FEDERAL RESERVE BANK OF NEW YORK
ECONOMIC POLICY REVIEW

How Do Banks Build Equity Capital?

Lily Gordon and Beverly Hirtle

Volume 32 , Number 1
September 2026

How Do Banks Build Equity Capital?

Lily Gordon and Beverly Hirtle

OVERVIEW

- Understanding how bank equity capital evolves over time is critical to understanding the risks facing individual banks, the banking system, and the broader economy.
- Using regulatory data, the authors analyze the components of equity capital—stock issuance, shareholder payouts in the form of dividends and share repurchases, and after-tax earnings—to document how U.S. bank holding companies built and depleted equity capital from 1990 to 2024.
- Earnings are by far the dominant source of equity capital growth. While common stock issuance is frequent, amounts are typically small and contribute little to overall equity capital growth. At the bank level, dividends and share repurchases exceed earnings in a meaningful share of years, reflecting both capital-management decisions and the effects of unexpected earnings shocks.
- The findings also indicate that routine issuance reflects share-maintenance practices and compensation rather than deliberate efforts to raise capital.

Capital is fundamental to the health and safety of banks. Equity capital, in particular, is the first line of defense in absorbing losses that can threaten the viability of a banking institution. Without sufficient equity capital, banks can be overly exposed to the possibility of failure, and the economy in turn can be exposed to the associated disruptions to the flow of credit and other financial services. Most bank failures are caused by insolvency resulting from credit and other losses that reduce equity capital to critically low levels (Correa, Luck, and Verner 2026); widespread insolvency across many banks can cause banking crises that are deeply costly to local, national, and global economies (Hoggarth, Reis, and Saporta 2002). Understanding how banks' equity capital evolves over time is thus critical to understanding the risks facing individual banks, the banking system, and the broader economy.

In light of these risks, regulators have long focused considerable efforts on capital regulation (Basel Committee on Banking Supervision 2011). The global financial crisis (GFC) revealed

Lily Gordon is a former research analyst and Beverly Hirtle is a research advisor emerita at the Federal Reserve Bank of New York. Correspondence: Beverly Hirtle, beverly_hirtle@yahoo.com.

https://doi.org/10.59576/epr.32.1.1-48

important limitations of earlier regulatory capital measures, which relied in part on instruments that proved less effective at absorbing losses in stress (Board of Governors of the Federal Reserve System 2009). Post-crisis reforms therefore placed greater emphasis on the newly defined Common Equity Tier 1 capital—composed primarily of equity capital—as the most reliable indicator of bank resilience.

In this article, we examine the sources and uses of equity capital in the banking industry: how banks grow equity capital and how they deplete it. Equity capital, which, in the banking industry, is the sum of common stock and perpetual preferred stock, is an accounting-based measure that incorporates the value of stock when issued plus retained earnings and other comprehensive income. It is distinct, and often differs significantly, from the market value of equity, which reflects the price that investors are willing to pay for a bank's common and preferred stock. Equity capital forms the base of the capital measures used in regulatory capital requirements. Unlike that of regulatory capital, however, the definition of equity capital has remained relatively consistent over time, allowing us to study the evolution of equity capital over a long historical period that includes several economic cycles.

We use regulatory reports filed by bank holding companies—the Consolidated Financial Statements of Bank Holding Companies (FR Y-9C data)—to measure the key components of changes in banks' equity capital over time.[1] These components include new issuance of common and preferred shares, which increase equity capital; dividends and share repurchases, both of which decrease equity capital; and after-tax earnings, which can either increase or decrease equity capital depending on whether earnings are positive or negative. We examine data for the banking industry as a whole and for individual banks in the cross section. One advantage of using regulatory report data is that we can track both publicly traded and non-publicly traded bank holding companies, unlike other studies that focus only on publicly traded firms (for instance, Floyd, Li, and Skinner [2015], Baron [2020], and Fahlenbrach, Ko, and Stulz [2024]). A second advantage is that we can examine trends over a relatively long historical period, from 1990 to 2024.

Earnings are the largest contributor to changes in equity capital, equaling 11 to 12 percent of equity capital in a typical year. While new issuance of common or preferred stock is significant in some years and for some individual banks, it generally contributes much less to overall equity capital growth. Common stock issuance is quite frequent, but amounts tend to be small, with median issuance amounts of 0.9 percent of equity capital among banks that issue in a given year.

Common stock dividends and share repurchases reduce equity capital in meaningful ways, with typical yearly drawdowns of 4.5 percent and 4.0 percent, respectively. Common stock is by far the larger component of equity capital relative to perpetual preferred stock, representing about 95 percent of the industry total on average during the sample period. The impact of changes in perpetual preferred stock is typically quite small, given preferred stock's much smaller share of total equity capital. The notable

[1] Due to reporting limitations, our sample excludes bank holding companies with assets less than $3 billion in 2024 dollars and stand-alone commercial banks. The asset cutoff ensures a historically consistent sample, since the reporting threshold for the FR Y-9C has increased over time. These entities are small in aggregate relative to the total industry, so our conclusions about the industry would not differ significantly if we had included them in the sample.

exceptions are in 2008 and 2009, reflecting the very significant impact of preferred stock injections (in 2008) and redemptions (in 2009) associated with the Troubled Asset Relief Program (TARP).

A closer look at the individual bank data reveals detail that is not observable from the aggregate industry results. In particular, nearly all banks pay dividends most of the time: dividend payments are positive in more than 85 percent of bank-year observations in our sample. As documented in prior studies (Hirtle 2004, 2017; Fahlenbrach, Ko, and Stulz 2024), share repurchases are also quite common, rising in both frequency and size over the 1990s, declining during the GFC, and rising again since that period.

Common stock dividends and repurchases exceed earnings for more than 20 percent of the bank-years in the sample, representing a net drag on equity capital for those institutions in those years. We document significant year-over-year persistence in such behavior, as banks whose payouts exceeded earnings in one year are more likely to exhibit the same behavior in the next year. This behavior is more likely at banks with higher levels of common equity, suggesting that capital planning—for instance, movement toward a target capital ratio—could play a role. At the same time, banks are also more likely to make payouts that exceed earnings when they experience a negative earnings shock, consistent with the idea that unanticipated changes in earnings are an important contributor to this behavior.

A meaningful share of banking organizations both issue new common stock and conduct share repurchases in the same year, with repurchase amounts generally exceeding new issuance. This pattern suggests that issuance is only infrequently used as a direct means of increasing equity capital and instead likely reflects factors such as equity awards associated with employee stock-based compensation (SBC). And indeed, we find that while overall common stock issuance is unrelated to a bank's use of SBC, smaller issuance amounts are positively related to the extent of SBC at the bank. Further, small-scale repurchase activity is also related to the extent of SBC, consistent with the idea that repurchases are used to offset SBC-related issuance. The significant exception to the relatively limited role of new issuance is the period following the GFC, when sizable issuance of both TARP-related perpetual preferred stock and common stock took place.

Our article is related to a large literature on firms' payout policies and financing decisions. Much of this literature excludes financial and utility firms from empirical analysis, though a smaller literature examines these behaviors specifically in banks. Together, this work highlights how firms' equity capital evolves through the joint interaction of earnings, payouts, and equity issuance, providing a useful framework for analyzing these dynamics in the banking sector.

A large body of work examines how the determinants and prevalence of dividend payouts have evolved over time. The fraction of firms paying dividends declined between 1978 and 1999, largely driven by the entry of smaller, less profitable firms (Fama and French 2001). Despite this decline in the number of dividend payers, aggregate real dividends increased over the same period as payout activity became increasingly concentrated among large, profitable, mature firms (DeAngelo, DeAngelo, and Skinner 2004). This concentration of payouts among mature firms is consistent with the life-cycle theory of dividends, which predicts that firms with higher retained earnings relative to contributed equity are

more likely to pay dividends, reflecting a transition from a growth phase to a cash-distributing phase (DeAngelo, DeAngelo, and Stulz 2006). Subsequent work revisits both the decline and the later recovery in dividend payers, emphasizing roles for firm characteristics, risk, and changes in firms' propensity to pay (Hoberg and Prabhala 2008; Julio and Ikenberry 2004; Kuo, Philip, and Zhang 2013; Michaely and Moin 2022). While much of this literature focuses on nonfinancial firms, recent work shows that financial firms exhibit a higher propensity to distribute payouts than nonfinancial firms, with these differences largely explained by leverage, liquidity, and ownership structure (Caiazzo et al. 2025).

Beyond the decision of whether to distribute cash to shareholders and how much to distribute, firms must also decide how to do so, either through dividends or share repurchases. Over time, repurchases have increasingly substituted for dividends as a payout mechanism (Grullon and Michaely 2002). Many studies attribute the rise in repurchases to their greater flexibility relative to dividends. Managers are often reluctant to reduce dividends because of the negative signal that dividend cuts may convey to investors, while repurchases allow firms to adjust payouts more easily (Jagannathan, Stephens, and Weisbach 2000; Allen and Michaely 2003; Brav et al. 2005). Consistent with this interpretation, repurchases respond more strongly to transitory changes in earnings than dividends (Skinner 2008), while dividend increases tend to reflect more permanent shifts in cash flows (Guay and Harford 2000; Jagannathan, Stephens, and Weisbach 2000).

A smaller literature examines payout dynamics specifically in the banking sector. Several studies document how the use of dividends and share repurchases has changed over time in the industry (Fahlenbrach, Ko, and Stulz 2024; Floyd, Li, and Skinner 2015; Hirtle 2004, 2017). This work shows that repurchases are a higher share of payouts at larger banking companies (Fahlenbrach, Ko, and Stulz 2024) and that repurchases are more volatile than dividends over time (Fahlenbrach, Ko, and Stulz 2024; Floyd, Li, and Skinner 2015; Hirtle 2023), patterns that mirror those documented for nonfinancial firms.

Other articles examine bank payout behavior during periods of financial stress, such as the GFC (Acharya et al. 2022; Cziraki, Laux, and Lóránth 2024; Hirtle 2014) and the COVID-19 pandemic (Fringuellotti and Kroen 2024; Hirtle 2023; Marsh 2022). These articles document that while banks continued to pay dividends well into the GFC, they cut share repurchases early in this period. Similarly, most banks continued to pay dividends during the pandemic, though regulators capped dividends at pre-pandemic levels and prohibited share repurchases by large banks (Board of Governors of the Federal Reserve System 2020). Some articles suggest that shifting risk to creditors or other banks was the dominant motivation for this behavior (Acharya, Le, and Shin 2016; Acharya et al. 2022; Fringuellotti and Kroen 2024), while others find less evidence of risk-shifting or suggest that concerns about signaling seem more consistent with the evidence (Cziraki, Laux, and Lóránth 2024; Hirtle 2014).

Another strand of the literature examines the interaction between shareholder payouts and external financing decisions. Fama and French (2005) provide evidence inconsistent with Myers' (1984) pecking order model, which predicts that firms prefer internal financing, then debt, and issue equity only as a last resort. Instead, they show that equity issuance is common and that firms frequently issue and repurchase equity in the same year, suggesting that financing and payout decisions are jointly determined rather

than sequential. More recently, Farre-Mensa, Michaely, and Schmalz (2024) find that a large share of firms that make payouts also issue debt or equity in the same year, with debt issuance being particularly common. Further, a large share of firms make payouts exceeding free cash flow each year, meaning these payouts are effectively "financed" by new issuance (particularly debt). In the banking literature, Baron (2020) finds that net equity issuance—that is, equity issuance net of dividends and repurchases—is countercyclical, particularly at large banks. Banks issue less equity on net during credit expansions, while issuance at smaller banks is common and can be substantial.

Related work examines how stock-based compensation and employee equity incentives shape repurchase and issuance policies. SBC intensity is positively associated with both equity issuance and repurchases, since firms with greater SBC are more likely to issue shares to settle equity awards and subsequently repurchase shares to offset the resulting dilution (Mohanram, White, and Zhao 2020; Bonaime et al. 2020). Other work focuses on the timing of repurchases around vesting and equity sales, finding that firms repurchase more aggressively when CEOs' equity vests and sell shares in the weeks following buyback announcements (Edmans, Fang, and Huang 2022; Moore 2023). However, Dittman et al. (2025) test whether CEOs exploit share repurchases to sell equity at inflated prices and show that the correlation between repurchases and equity-based compensation is largely explained by the firm's corporate calendar.

Our article extends this prior work in several ways. First, we bring together the various threads of work looking separately at dividends and share repurchases, new common equity issuance, and earnings in the banking industry by examining their joint behavior both across banks and over time. In this way, we establish stylized facts about the sources of equity capital growth in the banking industry. While much of the corporate finance literature has examined these decisions for nonfinancial firms, banks have received relatively less attention despite their importance for financial intermediation and the broader economy. Second, we examine the characteristics of banks that make payouts exceeding earnings to understand the role of capitalization and the volatility of earnings and payouts. Third, we extend the literature on stock-based compensation by analyzing the relationship between SBC, issuance, and repurchases in the banking industry. Fourth, we use regulatory report data to examine both publicly traded and non-publicly traded bank holding companies, in contrast to most of the prior literature, which focuses only on publicly traded firms. In the same vein, we also analyze differences across asset size cohorts, including smaller banking organizations.

The remainder of this article is organized as follows. Section 1 describes the data we use in our analysis, the construction of our key variables, and the sample of banks we analyze. Section 2 presents aggregate results for the banking industry and for cohorts based on asset size and whether a bank holding company is publicly traded, establishing stylized facts about how equity capital changes over time and the key drivers of those changes. Section 3 turns to cross-sectional analysis of individual banks, with a particular focus on factors that distinguish banks that pay out more than they earn in a particular year and on concurrent issuance and repurchasing of common stock. Section 4 contains a summary and conclusions.

1. DATA, VARIABLES, AND SAMPLE

Our primary data source is the FR Y-9C report, which contains consolidated balance sheet and income statement data for bank holding companies—the corporate parents that own commercial banks and related subsidiaries and that are typically the issuers of common and preferred stock in the banking industry (Board of Governors of the Federal Reserve System 2024).[2] We rely in particular on the "Changes in Holding Company Equity Capital" schedule, which traces the change in equity capital from the end of the previous calendar year through the current quarter. The March 2025 version of this schedule is reproduced here as Exhibit 1. We also use other FR Y-9C schedules for information on asset size and the dollar amounts of common equity and perpetual preferred stock. Additionally, we use the Federal Reserve Bank of New York's crosswalk linking bank holding company regulatory identification numbers (RSSD-ID) and firm identifiers in the Center for Research in Security Prices (CRSP) data to identify publicly traded bank holding companies (Federal Reserve Bank of New York 2025). Finally, we obtain data on stock-based compensation from Compustat.

The main exercise in this article is to explain the evolution of equity capital over time for individual banks and for the banking system. The year-over-year change in common equity is defined by Equation 1, below.

$$
\begin{aligned}
Equity\ Capital_t \\
&= Equity\ Capital_{t-1} + After\ Tax\ Net\ Income_t \\
&+ Other\ Comprehensive\ Income_t \\
&+ Common\ Stock\ Issuance_t - Common\ Stock\ Dividends_t \\
&- Common\ Stock\ Repurchases_t \\
&+ Preferred\ Stock\ Issuance_t \\
&- Preferred\ Stock\ Dividends_t \\
&- Preferred\ Stock\ Repurchases_t + Other_t
\end{aligned}
\tag{1}
$$

Equity capital is defined as common stock plus perpetual preferred stock. As the equation suggests, year-over-year changes in equity capital are driven by after-tax earnings, new common and preferred issuance, dividends paid on common and preferred shares, and common and preferred stock repurchases. Many of these variables can be taken directly from the Y-9C reports, but some must be imputed from reported data. We describe each of these calculations in more detail below.

[2] For convenience, we use the terms "bank" and "bank holding company" interchangeably, but all the data used in the analysis are for bank holding companies.

