# Global Share Repurchases Over the Business Cycle

Zigan Wang, Tsinghua University

Qie Ellie Yin, Hong Kong Baptist University

Luping Yu, Xiamen University

June 2024

**Abstract**

Using a new dataset of global repurchase cases, we analyze how repurchase patterns vary over the business cycle. During economic expansions, firms repurchase shares primarily to distribute excess cash. During recessions, firms reduce the volume of share repurchases but maintain the frequency of repurchase announcements. Announcements made during recessions are associated with a 2.7% decrease in repurchase size and a 3.8% decline in completion rates. These announcements yield a short-term return of up to 2.2%, but this gain is reversed in the long term, resulting in a one-year abnormal return of -4.6%. Our findings suggest that firms strategically use uncommitted open market repurchase announcements to signal to the market that their shares are undervalued, thereby boosting short-term stock prices during recessions. The extent to which firms engage in such strategies is influenced by financial constraints, analyst coverage, cash flow shocks, and institutional ownership.

Keywords: Share repurchases, payout policy, business cycle, stock return

JEL: F44, G10, G30, G31, G35

* Zigan Wang (wangzg@sem.tsinghua.edu.cn), School of Economics and Management, Tsinghua University; Qie Ellie Yin (qieyin@hkbu.edu.hk), Hong Kong Baptist University; Luping Yu (lupingyu@xmu.edu.cn), Xiamen University. We thank Heitor Almeida, Bo Becker, Alice Bonaimé, Sheng-Syan Chen, Harry DeAngelo, Vyacheslav Fos, Jarrad Harford, Martin Jacob, Murali Jagannathan, Nan Li, Alberto Manconi, Roni Michaely, Ozde Oztekin, Yanzhi Wang, Miaomiao Yu, and audiences and discussants at 2021 China International Conference in Finance, 2021 Asia Meeting of the Econometric Society, American Economic Association 2022 Annual Meeting, 35th Australasian Finance and Banking Conference, University of Hong Kong, Hong Kong Baptist University, CUHK-Shenzhen, Shenzhen University, and Xiamen University for helpful comments and suggestions. We thank Yan Li for research assistance. All remaining errors are ours.

# Global Share Repurchases Over the Business Cycle

June 2024


## Abstract

Using a new dataset of global repurchase cases, we analyze how repurchase patterns vary over the business cycle. During economic expansions, firms repurchase shares primarily to distribute excess cash. During recessions, firms reduce the volume of share repurchases but maintain the frequency of repurchase announcements. Announcements made during recessions are associated with a 2.7% decrease in repurchase size and a 3.8% decline in completion rates. These announcements yield a short-term return of up to 2.2%, but this gain is reversed in the long term, resulting in a one-year abnormal return of -4.6%. Our findings suggest that firms strategically use uncommitted open market repurchase announcements to signal to the market that their shares are undervalued, thereby boosting short-term stock prices during recessions. The extent to which firms engage in such strategies is influenced by financial constraints, analyst coverage, cash flow shocks, and institutional ownership.



Keywords: Share repurchases, payout policy, business cycle, stock return

JEL: F44, G10, G30, G31, G35

## 1. Introduction

Since the 1980s, share repurchase has increasingly become an indispensable payout policy in the U.S. (DeAngelo, DeAngelo, and Skinner, 2009). In 2021, for example, US companies bought back shares in record volumes: S&P 500 companies plowed around $880 billion into their own shares last year, a 69.6% increase from $519.8 billion in 2020.[1] Repurchase is also growing in markets across the world. Since 1982, 18 major markets have legalized open market share repurchases (Wang, Yin, and Yu, 2021).

Researchers interested in this phenomenon have investigated various repurchase motivations, including the substitution theory (Jacob and Jacob, 2013; Moser, 2007), the financial flexibility theory (Guay and Harford, 2000; Jagannathan, Stephens, and Weisbach, 2000; Skinner, 2008), and the undervaluation theory (Guay and Harford, 2000; Moser, 2007; Stephens and Weisbach, 1998), each with empirical support. However, empirical studies find mixed evidence on these theories. For example, Dittmar (2000) and Wang, Yin, and Yu (2021) do not find significant estimates of stock returns to support the undervaluation theory.

Most prior literature on repurchases focuses on the issuers' motivation; however, few studies examine how time, a more macro and more fundamental factor, may affect firms repurchase behaviors. New repurchase announcements, along with repurchase amounts, vary over years (see Dittmar and Dittmar, 2008). This observation immediately reminds us of the literature documenting how time figures into other corporate financing behaviors such as IPO waves (Pástor and Veronesi, 2005; He, 2007) and merger waves (Harford, 2005; Maksimovic, Phillips, and Yang, 2013).

[1] The report can be accessed here as of June 30, 2022: https://press.spglobal.com/2022-03-15-S-P-500-Buybacks-Set-Quarterly-and-Annual-Record.

Although multiple time factors, such as presidential election cycles (Jens, 2017), affect corporate behaviors, we maintain that the business cycle may be the most fundamental because it incorporates all transitory fluctuations of the economy away from a long-run trend. This idea dates back as early as Hawtrey (1923), Keynes (1936), and Schumpeter (1939); more recent work (e.g., Morley and Piger, 2012) continues to argue that "the business cycle is a fundamental yet elusive concept in macroeconomics." In addition to intensive study from macroeconomists (e.g., Ritschl, Sarferaz, and Uebele, 2016), the business cycle is also important to microeconomists, who examine its impact on various economic entities and their behaviors,[2] including individual income (Carey and Shore, 2013), household risk-sharing (Shore, 2010), government spending outcomes (Sims and Wolff, 2018), and entrepreneurship (Koellinger and Thurik, 2012). Microeconomists also study how the business cycle affects corporate behaviors related to corporate investment (Jovanovic and Rousseau, 2014; Dangl and Wu, 2016), innovation (Geroski and Walters, 1995), mergers (Dittmar and Dittmar, 2008), financing policies (Korajczyk and Levy, 2003; Covas and Den Haan, 2012; Zetlin-Jones and Shourideh, 2017; Begenau and Salomao, 2019), default risk (Chen, Cui, He, and Milbradt, 2018), and equity premium (Bianchi, Ilut, and Schneider, 2018). However, researchers still have limited understanding of how payout policies, especially repurchases, vary over the business cycle.

Examining repurchase activities over the business cycle is helpful in gaining deeper insight into the repurchase motivations that have been documented in the literature. Lee and Rui (2007) claim that "there is no single dominant motive for corporations to repurchase stock". We show that, despite the multiple motivations that may drive firms to repurchase in all periods, statistically,

[2] It is arguable whether the business cycle itself is predictable. While many macroeconomic studies seek predicting signals of the business cycle (for example, see Lucas, 1975), a well-known *reductio ad absurdum* argument is that, if the business cycle is predictable, it can be avoided by taking proper actions. This paper does not intend to join the debate on the predictability of the business cycle; rather we assume that it is largely exogenous and unpredictable to average firms.

firms are more likely to repurchase for purposes related to financial flexibility in expansion, while in recession, the purpose of stabilizing stock prices tends to be more prominent. More specifically, firms repurchase to distribute excess cash in economic expansion; their announcements are followed by higher long-term returns and a higher completion rate. In recession periods, firms utilize uncommitted repurchase announcements to signal to the market that their shares are undervalued and then boost stock prices. Compared with repurchase cases in expansion periods, repurchase cases in recession periods are thus accompanied by higher short-term stock returns and lower completion rates.

Dittmar and Dittmar (2008), the study most similar to ours, document the procyclicality of U.S. firm repurchase *value*. However, *details* of repurchase behaviors and motivations over the business cycle—especially case-level analysis—in the U.S. and around the world are still worth investigating. Moreover, most repurchase studies focus on U.S. firms, while the examination of international samples is largely missing.[3] We conjecture that the gap in the literature is a result of data limitations. While Worldscope and Compustat Global obtain repurchase data from corporate annual reports, they lack case-level information. SDC data contain some case-level variables, yet around 80% of SDC cases are only for U.S. firms.

To overcome these limitations, we use S&P Global Market Intelligence (GMI) data that contain detailed information such as announced repurchase size and completion rate of global repurchase cases in 21 countries or regions. This dataset provides much broader non-US case coverage than SDC and enables us to investigate how repurchase patterns vary over the business

[3]Our survey of 114 top journal publications focusing on share repurchases, which we present in the online appendix, shows that only ten use non-U.S. data. Among them, six studies cover two or more non-U.S. countries, including five articles that mainly rely on Worldscope (Wang, Yin, and Yu, 2021; Manconi, Peyer, and Vermaelen, 2019; Becker, Jacob, and Jacob, 2013; Jacob and Jacob, 2013; Lee and Suh, 2011) and Von Eije and Megginson (2008), which covers firms in the European Union. Another four studies use single non-U.S. market data, including Young and Yang (2011) and Rau and Vermaelen (2002), which use UK data, Brockman and Chung (2001), which uses Hong Kong data to discuss the relation between actual repurchases and stock liquidity, and Ikenberry Lakonishok, and Vermaelen (2000), which analyzes repurchases in Canada.

cycle.[4] We obtain business-cycle peak and trough dates from the Economic Cycle Research Institute (ECRI) database that employs the National Bureau of Economic Research (NBER) methodology to classify recessionary periods.[5] Our baseline sample comprises 18,179 repurchase cases and 79,103 firm-year observations, covering 21 markets from 1992 to 2020.

First, we aggregate case-level numbers and total amounts of repurchases to the firm-year level. We find that, comparing the first year of recession periods with the final year of expansion periods, the amount of actual repurchases is 13.4% lower relative to the full-sample average of repurchase amount. Although the proportion of actual repurchases as a share of the total payout is 7.1% lower in recession periods, the number of repurchase announcements in recession periods remains stable, mainly in the form of open market repurchase announcements.

Intuitively, a recession may lead to pessimistic expectations over firms' prospects and to lower stock valuation (Fischer and Merton, 1984); thus, firms that believe they may be undervalued would use repurchase announcements to boost their valuation, although they may not actually fulfill their announced repurchase plans. Since tender offers will almost certainly be completed but open market announcements are not legally binding promises (Stephens and Weisbach, 1998), our results indicate that firms show lower commitment in recession periods. This is different from expansion periods, during which firms are more likely to return additional profits

[4] SDC data contain some case-level variables, yet around 80% of SDC cases are only for the U.S. firms. As shown in the Online Appendix A, S&P GMI covers 40,191 non-U.S. repurchase cases from 20 international markets, which is four times the non-U.S. cases covered by SDC. Manconi et al. (2019) use SDC data and have 9,034 non-U.S. observations from 31 markets; we use S&P GMI data (40,191 non-U.S. observations from 20 markets) to replicate their results and find that they generally hold.

