the non-financial business sector from FAUS. $\Delta Stock\,value$ is the change in total stock market value as reported by CRSP. $\Delta Fed\,funds$ is the change in federal funds rates. $Credit\,spread$ is Moody's seasoned Baa corporate bond yield relative to yield on 10-Year Treasury constant maturity. In Panel B, $\Delta Deposits$ is the change in total deposits held by all commercial banks. $Dividends_{BEA}$ is the personal dividend income from Table 2.6 of BEA's National Income and Product Accounts (NIPA). $Dividends_{CRSP}$ is the total monthly dividend payment by firms traded on NYSE, AMEX, or NASDAQ with CRSP shares codes 10 or 11 and first two digit distribution code (distcd) 12. $Income$ is disposable personal income from NIPA. $Stock\ return$ is CRSP's total value-weighted index return. In Panel C, $\Delta Deposits$ is the change in county-level deposits based on data from FDIC's SOD. $Dividends$ is the amount of ordinary dividends reported by the IRS SOI. $Income$ is non-dividend income defined as the difference between BEA total income and IRS dividend income. Div_ratio is the ratio of dividend income to adjusted gross income. ret is the annual stock return measured over the same window as deposit growth. In Panel D, changes in deposits, loans, and securities are the difference in the amount of these items from December call reports. $Dividend^c$, $Income^c$, $Deposits^c$ is, respectively, the amount of county level dividend, non-dividend income, and deposits apportioned to each bank based on the bank's average deposit share in each county.

			Percentile			
	Mean	SD	10	50	90	N
Panel A: Aggregate data, quarterly						
$\Delta Deposits$	71.387	72.843	-17.788	66.465	173.530	132
$Payout$	142.856	77.407	51.625	113.712	246.978	132
$\Delta Deposits/GDP_{t-1}$	0.005	0.005	-0.002	0.005	0.011	132
$Payout/GDP_{t-1}$	0.010	0.004	0.005	0.009	0.016	132
$\Delta Stock\,value/GDP_{t-1}$	0.017	0.095	-0.127	0.027	0.118	132
ΔGDP	0.005	0.007	-0.003	0.006	0.013	132
$\Delta Fed\,funds$	-0.035	0.428	-0.563	0.000	0.477	132
$\Delta Credit\ spread$	-0.006	0.381	-0.340	-0.030	0.410	132
Panel B: Aggregate data, monthly						
$\Delta Deposits/GDP_{t-1}$	0.001	0.002	-0.001	0.001	0.004	395
$Dividends_{BEA}/GDP_{t-1}$	0.004	0.001	0.002	0.003	0.005	395
$Dividends_{CRSP}/GDP_{t-1}$	0.002	0.000	0.001	0.001	0.002	395
$Income/GDP_{t-1}$	0.062	0.001	0.060	0.062	0.064	395
$Stock\ return$	0.009	0.043	-0.044	0.014	0.057	395
$\Delta Fed\,funds$	-0.012	0.182	-0.240	0.000	0.180	395
$\Delta Credit\ spread$	-0.002	0.169	-0.150	-0.010	0.160	395

Panel C: County level data (annual)						
$\Delta Deposits/deposits_{t-1}$	0.012	0.063	-0.051	0.008	0.080	73442
$Dividends/deposits_{t-1}$	0.021	0.016	0.008	0.017	0.040	73442
$Income/deposits_{t-1}$	2.384	1.162	1.289	2.124	3.734	73442
ΔPop	0.005	0.015	-0.009	0.003	0.021	73442
$Div\_ratio \times ret$	0.001	0.003	-0.003	0.002	0.005	73442
Div_ratio	0.018	0.009	0.009	0.016	0.028	73442
Panel D: Bank level data (annual)						
$\Delta Deposits/deposits^c_{t-1}$	0.051	0.127	-0.064	0.028	0.186	162617
$Dividends^c/deposits^c_{t-1}$	0.022	0.013	0.009	0.019	0.038	162617
$Income^c/deposits^c_{t-1}$	2.135	0.817	1.272	2.004	3.175	162617
$\Delta Loans/deposits^c_{t-1}$	0.047	0.114	-0.055	0.029	0.167	162617
$\Delta RE\ loans/deposits^c_{t-1}$	0.037	0.086	-0.038	0.020	0.130	162617
$\Delta CI\ loans/deposits^c_{t-1}$	0.007	0.034	-0.022	0.003	0.042	162617
$\Delta Securities/deposits^c_{t-1}$	0.010	0.062	-0.053	0.003	0.081	162617