EXHIBIT 1

FR Y-9C Equity Capital Reporting Schedule, March 2025

Schedule HI-A—Changes in Holding Company Equity Capital

Dollar Amounts in Thousands	BHCK	Amount	
1. Total holding company equity capital *most recently reported* for the end of previous calendar year (i.e., after adjustments from amended Reports of Income)	3217		1.
2. Cumulative effect of changes in accounting principles and corrections of material accounting errors	B507		2.
3. Balance end of previous calendar year as restated (sum of items 1 and 2)	B508		3.
	BHCT		
4. Net income (loss) attributable to holding company (must equal Schedule HI, item 14)	4340		4.
5. Sale of perpetual preferred stock (excluding treasury stock transactions):	BHCK		
a. Sale of perpetual preferred stock, gross	3577		5.a.
b. Conversion or retirement of perpetual preferred stock	3578		5.b.
6. Sale of common stock:			
a. Sale of common stock, gross	3579		6.a.
b. Conversion or retirement of common stock	3580		6.b.
7. Sale of treasury stock	4782		7.
8. LESS: Purchase of treasury stock	4783		8.
9. Changes incident to business combinations, net	4356		9.
10. LESS: Cash dividends declared on preferred stock	4598		10.
11. LESS: Cash dividends declared on common stock	4460		11.
12. Other comprehensive income[1]	B511		12.
13. Change in the offsetting debit to the liability for Employee Stock Ownership Plan (ESOP) debt guaranteed by the holding company	4591		13.
14. Other adjustments to equity capital (not included above)	3581		14.
15. Total holding company equity capital end of current period (sum of items 3, 4, 5, 6, 7, 9, 12, 13, and 14, less items 8, 10, and 11) (must equal item 27.a on Schedule HC)	BHCT 3210		15.

1. Includes, but is not limited to, changes in net unrealized holding gains (losses) on available-for-sale debt securities, changes in accumulated net gains (losses) on cash flow hedges, foreign currency translation adjustments, and pension and other postretirement plan related changes other than net periodic benefit cost.

Source: Board of Governors of the Federal Reserve System website, https://www.federalreserve.gov/apps/reportingforms/.

U.S. accounting standards recognize two broad forms of earnings: net income and other comprehensive income (OCI). Net income is the difference between interest and non-interest income (such as fees, trading revenues, and service charges) and interest and non-interest expense. OCI is composed of a variety of elements, including unrealized gains or losses on available-for-sale debt securities, changes in accumulated net gains or losses on hedging instruments, and foreign currency translation adjustments. Under current U.S. generally accepted accounting principles (GAAP), net income is recognized and reported on a bank's income statement; it is the most commonly accepted and analyzed form of income for banks. OCI, in contrast, does not run through the income statement but does affect equity capital,[3] as illustrated in Exhibit 1.

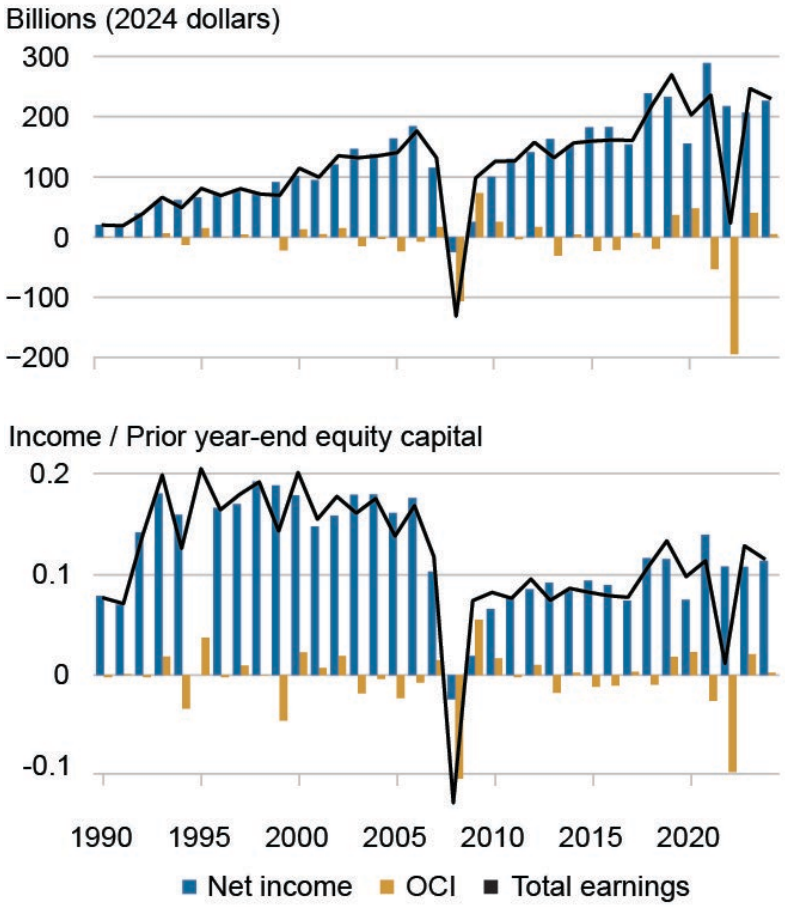
In our work, we combine after-tax net income and other comprehensive income into a single "earnings" variable.[4] Chart 1 shows industry aggregate net income (blue bars), other comprehensive

[3] OCI is used to report changes in market values and risk exposures, rather than a bank's core operating performance (Su et al. 2025). OCI allows fluctuations in the value of available-for-sale securities to be reflected in equity while keeping them separate from net income (Marsh and Laliberte 2023).

[4] Other comprehensive income is available on the FR Y-9C reports starting in 2001. Prior to that date, we calculate an OCI proxy based on reported income elements that are incorporated into other comprehensive income, including, during various years, changes in net unrealized losses on marketable securities, change in net unrealized holding gains or losses on available-for-sale securities, and foreign currency translation adjustments.

CHART 1

Net Income and Other Comprehensive Income, 1990–2024



Sources: Federal Reserve Y-9C reports; authors' calculations.

Note: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars.

income (gold bars), and total earnings (black line) for the banks in our sample, both in 2024 dollars (top panel) and as a share of common equity (bottom panel). In most years, net income is the largest component of earnings, and the two variables track one another closely. However, other comprehensive income is large and negative in 2008 and 2022, driven largely by unrealized losses on securities, reflecting steep increases in credit spreads in 2008 and sharp increases in interest rates in 2022.

Total amounts of new issuance of common stock and perpetual preferred stock are not directly available on the FR Y-9C and must be calculated from more detailed reporting items. Issuance of common stock is calculated as the sum of gross sales of common stock, sales of treasury stock,[5] and the

[5] Treasury stock is stock that has been repurchased by the bank but not retired. Since treasury stock is shares that have been issued but are not owned by shareholders, it does not contribute to equity capital. Hence, sale of treasury stock increases equity capital, while purchases of shares held as treasury stock decrease equity capital.

net of conversion or retirement of common stock if this net is positive (that is, if conversions exceed retirements). Issuance of perpetual preferred stock is calculated as gross sales of perpetual preferred stock plus the net of conversion or retirement of perpetual preferred stock if conversions exceed retirements.[6]

Dividends on common and preferred stock are reported directly on the FR Y-9C reports, but common stock repurchases must be inferred from the reported data. In particular, we calculate common stock repurchases as the sum of treasury stock purchases and the net of common stock repurchases and retirements if retirements exceed repurchases. This definition captures both stock that is repurchased in the open market and retained as treasury stock and stock that is repurchased and retired. We calculate preferred stock repurchases as the net of conversions and retirement of preferred stock if this net is negative (that is, if retirements exceed conversions).[7]

Finally, we group several other actions that can affect the evolution of equity capital into a combined "other" category, which is typically quite small for most firms in most years.[8] We adjust starting (end-of-prior-year) equity capital values to incorporate the impact of accounting changes and any material error corrections to prior reporting, so that the changes in equity capital we assess are based on bank fundamentals and deliberate actions rather than on errors or changes in accounting policy.

We also adjust end-of-prior-year equity capital values to account for any equity acquired through mergers or acquisitions during the year ("incident to business combinations"). While such changes increase equity capital at the acquiring institution, they reflect a transfer of equity within the banking system rather than growth of equity capital for the system as a whole. To ensure that we are capturing these within-banking-system transfers, our sample of banking companies in a given year includes only those that report full-year data at the end of that year. In this way, we do not lose bank holding companies that are acquired or merged during the year, since they remain reflected in the data through their acquiring firm.[9]

[6] These calculations are not precise for two reasons. First, the Y-9C variables for treasury stock combine holdings of common stock and perpetual preferred stock, which means that our measured value of common stock issuance may be somewhat overstated (and perpetual preferred issuance understated by a corresponding amount). Given that common stock outstanding is generally much larger than preferred stock outstanding, it is likely that this measurement error is small in most cases. Second, the calculations will understate issuance if a bank both has new stock created through conversion of other instruments (that is, convertible preferred shares or convertible debt) and retires stock in the same year.

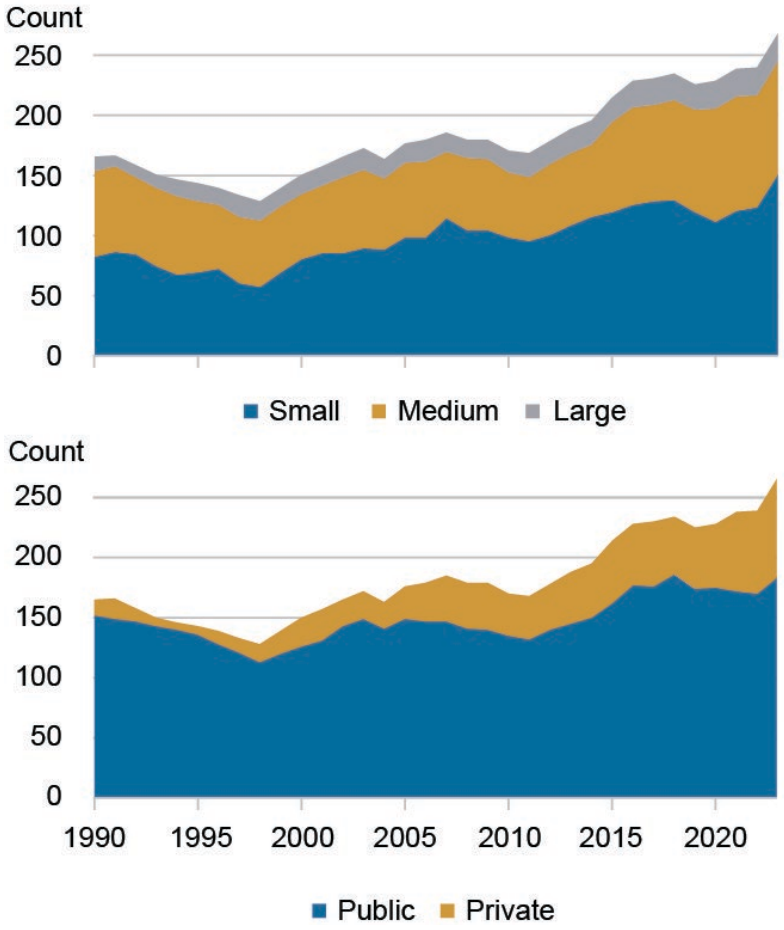
[7] As with stock issuance, and for the same reasons, the measurement of common and preferred stock repurchases is not precise. Treasury stock purchases include both common and perpetual preferred stock, so they can overstate common stock purchased and held as treasury stock. Additionally, we only observe the net of conversions and retirements, which means that retirements will be understated in years when other instruments are converted to common stock and treasury stock is retired.

[8] These actions include offsetting debits to liabilities associated with debt due to employee stock option plans (ESOPs) guaranteed by the bank and "other" actions reported as a single line item in the schedule.

[9] Banking companies could also acquire nonbank firms. Our approach would omit changes in equity capital related to these acquisitions, since the FR Y-9C reports do not provide detail on the business combinations resulting in changes in equity capital.

CHART 2

Number of Sample Banks over Time, 1990-2024



Sources: Federal Reserve Y-9C reports; New York Fed CRSP-FRB link.

Notes: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars. Small banks are those with less than $10 billion in assets, medium banks are those with assets between $10 billion and $100 billion, and large banks are those with assets greater than $100 billion, all in 2024 dollars. Public banks are those with stock traded on a major exchange, and private banks are the remainder.

Our sample consists of all U.S.-owned, top-tier bank holding companies with assets greater than $3 billion in 2024 dollars from 1990 to 2024. Chart 2 shows the number of banks in the sample in each year, broken out by asset size (top panel) and ownership status (bottom panel). The number of organizations in the sample varies over time, falling in the early years and then rising following the GFC, reflecting patterns of mergers and inflation-adjusted asset growth in the banking industry. While our analysis omits smaller banking companies, collectively, the organizations in our sample represent

94 percent of industry assets on average over time and thus capture the industry-wide evolution of equity capital.

As Chart 2 illustrates, we divide the sample by asset size cohort—less than $10 billion, $10 billion to $100 billion, and greater than $100 billion in 2024 dollars—and by whether the bank has publicly traded common stock. Most bank holding companies in our sample are in the two smaller size cohorts, with assets below $100 billion. The number of organizations in the largest size cohort roughly doubles over the sample period, consistent with consolidation and growth in the industry. Finally, since the sample focuses on larger banking organizations, most are publicly traded, though the share of private banks grows over time. Asset size and ownership status are closely related: 70 percent of small bank holding companies are publicly traded, compared with 94 percent of medium-sized banks, and all large banking companies. Conversely, roughly 86 percent of privately owned banks are in the smallest size cohort.

2. EQUITY CAPITAL GROWTH: KEY DRIVERS AND STYLIZED FACTS

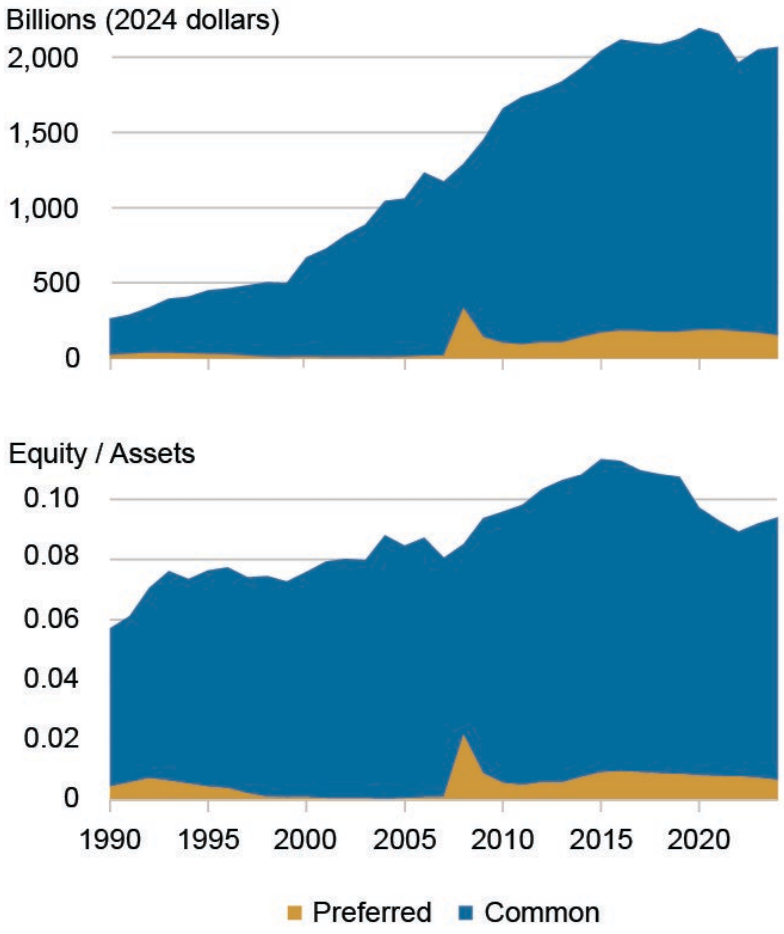
In this section, we present our core findings on the evolution of equity capital in the banking industry. We begin with an overview of the evolution of equity capital and its main drivers over our sample period. We then examine the relative size and importance of each of these factors in determining annual changes in equity capital, first for the industry as a whole and then for cohorts based on asset size and whether the bank is publicly traded. We end by examining bank-level data to develop stylized facts about common stock issuance and payout behavior and its impact on common equity growth.

2.1 Industry Aggregate and Cohort Results

Chart 3 shows the industry-level growth of equity capital from 1990 to 2024, both in levels (in 2024 dollars, top panel) and relative to total assets (bottom panel). As the top panel illustrates, equity capital increased steadily in inflation-adjusted terms over the sample period, rising from $260 billion in 1990 to more than $2 trillion by 2015. While much of this growth mirrors the overall growth of the banking industry, equity capital also increased relative to industry assets (bottom panel). Equity capital increased from less than 6 percent of assets in 1990, to a peak of 11 percent in the years immediately following the GFC, before declining to 9 percent at the end of the sample period.