[5] To capture the complex dynamics of the global economy, ECRI focuses on the interrelationships among cycles in inflation, employment, and economic growth. The approach builds on the work of ECRI's co-founder, Geoffrey H. Moore, and his mentors. A recession is a period of significant decline in economic activity spreading across the economy, lasting more than a few months and normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales. Similarly, during an expansion, economic activity rises substantially and spreads across the economy. For raw data, see the table "Business Cycle Peak and Trough Dates, 21 Countries, 1948-2020" available at https://www.businesscycle.com/download/report/3723 (accessed December 1, 2020). ECRI covers 21 countries or regions. Halling Yu, and Zechner (2016) and Graetz and Michaels (2017) also use the ECRI data to examine leverage dynamics and employment over the business cycle. Alternative measures of the business cycle are also used in the literature, such as GDP growth rate (Dittmar and Dittmar, 2008) and unemployment rate (Stevenson and Wolfers, 2011). Our results are robust to using these measures and are available upon request.

to shareholders using share repurchases. Buying back more shares avoids higher taxation and long-term commitment of cash dividends and mitigates the concern of wasting free cash flows. In short, our results indicate that firms repurchase more shares to distribute extra cash flows during expansion periods, while they announce more non-commitment open market share repurchases during recessions.[6]

Second, we analyze the details of repurchase cases over the business cycle at the case level. We find that, in recession periods, the planned percentage sought in repurchase announcements is 2.7% lower and the completion rate is 3.8% lower than in expansion periods. While some previous repurchase literature has examined completion rates (Stephens and Weisbach, 1998; Banyi, Dyl, and Kahle, 2008; Bonaimé, 2012), our paper contributes to the literature by identifying a pattern in which firms strategically use uncommitted open market share repurchase announcements to temporarily boost stock valuation. This is particularly observed during recession periods, where firms may not have enough cash flows to fulfill the announced plans. Such repurchase announcements serve as a false signal of undervaluation. Our cross-sectional heterogeneity analysis reveals that the degree to which firms engage in such strategies is influenced by their financial constraints, the level of analyst coverage, the occurrence of cash flow shocks, and the role of institutional investors.

Third, we analyze how market reactions to repurchase announcements vary over the business cycle. We find that announcements of repurchase cases in recession lead to higher and positive short-term stock returns, which further confirms the dominance of the incentive to boost stock valuation in recession periods. Meanwhile, repurchases in recession periods lead to lower

[6] To be clear, we acknowledge that different repurchase motives co-exist and that we are solely identifying which motive(s) is(are) likely to be more important in expansion or recession periods.

and even negative long-term abnormal stock returns, implying that repurchase announcements in recession periods are more likely to serve short-term purposes.

Taken together, our analyses and findings contribute to multiple fields of the repurchase literature, shedding light on the importance of the business cycle in shaping firm decisions. We discuss our contributions to these two streams of literature in depth in Section 8. Section 2 discusses testable hypotheses on repurchase patterns over the business cycle. Section 3 describes our data sources, variables, and sample. Sections 4 and 5 present our main results based on firm-year and case-level regressions, respectively. Section 6 presents cross-sectional heterogeneity analyses. Section 7 presents several robustness checks. Section 8 discusses our contributions to the literature. Section 9 concludes.

## 2. Hypotheses

In this section, we propose testable hypotheses about how repurchase patterns may vary over the business cycle. The repurchase literature has provided several theories of repurchase motives or purposes, from which we formalize our hypotheses. For example, the substitution theory (Grullon and Michaely, 2002; Moser, 2007) states that firms substitute share repurchases for cash dividends because the tax rate on dividend income is usually higher than the capital gain tax rate. The flexibility theory (Jagannathan, Stephens, and Weisbach, 2000; Brav, Graham, Harvey, and Michaely, 2005) argues that firms use share repurchases to avoid long-term distribution commitments and maintain financial flexibility. The undervaluation theory (Ikenberry, Lakonishok, and Vermaelen, 1995; D'Mello and Shroff, 2000) predicts that firms are more likely

to buy back shares when their stocks are undervalued; in this case, repurchase announcements may serve as an undervaluation signal to the market.[7]

Because firm operations, profitability, and business environment are different over the business cycle, it is possible that firms repurchase for different purposes in expansion and in recession. In expansion years, firms tend to have better performance and more net cash inflows, resulting in more cash distributions (Dittmar, 2000; Guay and Harford, 2000). Because firms usually tend to smooth out dividend growth to avoid potential dividend cuts (Lintner, 1956), firms are more likely to increase share repurchases in expansion periods. Moreover, if firms use share repurchases to distribute extra profits in expansion periods, they may avoid long-term dividend commitments (Stephens and Weisbach, 1998) and avoid tax penalties due to a higher dividend tax rate (Moser, 2007; Jacob and Jacob, 2013). In short, we predict that firms treat repurchases as a flexible method to distribute extra cash flows in expansion periods: They buy back more shares in expansion periods, even though cash dividends may change very little.

In recession periods, stock valuation may suffer from large drops. Such procyclicality of stock prices (Fischer and Merton, 1984) is intuitive. Firms may have lower profits and growth but face higher costs of financing (McLean and Zhao, 2014) in recession; then stock valuation, which is determined by the discounted value of expected cash flows, tends to be lower. Given worse-off profitability in recession, it is less likely that firms buy back shares to distribute extra cash flows as in an expansion period. In contrast, it is more likely that, in response to a large drop in stock prices, firms may take advantage of share repurchase plans to increase their stock valuation (Ikenberry, Lakonishok, and Vermaelen, 1995; Dittmar, 2000). One possibility is that these firms

[7] Other theories regarding motivations for repurchases include the optimal leverage ratio theory (Lie, 2002), the management incentive theory (Fenn and Liang, 2001; Kahle, 2002), the liquidity hypothesis (Hong, Wang, and Yu, 2008; Hillert, Maug, and Obernberger, 2016), and the takeover deterrence hypothesis (Bagwell, 1991). The three that we emphasize are arguably the most cited.

have large underpricing: They announce repurchase plans to attract attention from speculators, and subsequent trades from speculators lead to value correction and increase stock prices, so these firms do not need to actually buy back shares to correct their valuation (Bhattacharya and Jacobsen, 2016). The second possibility is that firms use repurchase announcements as a false signal to boost short-term stock prices. The reason is that repurchase announcements, especially open market repurchase programs, are considered weak commitments. Compared to other forms of corporate payout, managers face a lower reputational risk if the company ultimately fails to repurchase shares under a share repurchase program (Chan, Ikenberry, Lee, and Wang, 2010; Bonaimé, 2012). Therefore, when managers are under heavy pressure to boost stock valuation, they are likely to announce repurchase plans to mislead investors (Chan, et al., 2010). No matter which possibility holds in recession, we predict that a dominating motivation of share repurchases in recession periods is the incentive of announcing repurchase plans to increase stock valuation, although firms may not actually have enough cash flows to fulfill announced plans. We summarize these predictions as follows:

***Hypothesis 1 (Distribution Pattern):*** *In expansion periods, share repurchases serve as a flexible method to distribute extra cash flows; therefore, firms repurchase more shares, and the proportion of repurchases relative to total distributions is higher. In recession periods, share repurchases are used to boost stock valuation; therefore, firms make more share repurchase announcements even though they may actually buy back fewer shares.*

Although firms may want to avoid long-term commitments using cash dividends in expansion periods, they may keep their short-term commitments using different repurchase strategies to distribute extra profits. For instance, a firm may announce a larger repurchase plan to signal its strong performance (Comment and Jarrell, 1991). Even though this repurchase

announcement does not guarantee a full realization of the repurchase plan in most markets (Manconi, Peyer, and Vermaelen, 2019), a firm could provide some level of commitment by finishing the announced repurchase plan with a higher completion rate. Moreover, because tender offer repurchases usually serve as a commitment to fulfill the announced plan (Stephens and Weisbach, 1998), the firm could use tender offers with a higher repurchase premium to signal its strong intention to repurchase (D'Mello and Shroff, 2000). This reasoning leads to the following hypothesis:

***Hypothesis 2 (Repurchase Details):*** *Repurchase cases in expansion periods have larger announced percentages sought and higher completion rates than repurchase cases in recession periods. Open market repurchases are more frequent in recession periods, whereas tender offers are more frequent in expansion periods.*

The final hypothesis considers market reactions to share repurchases. We predict that repurchase announcements in expansion periods lead to higher long-term abnormal returns than in recession periods. There are two reasons for this prediction. First, firms may have better long-term performance in expansion periods. Second, distributing free cash flows mitigates the concern of wasting money on inefficient projects, which is beneficial for long-term valuation (as an indication of enhancing shareholder value). In contrast, if boosting stock valuation is a major motivation for repurchases in recession periods, we expect to observe a quick price increase (i.e., to stabilize share price) and thus higher short-term abnormal returns after a repurchase plan is announced. If these announcing firms are truly good firms with large underpricing that use repurchase plans to signal their undervaluation, then over a long term, these good firms may have higher growth and profitability, which results in high long-term abnormal returns. In contrast, if these announcing firms are just using repurchase plans to boost short-term stock prices, then we expect that such

behavior is not sustainable and hence these firms have low long-term abnormal returns. The validity of these two predictions will be an empirical question. We summarize the above inferences as follows:

***Hypothesis 3 (Stock Market Reactions):*** *Repurchase announcements in expansion periods lead to higher long-term stock returns. Repurchase announcements in recession periods increase short-term stock returns.*

## 3. Data, Variables and Sample Description

### 3.1. Share Repurchase Cases

Our primary data source for share repurchase details is S&P Global Market Intelligence (S&P GMI). This database covers case-level repurchase information across the globe, including repurchase type (e.g., open market or tender offer), announcement date, announced repurchase percentage relative to total shares or total stock value, and actual repurchase amount related to the case.

Compared with other widely used databases that offer repurchase-related information (e.g., SDC Platinum, Worldscope, or Compustat Global), S&P GMI has several advantages. First, in contrast to Worldscope or Compustat Global which only provides annual repurchase size as shown in annual reports, S&P GMI offers repurchase information at the case level. Therefore, S&P GMI enables us to track the timing of when a firm has an intention to initiate a repurchase program.