Table 2: Quarterly aggregate net payout and deposit flow

The dependent variable is deposit flow scaled by lagged GDP. Deposit flow in the first four columns is the sum of the flow of checkable deposits and currency and time and savings deposits by households and nonprofit organizations in the first four columns, and in the last column the change in quarterly aggregate deposits held by all FDIC insured institutions from FDIC's QBP. *Net payout* is measured as net dividends plus net share repurchases of the non-financial corporate business sector from FAUS. *Net payout_Comp* is the total net payout of non-financial firms from Compustat. *Stock value* is the total value of U.S. stock market from CRSP. *Credit spread* is Moody's seasoned Baa corporate bond yield relative to yield on 10-Year Treasury constant maturity. The sample period is from 1987 to 2019.

	$\frac{\Delta Deposit_t}{GDP_{t-1}}$ (1)	$\frac{\Delta Deposit_t}{GDP_{t-1}}$ (2)	$\frac{\Delta Deposit_t}{GDP_{t-1}}$ (3)	$\frac{\Delta Deposit_t}{GDP_{t-1}}$ (4)	$\frac{\Delta Deposit\_FDIC_t}{GDP_{t-1}}$ (5)
$Net\,payout_t/GDP_{t-1}$	0.50***	0.49***	0.42***		0.54***
	(0.10)	(0.10)	(0.14)		(0.12)
$Net\,payout\_Comp_t/GDP_{t-1}$				0.58***	
				(0.13)	
$Net\,payout_{t-1}/GDP_{t-2}$			0.03		
			(0.14)		
$\Delta Deposit_{t-1}/GDP_{t-2}$			0.08		
			(0.09)		
$\Delta Stock\,value_t/GDP_{t-1}$		-0.01	-0.00	-0.00	-0.00
		(0.01)	(0.01)	(0.01)	(0.01)
GDP_t/GDP_{t-1}		-0.02	-0.03	-0.02	0.21**
		(0.07)	(0.07)	(0.07)	(0.08)
$\Delta Fed\,funds\,rate_t$		-0.00	-0.00	-0.00	-0.00*
		(0.00)	(0.00)	(0.00)	(0.00)
$\Delta Credit\,spread_t$		0.00	0.00	0.00	0.00
		(0.00)	(0.00)	(0.00)	(0.00)
R-squared	0.175	0.193	0.197	0.175	0.251
N	132	132	131	132	132

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Aggregate payout and deposit flow: IV estimation

Panel A reports the results of using monthly dividend and deposit data. Column (1) reports the OLS results, where the dependent variable is the change in monthly deposits held by all commercial banks divided by GDP of the previous quarter. $Dividends/GDP$ is the total monthly aggregate dividend income from the BEA divided by GDP of the previous quarter. Column (2) reports the first-stage results of the IV estimation where the instrument, $\Delta Dividend_{3\%}/GDP$, is the sum of the top 3% abnormal changes in dividend payments in CRSP within a month (scaled by GDP of the previous quarter), with abnormal changes defined in Section 3.1.2. Column (3) reports the second stage results of the IV estimation and the dependent variable is the change in monthly deposits divided by GDP of the previous quarter. Control variables include monthly disposable personal income, monthly stock returns, changes in monthly federal funds rate, and changes in credit spread. Panel B reports the results of the IV estimation using quarterly payout and deposit data. Column (1) reports the first-stage results, where the dependent variable is the total net equity payout of the non-financial corporate business sector from FAUS divided by lagged GDP. The instrument, $\Delta Payout_{3\%}/GDP$, is the sum of the top 3% abnormal changes in net payout within a quarter divided by lagged GDP. Column (2) reports the second stage of the IV estimation, where the dependent variable is the change in quarterly deposits divided by lagged GDP. Control variables include changes in stock market value (scaled by lagged GDP), GDP growth, changes in monthly federal funds rate, and changes in credit spread. The sample period is from 1987 to 2019 in both panels.