CHART 3

Growth of Equity Capital in the U.S. Banking System, 1990-2024



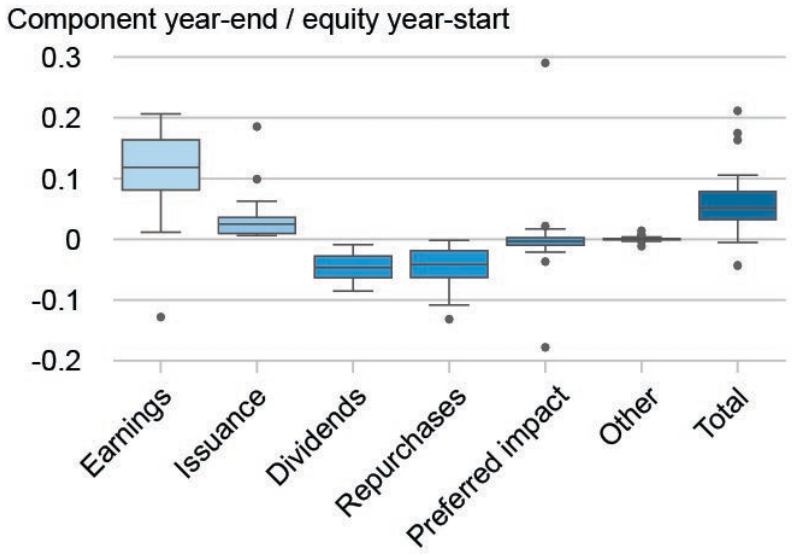
Source: Federal Reserve Y-9C reports.

Note: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars.

The chart also separates equity capital into its two components: common stock (in blue) and perpetual preferred stock (in gold). Equity capital is primarily composed of common stock, which represents 90 percent or more of aggregate industry equity capital in every sample year but 2008, when banks held comparatively large amounts of preferred stock associated with TARP issuance. While the share of preferred stock in aggregate equity capital has been higher in the post-GFC years than prior to the crisis, it is still relatively low for most banks. In 2024, just 9 percent of banks had more than 10 percent of equity capital in the form of preferred shares. For this reason, much of our firm-specific analysis will focus on common stock.

CHART 4

Contributions to Equity Capital Growth, Annual Data 1990-2024



Source: Federal Reserve Y-9C reports.

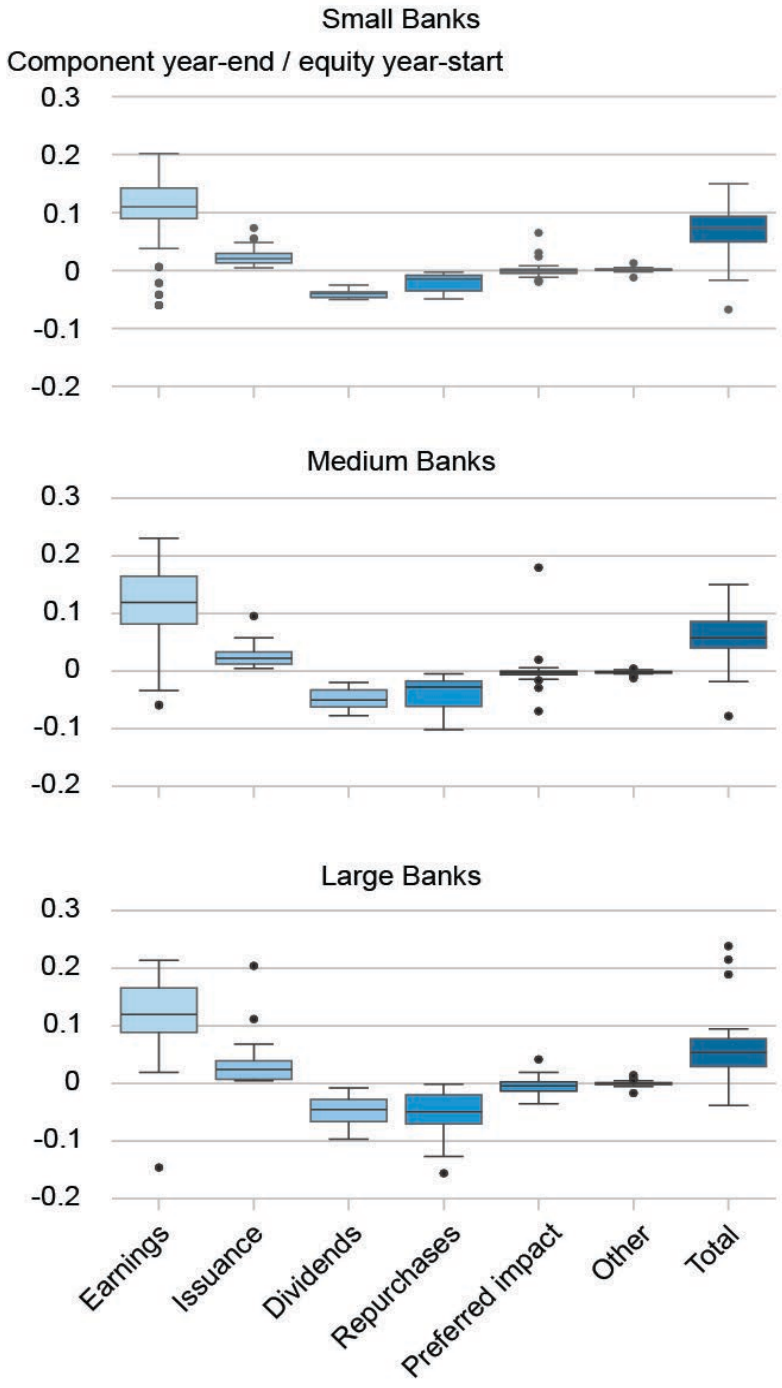
Notes: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars. Earnings is the sum of net income and other comprehensive income. Common issuance is issuance of common stock via sales and conversions. Dividends and repurchases are for common stock. Preferred impact is the net of issuance, dividends, and repurchases of perpetual preferred stock. Other is all other changes to equity capital. All values are shown as a share of prior end-of-year equity capital. The chart shows the range of annual aggregate values of each component over the sample period (1990 to 2024), with the solid box showing the 25th/75th percentile range and the line within the box showing the median value. The "whiskers" show the 5th/95th percentile range and dots outside the whiskers show values beyond that range.

Chart 4 provides an overview of the major components of equity capital growth. It shows the range of annual aggregate banking industry values for six components of equity capital growth, based on Equation 1: earnings (the sum of net income and other comprehensive income), common stock issuance, common stock dividends, common stock repurchases, the net impact of perpetual preferred stock actions (issuance, dividends, and repurchases), and "other" actions affecting equity capital. The chart shows the interquartile range (the box), the median (the line inside the box), the 5th/95th percentile values (the "whiskers"), and values outside this range (the dots). All values are expressed as shares of prior year-end equity capital.

In nearly every year in our sample period, aggregate banking industry equity capital increased (see the rightmost segment of Chart 4). In typical years, the increases ranged between 3 percent and 8 percent (the interquartile range), though there are outlier years of both growth and decline. In particular, equity capital growth was strong in 1992 and 1993, reflecting strong bank earnings and higher preferred issuance combined with comparatively low common stock repurchases, and in 2008, generated by the very large perpetual preferred stock issuance related to the TARP program. On the other end, aggregate

CHART 5

Contributions to Equity Capital Growth by Bank Size Cohort, Annual Data 1990-2024



Source: Federal Reserve Y-9C reports.

CONTINUED ON NEXT PAGE

Notes: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars. Small banks are those with less than $10 billion in assets, medium banks are those with assets between $10 billion and $100 billion, and large banks are those with assets greater than $100 billion, all in 2024 dollars. Earnings is the sum of net income and other comprehensive income. Common issuance is issuance of common stock via sales and conversions. Dividends and repurchases are for common stock. Preferred impact is the net of issuance, dividends, and repurchases of perpetual preferred stock. Other is all other changes to equity capital. All values are shown as a share of prior end-of-year equity capital. The chart shows the range of annual aggregate values of each component over the sample period (1990 to 2024), with the solid box showing the 25th/75th percentile range and the line within the box showing the median value. The "whiskers" show the 5th/95th percentile range and dots outside the whiskers show values beyond that range.

banking industry common equity fell by more than 4 percent in 2022, reflecting interest rate–related declines in earnings and sustained common stock shareholder payouts.

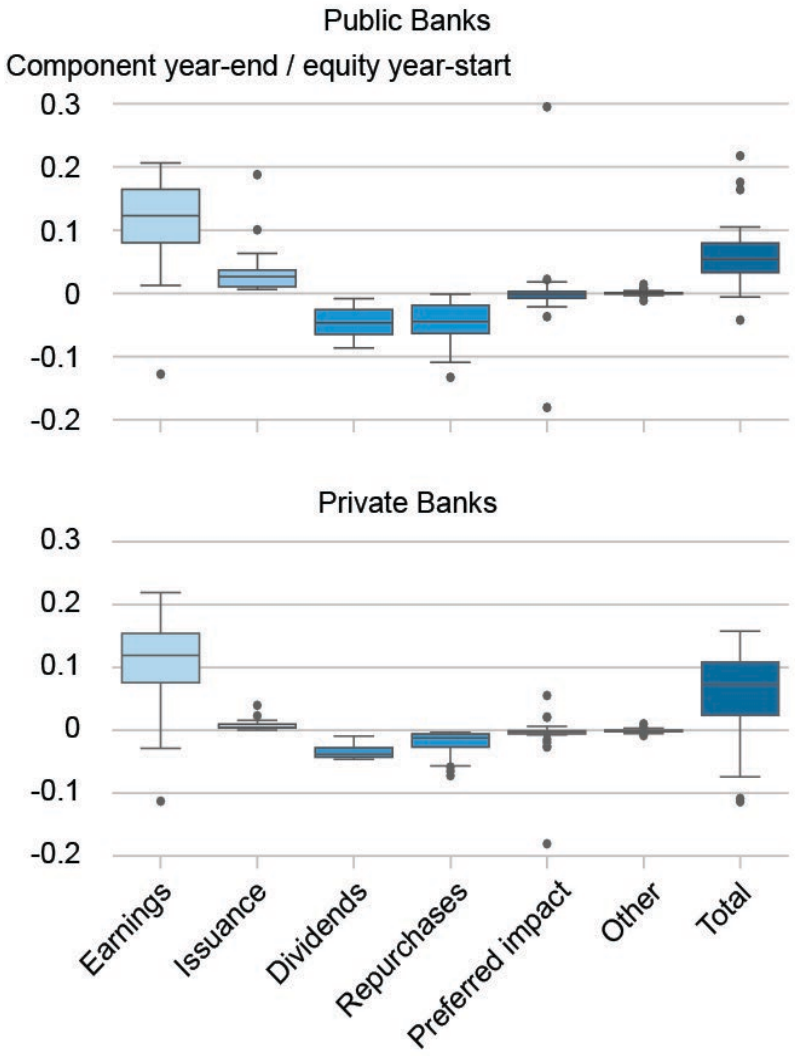
Consistent with the drivers of these outlier years, the largest contributor to equity capital growth in the banking industry is earnings. In a typical year, the combination of net income and OCI equals 11.6 percent of prior-year equity capital. Aggregate industry earnings are positive in every year of the sample period except 2008 (the dot at the bottom of the chart). Common stock issuance, in contrast, contributes much less to equity capital growth in most years, equaling just 2.5 percent of prior-year equity capital in a typical year. That said, common stock issuance made notably larger contributions during and immediately after the GFC in 2008 and 2009 (the two dots at the top of the chart), when banks issued new common stock to raise capital levels and to redeem TARP preferred stock. The Appendix discusses the GFC period in more detail.

Common stock shareholder payouts in the form of dividends and repurchases are the next most important contributors to changes in equity capital. In a typical year, common stock dividends and repurchases reduce equity capital by 4.7 percent and 4.2 percent, respectively. Finally, in most years, the impacts of changes in perpetual preferred stock and "other" equity capital actions are negligible at the industry level, with most annual values clustered around zero. The exceptions, as noted, are two years when perpetual preferred actions had large impacts on equity capital growth: 2008, when issuance associated with the TARP program increased equity capital by nearly 30 percent of the prior-year value (the dot near the top of the chart), and 2009, when redemptions of preferred stock drew down equity capital by nearly 20 percent of the prior-year value (the dot near the bottom of the chart).

When we break the industry into asset size cohorts (Chart 5) and by whether the banking company is publicly traded or privately held (Chart 6), the overall results are generally similar to those for the industry as a whole. The largest differences are for smaller and privately held banking companies (there is quite a bit of overlap between these two categories). In particular, privately held banking companies experience more years in which equity capital decreases, though years with increases are also the norm for this set of firms. Smaller banking companies also experience more years with negative earnings than the industry as a whole. Finally, in a typical year, smaller and privately held banking companies rely more on dividends than on share repurchases to return funds to shareholders.

CHART 6

Contributions to Equity Capital Growth by Ownership Status, Annual Data 1990-2024

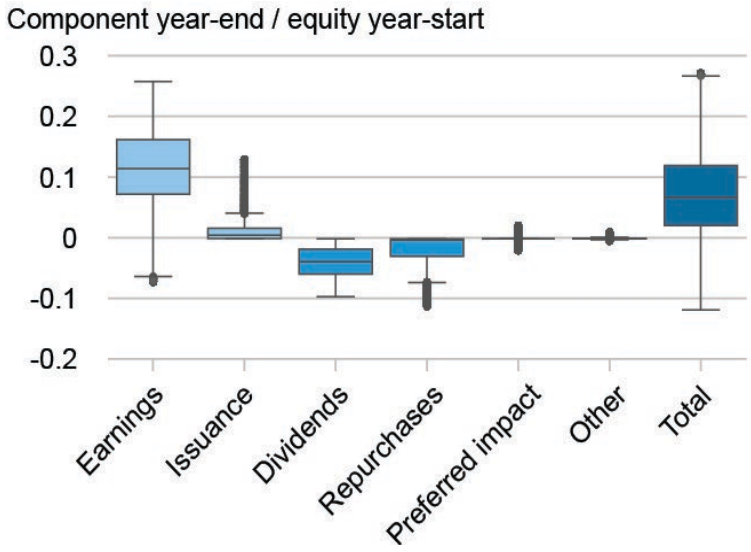


Sources: Federal Reserve Y-9C reports; Federal Reserve Bank of New York CRSP-FRB link.

Notes: The sample includes all top-tier bank holding companies (BHCs) with assets greater than $3 billion in 2024 dollars. Public BHCs are those with equity traded on major exchanges, while private BHCs are those without equity traded on major exchanges. Earnings is the sum of net income and other comprehensive income. Common issuance is issuance of common stock via sales and conversions. Dividends and repurchases are for common stock. Preferred impact is the net of issuance, dividends, and repurchases of perpetual preferred stock. Other is all other changes to equity capital. All values are shown as a share of prior end-of-year equity capital. The chart shows the range of aggregate annual values of each component over the sample period (1990 to 2024), with the solid box showing the 25th/75th percentile range and the line within the box showing the median value. The “whiskers” show the 5th/95th percentile range and dots outside the whiskers show values beyond that range.

CHART 7

Contributions to Equity Capital Growth Bank-Year Data, Annual Data 1990-2024, Winsorized at the 5th / 95th Percentiles



Source: Federal Reserve Y-9C reports.

Notes: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars. Earnings is the sum of net income and other comprehensive income. Common issuance is issuance of common stock via sales and conversions. Dividends and repurchases are for common stock. Preferred impact is the net of issuance, dividends, and repurchases of perpetual preferred stock. Other is all other changes to equity capital. All values are shown as a share of prior end-of-year equity capital. The chart shows the range of individual bank annual values of each component over the sample period (1990 to 2024), with the solid box showing the 25th/75th percentile range and the line within the box showing the median value. Data are winsorized at the 5th and 95th percentiles. The "whiskers" show the 5th/95th percentile range and dots outside the whiskers show values beyond that range, both after winsorization.

2.2 Stylized Facts: Earnings, Shareholder Payouts, and Common Stock Issuance

The discussion thus far has focused on data aggregated at the industry or cohort level. We now examine the main drivers of equity capital growth at the individual bank level and use this granular data to establish stylized facts on how banks use shareholder distributions and new common stock issuance to manage their equity capital positions.