Second, compared with SDC, which also covers case-level repurchase information, S&P GMI details each repurchase announcement, including not just announced repurchase size and repurchase type, but also how many shares are actually bought back under each repurchase case

(completion rate).[8] S&P GMI provides *Resolution Comment* for each repurchase case, which documents the announcement date, closed date, and actual repurchase amount under each program.[9] The closed date of a repurchase program is the date specified by the firm in the repurchase announcement, or the date when any of the following events occur: 1) the firm announces the completion of the current repurchase program, 2) the firm completes the planned repurchase amount, or 3) the firm announces a new repurchase program.

We would like to highlight that in the case of open market share repurchase programs, firms can reauthorize additional shares or even start a new program without officially terminating the existing one. S&P GMI relies on the information disclosed by the firms to determine whether the case represents an additional authorization or a new one.

For instance, when Apple Inc. (Nasdaq: AAPL) announced its repurchase program (IQTR182455551) on March 19, 2012, it stated that "The Company's Board of Directors has authorized a $10 billion share repurchase program commencing in the Company's fiscal 2013, which begins on September 30, 2012. The repurchase program is expected to be executed over three years..." Apple subsequently issued five additional authorizations for this case, as mentioned in its 8K filing:

- "The Board has increased its share repurchase authorization to $60 billion from the $10 billion level announced last year." (April 23, 2013),

[8] Using repurchase amounts based on CRSP or Compustat may underestimate completion rates for two reasons: (1) CSRP or Compustat does not identify whether the repurchase amount over a month or quarter is associated with multiple repurchase cases; (2) Some repurchase cases may last for a long time, even after the announcement of the next repurchase case, and hence directly summarizing the repurchase amount between two announcements or between several quarters does not consider those incomplete repurchase cases with a long duration. Unlike previous measures, S&P GMI tracks each repurchase case and provided detailed information on actual repurchase amount and the duration of the case.

[9] For instance, the resolution comment for transaction ID 28507463 is "Dun & Bradstreet Corp. announced repurchase program on August 2, 2006 and completed the repurchase program on July 31, 2007. Under the program, the Company has repurchased 2,300,000 shares for a total of $200 million". The resolution comment for transaction ID 39314243 is "Dun & Bradstreet Corp. announced repurchase program on December 4, 2007 and completed the repurchase program on December 31, 2009. Under the program, the company has repurchased 5,300,000 shares for a total cost of $400 million."

- "The Board has increased its share repurchase authorization to $90 billion from the $60 billion level announced last year." (April 23, 2014),
- "The Board has increased its share repurchase authorization to $140 billion from the $90 billion level announced last year." (April 27, 2015),
- "The Board has increased its share repurchase authorization to $175 billion from the $140 billion level announced last year." (April 26, 2016),
- and "The Board has increased its share repurchase authorization to $210 billion from the $175 billion level announced a year ago." (May 2, 2017).

The additional authorizations would adjust the amount authorized in the last announcement but would not be considered a new case. S&P GMI summarized this case in their *Transaction Comments*, stating that "As of May 2018, the company had completed the repurchase of 1,927,696,711 shares, representing 33.52% of the total authorized amount of $210,000 million under the buyback program announced on March 19, 2012." Apple announced a *new* case on May 1, 2018, in which it stated, "Given our confidence in Apple's future, we are very happy to announce that our Board has approved a *new* $100 billion share repurchase authorization and a 16 percent increase in our quarterly dividend."

Given that a repurchase announcement is typically not a commitment (Stephens and Weisbach, 1998), the comprehensive case-level data provided by S&P GMI not only aid in determining the actual repurchase amount under each program but enable a more thorough understanding of repurchasing behaviors as well. For instance, if a repurchase case has a high completion rate, the repurchasing firm is showing a higher level of distribution commitment.

Third, S&P GMI has a broader country coverage than SDC. As shown in Online Appendix A, almost 80% of cases covered by SDC are U.S. repurchase cases, whereas S&P GMI covers

many more cases from non-U.S. markets. For example, SDC covers only 81 repurchase cases in South Africa, while S&P GMI covers 1,887 cases in this country; SDC covers 461 repurchase cases in the UK, while S&P GMI covers 6,920; SDC covers 2,793 repurchase cases in Japan, while S&P GMI covers 9,186. In total, S&P GMI covers 40,191 non-U.S. repurchase cases from 20 international markets, which is four times the non-U.S. cases covered by SDC. Note that the sharp increase in S&P GMI repurchase case coverage in the early 2000s may be a result of the introduction of share repurchase legalization (Wang, Yin, and Yu, 2021).

### 3.2. Business Cycle Data

We obtain business cycle data from the Economic Cycle Research Institute's (ECRI) international cycle dates. ECRI covers 21 countries or regions, including Australia, Austria, Brazil, Canada, China, France, Germany, India, Italy, Japan, Mexico, New Zealand, Russia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, the United Kingdom, and the United States. This database has been widely used by a variety of studies in the economics (Graetz and Michaels, 2017) and finance literature (Henkel, Martin, and Nardari, 2011; Kaniel, Ozoguz, and Starks, 2012; Halling, Yu, and Zechner, 2016).[10]

Following these studies, we define recession months as ECRI peak-to-trough months. ECRI employs the National Bureau of Economic Research (NBER) methodology to classify recessionary periods: If a decline in economic activity across an economy lasts more than a few months and is visible in real GDP, real income, employment, industrial production, and wholesale-retail sales, the period is classified as a recession; in contrast, expansion periods are classified as those during which economic activity rises substantially and spreads across the economy. For firm-

[10] Alternative measures of the business cycle are also used in the literature, such as GDP growth rate (Dittmar and Dittmar, 2008) and unemployment rate (Stevenson and Wolfers, 2011). Our results are robust to using these measures and are available upon request.

year level analysis, we define the recession year, *Recession*, as one if a firm's entire fiscal year overlaps with a recession and zero otherwise. For our sample, we identify, on average, 5.4 expansion periods and 4.7 recession periods in a country or region. On average, one expansion period lasts for 6.5 years, whereas one recession period lasts for 16 months.

Although the business cycle itself is endogenous in many macroeconomic models, we argue that its timing is exogenous to firm-level share repurchases. First, it is unlikely that a few individual firms' decisions would generate the business cycle, so reverse causality should be minimal. Second, because the business cycle is arguably the most fundamental economic factor (Morley and Piger, 2012), various macroeconomic variables that may affect repurchases decisions, such as GDP, economic growth, or income, are likely to be simultaneously and endogenously determined in the business cycle model.

### 3.3. Sample Description

We combine data from multiple sources for our analysis. As previously mentioned, we gather information on repurchase cases from S&P GMI and business cycle data from ECRI. Additionally, we collect firm-level financial data from Refinitiv Worldscope. We construct a set of firm-level controls based on Worldscope data, which include common variables in repurchase literature, such as *Total Assets*, *Leverage*, *ROA*, *Market-to-Book Ratio*, *Tangibility*, *Liquidity*, *Sales Growth*, *Cash Flow Volatility*, and *Market Share*. These variables are commonly used in the repurchase literature (e.g., Wang, Yin, and Yu, 2021). Our sample covers 21 countries where ECRI business cycle data are available, spanning from 1992 to 2020.

We utilize both a case-level sample and a firm-year level sample for our empirical analyses. For the case-level sample, we retain all available repurchase cases and merge them with Worldscope's firm-level financial data and ECRI business cycle data. To construct our firm-year

sample for analysis, we first aggregate the case-level repurchase data from S&P GMI to the firm-level and then merge it with Worldscope's firm-level financial data and the business cycle data from ECRI. Unless otherwise specified, our firm-year sample is restricted to two years around the start of a recession, including both repurchasing and non-repurchasing firm-years, not just the firm announced repurchases. This timeframe is chosen because firm characteristics may have large variations over the business cycle, and we focus on the last year of an expansion period and the first year of a recession period to ensure matching of firm characteristics across the periods under analysis.

After excluding observations with missing control variable values, our baseline case-level sample consists of 18,179 repurchase cases, and our firm-year sample includes 79,103 observations in 21 countries from 1992 to 2020. The number of observations used for regressions varies across tables and columns due to missing values of different dependent variables. Variable definitions are listed in Appendix Table 1. Table 1 presents the summary statistics.

## 4. Payout Behaviors over the Business Cycle

We first analyze how firms' payout behaviors are different in expansion and recession periods based on the following firm-year panel regression model:

$$Y_{fict} = \beta_0 + \beta_1 Recession_{ct} + \beta_2 X_{fic,t-1} + FE_f + FE_{it} + \varepsilon_{fict}, \quad (1)$$

where the outcome variable $Y_{fict}$ measures payout or the number of repurchase announcements for firm *f* in industry *i* in country *c* in year *t*. We obtain three payout measures from the Worldscope database: the annual repurchase amount scaled by lagged total assets (*Actual Repurchase Amount*), the annual cash dividends scaled by lagged total assets (*Dividend Payment Amount*), and the

proportion of the annual repurchase amount to annual total payout (*Repurchase Proportion*).[11] We also construct the following three variables by aggregating the S&P GMI's case-level data to firm-level: the number of repurchase announcements per year (*# of Repurchase Announcements*), the number of open market repurchase announcements per year (*# of Market Repurchases*), and the number of tender offer announcements per year (*# of Tender Offers*). The main explanatory variable of interest is the dummy, $Recession_{ct}$, according to the definition in Section 3.2. The vector, $X_{fic,t-1}$, includes a group of firm-year variables as described in Section 3.3. We control for firm fixed effects and industry-year fixed effects in all model specifications to further mitigate concerns over omitted variables.[12]

Table 2 presents the results based on equation (1). As shown, actual dividend amount has no significant change over the business cycle (Column 2), but firms buy back fewer shares in recession periods. The amount of actual repurchases is 13.4% lower relative to the full-sample average of repurchase amount (Column 1), and the proportion of actual repurchases as a share of the total payout is 7.1% lower (Column 3), although the number of repurchase announcements remains stable (Column 4).[13]

These results are intuitive and support Hypothesis 1. First, firms usually have better performance and generate more cash flows in expansion periods than in recession periods. Second, according to the dividend stickiness theory (Lintner, 1956), firms prefer to smooth dividend growth and avoid dividend cuts. Therefore, we do not observe a significant variation in cash dividends over the business cycle; but firms may use share repurchases to distribute extra profits in expansion

[11] We collect repurchase amount data at both the firm-year and case levels. In Section 5, we will introduce case-level measures, such as the *Planned Percentage Sought in Repurchase Announcements* and *Completion Rate*.
[12] Every single firm in our regression sample has a unique country location. That is, for multinational firms, different subsidiary firms in different countries are treated as standalone unique firms. Therefore, the firm-year observations in our sample are in fact country-firm-year observations.
[13] Economic significance is calculated from a coefficient estimate divided by the sample average of a dependent variable. -13.4% = -0.121 / 0.90, and -7.1% = -1.591 / 22.6.

periods or reduce share repurchases if they perform worse in recession periods. One benefit of changing share repurchases over the business cycle is to maintain financial flexibility (Brav et al., 2005). Because it is difficult for an average firm to accurately predict the business cycle and because extra profits in expansion periods may not repeat regularly in the future, firms are expected to increase (or decrease) more flexible share repurchases in expansion (or recession) periods to avoid future dividend cuts. Moreover, because the tax rates on dividend income are higher than the long-term capital gain tax rates in many countries, firms may have an incentive to use a higher proportion of share repurchases if they need to make large distributions (Moser, 2007; Jacob and Jacob, 2013), such as in expansion periods.