Panel A: Monthly dividend

	OLS	First stage	Second stage
$Dividends_t/GDP_{t-1}$	0.56***		0.98**
	(0.14)		(0.48)
$\Delta Dividend_{3\%,t}/GDP_{t-1}$		1.65***	
		(0.26)	
Controls	Yes	Yes	Yes
R-squared	0.149	0.444	0.130
N	395	395	395

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Panel B: Quarterly payout

	First stage	Second stage
$\Delta Payout_{3\%,t}/GDP_{t-1}$	2.00***	
	(0.48)	
$Payout_t/GDP_{t-1}$		0.73**
		(0.29)
Controls	Yes	Yes
R-squared	0.199	0.150
N	131	131

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Dividend income and deposit flow at the county level

In columns (1)-(4) and (6), the dependent variable is the growth of deposits, measured as $\Delta Deposits_{i,t}/Deposits_{i,t-1}$, from June of year $t-1$ to June of year t. In column (5), the dependent variable is the change in deposits scaled by lagged population, $\Delta Deposits_{i,t}/Pop_{i,t-1}$. $Dividends_{i,t}$ is the average amount of dividend income in year t and $t-1$ in county i. $Income_{i,t}$ is the average of total income from the BEA minus the IRS dividend income in year t and $t-1$ in county i. Div_ratio is a county's average ratio of dividend income to adjusted gross income during the sample period. ret is the cumulative stock market return from June of year $t-1$ to June of year t. Columns (3) and (4) use the sub-sample of counties that are in the top 5% and bottom 95% of average population during the sample period, respectively. Standard errors clustered by county are reported in the parentheses.

			Top 5%	Bottom 95%		
	(1)	(2)	(3)	(4)	(5)	(6)
$Dividends_t/Deposits_{t-1}$	0.32***	0.69***	0.89***	0.27***		0.75***
	(0.07)	(0.16)	(0.23)	(0.08)		(0.13)
$Dividends_t/Pop_{t-1}$					0.85***	
					(0.19)	
$Income_t/Deposits_{t-1}$	0.03***	0.02***	0.03***	0.04***		0.02***
	(0.00)	(0.00)	(0.01)	(0.00)		(0.00)
$Income_t/Pop_{t-1}$					0.02**	
					(0.01)	
$Population\ growth_t$	0.56***	0.76***	0.45	0.55***	13.73***	0.59***
	(0.08)	(0.17)	(0.31)	(0.08)	(3.08)	(0.12)
$Div\_ratio \times ret_t$	-1.12***	-1.65***	-1.60	-1.01***	-48.08***	-1.36***
	(0.21)	(0.49)	(0.98)	(0.21)	(11.19)	(0.52)
Year FE	Yes	Yes	Yes	Yes	Yes	No
County FE	Yes	Yes	Yes	Yes	Yes	Yes
State*year FE	No	No	No	No	No	Yes
Population weighted	No	Yes	No	No	Yes	Yes
R-squared	0.169	0.228	0.225	0.166	0.250	0.356
N	73442	73441	3692	69750	73441	73421

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Dividend income and deposit flow at the county level: IV estimation

In the first three columns, the dependent variable is $Dividends_{i,t}/Deposits_{i,t-1}$, where $Dividends_t$ is the average amount of dividend income in year t and $t-1$, and $Deposits_{i,t-1}$ is the amount of deposits as of June of year $t-1$. $Dividends\_Proj_t$ is the average amount of projected dividends in year t and $t-1$, where the projected dividends in year t is based on a county's dividend share in total dividend in year $t-1$ and aggregate dividends in year t, $\frac{Dividends_{i,t-1}}{\sum Dividends_{i,t-1}} \times \sum Dividends_{i,t}$. In the last two columns, the dependent variable is the growth of deposits, measured as $\Delta Deposits_{i,t}/Deposits_{i,t-1}$, from June of year $t-1$ to June of year t. $Income_t$ is the average of total income from the BEA minus the IRS dividend income in year t and $t-1$. Div_ratio is a county's average ratio of dividend income to adjusted gross income during the sample period. ret is the cumulative stock market return from the end of June of year $t-1$ to the end June of year t. Standard errors clustered by county are reported in the parentheses.

	First stage			Second stage	
	(1)	(2)	(3)	(4)	(5)
$Dividends\_Proj_t/Deposits_{t-1}$	0.60***	0.54***	0.62***		
	(0.01)	(0.01)	(0.02)		
$Dividends_t/Deposits_{t-1}$				0.53***	0.86***
				(0.10)	(0.18)
$Income_t/Deposits_{t-1}$		0.00***	0.00***	0.03***	0.02***
		(0.00)	(0.00)	(0.00)	(0.00)
Population growth		0.01***	0.04***	0.59***	0.74***
		(0.00)	(0.01)	(0.08)	(0.18)
$Div\_ratio \times ret$		0.14***	0.25***	-1.00***	-1.52***
		(0.03)	(0.04)	(0.20)	(0.49)
Year FE	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes
Population weighted	No	No	Yes	No	Yes
R-squared	0.925	0.931	0.948	0.064	0.048
N	70349	70349	70349	70347	70347