To begin, Chart 7 shows the main components of equity capital growth based on bank-year data.[10] The overall pattern is generally similar to the industry aggregate results in Chart 4, though with more

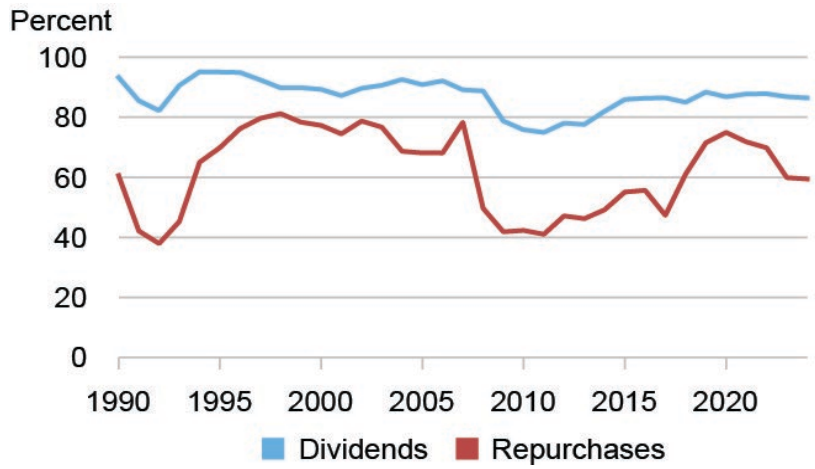
[10] We winsorize the data at the 5th and 95th percentiles for clarity.

outlier observations. Earnings continue to be the most significant source of equity capital growth. Common stock issuance plays an important role for some banks in some years (see the concentration of dots above the 95th percentile "whisker"), but it contributes relatively little to equity capital growth for most banks in most years. The impact of perpetual preferred stock and "other" equity actions is small in general, with the exception of the preferred stock impact during the GFC period. Common stock dividends continue to be the largest source of shareholder payouts in most bank-years, while the role of common stock repurchases appears somewhat smaller at the bank level than in the aggregate. The cluster of dots below the 5th percentile "whisker" suggests that large repurchases by a limited set of banks likely drive industry aggregate results.

Both the aggregate and bank-level data suggest that common stock dividends and repurchases play an important role in the evolution of equity capital in the banking industry. Chart 8 presents another perspective on this role by showing the share of banks in each year that pay common stock dividends (blue line) or make repurchases (red line). Nearly all banks pay dividends nearly all of the time: the share paying dividends ranges between 80 and 95 percent over most of the sample period, with a dip during the GFC years. The share of banks doing common stock repurchases is lower, ranging between 40 and 80 percent, and varies more significantly over time, with fairly steep declines during periods of banking industry stress (the mid-1990s and the GFC most notably). As illustrated in Chart 9, the share of banks making either form of common stock payout rises with bank asset size. The share paying dividends ranges between 70 and 90 percent for small banks, is consistently above 90 percent for medium-sized banks, and is 100 percent in most years for the largest size cohort. Nearly all large banks do common stock repurchases in most years, though the share drops steeply during periods of banking industry stress.

CHART 8

Share of Banks Making Common Stock Payouts, 1990-2024



Source: Federal Reserve Y-9C reports.

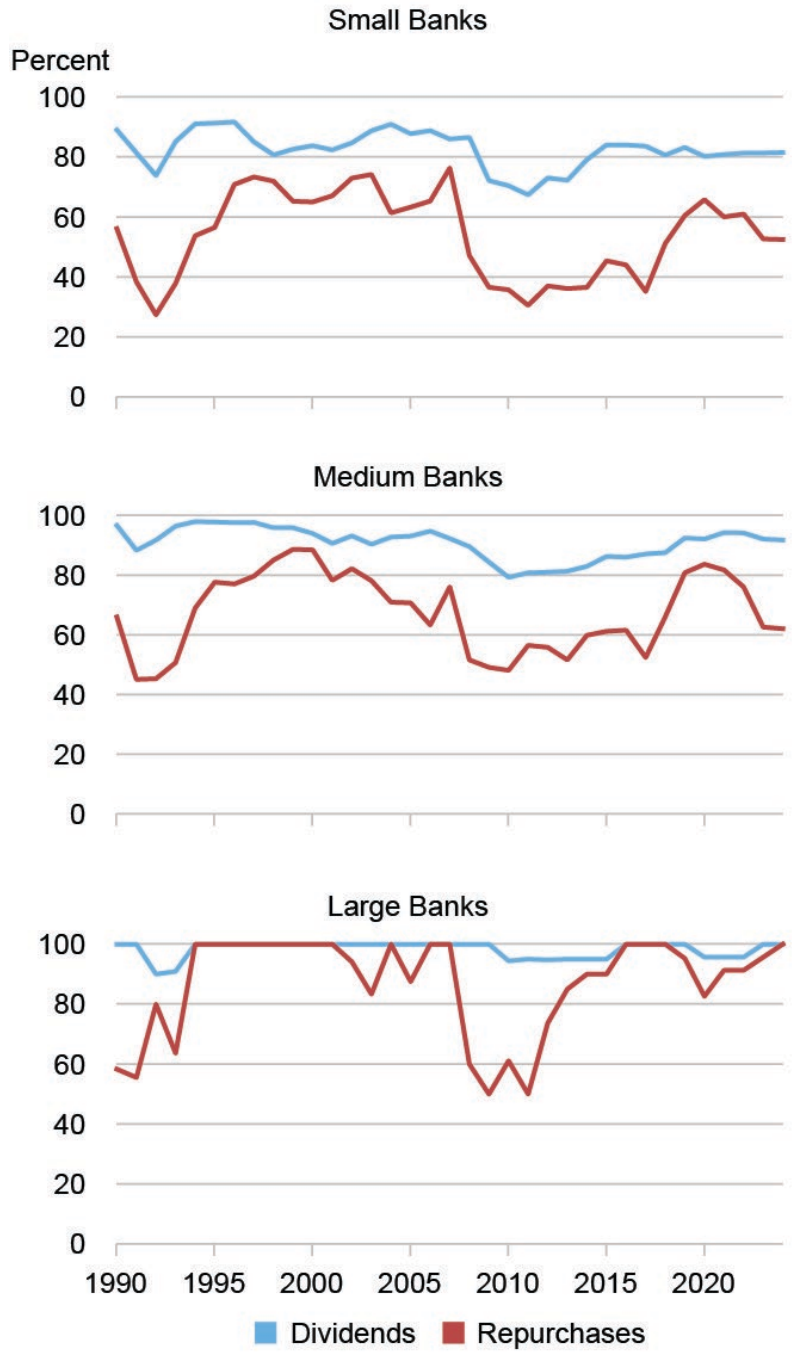
Note: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars.

The prevalence of common stock payouts, particularly dividends, suggests that these distributions play an important role in banks' management of their equity capital positions. And indeed, common stock payouts often exceed bank earnings—a payout ratio greater than one—so that the net impact reduces equity capital. Chart 10 shows the frequency of bank-years with negative earnings minus payouts (EMP) as well as the typical impact of these negative EMPs on equity capital. As the top panel illustrates, the share of banks with negative EMP ranges between 10 and 40 percent in most years, with higher spikes during periods of banking stress (the GFC and the 2022 interest rate cycle). The bottom panel shows the mean and median impact on equity capital. In a typical year, the median impact is between 2 and 5 percent, but in stress years (the early 1990s, the GFC, and the 2022 interest rate cycle), the typical impact is considerably larger. The mean impact exceeds the median, sometimes by large amounts, indicating that common stock payouts exceeding earnings were a very significant drain on equity capital for some banks. Such large decreases in equity capital could be concerning for individual banks and from a financial stability perspective. However, if a negative EMP reflects attempts by banks to manage their capital positions when capital is higher than desired, such occurrences are less troubling. We will explore the key factors associated with negative EMP in Section 3.

As we have documented, nearly all banks pay dividends and/or make repurchases in most years, sometimes in amounts that exceed earnings. While these payouts reduce equity capital, banks can increase equity capital by issuing new common stock. In fact, most banks issue some amount of new common stock in every year in our sample. Chart 11 shows that the share of banks issuing new common stock ranged between 80 and 90 percent prior to the GFC and has declined to about 70 percent in more

CHART 9

Share of Banks Making Common Stock Payouts by Asset Size Cohort, 1990-2024

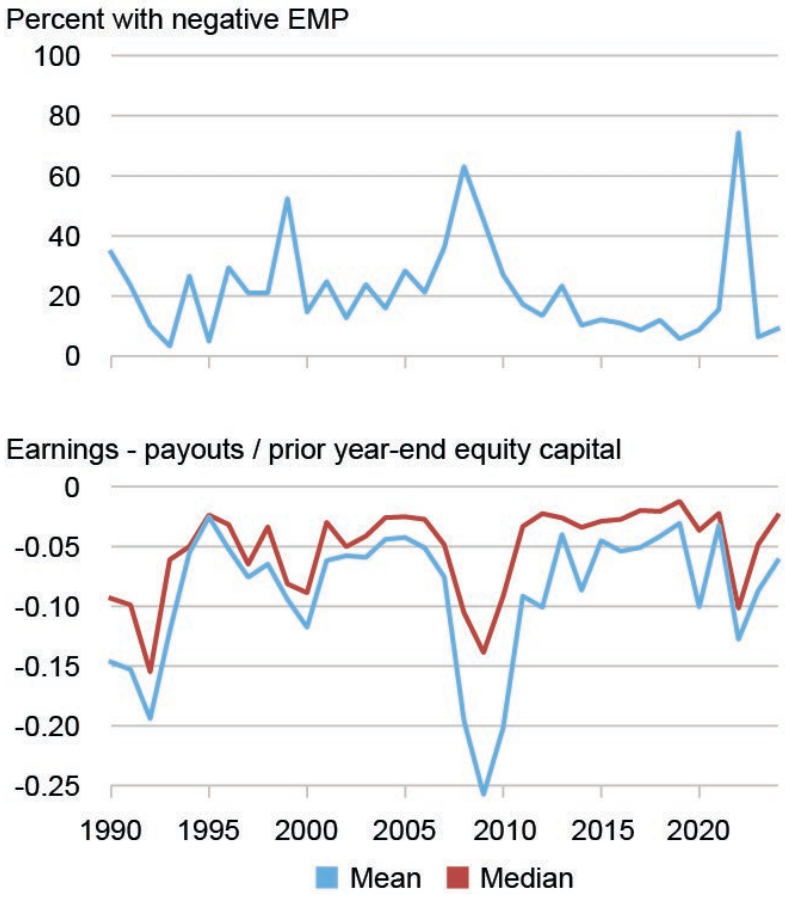


Source: Federal Reserve Y-9C reports.

Notes: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars. Small banks are those with less than $10 billion in assets, medium banks are those with assets between $10 billion and $100 billion, and large banks are those with assets greater than $100 billion, all in 2024 dollars.

CHART 10

Frequency and Size of Common Stock Payouts That Exceed Earnings, 1990-2024



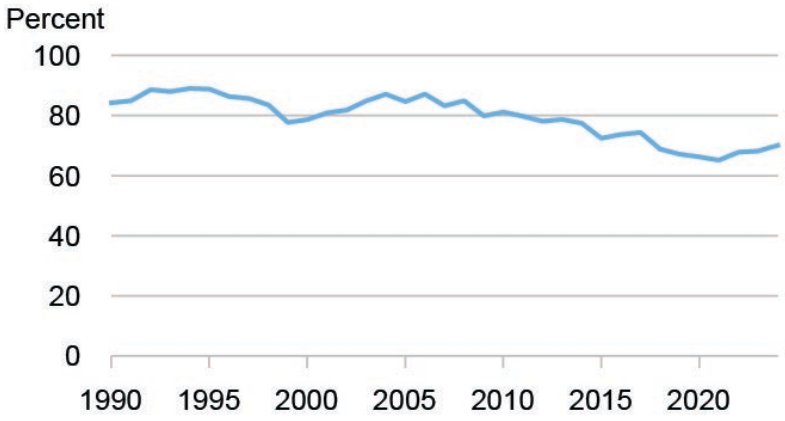
Source: Federal Reserve Y-9C reports.

Notes: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars. EMP is earnings (net income plus OCI) minus common stock payouts (dividends plus repurchases). The top panel shows the share of banks with negative EMP in a given year. The bottom panel shows the EMP scaled by end-of-prior-year equity capital for those banks with negative EMP in a given year.

recent years. As Chart 12 shows, larger banks are more likely to issue common stock than smaller ones. In recent years, about 60 percent of banks in the smallest size cohort have issued common stock, compared with 80 to 90 percent of banks in the largest size cohort. Issuance is also more common for publicly traded banks than for privately held ones, with about 80 percent of the former issuing common stock in recent years as compared to 40 percent of the latter.

CHART 11

Share of Banks That Issue Common Stock, 1990-2024

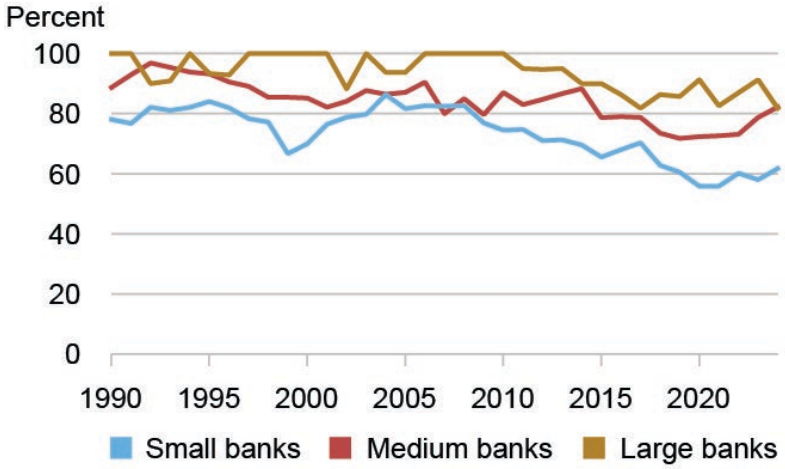


Source: Federal Reserve Y-9C reports.

Note: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars.

CHART 12

Share of Banks That Issue Common Stock by Asset Size Cohort, 1990-2024

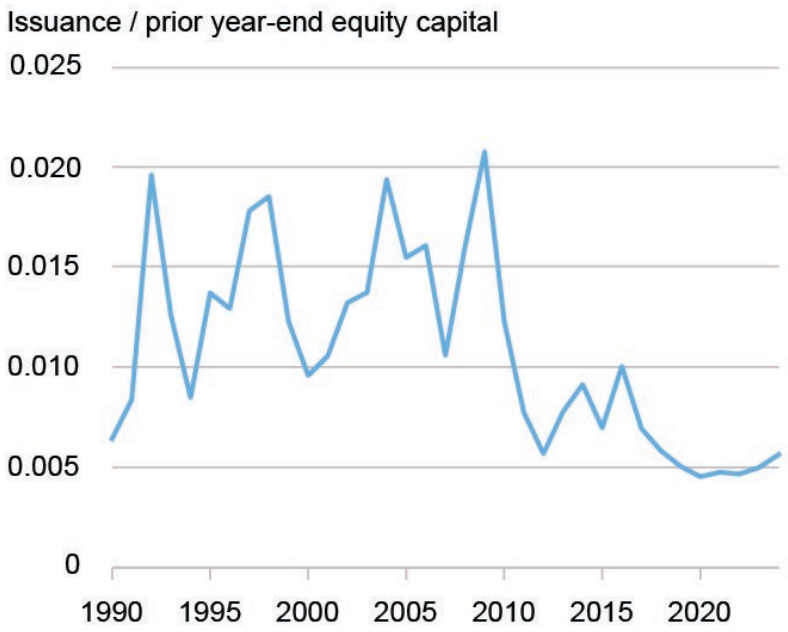


Source: Federal Reserve Y-9C reports.

Note: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars. Small banks are those with less than $10 billion in assets, medium banks are those with assets between $10 billion and $100 billion, and large banks are those with assets greater than $100 billion, all in 2024 dollars.

CHART 13

Median Size of Common Stock Issuance for Banks That Issued, 1990-2024



Source: Federal Reserve Y-9C reports.

Notes: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars that issued common stock in a given year. The chart shows the amount issued scaled by end-of-prior-year equity capital.