In contrast, in recession periods when stock price experiences large drops, it is more likely that firms use repurchase announcements to increase their stock valuation, even though they do not actually have enough resources complete share repurchases. This behavior could come from true undervaluation: Firms use repurchase announcements to signal the undervaluation of their stocks (Vermaelen, 1981; Ikenberry, Lakonishok, and Vermaelen, 1995) and to attract speculators to correct the valuation (Bhattacharya and Jacobsen, 2016). Announcing repurchase plans in recession can also be driven by the incentive of using these announcements as a false signal to mislead investors (Chan et al., 2010). Both cases explain why we observe a higher number of repurchase announcements but a lower amount of actual repurchases in recession periods.

Table 2 also shows that repurchase announcements in recession periods mainly comes from open market repurchase announcements, which is consistent with the prediction in Hypothesis 2. The number of open market repurchase announcements is 37.1% higher in recession periods relative to its average (Column 5), while the number of tender offer announcements is 88.1% lower

in recession periods (Column 6).[14] Open market repurchases account for the majority of all repurchase cases, but they are not commitments and do not have to be fully completed after announcements.[15] Tender offers, on the other hand, deliver a stronger commitment to buy back shares at a predetermined price (Stephens and Weisbach, 1998). Therefore, the results in Columns (5) and (6) of Table 2 suggest that firms have lower confidence to make commitments in recession periods; in expansion periods, if firms want to make distribution commitments, they may rely on more flexible short-term commitments such as tender offers, instead of increasing long-term commitments such as cash dividends.

Taking all results in Table 2 together, we find that firms' payout behaviors vary over the business cycle because of different repurchase motives, which provides support for Hypotheses 1 and 2. In recession periods, firms announce more open market repurchase plans but actually buy back fewer shares, implying that announcing repurchase plans is mainly for the sake of increasing stock valuation rather than distributing free cash flows. In expansion periods, firms make more distributions, especially in terms of share repurchases because they may have better performance and generate more free cash flows; using share repurchases to distribute extra profits suggests that the flexibility and substitution theories tend to be the dominant repurchase motives in expansion periods.

## 5. Repurchase Details and Announcement Returns over the Business Cycle

In this section, we further test Hypotheses 2 and 3 using case-level analysis of repurchase details and announcement returns over the business cycle. A large group of studies has used case-level data, primarily from the U.S., to study cumulative abnormal returns (CARs) around

[14] 37.1% = 0.0693 / 0.19, and -88.1% = -0.00451 / 0.01.
[15] 92.8% of repurchase cases in S&P GMI are open market repurchases.

repurchase announcements (Lakonishok and Vermaelen, 1990; Ikenberry, Lakonishok, and Vermaelen, 1995; Peyer and Vermaelen, 2009). Manconi, Peyer, and Vermaelen's (2019) analysis includes 9,034 non-U.S. repurchase cases in SDC. Wang, Yin, and Yu (2021) focus on firm-year level data of actual repurchases rather than case-level information. Our analysis differs from these studies in that we use S&P GMI data with broader country coverage; we analyze not only short-term and long-term returns around repurchase announcements, but also more details related to repurchase cases, such as announced size and completion rate. Importantly, when we introduce the business cycle into the analysis, we find notable differences in repurchase details and short-term and long-term stock market reactions between expansion and recession periods. Unlike the firm-level analysis that defines *Recession* by year, here we define *Recession* as a dummy that equals one for the ECRI peak-to-trough months and zero otherwise.

Figure 1 compares the cumulative abnormal returns (CARs) around repurchase announcements in expansion and recession periods, defining the repurchase announcement date as day 0. We obtain data on market-adjusted stock returns from WRDS Daily Event Analytics.[16] As shown, compared to repurchase cases announced in expansion periods, repurchase cases announced in recession periods are associated with larger price drops before the announcement date and larger price increases after the announcement date. The preliminary evidence denotes that firms announce repurchase plans to stabilize falling stock prices in recession periods, and those announcements are associated with higher short-term stock returns.

To provide more sophisticated evidence, we then calculate a range of announcement returns over different event windows. We define the repurchase announcement date as day 0 and use three event windows for short-term CARs: [-1, 1], [-2, 2], and [-5, 5]. We also use three post-

[16] The cumulative abnormal returns in Figure 1 are calculated based on a market-adjusted model. The results holds if we employ Fama-French three factor model. A few cases are omitted since they were authorized on non-trading days.

announcement event windows to proxy for long-term abnormal stock returns: 3 months, 6 months, and 12 months. For a given event window, we calculate a buy-and-hold abnormal return (BHAR) associated with a repurchase case announcement as the difference between the actual buy-and-hold return and the return of the characteristic-based matched portfolios.[17] We obtain data on long-term abnormal stock returns from WRDS Long-Run Abnormal Return Analytics, which provides BHAR calculated by using benchmark portfolio returns with annual rebalancing. The benchmarks are characteristic-based matching portfolios for each region, which are largely selected in accordance with Fama and French (1993, 2012) categorizations.[18] This method of estimating long-term returns is similar to Table 6 in Manconi, Peyer, and Vermaelen (2019).

Table 3 Panel A shows the t-test results of different abnormal returns around repurchase announcements in expansion and in recession periods. Short-term CARs around repurchase announcements are significantly positive across all periods but are higher in recession periods. Long-term abnormal returns around repurchase announcements are only significantly positive in expansion periods but are insignificant or even significantly negative in recession periods. For instance, during the two-week event window [-5, 5], the average CAR in expansion periods is 1.12%, while the average CAR in recession periods is 2.22%. In the 12 months after repurchase announcements, the average BHAR in expansion periods is 1.95%, while the average BHAR in recession periods is significantly negative. The opposite market reactions to repurchases in expansions and recessions are consistent with the findings of Bargero, Bonaime, and Thomas

[17] Despite lack of methods that are perfectly immune to risk adjustment errors or model misspecification for calculating long-term abnormal returns, two approaches have commonly been employed to measure long-run abnormal stock returns after corporate events: the BHAR method, and the calendar time portfolio method (Jensen's alpha). The advantage of the BHAR method is that it reflects the true magnitude of returns of an investment strategy, while the advantage of the calendar time portfolio method is that it controls well for cross-sectional dependence among sample firms and is less sensitive to a poorly specified asset pricing model. In the main analysis we focus on the first approach. The results holds if we employ calendar time portfolio method.

[18] In long-horizon event studies, it is crucial to select a proper benchmark to calibrate the performance abnormality of event firms. The benchmarks we employed are characteristic-based matching portfolios (Fama and French, 1993).We also rely on international benchmarks (Fama and French, 2012) for each region, rather than just looking at market returns.

(2017) who observed that long-run abnormal returns are not significantly different from zero over the repurchase completion periods.

These results support Hypothesis 3. In expansion periods, when firms distribute extra cash flows using share repurchases, the likelihood of wasting free cash flows to inefficient investment tends to be lower, which is beneficial for long-term stock performance. In recession periods, firms announce repurchase plans mainly to quickly increase their stock valuation in a few days. The result of insignificant or even negative long-term post-announcement abnormal returns implies that these announcing firms are not good firms with strong future prospects; instead, they are more likely to be the firms that utilize repurchase announcements to boost short-term stock prices.

To further compare the differences between expansion and recession periods, we construct the following case-level regression model:

$$Y_{kfict} = \beta_0 + \beta_1 Recession_{ct} + \beta_2 X_{fict} + FE_f + FE_{it} + \varepsilon_{kfict}, \quad (2)$$

where $Y_{kfict}$ denotes the percentage of outstanding shares to buy back under a repurchase announcement (*Planned Percentage Sought in Repurchase Announcements*), the ratio of actual repurchase amount to announced amount (*Completion Rate*), or one of the six CARs of repurchase case $k$ for firm $f$ in industry $i$ in country $c$ in year $t$. All other model specifications are the same as in equation (1).

Table 3 Panel B presents the results from equation (2). We find that the planned percentage sought and the completion rate are both significantly lower. Repurchase announcements in recession periods have a 2.7% lower announced percentage sought (Column 1) and a 3.78% lower completion rate (Column 2) than those in expansion periods.[19] These results are consistent with Hypothesis 2. Repurchasing firms are more likely to announce large repurchase plans and to fulfill

[19] -2.72% = -0.196 / 7.2, and -3.78% = -2.476 / 65.5.

their repurchase commitments in expansion periods. Although firms in expansion periods avoid *long-term* commitments like dividend payments, the results suggest they are still inclined to provide and realize *short-term* commitments using a more convincing repurchasing strategy to distribute unused extra cash flows.

The univariate CARs analysis in Table 3 Panel A is also confirmed by the regressions in Table 3 Panel B. After controlling for firm-year characteristics and fixed effects, the short-term (long-term) abnormal returns are significantly higher (lower) in recession periods than in expansion periods. For example, repurchase announcements in recession periods experience a 1.72% higher three-day abnormal return [-1, 1] (Column 3) and a 1.58% higher five-day abnormal return [-2, 2] (Column 4). In the long run, repurchase announcements in recession periods are followed by a 12% lower six-month abnormal return (Column 7) and a 12.5% lower one-year abnormal return (Column 8), relative to those in recession periods during the same year.

Overall, firms' repurchase strategies over the business cycle are consistent with our hypotheses. In expansion periods, firms use repurchases as a flexible method to distribute extra profits and as a substitution for cash dividends; in recession periods, firms use repurchase announcements to signal to the market that their shares are undervalued and boost short-term stock performance.