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Dividend income and deposit flow: within-bank and zip-code level estimation

In Panel A, the dependent variable is the difference in a bank, b's, deposits in a county, i, scaled by lagged total county deposits, $\Delta Deposits_{i,b,t}/Deposits_{i,t-1}$. *Dividends* is a county's total dividends (averaged over year t and $t-1$) multiplied by the bank's average share of deposits in that county. *Controls* include non-dividend income divided by lagged county deposits and population growth. Standard errors clustered by bank and county are reported in the parentheses.

In Panel B, the dependent variable is the growth of deposits at the zip-code level, measured as $\Delta Deposits_{i,t}/Deposits_{i,t-1}$, from June of year $t-1$ to June of year t. $Dividends_t$ is the average amount of zip-code dividend income in year t and $t-1$. *Controls* include non-dividend income divided by lagged deposits at the zip-code level, zip-code average dividend income ratio and its interaction with stock returns. Standard errors clustered by county are reported in the parentheses.

Panel A: Within-bank estimation		
	(1)	(2)
$Dividends_{i,b,t}/Deposits_{i,t-1}$	0.53***	0.51***
	(0.10)	(0.09)
Controls	Yes	Yes
Year FE	Yes	No
Bank*county FE	Yes	Yes
Bank*year FE	No	Yes
R-squared	0.176	0.370
N	409775	409771

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Panel B: Zip-code level estimation		
	(1)	(2)
$Dividends_t/Deposits_{t-1}$	0.32***	0.37***
	(0.04)	(0.03)
Controls	Yes	Yes
Year FE	Yes	No
Zip code FE	Yes	Yes
County*year FE	No	Yes
R-squared	0.275	0.365
N	301701	294111

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Dividend income, bank deposits, and lending

The dependent variable is the change in deposits, loans, or securities as indicated in the table header from December of year $t-1$ to December of year t. Dividend income at the bank level, $Dividends^c$, is the sum of bank dividend at the county level across all counties where the bank has branches, where the bank dividend at the county level is the county's total dividends multiplied by the bank's average share of deposits in that county. The estimation controls for non-dividend income, calculated similarly as dividend income using county non-dividend income and banks' average deposits share in a county. The dependent variable as well as dividend income and non-dividend income are scaled by lagged county deposits apportioned to a bank based on a bank's average deposit share in counties where it operates. Other controls include (deposit-weighted) population growth, lagged log assets, lagged income-to-asset ratio, lagged equity-to-asset ratio, and lagged deposit-to-asset ratio. Standard errors clustered by bank are reported in the parentheses.

	$\Delta Deposits$	$\Delta Loan$	$\Delta REloan$	$\Delta CIloan$	$\Delta Securities$
	(1)	(2)	(3)	(4)	(5)
$Dividends^c_t$	0.42***	0.41***	0.15**	0.15***	-0.03
	(0.11)	(0.09)	(0.07)	(0.02)	(0.04)
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes
R-squared	0.283	0.315	0.302	0.164	0.116
N	162583	162583	162583	162583	162583