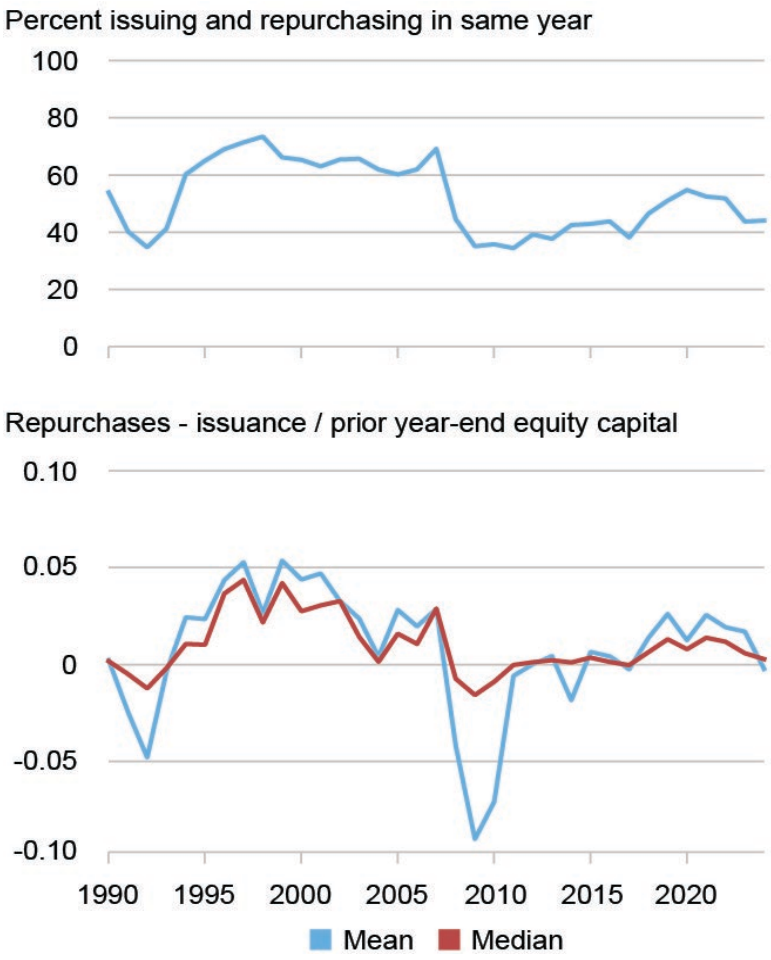
While common stock issuance by U.S. commercial banks is common, the typical amount of issuance is small.[11] Chart 13 shows the median size of common stock issuance as a share of prior-year equity capital for the years in our sample period. Although there is considerable year-to-year variation, in most years the size of a typical common stock issue is 1.5 percent or less of prior-year equity capital. This is consistent with the industry aggregate results in Chart 4 and the bank-level results in Chart 7, both of which suggest that equity issuance is not a large contributor to equity capital growth in most years. The relatively small size of issuance suggests that it is driven primarily by factors other than management of equity capital resources for most banks in most years. One potential explanation is that issuance is related to stock-based compensation of bank employees, a relationship we explore in the next section.

Both common stock issuance and common stock repurchases are widespread, with a large share of banks undertaking each of these activities in most years of our sample period (see Charts 8 and 11). Surprisingly, a meaningful portion of banks take both actions in the same year, simultaneously

[11] This finding stands in contrast to those in Baron (2020), which finds that small banks raise common stock frequently and in large amounts. That article focuses on issuance greater than 5 percent of equity capital and finds that such issuance is frequent for smaller banks. Since our work examines the full range of common stock issuance, it contains a significant portion of the distribution that is excluded in Baron (2020).

CHART 14

Frequency and Net Impact of Concurrent Common Stock Issuance and Repurchases, 1990-2024



Source: Federal Reserve Y-9C reports.

Notes: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars. The top panel shows the share of banks that both issued common stock and made common stock repurchases in a given year. The bottom panel shows the mean and median size of repurchases minus issuance scaled by end-of-prior-year equity capital for those banks that both issued and repurchased in a given year.

increasing and decreasing their equity capital resources.[12] The top panel of Chart 14 shows that the share of banks that both issue and repurchase common stock in the same year has ranged between

[12] This pattern is robust to examining issuance and repurchase activity at the quarterly frequency. The share of banks that both issue and repurchase common stock within the same quarter moves closely with the annual share undertaking both actions within a year. Differences between the quarterly and annual measures are generally modest, and the two series have similar time-series variation, with a correlation of approximately 0.94. This suggests that the annual findings are not driven by banks issuing early in the year and repurchasing later in the year.

35 and 70 percent over the sample period, with somewhat lower (though rising) shares in the post-GFC period. Since common stock issuance tends to be small, repurchases typically exceed issuance, resulting in a net decrease in equity capital (see the bottom panel of Chart 14). We will explore these offsetting actions in more detail in the following section.

3. BANK-LEVEL ANALYSIS

In the previous section, we documented aggregate facts on the evolution of equity capital in the banking sector. Two trends stand out as particularly noteworthy. First, a nontrivial share of banks make common stock payouts that exceed earnings, ranging from 10 to 40 percent of banks in most years (Chart 10), suggesting that some banks continue to distribute cash to shareholders even when contemporaneous earnings are insufficient to support those payouts. Second, a meaningful portion of banks both issue and repurchase common stock in the same year (Chart 14), suggesting that some issuance may occur for reasons unrelated to increasing equity capital. We now turn to the cross section of banks to study these behaviors in more detail.

3.1 Probability of Negative EMP

We begin by exploring the micro-founders associated with years in which common stock payouts (dividends plus repurchases) exceed earnings. Chart 10 shows that this behavior occurs across a range of banks and time periods, not just during stress years, consistent with findings for nonfinancial firms (Farre-Mensa, Michaely, and Schmalz 2024). We focus on two not mutually exclusive channels. The first is the capital-management channel, where banks with relatively elevated levels of equity capital (or capital buffers above their desired target) may be more likely to experience negative EMP. This pattern is consistent with capital planning and is related to the broader literature on dividend smoothing, which argues that firms adjust payouts gradually as they move toward target payout ratios (Lintner 1956; Leary and Michaely 2011). The second potential channel is related to earnings shocks, where unexpected declines in income can result in payouts, often based on earlier expectations, that exceed current earnings. The two channels can operate jointly, since banks can both manage toward target capital ratios over time and face unanticipated earnings outcomes that, in the presence of sticky payouts, lead to negative EMP. In fact, we find evidence of both channels being in play.

We begin with the capital-management channel by examining whether negative EMP is persistent from year to year. If banks are attempting to manage toward target capital ratios, then we might expect consecutive years of negative EMP when capital levels are above target and payouts are smoothed over time. To explore this idea, we regress an indicator for negative EMP on one- and two-year lagged indicators, along with controls for asset size and capitalization.

TABLE 1

Summary Statistics, 1990-2024

	Mean	Standard Deviation	Median	Minimum	Maximum	N
ln(Assets)	16.42	1.36	16.02	14.95	21.49	6448
Equity / Assets	9.10	2.65	8.79	4.18	17.68	6448
Tier 1 Buffer	6.74	3.69	6.13	0.52	22.30	6394
Earnings / Assets	0.90	0.89	0.99	-3.43	3.33	6448
Net Income / Assets	0.95	0.79	1.02	-3.20	3.32	6448
OCI / Assets	-0.03	0.37	0.00	-2.02	0.87	6448
Δ Earnings / Assets	-0.02	0.92	-0.01	-3.46	3.42	5778
Δ Net Income / Assets	-0.02	0.66	0.01	-3.24	2.54	5778
Δ OCI / Assets	0.00	0.59	-0.01	-1.86	2.54	5778
Dividends / Assets	0.37	0.54	0.33	0.00	16.31	6448
Repurchases / Assets	0.22	0.59	0.02	0.00	20.73	6448
Issuance / Assets	0.20	0.60	0.05	-0.18	11.23	6448
Negative EMP	0.21	0.41	0.00	0.00	1.00	6448
SBC / Assets	0.05	0.03	0.04	-0.01	0.40	2806

Sources: Federal Reserve Y-9C reports; Compustat.

Notes: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars. Assets, Equity, Tier 1 Buffer, Earnings, Net Income, Other Comprehensive Income (OCI), and their change counterparts are winsorized at the 1st and 99th percentiles. Assets are scaled to 2024 dollars. Variables scaled by assets are reported as percentages (×100) for readability. Stock-based compensation (SBC) prior to 2006 is set to missing for consistency.

As in the industry-level analysis, our main sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars. Variables are winsorized at the 1st and 99th percentiles, and all regressions include log assets, equity scaled by assets, and the Tier 1 buffer as controls.[13] Table 1 presents summary statistics for the main set of variables used in the analysis. Of particular interest, the indicator for negative EMP has a mean of 0.21, implying about one-fifth of bank-year observations have common stock payouts that exceed earnings.

[13] The Tier 1 buffer equals each bank's Tier 1 risk-based capital ratio (Tier 1 capital divided by risk-weighted assets) minus the applicable regulatory Tier 1 requirement at year-end. Starting in 1996, Tier 1 capital and risk-weighted assets are taken directly from the FR Y-9C. For 1990-1995, we reconstruct both from component line items. The required ratio incorporates the time-varying phase-in of minimums and capital buffers under Basel I and Basel III so that the buffer consistently measures distance to the binding Tier 1 requirement in each year.

TABLE 2

Persistence of Negative EMP

	(1) Neg. EMP_t	(2) Neg. EMP_t	(3) Neg. EMP_t	(4) Neg. EMP_t
Neg. EMP_{t-1}	0.201***	0.201***	0.208***	0.097***
	(0.060)	(0.060)	(0.029)	(0.029)
Neg. EMP_{t-2}	0.070**	0.070**	0.085***	0.015
	(0.033)	(0.033)	(0.014)	(0.017)
ln($Assets_{t-1}$)	0.020**	0.020**	0.017**	0.059**
	(0.009)	(0.008)	(0.008)	(0.023)
$Equity_{t-1}$ / $Assets_{t-1}$	0.152	0.152	0.910***	2.331***
	(0.723)	(0.720)	(0.311)	(0.543)
Tier 1 $Buffer_{t-1}$	0.002	0.002	-0.000	0.007*
	(0.007)	(0.007)	(0.003)	(0.004)
Sample	Full	Full	Full	Full
Fixed Effects	No	No	Year	Year, Bank
Error Cluster	Year	Year, Bank	Year, Bank	Year, Bank
N	5148	5148	5148	5091
R-squared	0.06	0.06	0.24	0.34

Source: Authors' calculations.

Notes: The dependent variable is equal to one if a bank's earnings after subtracting common stock payouts is negative in year *t*. The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars. Assets are scaled to 2024 dollars. Assets, Equity, and Tier 1 Buffer are winsorized at the 1st and 99th percentiles. Column (3) includes year fixed effects, while Column (4) adds bank fixed effects. Standard errors are clustered by year in Column (1) and by year and bank in Columns (2)-(4). ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Table 2 quantifies the persistence of negative EMP. Across all specifications, the one-year lag of negative EMP is positive and highly significant, indicating that the behavior is persistent from one year to the next. The estimates suggest that a bank with negative EMP in one year is 50 to 100 percent more likely to have negative EMP in the following year (10 to 20 percentage points relative to the overall average of 21 percent), a substantial increase. The two-year lag is significant without bank fixed effects but becomes insignificant once they are included in Column 4, suggesting that longer-run persistence is likely explained by systemic differences across banks rather than by continuing shocks for a single bank.

The coefficient on log assets is positive and significant in all columns, implying that larger banks are more likely to exhibit negative EMP. Equity scaled by assets becomes positive and significant when year fixed effects are included (Column 3) and remains large and significant with bank fixed effects (Column 4). After we control for common time shocks and time-invariant bank characteristics, years in

which a given bank is more highly capitalized are more likely to have payouts that exceed earnings. The estimates suggest that a one standard deviation increase in equity capital results in a 10 to 30 percent (2 to 6 percentage point) increase in the likelihood of negative EMP relative to average. This pattern is consistent with the capital-management channel where banks distribute more capital when equity levels are high.

We next examine the earnings shock channel. To do so, we regress the negative EMP indicator on measures of earnings shocks as well as variables controlling for capitalization and asset size. We proxy earnings shocks with the year-over-year change in earnings, including both net income and OCI. The key assumption is that banks form their distribution plans, particularly for dividends, before earnings are realized during the year. We use overall changes in earnings to proxy for unanticipated changes, recognizing that some portion of the change could have been expected. To test the sensitivity of our results to this assumption, we also separate earnings shocks into positive and negative changes, based on the idea that negative shocks are less likely to be anticipated.

Table 3 examines how different earnings measures relate to the likelihood of negative EMP. Across all specifications, the shock to earnings is negatively associated with the probability of negative EMP, a result that holds even when we include lagged earnings levels (see Columns 2 and 4). Banks experiencing a negative earnings shock in a given year are more likely to have payouts that exceed earnings. The estimates suggest that a one standard deviation decrease in an earnings shock raises the probability of negative EMP by 60 to 100 percent (12 to 20 percentage points), a substantial impact. When earnings are decomposed into net income and OCI, shocks to both components are significant. However, the magnitude of the coefficient on an OCI shock exceeds that on a net income shock. A one standard deviation decrease in the OCI shock results in a 50 to 100 percent (11 to 21 percentage point) increase in the probability of negative EMP, as compared to a 40 to 65 percent (9 to 14 percentage point) increase for a one standard deviation decline in net income. These differences are statistically significant, as shown in the bottom two rows of the table, suggesting that shocks to OCI are disproportionately likely to increase the probability that a bank pays out more than it earns.

To assess whether a bank's payout behavior affects the likelihood of negative EMP by effectively "locking in" shareholder payouts, Table 4 extends our analysis by adding lagged common stock dividends and repurchases, each scaled by assets, to the specification. The results for the earnings measures are largely unchanged. Focusing on payouts, the coefficients on repurchases are consistently positive and significant across all columns, while the coefficients on dividends are smaller and change sign across specifications. This result is somewhat surprising considering that dividends are typically regarded as the "stickier" payout method, whereas repurchases are more discretionary. If dividend smoothing leads banks to maintain current dividend levels even when earnings decline, one might expect dividends to have a stronger association with negative EMP. Instead, the full sample results suggest that repurchases are the payout component more closely related to this behavior.

Perhaps the full sample estimates mask differences in behavior by size. Table 5 repeats the analysis by asset size cohort. The results for earnings shocks are similar to those in the full sample across all size

TABLE 3

Negative EMP and Earnings

	(1) Neg. EMPt	(2) Neg. EMPt	(3) Neg. EMPt	(4) Neg. EMP_t
$Earnings_{t-1}$ / $Assets_{t-1}$		-21.326***		
		(2.011)		
Δ $Earnings_t$ / $Assets_t$	-13.313***	-22.158***		
	(1.449)	(1.794)		
Net $Income_{t-1}$ / $Assets_{t-1}$				-20.889***
				(1.845)
Δ Net $Income_t$ / $Assets_t$			-13.620***	-21.188***
			(1.562)	(1.792)
OCI_{t-1} / $Assets_{t-1}$				-38.580***
				(3.723)
Δ OCI_t / $Assets_t$			-17.934***	-36.898***
			(4.206)	(3.154)
ln($Assets_{t-1}$)	0.036	0.023	0.035	0.019
	(0.023)	(0.020)	(0.023)	(0.019)
$Equity_{t-1}$ / $Assets_{t-1}$	3.241***	2.143***	3.251***	2.203***
	(0.587)	(0.506)	(0.569)	(0.497)
Tier 1 $Buffer_{t-1}$	-0.002	0.008**	-0.002	0.008**
	(0.005)	(0.004)	(0.005)	(0.003)
Sample	Full	Full	Full	Full
Fixed Effects	Year, Bank	Year, Bank	Year, Bank	Year, Bank
Error Cluster	Year, Bank	Year, Bank	Year, Bank	Year, Bank
N	5673	5673	5673	5673
R-squared	0.38	0.44	0.39	0.46
t: $\beta_{\Delta NI} - \beta_{\Delta OCI} = 0$				4.31
p-value				0.00

Source: Authors' calculations.