## 6. Cross-sectional Heterogeneity

This section analyzes cross-sectional heterogeneity as additional support for our hypotheses. We introduce an interaction term with the *Recession* dummy used in equations (1) and (2). For ease of presentation, we select two firm-year level dependent variables (actual repurchase amount and the number of repurchase announcements) and three case-level dependent variables

(completion rate, short-term CAR [-5,5], and the 12-month long-term abnormal stock return). All other explanatory variables are the same as in equation (1) for firm-year regressions and as in equation (2) for case-level regressions.

Table 4 shows the results by interacting the *Recession* dummy with a measure for financial constraint, *KZ Index*. A higher value for *KZ Index* suggests that a firm faces more difficulty obtaining external financing and hence is more financially constrained (Kaplan and Zingales, 1997). In general, the baseline coefficients on the *Recession* dummy have the same signs as in Tables 2 and 3, despite different magnitudes and significances.

The coefficients on the interaction term, *Recession*KZ Index*, are significantly negative in all regressions. Intuitively, considering financially constrained firms may face even worse financing conditions in a recession, these firms may be less likely to realize their announced repurchase plans in recession periods (fewer amounts of actual repurchases in Column 1 and lower completion rates in Column 3). Anticipating the lower likelihood that firms will actually buy back shares, the stock market reactions to these repurchase announcements tend to be less favorable (lower short-term CAR in Column 4 and lower long-term CAR in Column 5). Given a less favorable *ex post* reaction, the *ex ante* incentive of using repurchase announcements to boost stock valuation may also be lower, as indicated by a smaller number of repurchase announcements in Column 2.

In Table 5, we replace *KZ Index* with a measure for analyst coverage, *Residual Coverage*, which is the residual from the regression shown in Online Appendix B following Yu (2008). A higher value of *Residual Coverage* implies that a firm is covered by more analysts and faces lower information asymmetry. As shown, the signs for the coefficients on *Recession* remain the same as in previous tables.

More importantly, the coefficients on *Recession*Residual Coverage* show that, in recession periods, firms with more analyst coverage announce fewer repurchase plans (Column 2) and buy back fewer shares under these plans (Column 1 and Column 3), implying that firms with less information asymmetry have lower demand to use repurchase plans to boost stock valuation. However, if they do announce repurchase plans in recession periods, these announcements may deliver more credible signals of undervaluation, which results in more favorable stock market reactions in both the short run (Column 4) and the long run (Column 5).

The findings in Table 4 and Table 5 further support Hypothesis 1 that the undervaluation motive of share repurchases plays a more important role in recession periods. To show that using repurchases as a flexible method to distribute extra cash flows is more important in expansion periods, we conduct two additional tests. For ease of interpretation, we switch to an *Expansion* dummy: For firm-year regressions, *Expansion* equals one in the last year of an expansion and equals zero in the first year of a recession; for case-level regressions, *Expansion* equals one for the ECRI trough-to-peak months and zero otherwise.

In Table 6, we interact the *Expansion* dummy with a measure for extra or temporary cash flows, *Cash Flow Shock*, in the spirit of Guay and Harford (2000). We obtain two findings. First, the baseline coefficients on the *Expansion* dummy are opposite to the estimates when we use the *Recession* dummy in Tables 2 and 3, which suggests the robustness of our results. For example, in expansion periods, actual repurchase amount (Column 1) and completion rate (Column 3) are significantly higher, but the short-term CAR (Column 4) is significantly lower.

Second, the coefficients on the interaction term, *Expansion*Cash Flow Shock*, are significantly positive in all regressions. In expansion periods, if a firm has more temporary cash flows (a higher value of *Cash Flow Shock*), this firm is more likely to announce repurchases

(Column 2) and use repurchases to make distributions (Column 1 and Column 3) because it anticipates that the extra cash flows are only temporary. Share repurchases help the firm to maintain flexibility, avoid dividend changes, and prevent the waste of free cash flows, which then induces more favorable stock market responses (Column 4 and Column 5).

Table 7 replaces *Cash Flow Shock* with a proxy for corporate governance quality, *Institutional Ownership*, and interacts this variable with the *Expansion* dummy. If a firm has higher institutional ownership, we expect that the agency problem in this firm is less severe and that this firm is more likely to distribute free cash flows without promising investment opportunities. Again, we are interested in the coefficients on the interaction term, *Expansion*Institutional Ownership*.

As shown, in expansion periods, firms with higher institutional ownership announce more repurchase plans (Column 2), buy back more shares (Column 1), and have higher completion rates (Column 3). These patterns imply that if better governed firms experience better performance and generate more cash flows in expansion periods, they are more likely to return free cash flows to their shareholders in the form of share repurchases. Distributing free cash flows then means that these better governed firms are not wasting resources on inefficient projects in expansion periods, which leads to higher stock returns in both the short run (Column 4) and the long run (Column 5).

In contrast, the baseline coefficient on *Institutional Ownership* is statistically insignificant for the regression of short-term CAR (Column 4) but is significantly positive for the regression of actual repurchase amount (Column 1) or the number of repurchase announcements (Column 2). These results imply that, in recession, firms with good governance are not taking advantage of repurchase announcements to boost their stock valuation. In other words, the main results in Table 2 that firms in recession announce more repurchase plans but buy back fewer shares are more likely to be driven by firms with bad governance. This inference is consistent with the story of

(Chan, et al., 2010): In recession periods, managers are under pressure to boost stock valuation, and firms with worse governance are more inclined to announce repurchase plans to mislead investors.

Taken together, the results in Table 6 and Table 7 show that firms with higher temporary cash flows or with better corporate governance announce and complete more share repurchase plans in expansion periods. These findings are consistent with Hypothesis 1 that, in expansion periods, share repurchases serve as a flexible method to distribute extra cash flows.

## 7. Robustness Checks

We present several robustness checks in this section. Our main results focus on the final year of expansion periods and the first year of recession periods to mitigate bias due to variation in firm characteristics over the business cycle. Therefore, we relax the restriction of two years around the start of a recession period and re-estimate equation (1).

The results are shown in Appendix Table 2 and are similar to those in Table 2, with a few exceptions: First, the coefficient on *Recession* in the regression of *Actual Dividend Amount* (Column 2) is marginally significant, and second, most coefficient estimates have smaller economic magnitudes. Therefore, these results are resonant with the conclusions from Table 2. In recession periods, firms make fewer distributions, especially in the form of share repurchases; firms also announce more repurchase plans, especially in the form of open market repurchases.

As a second robustness check, we use an alternative measure for the business cycle based on GDP growth. We obtain peak and trough dates using quarterly GDP data from the OECD. Following Graetz and Michaels (2017), we define a recession as a year with two or more consecutive quarters of negative GDP growth. We then construct a dummy *Recession (GDP*

*Measure)*, which equals one in the first year of a recession and equals zero in the year before a recession. Using this dummy, we re-estimate our baseline equation (1) and present the results in Appendix Table 3. Similar to Table 2, actual dividend amount does not change over the business cycle, whereas actual repurchase amount, repurchase proportion, and the number of tender offer announcements are significantly lower in recession periods. Therefore, our results are robust to different measures for the business cycle.

Given that the business cycle, especially an expansion period, may last for several years, the third robustness check investigates how repurchase patterns vary over different stages of the business cycle. Similar to Section 6, we focus on two firm-year level variables (actual repurchase amount and the number of repurchase announcements) and three case-level variables (completion rate, short-term CAR [-5,5], and the 12-month long-term abnormal stock return).

We start with ECRI's definitions of expansion and recession periods. As described in Section 3.2, ECRI identifies trough and peak months based on economic indicators. Expansion periods begin at a trough month and end at a peak month, and recession periods begin at the peak month and end at the trough month. Following DeStefano (2004), we separate the business cycle into four stages as follows. We identify the chronological middle month for each expansion period (trough-to-peak months) and for each recession period (peak-to-trough months). Early expansion (Stage I) then begins at a trough month and continues to the middle of an expansion period. Late expansion (Stage II) consists of the second half of an expansion period and concludes at a peak month. Similarly, early recession (Stage III) begins at a peak month and continues to the middle of a recession period. Late recession (Stage IV) begins at the middle of a recession period and ends at a trough month. On average, one expansion period lasts for 6.5 years (3 years and 3 months for Stage I or II). One recession period lasts for 16 months (8 months for Stage III or IV). Because

recession periods are always too short to break, we compare case-level variables in recession periods with those in early (Stage I) and late (Stage II) expansion periods; we compare firm-year level variables in the first recession year with those in the six years before a recession period. We present these comparisons in Figure 2.

Graph A of Figure 2 shows the results for two firm-year level variables—actual repurchase amount and number of repurchase announcements. Actual repurchase amount slightly increases over an expansion period (time -6 to time -1) but declines when approaching the recession year (time 0). The number of repurchase announcements continuously increases from an early expansion period (time -6) to a recession period (time 0). This trend is consistent with the results in Table 2 that show firms buy back fewer shares in recession periods although they announce more repurchase plans.

Graph B of Figure 2 shows the results for three case-level variables—short-term CARs, long-term CARs, and completion rates—which are similar to those in Table 3. From an early expansion to a recession, short-term CARs increase, but long-term CARs and completion rates decline. These patterns imply that firms announce repurchase plans in recession periods mainly to boost short-term stock valuation, while firms increase fulfillment of their announced repurchase plans in expansion periods to distribute free cash flows and enhance long-term stock performance.

Our final robustness check is related to the incentive of using repurchase announcements to mislead investors in recession periods (Chan, et al., 2010). We directly compare the characteristics of repurchasing firms and non-repurchasing firms. The results are in Appendix Table 4. As shown, in recession periods, firms that announce repurchase plans are those with higher discretionary accruals but with less undervaluation relative to non-repurchasing firms. This result is consistent with Chan, et al. (2010): In recession, when managers are under higher pressure

of boosting stock valuation, measured by higher discretionary accruals, these firms are more likely to announce repurchase plans to mislead investors, although they may not actually have large undervaluation.

Another two groups of results in previous sections also support this story. First, as shown in Table 7, firms with better governance announce more repurchase plans and also buy back more shares in recession periods. If high quality firms are more likely to use repurchase announcements to signal their undervaluation in recession, they do not need to use costly actual buybacks as an additional signal. Second, as shown in Table 3, the market reaction to repurchase announcements in recession is significantly positive in a short term but insignificant or even negative in a long term. Therefore, the firms that announce repurchase plans in recession periods are not those with strong growth in a long-run future; instead, they are more likely to be firms that utilize repurchase announcements to boost stock valuation in a short term.