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

APPENDICES

A Additional figures

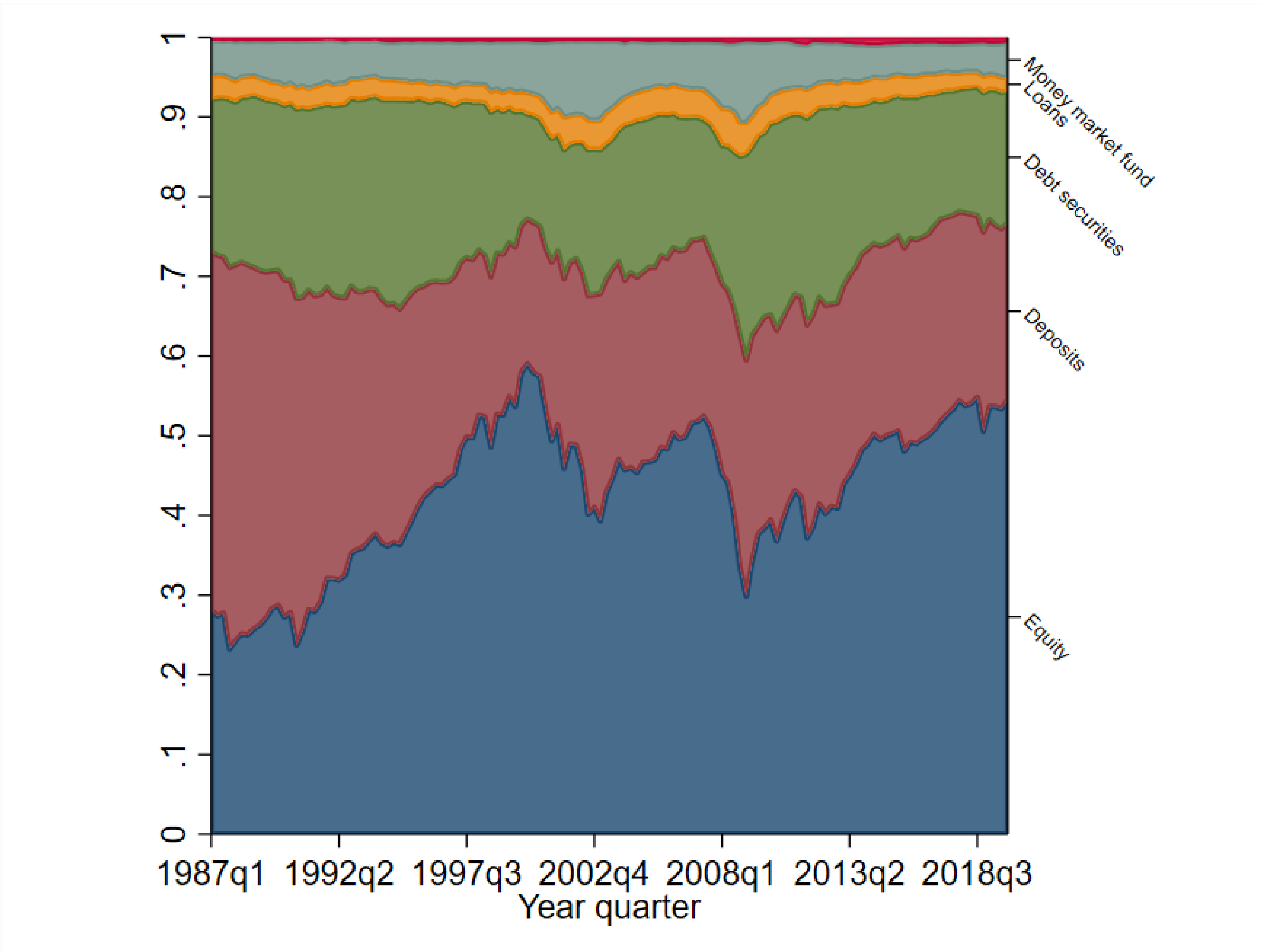
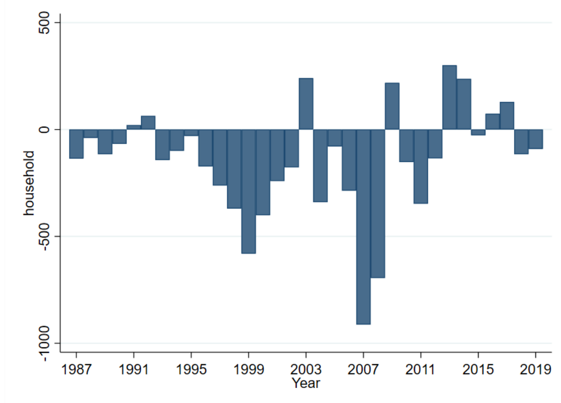
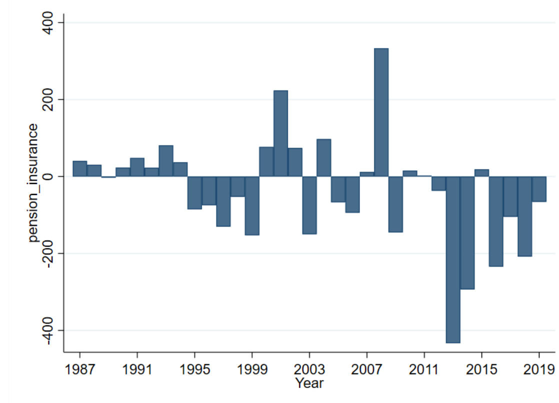