Notes: The dependent variable is equal to one if a bank's earnings after subtracting common stock payouts is negative in year *t*. The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars. Assets are scaled to 2024 dollars. Assets, Equity, Tier 1 Buffer, Earnings, Net Income, Other Comprehensive Income (OCI), and their change counterparts are winsorized at the 1st and 99th percentiles. All columns include year and bank fixed effects and have standard errors clustered at the year and bank level. ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

TABLE 4

Negative EMP, Earnings, and Common Stock Payouts

	(1) Neg. EMP_t	(2) Neg. EMP_t	(3) Neg. EMP_t	(4) Neg. EMP_t
$Earnings_{t-1}$ / $Assets_{t-1}$		-22.107***		
		(2.140)		
Δ $Earnings_t$ / $Assets_t$	-13.103***	-22.052***		
	(1.442)	(1.824)		
$Net\ Income_{t-1}$ / $Assets_{t-1}$				-21.974***
				(2.004)
Δ $Net\ Income_t$ / $Assets_t$			-13.252***	-20.934***
			(1.546)	(1.820)
OCI_{t-1} / $Assets_{t-1}$				-38.059***
				(3.692)
Δ OCI_t / $Assets_t$			-17.804***	-36.474***
			(4.183)	(3.121)
$Dividends_{t-1}$ / $Assets_{t-1}$	-1.171	5.372	-0.633	6.207
	(2.476)	(3.634)	(2.385)	(3.689)
$Repurchases_{t-1}$ / $Assets_{t-1}$	7.089**	8.915**	6.684**	8.138**
	(2.727)	(3.275)	(2.939)	(3.729)
ln($Assets_{t-1}$)	0.042*	0.030*	0.041*	0.026
	(0.022)	(0.017)	(0.021)	(0.017)
$Equity_{t-1}$ / $Assets_{t-1}$	2.846***	1.511***	2.872***	1.609***
	(0.556)	(0.470)	(0.542)	(0.483)
$Tier\ 1\ Buffer_{t-1}$	-0.001	0.010***	-0.001	0.009***
	(0.005)	(0.003)	(0.004)	(0.003)
Sample	Full	Full	Full	Full
Fixed Effects	Year, Bank	Year, Bank	Year, Bank	Year, Bank
Error Cluster	Year, Bank	Year, Bank	Year, Bank	Year, Bank
N	5673	5673	5673	5673
R-squared	0.39	0.45	0.39	0.46
t: $\beta_{\Delta NI} - \beta_{\Delta OCI} = 0$				4.34
p-value				0.00

Source: Authors' calculations.

Notes: The dependent variable is equal to one if a bank's earnings after subtracting common stock payouts is negative in year *t*. The sample includes all top-tier BHCs with assets greater than $3 billion in 2024 dollars. Assets are scaled to 2024 dollars. Assets, Equity, Tier 1 Buffer, Earnings, Net Income, OCI, and their change counterparts are winsorized at the 1st and 99th percentiles. All columns include year and bank fixed effects and have standard errors clustered at the year and bank level. ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

TABLE 5

Negative EMP, Earnings, and Common Stock Payouts by Asset Size Cohort

	(1) Neg. EMP_t	(2) Neg. EMP_t	(3) Neg. EMP_t	(4) Neg. EMP_t	(5) Neg. EMP_t	(6) Neg. EMP_t
$Earnings_{t-1}$ / $Assets_{t-1}$	-21.384***		-20.717***		-33.341***	
	(2.209)		(3.079)		(4.511)	
Δ $Earnings_t$ / $Assets_t$	-20.632***		-22.592***		-31.992***	
	(1.913)		(2.767)		(5.456)	
$Net\ Income_{t-1}$ / $Assets_{t-1}$		-20.460***		-21.889***		-33.251***
		(2.479)		(2.704)		(5.261)
Δ $Net\ Income_t$ / $Assets_t$		-19.123***		-23.431***		-28.045***
		(2.058)		(2.571)		(6.014)
OCI_{t-1} / $Assets_{t-1}$		-41.263***		-34.111***		-40.172***
		(4.308)		(4.568)		(6.090)
Δ OCI_t / $Assets_t$		-36.821***		-34.156***		-45.195***
		(3.292)		(4.118)		(5.726)
$Dividends_{t-1}$ / $Assets_{t-1}$	2.143	1.608	3.742	6.694	64.689***	63.008***
	(2.573)	(2.752)	(7.808)	(8.272)	(19.103)	(19.385)
$Repurchases_{t-1}$ / $Assets_{t-1}$	13.511***	12.881***	4.950	3.863	0.083	2.335
	(3.562)	(3.467)	(3.080)	(3.620)	(7.018)	(7.314)
ln($Assets_{t-1}$)	0.122***	0.116***	0.021	0.010	0.076	0.080
	(0.040)	(0.042)	(0.031)	(0.031)	(0.066)	(0.063)
$Equity_{t-1}$ / $Assets_{t-1}$	0.891	0.963	1.935***	2.084***	2.741	2.180
	(0.658)	(0.656)	(0.654)	(0.662)	(1.637)	(1.726)
$Tier\ 1\ Buffer_{t-1}$	0.009*	0.008*	0.021***	0.021***	0.038*	0.039*
	(0.005)	(0.004)	(0.007)	(0.006)	(0.020)	(0.021)
Sample	Small	Small	Medium	Medium	Large	Large
Fixed Effects	Year, Bank	Year, Bank	Year, Bank	Year, Bank	Year, Bank	Year, Bank
Error Cluster	Year, Bank	Year, Bank	Year, Bank	Year, Bank	Year, Bank	Year, Bank
N	2830	2830	2225	2225	589	589
R-squared	0.53	0.54	0.47	0.48	0.44	0.44
t: $\beta_{\Delta NI} - \beta_{\Delta OCI} = 0$		4.50		2.35		2.60
p-value		0.00		0.02		0.01

Source: Authors' calculations.

Notes: The dependent variable is equal to one if a bank's earnings after subtracting common stock payouts is negative in year *t*. The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars. Assets are scaled to 2024 dollars. Assets, Equity, Tier 1 Buffer, Earnings, Net Income, Other Comprehensive

CONTINUED ON NEXT PAGE

Income (OCI), and their change counterparts are winsorized at the 1st and 99th percentiles. All columns include year and bank fixed effects and have standard errors clustered at the year and bank level. Columns (1)-(2) include banks with less than $10 billion in assets, Columns (3)-(4) include banks with assets between $10 billion and $100 billion, and Columns (5)-(6) include banks with assets greater than $100 billion, all in 2024 dollars. ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

categories, but the patterns for payout behavior differ meaningfully. For small banks, the coefficient on repurchases is positive and statistically significant, consistent with the full sample. For medium-sized banks, neither dividends nor repurchases are significant. In contrast, for large banks, repurchases are insignificant, while dividends are positive and significant. The estimates suggest that a one standard deviation increase in dividend payments would result in a 13 to 14 percentage point increase in the probability of negative EMP, as compared to an average incidence of 31 percent among these large banks.

These results suggest systematic differences in payout behavior across bank sizes. Small banks appear more likely to have negative EMP in years following larger repurchases, which tend to be more idiosyncratic. Large banks, on the other hand, are more likely to have negative EMP when dividend payouts are high. This pattern is consistent with dividends being the more rigid component of payout policy for large institutions. Because large banks rarely cut dividends even during periods of weaker earnings, maintaining those payouts can increase the likelihood that distributions exceed contemporaneous earnings.

Table 6 separates positive and negative changes in earnings, net income, and OCI to test whether earnings shocks have asymmetric effects on the probability of negative EMP. The corresponding change variable equals the observed change when it is positive or negative and zero otherwise.

In Columns 1 and 3, only the coefficients on the negative earnings shocks are statistically significant, indicating that negative earnings shocks are more strongly associated with increasing the probability of negative EMP than positive earnings shocks are associated with reducing the probability of negative EMP. Once lagged earnings levels are added in Columns 2 and 4, both the positive and negative components are significant. Still, the magnitude of the negative coefficients remains substantially larger, implying that reductions in earnings continue to have a stronger effect. The bottom rows of the table report one-sided t-tests comparing the coefficients on the positive and negative components. In all specifications, we reject the null hypothesis that the two coefficients are equal, confirming that negative shocks have a larger impact on the probability of negative EMP than positive earnings shocks, consistent with declines in income being less anticipated or less immediately reflected in payout adjustments.

TABLE 6

Negative EMP, Positive and Negative Earnings Split

	(1) Neg. EMP_t	(2) Neg. EMP_t	(3) Neg. EMP_t	(4) Neg. EMP_t
Positive Δ $Earnings_t$ / $Assets_t$	0.186	-14.591***		
	(1.134)	(2.254)		
Negative Δ $Earnings_t$ / $Assets_t$	-27.057***	-27.958***		
	(1.776)	(2.393)		
Positive Δ Net $Income_t$ / $Assets_t$			0.859	-14.245***
			(1.336)	(2.655)
Negative Δ Net $Income_t$ / $Assets_t$			-25.046***	-25.620***
			(2.220)	(2.346)
Positive Δ OCI_t / $Assets_t$			-1.646	-25.019***
			(1.973)	(3.687)
Negative Δ OCI_t / $Assets_t$			-39.088***	-44.603***
			(6.016)	(4.076)
$Earnings_{t-1}$ / $Assets_{t-1}$		-19.279***		
		(2.248)		
Net $Income_{t-1}$ / $Assets_{t-1}$				-19.747***
				(2.140)
OCI_{t-1} / $Assets_{t-1}$				-31.642***
				(4.211)
$Dividends_{t-1}$ / $Assets_{t-1}$	-0.442	4.830	0.421	5.897
	(2.322)	(3.468)	(2.449)	(3.562)
$Repurchases_{t-1}$ / $Assets_{t-1}$	7.002**	8.650**	6.357**	7.821**
	(2.688)	(3.198)	(2.953)	(3.618)
ln($Assets_{t-1}$)	0.041**	0.031*	0.031*	0.022
	(0.019)	(0.017)	(0.017)	(0.016)
$Equity_{t-1}$ / $Assets_{t-1}$	2.556***	1.555***	2.843***	1.780***
	(0.475)	(0.440)	(0.459)	(0.456)
Tier 1 $Buffer_{t-1}$	-0.001	0.008**	-0.002	0.007**
	(0.004)	(0.003)	(0.004)	(0.003)
Sample	Full	Full	Full	Full
Fixed Effects	Year, Bank	Year, Bank	Year, Bank	Year, Bank
Error Cluster	Year, Bank	Year, Bank	Year, Bank	Year, Bank
N	5673	5673	5673	5673
R-squared	0.42	0.46	0.42	0.47
t(Earnings): $\beta_{neg} - \beta_{pos} < 0$	-12.60	-4.51		

CONTINUED ON NEXT PAGE

p(Earnings)	0.00	0.00		
t(NI): $\beta_{neg} - \beta_{pos} < 0$			-9.19	-3.52
p(NI)			0.00	0.00
t(OCI): $\beta_{neg} - \beta_{pos} < 0$			-5.51	-3.45
p(OCI)			0.00	0.00

Source: Authors' calculations.

Notes: The dependent variable is equal to one if a bank's earnings after subtracting common stock payouts is negative in year *t*. The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars. Assets are scaled to 2024 dollars. Assets, Equity, Tier 1 Buffer, Earnings, Net Income, Other Comprehensive Income (OCI), and their change counterparts are winsorized at the 1st and 99th percentiles. All columns include year and bank fixed effects and have standard errors clustered at the year and bank level. Positive Δ Earnings$_t$ / Assets$_t$ equals the change in earnings scaled by assets when the change is positive and 0 otherwise. Negative Δ Earnings$_t$ / Assets$_t$ equals the change in earnings scaled by assets when the change is negative and 0 otherwise. The same definitions apply to Δ Net Income$_t$ / Assets$_t$ and Δ OCI$_t$ / Assets$_t$, where each variable is split into its positive and negative components. ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

3.2 Issuance and Repurchases in the Same Year

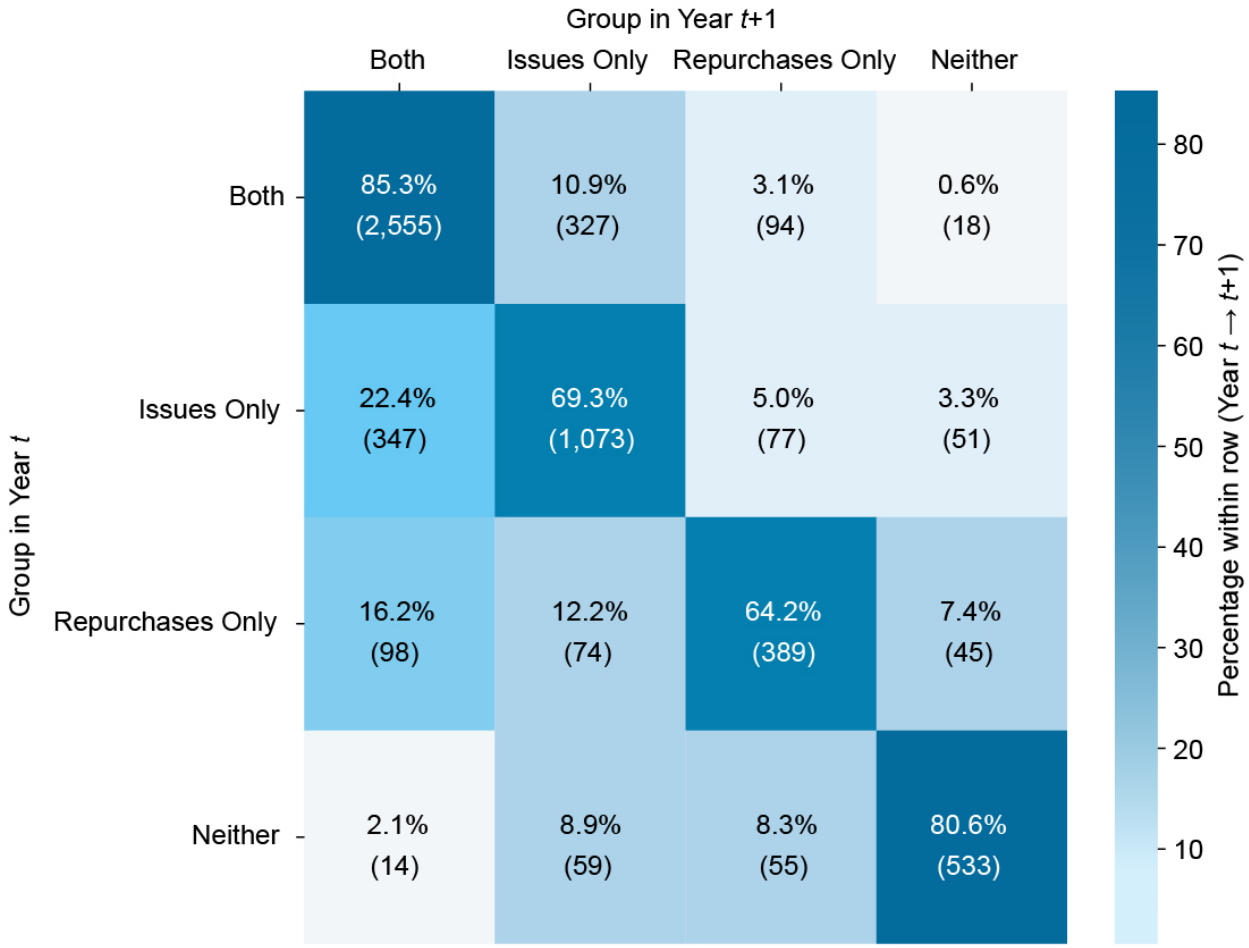
We next examine cases in which a bank both issues and repurchases common stock in the same year. As shown in Chart 14, this behavior is common, ranging from 35 to 75 percent of banks in a given year over the sample. At first glance, issuing and repurchasing in the same year may seem contradictory, since issuance adds to equity capital while repurchases reduce it. In practice, however, these actions are likely to serve different purposes. Chart 13 shows that in most years, the median level of common stock issuance is relatively small, although large issuance also occurs. This pattern suggests that issuance may reflect more than one motive. In particular, we examine whether smaller issuance is tied to stock-based compensation, consistent with the broader literature on the role of SBC among nonfinancial firms (Mohanram, White, and Zhao 2020; Bonaime et al. 2020).