## 8. Contribution to the Literature

This section discusses how this study relates to different areas in the repurchase literature and the business cycle literature. We survey 114 studies on share repurchases published in top academic journals.[20]

Categorized by topics, 62 of these papers study repurchase motives. Fifty-two examine various repurchase consequences related to: stock returns (35 papers), stock liquidity (9 papers), and other operating outcomes (22 papers). Thirty-nine studies discuss the relationship between

[20] We survey share repurchases articles published between 1981 and 2020 from *Journal of Finance, Journal of Financial Economics, Review of Financial Studies, Journal of Accounting and Economics, The Accounting Review, Journal of Accounting Research, Management Science, Journal of Financial and Quantitative Analysis, Review of Finance,* and *Journal of Business*. We have made utmost endeavors to ensure the survey's comprehensiveness; however, we acknowledge that it is likely incomplete despite our diligent efforts. The comprehensive list of papers surveyed can be found in the online appendix. We have omitted papers that primarily focus on dividend payments or payout policies in general, without specifically addressing share repurchases.

repurchases and cash dividends (33 papers) or capital structure (6 papers). In addition, there are 7 papers on repurchase prices, 17 papers on repurchase completion rates, 18 papers on tender offer repurchases, 12 papers on repurchase regulations, and 5 papers on repurchase waves over time. Among all 114 studies, 93 use U.S. data, and only 10 studies use non-U.S. or international data.[21] In terms of repurchase databases, 48 use SDC, 74 use Compustat, 26 use the Wall Street Journal, 8 use SEC filings, and 4 use Worldscope. We summarize these papers in our Online Appendix C. By introducing S&P GMI, a unique dataset that covers details of repurchase cases over the globe, we make contributions in several ways.

First, we show significant variations in repurchase patterns over the business cycle. This finding is closely related to the literature on repurchase motives, repurchase consequences, repurchase waves, and the relation of repurchases to stock returns or completion rates. We show that even the same firms may have different repurchase motives in expansion and in recession periods. In general, repurchases in expansion periods are more likely to be driven by the flexibility motive (Jagannathan, Stephens, and Weisbach, 2000) or the substitution motive (Grullon and Michaely, 2002). Repurchases in recession periods are more likely to be driven by the incentive to mislead investors and to increase stock valuation (Ikenberry, Lakonishok, and Vermaelen, 1995; D'Mello and Shroff, 2000; Chan et al., 2010).

Related to studies on the repurchase-stock return relation, we show that stock market reactions to repurchase announcements differ in expansion and in recession periods. Ikenberry, Lakonishok, and Vermaelen (1995) find a long-term positive abnormal return around repurchase announcements, while we find that this long-term reaction is only positive in expansion periods.[22]

[21] The other 11 papers are theoretical or survey studies.
[22] Table 3 Panel A shows that this reaction is on average negative for repurchases in recession periods.

Vermaelen (1981) finds a short-term positive abnormal return around repurchase announcements; we find that this short-term effect is more positive in recession periods.

Our findings are related to a handful of studies on repurchase waves. For instance, Bolton, Chen, and Wang (2013) develop a unified dynamic q-theoretic framework and find that firms do more equity issuances in good times and that repurchase waves are positively related to equity issuance. Utilizing U.S. data, Dittmar and Dittmar (2008) show that during periods with high GDP growth, there are more share repurchases. Our finding that firms repurchase more in expansion periods is consistent with these studies.

By examining the relation between repurchase patterns and the business cycle, our second contribution is to the business cycle literature. Previous scholars have observed that economic expansion is associated with increases in various corporate activities, such as firms' capital growth rate (Dangl and Wu, 2016), investment (Jovanovic and Rousseau, 2014), innovation activities (Geroski and Walters, 1995), consumption risk sharing (Hoffmann and Shcherbakova-Stewen, 2011), equity issuance (Korajczyk and Levy, 2003; Covas and Den Haan, 2011), capital reallocation and the price of used capital (Lanteri, 2018), debt retirement for small firms (Begenau and Salomao, 2019), and net flow of funds to shareholders for large firms (Begenau and Salomao, 2019). Many other studies also examine how the business cycle influences noncorporate decisions (for example, see Challe and Ragot (2016) for households' precautionary savings). However, the potential impact of the business cycle on share repurchases remains largely unexplored.

One exception is Dittmar and Dittmar's (2008), who document the procyclicality of U.S. firms' repurchase value. We differ from their analysis in several ways. First, Dittmar and Dittmar's (2008) study does not examine detailed repurchase behaviors at the case-level. Therefore, our study expands upon the existing literature by analyzing more case-level details and repurchase

motivations over the business cycle. Second, compared to analyses limited to single countries, we use international data so that the business cycle, our main variable of interest, exhibits both cross-sectional and time-series variations.

Given our use of international data, the third contribution of our research is that we extend country coverage of repurchase studies, especially at the case-level. Among the 114 studies we surveyed, only ten cover non-U.S. data. Among them, six studies cover two or more non-U.S. countries, including five articles that mainly rely on Worldscope (Wang, Yin, and Yu, 2021; Manconi, Peyer, and Vermaelen, 2019; Becker, Jacob, and Jacob, 2013; Jacob and Jacob, 2013; Lee and Suh, 2011) and Von Eije and Megginson (2008), which covers firms in the European Union. Another four studies use single non-U.S. market data, including Young and Yang (2011) and Rau and Vermaelen (2002), which use UK data; Brockman and Chung (2001), which uses Hong Kong data to discuss the relation between actual repurchases and stock liquidity; and Ikenberry, Lakonishok, and Vermaelen (2000), which analyzes repurchases in Canada. None of this work includes in-depth investigation of different repurchase details, such as completion rate and duration, using an international dataset. We thus enrich the analysis of repurchase case details using a novel repurchase database, S&P GMI, which contain detailed information such as announced repurchase size and completion rate of global repurchase cases across 21 countries or regions.[23] This dataset provides broader coverage of non-US cases than SDC, and allows us to examine variations in repurchase patterns over the business cycle worldwide.

[23] Although some studies have examined completion rates (Stephens and Weisbach, 1998) of repurchase announcements, they rely primarily on U.S. data from SDC. The S&P GMI database covers 21 countries or regions including the U.S.; the repurchase cases announced by non-U.S. firms account for over 50% of our sample. This stands in sharp contrast to existing studies that cover a relatively small number of non-U.S. cases. For example, Manconi, Peyer, and Vermaelen (2019) use SDC data and have 9,034 non-U.S. firms' observations from 31 markets, while we use S&P GMI data that contain 40,191 non-U.S. observations. Additionally, the measure of completion rates in S&P GMI is strictly associated with each repurchase case, which differs from previous studies that measure repurchases using purchase of common and preferred stock minus any decrease in redeemable preferred stock (Banyi, Dyl, and Kahle, 2008), any increase in treasury stock (e.g., Bonaimé, 2012), or decrease in shares outstanding (Stephens and Weisbach, 1998). All of these alternative measures may underestimate completion rates because they are calculated from annual or quarterly reports in Compustat or stock information in CRSP. As a result, the amount repurchased

## 9. Conclusion

Relying on a new and comprehensive database that contains detailed information of global repurchase cases, this study investigates how repurchase patterns vary over a fundamental economic time factor—the business cycle. We find that firms repurchase stocks for different purposes under different economic conditions.

In economic recession periods, firms announce repurchase plans to quickly bring up stock prices; therefore, their repurchase announcements are accompanied with higher short-term stock returns and lower completion rates. In expansion periods, firms repurchase to distribute excess cash; their announcements are followed by higher long-term returns and higher completion rates, which is consistent with the predictions of the substitution and flexibility theories. These findings suggest that firms utilize uncommitted repurchase announcements to signal to the market that their shares are undervalued and to boost stock valuation in recession periods. The extent to which firms engage in such strategies is influenced by their financial constraints, the level of analyst coverage, the presence of cash flow shocks, and the role of institutional investors.

Our findings have political implications in terms of repurchase regulations. An effective repurchase policy should incentivize firms to use repurchase plans for long-term benefits. For example, by imposing restrictions on the completion rate or repurchase type, regulators may be able to guarantee that firms do return enough extra profits to their shareholders using repurchase plans. Given that firms may use repurchase plans only for the sake of boosting short-term stock prices in recession periods, regulators might want to limit the usage of repurchase announcements in an economic downturn to avoid such short-sighted behavior.

---

may be associated with multiple repurchase cases, and summarizing the amount repurchased over a specific time period may overlook the scenario in which a repurchase case has a very long duration.

## Reference


Bagwell, L. S. (1991). Share repurchase and takeover deterrence. *Rand Journal of Economics*, 22(1), 72-88.

Banyi, M. L., Dyl, E. A., & Kahle, K. M. (2008). Errors in estimating share repurchases. *Journal of Corporate Finance*, 14(4), 460-474.

Bargeron, L., Bonaime, A., & Thomas, S. (2017). The timing and source of long-run returns following repurchases. *Journal of Financial and Quantitative Analysis*, 52(2), 491-517.

Becker, B., Jacob, M., & Jacob, M. (2013). Payout taxes and the allocation of investment. *Journal of Financial Economics*, 107(1), 1-24.

Begenau, J., & Salomao, J. (2019). Firm financing over the business cycle. *Review of Financial Studies*, 32(4), 1235-1274.

Bhattacharya, U., & E. Jacobsen, S. (2016). The share repurchase announcement puzzle: Theory and evidence. *Review of Finance*, 20(2), 725-758.

Bianchi, F., Ilut, C. L., & Schneider, M. (2018). Uncertainty shocks, asset supply and pricing over the business cycle. *Review of Economic Studies*, 85(2), 810-854.

Bolton, P., Chen, H., & Wang, N. (2013). Market timing, investment, and risk management. *Journal of Financial Economics*, 109(1), 40-62.

Bonaimé, A. A. (2012). Repurchases, reputation, and returns. *Journal of Financial and Quantitative Analysis*, 47(2), 469-491.

Brav, A., Graham, J. R., Harvey, C. R., & Michaely, R. (2005). Payout policy in the 21st century. *Journal of Financial Economics*, 77(3), 483-527.

Brockman, P., & Chung, D. Y. (2001). Managerial timing and corporate liquidity: Evidence from actual share repurchases. *Journal of Financial Economics*, 61(3), 417-448.

Carey, C., & Shore, S. H. (2013). From the peaks to the valleys: Cross-state evidence on income volatility over the business cycle. *Review of Economics and Statistics*, 95(2), 549-562.

Challe, E., & Ragot, X. (2016). Precautionary saving over the business cycle. *Economic Journal*, 126(590), 135-164.