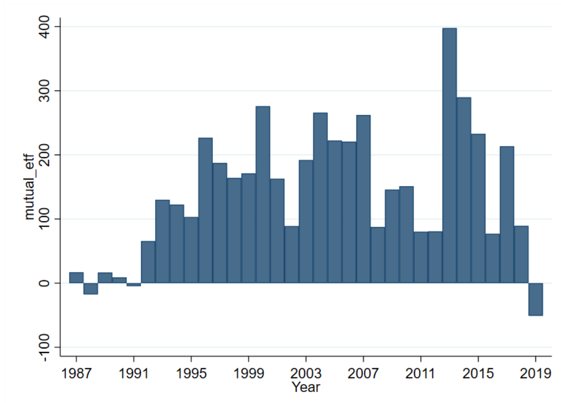
Figure A1: Household holdings of financial assets. This figure plots the quarterly household holdings of financial assets in non-retirement accounts from 1987 to 2019. Data source: Financial Accounts of the United States (FAUS). Equity includes directly held equity (lm153064105) and indirectly held equity through mutual funds (lm153064205*lm653064100/lm654090000); Deposits: (fl153020005+fl153030005); Debt securities: Debt securities (lm154022005) + bond mutual fund (lm153064205*(lm653061105+lm653061703+lm653062003+lm653063005)/lm65409000); Loans (fl154023005); Money market mutual fund (fl153034005).



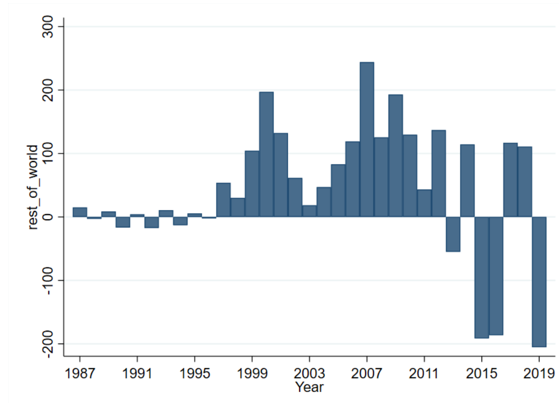
(a) Household



(b) Pension & insurance



(c) Mutual funds & ETFs



(d) Rest of the world

Figure A2: These figures plot the annual net purchases of corporate equities by the household sector (directly, fa153064105), pension and insurance companies (fa573064105+fa343064105+fa223064145+fa513064105+fa543064105), mutual funds, closed-end funds and etfs (fa653064100 + fa553064103 + fa563064100), and the rest of the world (fa263064105).