Our analysis of SBC is based on the subset of publicly traded banks from 2006 onward, since consistent SBC data are only available for these banks during this period.[14] SBC is small for most observations, with a mean of 0.05 percent of assets (Table 1). Repurchases, on the other hand, are a primary channel for returning capital to shareholders and tend to be larger. Viewed in this context,

[14] Statement of Financial Accounting Standards (SFAS) no. 123R required public firms to recognize the fair value of stock-based compensation as an expense on the income statement (Financial Accounting Standards Board 2004). The standard became effective for fiscal periods beginning after December 15, 2005, so comprehensive reporting begins in 2006. Prior to 2006, SBC reporting was voluntary or required only in limited cases, which raises the risk of selection bias if early adopters differ systemically from non-adopters and introduces measurement error from inconsistent disclosures. To limit these biases, we restrict SBC analyses to public firms from 2006 onward.

EXHIBIT 2

Transition Matrix of Issuance and Repurchase Decisions



Source: Federal Reserve Y-9C reports.

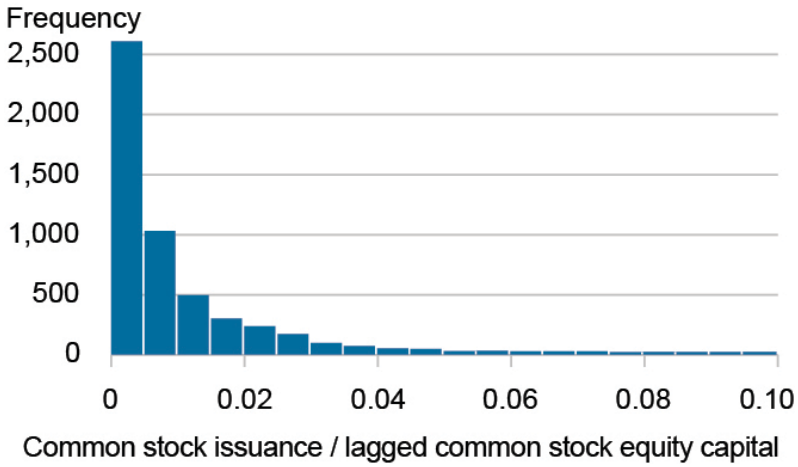
Notes: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars. Cell value is the probability that a bank in the row's group in year *t* is in the column's group in year *t* +1. Observation count is in parentheses.

concurrent issuance and repurchases are consistent with banks' broader capital planning and compensation practices.

To better understand the dynamics of issuance and repurchases, Exhibit 2 summarizes how these behaviors evolve over time using a transition matrix from one year to the next. The percentages are row-normalized probabilities that a bank in the row's group in year *t* is in the column's group in year *t* + 1. The number in parentheses is the count of bank-year transitions. Three patterns stand out. First, issuance and repurchase behaviors are highly persistent. Banks that both issue and repurchase in one year overwhelmingly continue to do so the next year, with 85 percent remaining in the "Both" category.

CHART 15

Histogram of Common Stock Issuance, 1990-2024



Source: Federal Reserve Y-9C reports.

Notes: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars. The sample is restricted to bank-year observations with values between 0 and 0.1 to limit the influence of outliers. This covers approximately 93 percent of the sample.

Likewise, banks that do neither tend to remain inactive, with 81 percent staying in the "Neither" category. Second, transitions between issuing-only and repurchasing-only are relatively uncommon. Most banks that rely on one of these capital behaviors continue with the same action in subsequent years. Finally, the most prevalent state overall is "Both," both in levels and in year-to-year persistence. The next most common group is "Issues Only," which aligns with the finding that banks that do not repurchase often still issue shares for compensation and related programs.

While common stock issuance is frequent among the banks in our sample, the typical size of that issuance is quite small. Chart 15 presents a histogram of issuance scaled by lagged common stock equity capital for bank-year observations, capped at 10 percent for clarity. The distribution is highly right-skewed, with most observations between 0 and 1 percent of lagged common equity. Such small levels of issuance are unlikely to meaningfully increase equity. This motivates the subsequent analysis linking small issuance to SBC and examining how repurchases may be used to offset dilution.

We now provide evidence that the small size of most common stock issuance is related to a bank's level of stock-based compensation. To do this analysis, we regress issuance size (common stock issuance in a year scaled by beginning-of-year assets) on the amount of SBC each bank paid in the prior year (again scaled by assets), controlling for bank asset size and capitalization. Our hypothesis is that small equity issuance is related to SBC, while larger issuance is related to other factors, for instance, capital management. As Chart 15 illustrates, the distribution does not feature a clear boundary that

TABLE 7

Stock-Based Compensation and Common Stock Issuance

	(1) Iss_t / $Assets_t$	(2) Iss_t / $Assets_t$	(3) Iss_t / $Assets_t$	(4) Iss_t / $Assets_t$	(5) Iss_t / $Assets_t$	(6) Iss_t / $Assets_t$	(7) Iss_t / $Assets_t$
SBC_{t-1} / $Assets_{t-1}$	0.003	0.255**	0.082	0.130***	0.185	0.070**	8.627
	(0.057)	(0.100)	(0.117)	(0.015)	(2.088)	(0.029)	(5.196)
$\ln(Assets_{t-1})$	-0.003***	-0.000	-0.001	-0.000	-0.001	-0.000*	0.011
	(0.001)	(0.000)	(0.004)	(0.000)	(0.005)	(0.000)	(0.009)
$Equity_{t-1}$ / $Assets_{t-1}$	0.012	-0.001	0.101	0.001	0.125	0.006	0.240
	(0.018)	(0.001)	(0.073)	(0.001)	(0.088)	(0.004)	(0.173)
Tier 1 $Buffer_{t-1}$	-0.001**	-0.000	-0.001**	-0.000*	-0.001*	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)
Sample	Full	< 2%	≥ 2%	< 5%	≥ 5%	< 10%	≥ 10%
Fixed Effects	Year, Bank	Year, Bank	Year, Bank	Year, Bank	Year, Bank	Year, Bank	Year, Bank
Error Cluster	Year, Bank	Year, Bank	Year, Bank	Year, Bank	Year, Bank	Year, Bank	Year, Bank
N	2705	1753	441	1961	229	2050	133
R-squared	0.22	0.81	0.49	0.78	0.51	0.45	0.60

Source: Authors' calculations.

Notes: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars. Assets are scaled to 2024 dollars. Assets, Equity, Tier 1 Buffer, Earnings, Net Income, Other Comprehensive Income (OCI), and their change counterparts are winsorized at the 1st and 99th percentiles. All columns include year and bank fixed effects and have standard errors clustered at the year and bank level. ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

separates "small" issuance from "large" issuance, so we consider a range of definitions of "small" issuance.

Table 7 reports the results. Column 1 uses the full sample of bank-years. Columns 2, 4, and 6 restrict the sample to observations with small issuance, defined as issuance less than 2, 5, and 10 percent of lagged common equity, respectively. Columns 3, 5, and 7 use samples of large issuance, with issuance at least 2, 5, and 10 percent of lagged common equity.

In the full sample (Column 1), the coefficient on SBC is small and statistically insignificant, suggesting that SBC is not driving issuance across the full spectrum of issuance amounts. When we restrict the sample to bank-years with small issuance (Columns 2, 4, and 6), the relationship becomes positive and statistically significant. The size of the coefficient decreases as the cutoff defining "small" issuance rises, suggesting that larger issuance amounts are driven by factors other than SBC. The estimates suggest that within the small-issuance subsamples, a one standard deviation increase in SBC is associated with a 1 to 4 percent increase in common stock issuance relative to the sample mean. These

TABLE 8

Stock-Based Compensation and Common Stock Repurchases

	(1) Rep_t / $Assets_t$	(2) Rep_t / $Assets_t$	(3) Rep_t / $Assets_t$	(4) Rep_t / $Assets_t$	(5) Rep_t / $Assets_t$	(6) Rep_t / $Assets_t$	(7) Rep_t / $Assets_t$
SBC_{t-1} / $Assets_{t-1}$	-0.211	0.220**	-0.459	0.222*	-0.579	0.240***	-17.707***
	(0.482)	(0.101)	(0.627)	(0.119)	(0.703)	(0.055)	(3.480)
ln($Assets_{t-1}$)	-0.000	-0.000*	0.000	0.000	-0.000	0.000	0.007
	(0.000)	(0.000)	(0.001)	(0.000)	(0.003)	(0.000)	(0.005)
$Equity_{t-1}$ / $Assets_{t-1}$	0.043***	0.003	0.094***	0.013***	0.108**	0.023***	0.110*
	(0.013)	(0.002)	(0.020)	(0.004)	(0.043)	(0.008)	(0.062)
Tier 1 $Buffer_{t-1}$	0.000**	0.000	0.001***	0.000	0.002**	0.000***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Sample	Full	< 2%	≥ 2%	< 5%	≥ 5%	< 10 %	≥ 10 %
Fixed Effects	Year, Bank	Year, Bank	Year, Bank	Year, Bank	Year, Bank	Year, Bank	Year, Bank
Error Cluster	Year, Bank	Year, Bank	Year, Bank	Year, Bank	Year, Bank	Year, Bank	Year, Bank
N	2705	958	681	1358	301	1616	72
R-squared	0.59	0.49	0.66	0.41	0.66	0.67	0.97

Source: Authors' calculations.

Notes: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars. Assets are scaled to 2024 dollars. Assets, Equity, Tier 1 Buffer, Earnings, Net Income, Other Comprehensive Income (OCI), and their change counterparts are winsorized at the 1st and 99th percentiles. All columns include year and bank fixed effects and have standard errors clustered at the year and bank level. ***, **, and * denote statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

modest economic magnitudes are consistent with SBC-related issuance reflecting routine equity flows that are small relative to overall bank assets. Together, the results support the idea that small levels of common stock issuance are related to a bank's use of SBC, consistent with these issuances reflecting the settlement of equity awards rather than deliberate efforts to raise equity capital.

In contrast, SBC is unrelated to larger issuance events. Columns 3, 5, and 7 show no evidence of a relationship between SBC and issuance. These larger issuances likely reflect capital-raising decisions or other strategies unrelated to compensation programs.

The literature on nonfinancial firms suggests that firms engaging in SBC are more likely to both issue and repurchase (Mohanram, White, and Zhao 2020; Bonaime et al. 2020). Table 8 repeats the analysis using common stock repurchases as the dependent variable and applies the same sample splits based on the size of repurchases relative to lagged common equity. The results parallel those for issuance. In the full sample (Column 1), SBC is unrelated to repurchases, reflecting the fact that repurchases combine small SBC-related offsets with much larger payout decisions driven by other

factors. Once the sample is restricted to observations with small repurchase amounts, SBC becomes positively associated with repurchases.

In contrast, SBC does not predict larger repurchase levels. In Columns 3 and 5, which focus on repurchases above 2 and 5 percent of equity, the coefficients are insignificant. In Column 7, the coefficient becomes negative and significant for repurchases exceeding 10 percent of common equity. This result likely reflects the finding that very large repurchase amounts are driven by factors unrelated to the relatively small contribution of SBC.

Taken together, the results for issuance and repurchases help explain why many banks both issue and repurchase common stock in the same year. SBC drives small, routine issuance and is associated with small repurchases. Meanwhile, large issuance and repurchase programs are driven by broader equity management objectives and are unrelated to SBC.

4. CONCLUSION

Understanding how bank equity capital evolves over time is central to understanding banks' capital-management strategies and evaluating their resilience. In this article, we document how U.S. bank holding companies built and depleted equity capital from 1990 to 2024, using regulatory data that cover both publicly traded and privately held institutions. By bringing together earnings, stock issuance, and shareholder payouts within a unified framework, we quantify the contributions of these components and characterize the patterns that shape equity capital over time.

Earnings are, by a wide margin, the dominant source of equity capital growth. Although common stock issuance is frequent, issuance amounts are typically small and contribute little to overall equity capital growth. At the bank level, payouts exceed earnings in a meaningful share of years, reflecting both capital-management decisions and the effects of unexpected earnings shocks. We also show that the widespread practice of issuing and repurchasing common stock within the same year is linked to stock-based compensation. Small issuance is positively related to the level of SBC, and repurchase behavior is consistent with offsetting dilution. Together, these findings indicate that much routine issuance reflects compensation and share-maintenance practices rather than deliberate efforts to raise capital.

More broadly, our results provide a foundation for understanding how equity capital adjusts in normal times and how these patterns change in periods of stress. They also open a number of promising research avenues. Examples include examining how payout behavior interacts with internal capital targets versus supervisory requirements; analyzing the role of the volatility of other comprehensive income, which our results show differs meaningfully from that of net income; and further investigating the link between stock-based compensation and equity management in the banking sector, an area where, to our knowledge, no prior work exists. These are only some of the research opportunities enabled by the framework and patterns documented in this article, and further research on these

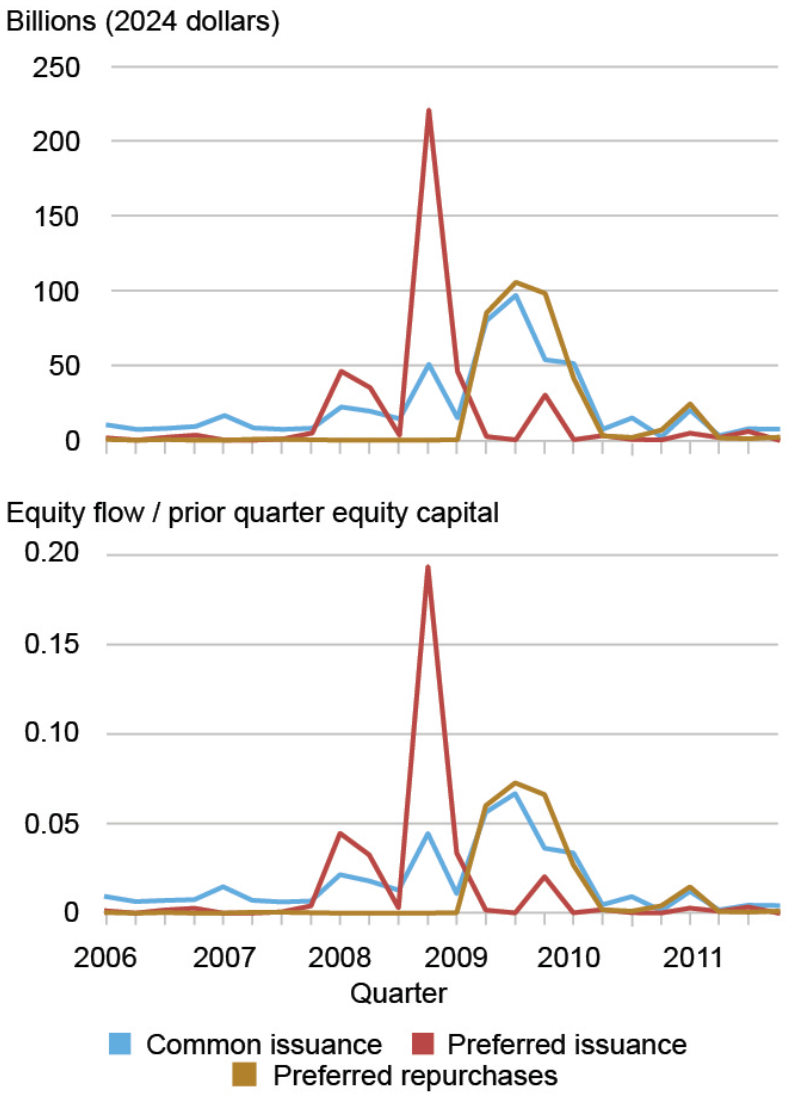
mechanisms can inform analyses of how capital policies, supervisory requirements, and internal capital management interact in practice.

APPENDIX 1: COMMON AND PREFERRED ISSUANCE AND REDEMPTIONS DURING THE GFC

Charts 1A and 1B explore issuance and redemptions of common and preferred stock during the GFC. The charts show quarterly issuance of common and perpetual preferred stock and repurchases of preferred stock from 2006 to 2011. As shown in Chart 1A, preferred stock issuance rose sharply at the beginning of 2008 before spiking in the fourth quarter of that year as the TARP program was implemented. Common stock issuance rose over the course of 2009 and 2010, as banks issued new common shares and, in many cases, used the proceeds to redeem TARP shares.