Chan, K., Ikenberry, D. L., Lee, I., & Wang, Y. (2010). Share repurchases as a potential tool to mislead investors. *Journal of Corporate Finance*, 16(2), 137-158.

Chen, H., Cui, R., He, Z., & Milbradt, K. (2018). Quantifying liquidity and default risks of corporate bonds over the business cycle. *Review of Financial Studies*, 31(3), 852-897.

Comment, R., & Jarrell, G. A. (1991). The relative signalling power of Dutch-auction and fixed-price self-tender offers and open-market share repurchases. *Journal of Finance*, 46(4), 1243-1271.

Covas, F., & Den Haan, W. J. (2011). The cyclical behavior of debt and equity finance. *American Economic Review*, 101(2), 877-899.

Covas, F., & Den Haan, W. J. (2012). The role of debt and equity finance over the business cycle. *Economic Journal*, 122(565), 1262-1286.

D'mello, R., & Shroff, P. K. (2000). Equity undervaluation and decisions related to repurchase tender offers: An empirical investigation. *Journal of Finance*, 55(5), 2399-2424.

Dangl, T., & Wu, Y. (2016). Corporate investment over the business cycle. *Review of Finance*, 20(1), 337-371.

DeAngelo, H., DeAngelo, L., & Skinner, D. J. (2009). Corporate payout policy. *Foundations and Trends in Finance*, 3(2-3), 95-287.

DeStefano, M. (2004). Stock returns and the business cycle. *Financial Review*, 39(4), 527-547.

Dittmar, A. K. (2000). Why do firms repurchase stock. *Journal of Business*, 73(3), 331-355.

Dittmar, A. K., & Dittmar, R. F. (2008). The timing of financing decisions: An examination of the correlation in financing waves. *Journal of Financial Economics*, 90(1), 59-83.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 33(1), 3-56.

Fama, E. F., & French, K. R. (2012). Size, value, and momentum in international stock returns. *Journal of Financial Economics*, 105(3), 457-472.

Fenn, G. W., & Liang, N. (2001). Corporate payout policy and managerial stock incentives. *Journal of Financial Economics*, 60(1), 45-72.

Fischer, S., & Merton, R. C. (1984). Macroeconomics and finance: The role of the stock market. *Carnegie-Rochester Conference Series on Public Policy*, 21, 57-108.

Geroski, P. A., & Walters, C. F. (1995). Innovative activity over the business cycle. *Economic Journal*, 105(431), 916-928.

Graetz, G., & Michaels, G. (2017). Is modern technology responsible for jobless recoveries?. *American Economic Review*, 107(5), 168-173.

Grullon, G., & Michaely, R. (2002). Dividends, share repurchases, and the substitution hypothesis. *Journal of Finance*, 57(4), 1649-1684.

Guay, W., & Harford, J. (2000). The cash-flow permanence and information content of dividend increases versus repurchases. *Journal of Financial Economics*, 57(3), 385-415.

Halling, M., Yu, J., & Zechner, J. (2016). Leverage dynamics over the business cycle. *Journal of Financial Economics*, 122(1), 21-41.

Harford, J. (2005). What drives merger waves?. *Journal of Financial Economics*, 77(3), 529-560.

Hawtrey, R. G. (1923). *Currency and Credit*. Longmans Green.

He, P. (2007). A theory of IPO waves. *Review of Financial Studies*, 20(4), 983-1020.

Henkel, S. J., Martin, J. S., & Nardari, F. (2011). Time-varying short-horizon predictability. *Journal of Financial Economics*, 99(3), 560-580.

Hillert, A., Maug, E., & Obernberger, S. (2016). Stock repurchases and liquidity. *Journal of Financial Economics*, 119(1), 186-209.

Hoffmann, M., & Shcherbakova-Stewen, I. (2011). Consumption risk sharing over the business cycle: The role of small firms' access to credit markets. *Review of Economics and Statistics*, 93(4), 1403-1416.

Hong, H., Wang, J., & Yu, J. (2008). Firms as buyers of last resort. *Journal of Financial Economics*, 88(1), 119-145.

Ikenberry, D., Lakonishok, J., & Vermaelen, T. (1995). Market underreaction to open market share repurchases. *Journal of Financial Economics*, 39(2-3), 181-208.

Ikenberry, D., Lakonishok, J., & Vermaelen, T. (2000). Stock repurchases in Canada: Performance and strategic trading. *Journal of Finance*, 55(5), 2373-2397.

Jacob, M., & Jacob, M. (2013). Taxation, dividends, and share repurchases: Taking evidence global. *Journal of Financial and Quantitative Analysis*, 48(4), 1241-1269.

Jagannathan, M., Stephens, C. P., & Weisbach, M. S. (2000). Financial flexibility and the choice between dividends and stock repurchases. *Journal of Financial Economics*, 57(3), 355-384.

Jens, C. E. (2017). Political uncertainty and investment: Causal evidence from US gubernatorial elections. *Journal of Financial Economics*, 124(3), 563-579.

Jovanovic, B., & Rousseau, P. L. (2014). Extensive and intensive investment over the business cycle. *Journal of Political Economy*, 122(4), 863-908.

Kahle, K. M. (2002). When a buyback isn'ta buyback: Open market repurchases and employee options. *Journal of Financial Economics*, 63(2), 235-261.

Kaniel, R., Ozoguz, A., & Starks, L. (2012). The high volume return premium: Cross-country evidence. *Journal of Financial Economics*, 103(2), 255-279.

Kaplan, S. N., & Zingales, L. (1997). Do investment-cash flow sensitivities provide useful measures of financing constraints?. *Quarterly Journal of Economics*, 112(1), 169-215.

Keynes, J. M. (1936). *The General Theory of Employment, Interest and Money*. Palgrave Macmillan.

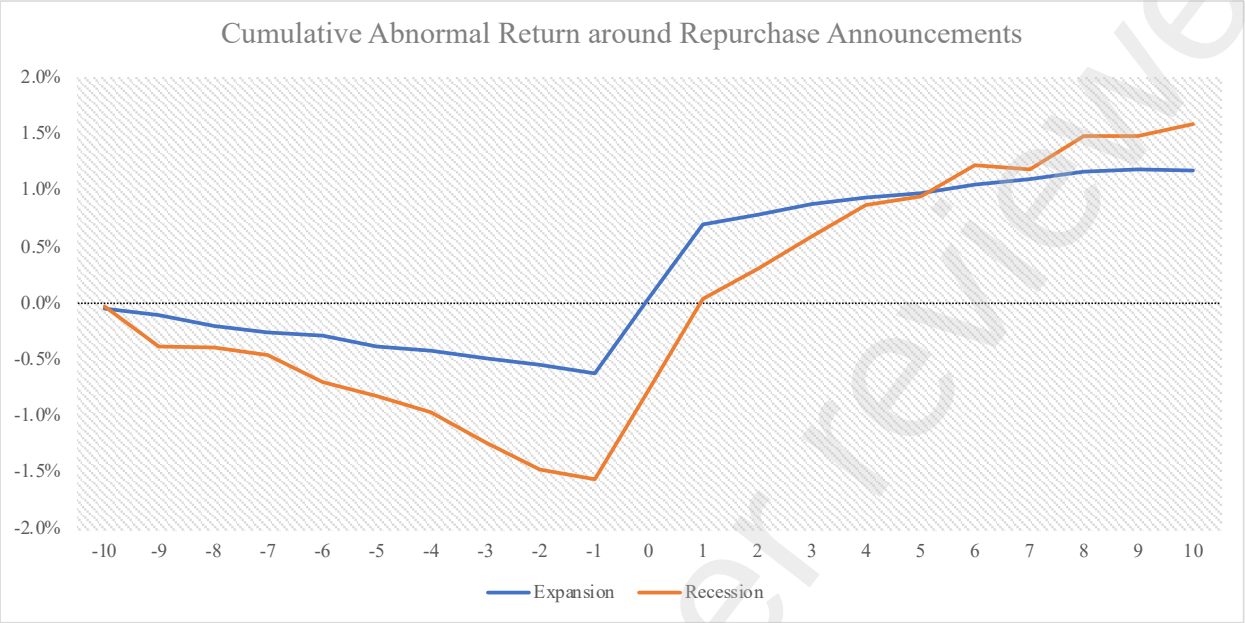
Koellinger, P. D., & Roy Thurik, A. (2012). Entrepreneurship and the business cycle. *Review of Economics and Statistics*, 94(4), 1143-1156.

Korajczyk, R. A., & Levy, A. (2003). Capital structure choice: Macroeconomic conditions and financial constraints. *Journal of Financial Economics*, 68(1), 75-109.

Lakonishok, J., & Vermaelen, T. (1990). Anomalous price behavior around repurchase tender offers. *Journal of Finance*, 45(2), 455-477.