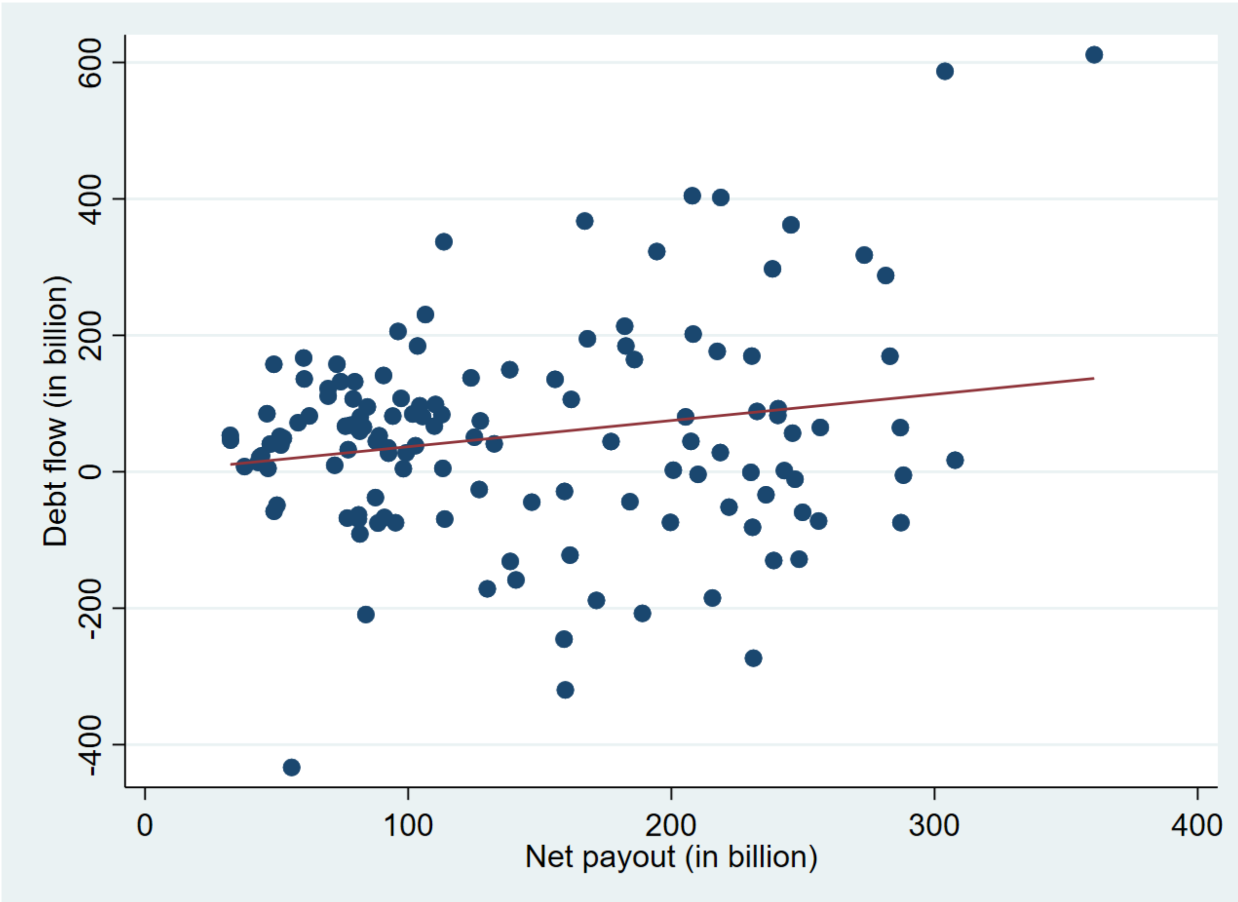


Figure A3: Quarterly payouts and flow of household holdings of debt securities and loans, 1987–2019. This figure plots the quarterly flow of household holding of debt securities and loans (fa153034005 (money market fund) + fa154022005 (debt securities) + fa154023005 (loans)) against net corporate payout (fa106121075−fa103164103). All values are in 2010 dollars. Data source: Financial Accounts of the United States (FAUS).

B Additional tables

Table A1: Aggregate deposit flow and payout: robustness

In Panel A, the dependent variable is deposit flow in column (1), deposit flow scaled by lagged deposits in column (2) and deposit flow scaled by lagged GDP in columns (3)-(4). Deposit flow is the sum of the flow of checkable deposits and currency and time and savings deposits by households and nonprofit organizations. *Net payout* is measured as net dividends plus net share repurchases of the non-financial corporate business sector from FAUS. The sample period is from 1987 to 2019. In Panel B, the dependent variable is the change in monthly deposits held by all U.S. commercial banks dividend by GDP of the previous quarter. *Dividends* in columns (1) and (3) is the personal dividend income from Table 2.6 of National Income and Product Accounts (NIPA). *Dividends* in columns (2) and (4) is the total monthly dividend payment by firms traded on NYSE, AMEX, or NASDAQ with CRSP shares codes 10 or 11 and first two digit distribution code (distcd) 12. Control variables include monthly disposable personal income from the BEA, monthly stock returns, and changes in monthly federal funds rate and changes in credit spread. The last two columns report results of the IV estimation, where the instrument is the sum of the top 3% abnormal changes in dividend payments within a month, with abnormal changes defined in Section 3.1.2. The sample period is from 1987 to 2019.

Panel A: Quarterly deposit and payout				
	$\Delta Deposit_t$	$\frac{\Delta Deposit_t}{Deposits_{t-1}}$	$\frac{\Delta Deposit_t}{GDP_{t-1}}$	$\frac{\Delta Deposit_t}{GDP_{t-1}}$
	(1)	(2)	(3)	(4)
$Net\ payout_t$	0.47***			
	(0.07)			
$Net\ payout_t/Deposits_{t-1}$		0.44***		
		(0.10)		
$Net\ payout_t/GDP_{t-1}$			0.51***	0.41**
			(0.10)	(0.12)
Controls	Yes	Yes	Yes	Yes
Quarter FE	No	No	Yes	Yes
Qudratic trend	No	No	No	Yes
R-squared	0.282	0.175	0.208	0.224
N	132	131	132	132

Panel B: Monthly deposit and dividend				
	OLS		IV	
	BEA div	CRSP div	BEA div	CRSP div
$Dividends_t/GDP_{t-1}$	0.55***	0.98**	0.84*	1.36*
	(0.14)	(0.38)	(0.44)	(0.72)
Controls	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
R-squared	0.157	0.138	0.147	0.136
N	395	395	395	395