CHART 1A

Issuance of Common and Perpetual Preferred Stock and Preferred Repurchases During the Global Financial Crisis Period, Quarterly Data 2006-2011



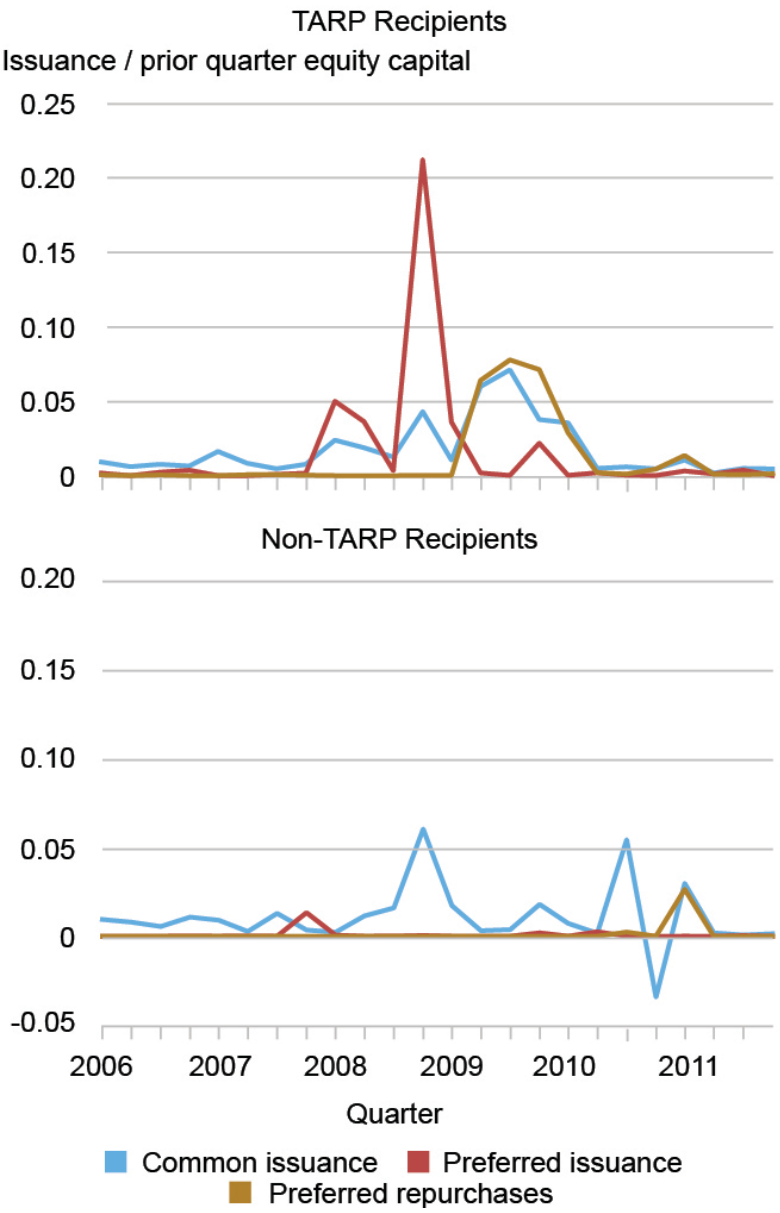
Source: Federal Reserve Y-9C reports.

Note: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars.

Indeed, repurchases of preferred stock spiked in 2009, consistent with the idea that the common stock issuance proceeds were used to redeem TARP shares. Chart 1B further illustrates this point by dividing the sample into those banks that received TARP investments (top panel) and those banks that did not (bottom panel). Clearly, the spike in preferred issuance in 2008 followed by a rise in common stock issuance and in preferred repurchases in 2009 was driven entirely by banks receiving TARP injections.

CHART 1B

Issuance of Common and Perpetual Preferred Stock and Preferred Repurchases During the Global Financial Crisis Period, TARP Recipients and Nonrecipients, Quarterly Data 2006-2011



Sources: Federal Reserve Y-9C reports; U.S. Treasury Department TARP Transactions Report: Capital Purchase Program.

Note: The sample includes all top-tier bank holding companies with assets greater than $3 billion in 2024 dollars.

REFERENCES

Acharya, V. V., I. Gujral, N. Kulkarni, and H. S. Shin. 2022. "Dividends and Bank Capital in the Global Financial Crisis of 2007-2009." JOURNAL OF FINANCIAL CRISES 4, no. 2: 1-39. https://elischolar.library.yale.edu/journal-of-financial-crises/vol4/iss2/1/.

Acharya, V. V., H. T. Le, and H. S. Shin. 2016. "Bank Capital and Dividend Externalities." REVIEW OF FINANCIAL STUDIES 30, no. 3: 988-1018. https://academic.oup.com/rfs/article/30/3/988/2454738.

Allen, F., and R. Michaely. 2003. "Payout Policy." HANDBOOK OF THE ECONOMICS OF FINANCE 1, Part A: 337-429. https://www.sciencedirect.com/science/chapter/handbook/pii/S1574010203010112.

Basel Committee on Banking Supervision. 2011. "Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems." (June). https://www.bis.org/publ/bcbs189.pdf.

Baron, M. 2020. "Countercyclical Bank Equity Issuance." REVIEW OF FINANCIAL STUDIES 33, no. 9: 4186-4230. https://academic.oup.com/rfs/article/33/9/4186/5716336.

Board of Governors of the Federal Reserve System. 2009. "The Supervisory Capital Assessment Program: Overview of Results." https://www.federalreserve.gov/newsevents/files/bcreg20090507a1.pdf.

Board of Governors of the Federal Reserve System. 2020. "Federal Reserve Board Releases Results of the Stress Tests for 2020 and Additional Sensitivity Analyses Conducted in Light of the Coronavirus Event." Press release, June 25, 2020. https://www.federalreserve.gov/newsevents/pressreleases/bcreg20200625c.htm.

Board of Governors of the Federal Reserve System. 2024. "FR Y-9C. Consolidated Financial Statements for Holding Companies." Accessed March 5, 2025. https://www.federalreserve.gov/apps/reportingforms/Report/Index/FR_Y-9C.

Bonaime, A. A., K. M. Kahle, D. Moore, and A. Nemani. 2020. "Employee Compensation Still Impacts Payout Policy." Available at SSRN 3180292.

Brav, A., J. R. Graham, C. R. Harvey, and R. Michaely. 2005. "Payout Policy in the 21st Century." JOURNAL OF FINANCIAL ECONOMICS 77, no. 3: 483-527. https://www.sciencedirect.com/science/article/pii/S0304405X05000528.

Caiazzo, E., L. Gambacorta, T. Oliviero, and H. S. Shin. 2025. "Corporate Payout Policy: Are Financial Firms Different?" REVIEW OF CORPORATE FINANCE STUDIES. https://academic.oup.com/rcfs/advance-article/doi/10.1093/rcfs/cfaf025/8279667?guestAccessKey=.

Correa, S., S. Luck, and E. Verner. 2026. "Bank Failures: The Roles of Solvency and Liquidity." Federal Reserve Bank of New York STAFF REPORTS no. 1181 (February). https://www.newyorkfed.org/research/staff_reports/sr1181.

REFERENCES (CONTINUED)

Cziraki, P., C. Laux, and G. Lóránth. 2024. "Understanding Bank Payouts during the Crisis of 2007-2009." REVIEW OF CORPORATE FINANCIAL STUDIES 13, no. 1: 191-234. https://academic.oup.com/rcfs/article/13/1/191/6580220.

DeAngelo, H., L. DeAngelo, and D. J. Skinner. 2004. "Are Dividends Disappearing? Dividend Concentration and the Consolidation of Earnings." JOURNAL OF FINANCIAL ECONOMICS 72, no. 3: 425-56. https://www.sciencedirect.com/science/article/pii/S0304405X03001867.

DeAngelo, H., L. DeAngelo, and R. M. Stulz. 2006. "Dividend Policy and the Earned/Contributed Capital Mix: A Test of the Life-Cycle Theory." JOURNAL OF FINANCIAL ECONOMICS 81, no. 2: 227-54. https://www.sciencedirect.com/science/article/pii/S0304405X06000225.

Dittmann, I., A. Y. Li, S. Obernberger, and J. Zheng. 2025. "Equity-Based Compensation and the Timing of Share Repurchases: The Role of the Corporate Calendar." JOURNAL OF ACCOUNTING AND ECONOMICS 80, no. 1: 101798.

Edmans, A., V. W. Fang, and A. H. Huang. 2022. "The Long-Term Consequences of Short-Term Incentives." JOURNAL OF ACCOUNTING RESEARCH 60, no. 3: 1007-46.

Fahlenbrach, R., M. Ko, and R. M. Stulz. 2024. "Bank Payout Policy, Regulation, and Politics." NBER Working Paper no. 32770, August. https://www.nber.org/papers/w32770.

Fama, E. F., and K. R. French. 2001. "Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay?" JOURNAL OF FINANCIAL ECONOMICS 60, no. 1: 3-43. https://www.sciencedirect.com/science/article/pii/S0304405X01000381.

Fama, E. F., and K. R. French. 2005. "Financing Decisions: Who Issues Stock?" JOURNAL OF FINANCIAL ECONOMICS 76, no. 3: 549-82. https://www.sciencedirect.com/science/article/pii/S0304405X04001849.

Farre-Mensa, J., R. Michaely, and M. Schmalz. 2024. "Financing Payouts." JOURNAL OF FINANCIAL AND QUANTITATIVE ANALYSIS 60, no. 4 (June): 1586-1624. https://doi.org/10.1017/S0022109024000231.

Federal Reserve Bank of New York. 2025. "Banking Research Data Sets: CRSP-FRB Link." Federal Reserve Bank of New York website. Accessed April 9, 2025. https://www.newyorkfed.org/research/banking_research/datasets.

Financial Accounting Standards Board. 2004. "Share-Based Payment." Statement of Financial Accounting Standards no. 123 (revised 2004). https://fasb.org/page/ShowPdf?path=aop_fas123R.pdf&title=FAS%20123R%20(AS%20AMENDED).

Floyd, E., N. Li, and D. J. Skinner. 2015. "Payout Policy Through the Financial Crisis: The Growth of Repurchases and the Resiliency of Dividends." JOURNAL OF FINANCIAL ECONOMICS 118, no. 2: 299-316. https://www.sciencedirect.com/science/article/pii/S0304405X15001415.

REFERENCES (CONTINUED)

Fringuellotti, F., and T. Kroen. 2024. "Payout Restrictions and Bank Risk-Shifting." Federal Reserve Bank of New York STAFF REPORTS no. 1123, revised June 2025. https://www.newyorkfed.org/research/staff_reports/sr1123.

Grullon, G., and R. Michaely. 2002. "Dividends, Share Repurchases, and the Substitution Hypothesis." JOURNAL OF FINANCE 57, no. 4: 1649-84. https://onlinelibrary.wiley.com/doi/full/10.1111/1540-6261.00474.

Guay, W., and J. Harford. 2000. "The Cash-Flow Permanence and Information Content of Dividend Increases Versus Repurchases." JOURNAL OF FINANCIAL ECONOMICS 57, no. 3: 385-415. https://www.sciencedirect.com/science/article/pii/S0304405X00000623.

Hirtle, B. 2004. "Stock Repurchases and Bank Holding Company Performance." JOURNAL OF FINANCIAL INTERMEDIATION 13, no. 1: 28-57. https://www.sciencedirect.com/science/article/pii/S1042957303000287.

Hirtle, B. 2014. "Bank Holding Company Dividends and Repurchases During the Financial Crisis." Federal Reserve Bank of New York STAFF REPORTS no. 666, revised April 2016. https://www.newyorkfed.org/research/staff_reports/sr666.html.

Hirtle, B. 2017. "What Explains Shareholder Payouts by Large Banks?" LIBERTY STREET ECONOMICS. October 18, 2017. https://libertystreeteconomics.newyorkfed.org/2017/10/what-explains-shareholder-payouts-by-large-banks/.

Hirtle, B. 2023. "Bank Profits and Shareholder Payouts: The Repurchases Cycle." LIBERTY STREET ECONOMICS. January 9, 2023. https://libertystreeteconomics.newyorkfed.org/2023/01/bank-profits-and-shareholder-payouts-the-repurchases-cycle/.

Hoberg, G., and N. R. Prabhala. 2008. "Disappearing Dividends, Catering, and Risk." REVIEW OF FINANCIAL STUDIES 22, no. 1: 79-116. https://academic.oup.com/rfs/article/22/1/79/1587181?guestAccessKey=.

Hoggarth, G., R. Reis, and V. Saporta. 2002. "Costs of Banking System Instability: Some Empirical Evidence." JOURNAL OF BANKING AND FINANCE 26, 5: 825-55. https://www.sciencedirect.com/science/article/abs/pii/S0378426601002680.

Jagannathan, M., C. P. Stephens, and M. S. Weisbach. 2000. "Financial Flexibility and the Choice Between Dividends and Stock Repurchases." JOURNAL OF FINANCIAL ECONOMICS 57, no. 3: 355-84. https://www.sciencedirect.com/science/article/pii/S0304405X00000611.

Julio, B., and D.L. Ikenberry. 2004. "Reappearing Dividends." JOURNAL OF APPLIED CORPORATE FINANCE 16, no. 4: 89-100. https://onlinelibrary.wiley.com/doi/full/10.1111/j.1745-6622.2004.00010.x.

Kuo, J.-M., D. Philip, and Q. Zhang. 2013. "What Drives the Disappearing Dividends Phenomenon?" JOURNAL OF BANKING AND FINANCE 37, no. 9: 3499-3514. https://www.sciencedirect.com/science/article/pii/S0378426613002215.

REFERENCES (CONTINUED)

Leary, M. T., and R. Michaely. 2011. "Determinants of Dividend Smoothing: Empirical Evidence." REVIEW OF FINANCIAL STUDIES 24, no. 10: 3197-3249. https://academic.oup.com/rfs/article-abstract/24/10/3197/1594534?redirectedFrom=fulltext.

Lintner, J. 1956. "Distribution of Incomes of Corporations Among Dividends, Retained Earnings, and Taxes." AMERICAN ECONOMIC REVIEW 46, no. 2: 97-113. Papers and Proceedings of the 68th Meeting of the American Economic Association.

Marsh, W. B. 2022. "Supervisory Stringency, Payout Restrictions, and Bank Equity Prices." Federal Reserve Bank of Kansas City Research Working Paper no. 22-01, January. https://www.kansascityfed.org/research/research-working-papers/supervisory-stringency-payout-restrictions-and-bank-equity-prices/.

Marsh, W. B., and B. Laliberte. 2023. "The Implications of Unrealized Losses for Banks." ECONOMIC REVIEW 108, no. 2: 5-24. https://www.kansascityfed.org/Economic%20Review/documents/9473/EconomicReviewV108N2MarshLaliberte.pdf.

Michaely, R., and A. Moin. 2022. "Disappearing and Reappearing Dividends." JOURNAL OF FINANCIAL ECONOMICS 143, no. 1: 207-26. https://www.sciencedirect.com/science/article/pii/S0304405X21002993.

Mohanram, P., B. White, and W. Zhao. 2020. "Stock-Based Compensation, Financial Analysts, and Equity Overvaluation." REVIEW OF ACCOUNTING STUDIES 25, no. 3: 1040-77.

Moore, D. 2023. "Strategic Repurchases and Equity Sales: Evidence from Equity Vesting Schedules." JOURNAL OF BANKING AND FINANCE 146, 106717.

Myers, S. C. 1984. "Capital Structure Puzzle." NBER Working Paper no. 1393, July. https://www.nber.org/papers/w1393.

Skinner, D. J. 2008. "The Evolving Relation Between Earnings, Dividends, and Stock Repurchases." JOURNAL OF FINANCIAL ECONOMICS 87, no. 3: 582-609. https://www.sciencedirect.com/science/article/pii/S0304405X07002334.

Su, Y., J. Zhang, H. Zhao, and M. Zhou. 2025. "Other Comprehensive Income Volatility and Bank Risk." JOURNAL OF INTERNATIONAL FINANCIAL MARKETS, INSTITUTIONS AND MONEY 99, 102115. https://doi.org/10.1016/j.intfin.2025.102115.

FEDERAL RESERVE BANK OF NEW YORK
ECONOMIC POLICY REVIEW

The *Economic Policy Review* is published by the Research and Statistics Group of the Federal Reserve Bank of New York. The views expressed are those of the individual authors and do not necessarily reflect the position of the Federal Reserve Bank of New York or the Federal Reserve System.

Series Editor: Julian di Giovanni. Editorial Staff: Robert Powell, Trevor Delaney, Maureen Egan, Anna Snider, and Peter Stevens. Design Staff: Theresa Izzillo, Alyona Botogoeva, and Laura Gharrity.

www.newyorkfed.org/research
Follow us on Twitter: *@NYFedResearch*