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A2: Corporate payout and change in sector ownership

The dependent variable is the change in sector ownership of corporate equities, where the sector is indicated in table headers. Ownership share if measured as each sector's ownership divided by total corporate equities (LM893064105). Ownership by the household sector is the sum of direct ownership (LM153064105) and indirect ownership through mutual funds (LM653064155). Pension and life insurance includes the sum of defined benefit pension plans: direct (LM573064143+LM343064135+LM223064145), indirectly through mutual funds ((LM573064243+LM223064243)*LM653064100/LM654090000), private defined contribution pension funds; corporate equities held directly and indirectly through mutual funds (LM573064175), federal government retirement funds; corporate equities held by thrift savings plan (LM343064125), state and local government employee retirement funds; corporate equities held indirectly through mutual funds (LM223064213), and life insurance companies; corporate equities held directly and indirectly through mutual funds (LM543064153). Rest of the world: LM263064105.

	ΔHousehold		ΔPension and life		ΔRest of world	
	(1)	(2)	(3)	(4)	(5)	(6)
$Payout_t/GDP_{t-1}$	-0.14		-0.09		0.04	
	(0.23)		(0.14)		(0.06)	
$Payout_{t-1}/GDP_{t-2}$	-0.04		-0.05		0.01	
	(0.22)		(0.14)		(0.06)	
$Repurchases_t/GDP_{t-1}$		-0.18		0.01		0.08
		(0.25)		(0.16)		(0.07)
$Repurchases_{t-1}/GDP_{t-2}$		0.10		-0.24		-0.00
		(0.25)		(0.15)		(0.07)
$Stock\ return_t$	0.07***	0.07***	-0.01*	-0.01*	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
$Stock\ return_{t-1}$	-0.01	-0.01	-0.00	-0.00	0.00	0.00
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Time trend	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.374	0.373	0.063	0.079	0.040	0.047
N	131	131	131	131	131	131

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A3: Quarterly aggregate equity payout and corporate deposit flow

The dependent variable is the flow of corporate deposits scaled by lagged GDP. Checking deposits is item fa103020000 in the FAUS, and time and savings deposits is fa103030003. *Net payout* is measured as net dividends plus net share repurchases of nonfinancial corporate business sector. *Stock value* is the total value of the US stock market from CRSP. The sample period is from 1987 to 2019.

	FAUS payout			Compustat payout		
	Checkable	Time&savings	All	Checkable	Time&savings	All
$Net\,payout_t/GDP_{t-1}$	-0.01	-0.08***	-0.10*	0.08	-0.10***	-0.02
	(0.04)	(0.03)	(0.05)	(0.06)	(0.04)	(0.07)
$\Delta Stock\ value_t/GDP_{t-1}$	0.00	0.00**	0.00	0.00	0.00**	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
GDP_t/GDP_{t-1}	0.01	0.04**	0.05	0.01	0.04**	0.05
	(0.03)	(0.02)	(0.03)	(0.03)	(0.02)	(0.04)
$\Delta Fed\,funds\,rate$	0.00*	0.00	0.00*	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$\Delta Credit\ spread_t$	-0.00*	-0.00	-0.00**	-0.00**	-0.00	-0.00**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
R-squared	0.087	0.228	0.198	0.102	0.222	0.178
N	131	131	131	131	131	131

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A4: Quarterly aggregate equity payout and household ownership of debt securities

The dependent variable is the flow of household holding of fixed income assets, scaled by lagged GDP. Total debt flow includes the flow of money market mutual funds (fa153034005), debt securities (fa154022005), and loans (fa154023005). *Net payout* is measured as net dividends plus net share repurchases of nonfinancial corporate business sector. *Stock value* is the total value of the US stock market from CRSP. The sample period is from 1987 to 2019.

	FAUS payout	Compustat payout
	(1)	(2)
$Net\,payout_t/GDP_{t-1}$	0.21	0.03
	(0.19)	(0.25)
$\Delta Stock\,value_t/GDP_{t-1}$	-0.02**	-0.02**
	(0.01)	(0.01)
GDP_t/GDP_{t-1}	-0.04	-0.05
	(0.13)	(0.13)
$\Delta Fed\,funds\,rate$	0.00	0.00
	(0.00)	(0.00)
$\Delta Credit\,spread_t$	0.01***	0.01***
	(0.00)	(0.00)
R-squared	0.312	0.305
N	132	132

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$