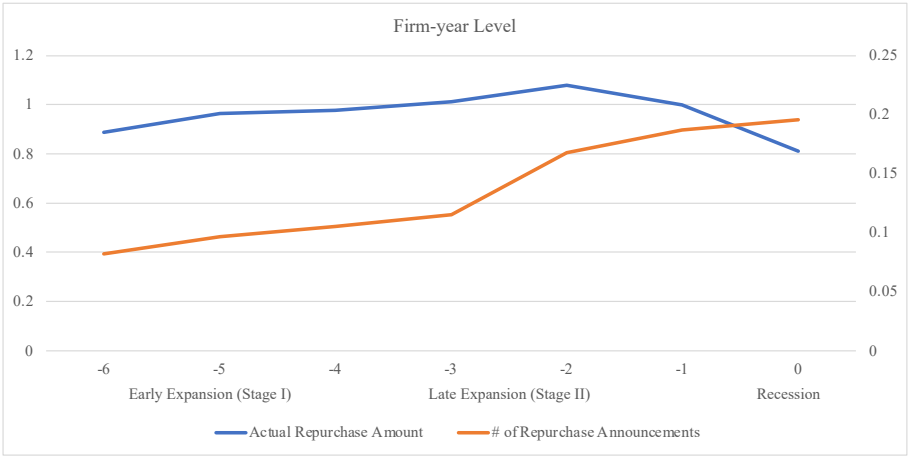
Lanteri, A. (2018). The market for used capital: Endogenous irreversibility and reallocation over the business cycle. *American Economic Review*, 108(9), 2383-2419.
Lee, B. S., & Rui, O. M. (2007). Time-series behavior of share repurchases and dividends. *Journal of Financial and Quantitative Analysis*, 42(1), 119-142.
Lee, B. S., & Suh, J. (2011). Cash holdings and share repurchases: International evidence. *Journal of Corporate Finance*, 17(5), 1306-1329.
Lie, E. (2002). Do firms undertake self-tender offers to optimize capital structure?. *Journal of Business*, 75(4), 609-639.
Lintner, J. (1956). Distribution of incomes of corporations among dividends, retained earnings, and taxes. *American Economic Review*, 46(2), 97-113.
Lucas Jr, R. E. (1975). An equilibrium model of the business cycle. *Journal of Political Economy*, 83(6), 1113-1144.
Maksimovic, V., Phillips, G., & Yang, L. (2013). Private and public merger waves. *Journal of Finance*, 68(5), 2177-2217.
Manconi, A., Peyer, U., & Vermaelen, T. (2019). Are buybacks good for long-term shareholder value? Evidence from buybacks around the world. *Journal of Financial and Quantitative Analysis*, 54(5), 1899-1935.
McLean, R. D., & Zhao, M. (2014). The business cycle, investor sentiment, and costly external finance. *Journal of Finance*, 69(3), 1377-1409.
Morley, J., & Piger, J. (2012). The asymmetric business cycle. *Review of Economics and Statistics*, 94(1), 208-221.
Moser, W. J. (2007). The effect of shareholder taxes on corporate payout choice. *Journal of Financial and Quantitative Analysis*, 42(4), 991-1019.
Pástor, Ľ., & Veronesi, P. (2005). Rational IPO waves. *Journal of Finance*, 60(4), 1713-1757.
Peyer, U., & Vermaelen, T. (2009). The nature and persistence of buyback anomalies. *Review of Financial Studies*, 22(4), 1693-1745.
Rau, P. R., & Vermaelen, T. (2002). Regulation, taxes, and share repurchases in the United Kingdom. *Journal of Business*, 75(2), 245-282.
Ritschl, A., Sarferaz, S., & Uebele, M. (2016). The US business cycle, 1867–2006: A dynamic factor approach. *Review of Economics and Statistics*, 98(1), 159-172.
Schumpeter, J. A. (1939). *Business Cycles*. New York Mcgraw-Hill.
Shore, S. H. (2010). For better, for worse: Intrahousehold risk-sharing over the business cycle. *Review of Economics and Statistics*, 92(3), 536-548.
Sims, E., & Wolff, J. (2018). The output and welfare effects of government spending shocks over the business cycle. *International Economic Review*, 59(3), 1403-1435.
Skinner, D. J. (2008). The evolving relation between earnings, dividends, and stock repurchases. *Journal of Financial Economics*, 87(3), 582-609.
Stephens, C. P., & Weisbach, M. S. (1998). Actual share reacquisitions in open-market repurchase programs. *Journal of Finance*, 53(1), 313-333.
Stevenson, B., & Wolfers, J. (2011). Trust in public institutions over the business cycle. *American Economic Review*, 101(3), 281-287.
Vermaelen, T. (1981). Common stock repurchases and market signalling: An empirical study. *Journal of Financial Economics*, 9(2), 139-183.
Von Eije, H., & Megginson, W. L. (2008). Dividends and share repurchases in the European Union. *Journal of Financial Economics*, 89(2), 347-374.
Wang, Z., Yin, Q. E., & Yu, L. (2021). Real effects of share repurchases legalization on corporate behaviors. *Journal of Financial Economics*, 140(1), 197-219.
Young, S., & Yang, J. (2011). Stock repurchases and executive compensation contract design: The role of earnings per share performance conditions. *The Accounting Review*, 86(2), 703-733.
Yu, F. F. (2008). Analyst coverage and earnings management. *Journal of Financial Economics*, 88(2), 245-271.
Zetlin-Jones, A., & Shourideh, A. (2017). External financing and the role of financial frictions over the business cycle: Measurement and theory. *Journal of Monetary Economics*, 92, 1-15.

**Figure 1. Market Reaction to Repurchase Announcements**

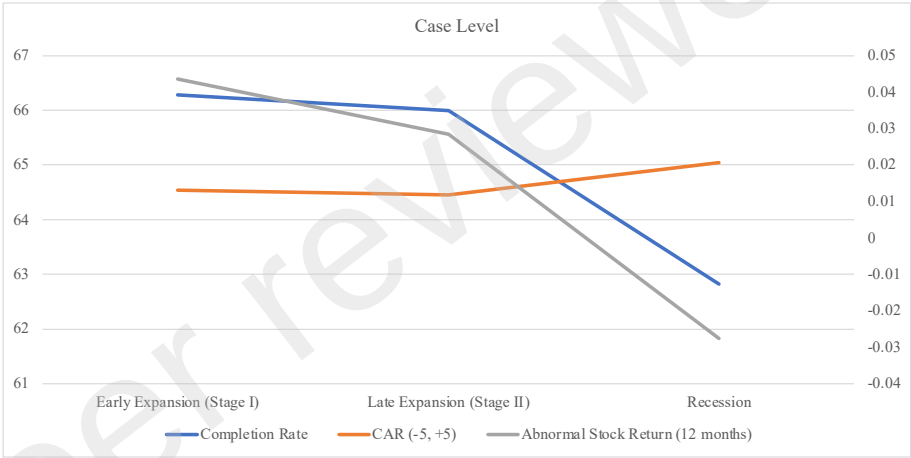



Note: This figure presents cumulative abnormal returns (CARs) using the market-adjusted model around repurchase announcements. The stock data is obtained from WRDS Daily Event Analytics. The blue bars represent the CAR of repurchase announcements in the expansion periods, and the orange bars represent the CAR of repurchase announcements in the recession periods.

**Figure 2. Payout in Recessions and Early/Late Expansions**




(a). Firm-year Level Repurchase Behaviors




(b). Case Level Repurchase Details and Announcement Returns

Note: The ECRI defines periods of recession and expansion by publishing peak and trough months in economic activity. Periods of expansion begin at the trough month and end at the peak month, and periods of recession begin at the peak month and end at the trough month. In this analysis, these dates are used to separate the business cycle into four stages (DeStefano, 2004). Stage I, which is interpreted as early expansion, begins at the trough month and continues through one-half of the expansionary period. Stage II, late expansion, consists of the second half of the expansionary period and concludes at the peak month. Recessions are dissected into Stages III and IV, which, with similar reasoning, are interpreted as early decline and late decline, respectively. It should be noted that the ECRI only defines peak and trough months and does not define the months that separate Stages I and II and Stages III and IV. Again, it is assumed that these months occur in the chronological middle of the trough-to-peak and peak-to-trough periods. The purpose of the stages is simply to break expansions and recessions into early and late segments so that payout patterns between stages can be analyzed. On average, one expansion period lasts for 6.5 years (Stage I/II sustains 3 years and 3 months). One recession period lasts for 16 months (Stage III/IV sustains 8 months). Since recession periods are too short to break, we compare the payout patterns in recessions with payout patterns in early (Stage I) and late expansions (Stage II).

## Table 1. Summary Statistics

This table presents descriptive statistics for the main sample. The numbers of observations for different variables and different tables vary slightly because some variables are not available. All variables are defined in Appendix Table 1.

| | Obs | Mean | Std Dev | 25% | Median | 75% |
|---|---|---|---|---|---|---|
| **Dependent Variables** | | | | | | |
| # of Market Repurchases | 31,649 | 0.19 | 0.43 | 0 | 0 | 0 |
| # of Repurchase Announcements | 31,649 | 0.19 | 0.45 | 0 | 0 | 0 |
| # of Tender Offers | 31,649 | 0.01 | 0.07 | 0 | 0 | 0 |
| Abnormal Stock Return (3 months) | 7,364 | 0.01 | 0.18 | -0.09 | 0.00 | 0.09 |
| Abnormal Stock Return (6 months) | 7,364 | 0.01 | 0.27 | -0.13 | 0.00 | 0.13 |
| Abnormal Stock Return (12 months) | 7,364 | 0.03 | 0.41 | -0.20 | -0.01 | 0.20 |
| Actual Dividend Amount | 74,404 | 1.17 | 2.30 | 0 | 0.33 | 1.28 |
| Actual Repurchase Amount | 54,124 | 0.90 | 2.67 | 0 | 0 | 0.14 |
| CAR (-1, +1) | 7,637 | 0.01 | 0.07 | -0.02 | 0.01 | 0.04 |
| CAR (-2, +2) | 7,637 | 0.01 | 0.08 | -0.02 | 0.01 | 0.05 |
| CAR (-5, +5) | 7,637 | 0.01 | 0.10 | -0.03 | 0.01 | 0.06 |
| Completion Rate | 15,490 | 65.5 | 37.4 | 32.9 | 81.4 | 100 |
| Planned Percentage Sought in Repurchase Announcements | 18,179 | 7.20 | 5.51 | 2.58 | 6.40 | 10 |
| Repurchase Proportion | 48,472 | 22.6 | 37.5 | 0 | 0 | 36.8 |
| **Independent Variables** | | | | | | |
| Analyst Coverage | 45,399 | 5.87 | 6.03 | 1.33 | 3.5 | 8.17 |
| Cash Flow Shock | 55,571 | 1.46 | 53.3 | -4.34 | 0.10 | 4.83 |
| Expansion | 79,103 | 0.47 | 0.50 | 0 | 0 | 1 |
| Institutional Ownership | 30,932 | 0.22 | 0.30 | 0.01 | 0.07 | 0.33 |
| KZ Index | 63,513 | -1.83 | 6.35 | -1.87 | 0.16 | 1.41 |
| Recession | 79,103 | 0.53 | 0.50 | 0 | 1 | 1 |
| Recession (GDP Measure) | 114,277 | 0.51 | 0.50 | 0 | 1 | 1 |
| **Control Variables** | | | | | | |
| Cash Flow Volatility | 79,103 | 14.6 | 46.7 | 1.61 | 3.30 | 7.71 |
| Leverage | 79,103 | 27.7 | 41.3 | 4.04 | 19.9 | 37.0 |
| Liquidity | 79,103 | 2.58 | 3.95 | 1.06 | 1.56 | 2.55 |
| Market Share | 79,103 | 1.24 | 6.00 | 0.01 | 0.05 | 0.30 |
| Market-to-Book Ratio | 79,103 | 2.02 | 5.99 | 0.37 | 0.73 | 1.51 |
| ROA | 79,103 | -5.95 | 26.0 | -3.27 | 2.05 | 5.80 |
| Sales Growth | 79,103 | 23.7 | 96.6 | -2.07 | 6.28 | 20.0 |
| Tangibility | 79,103 | 28.0 | 22.4 | 9.07 | 23.4 | 41.6 |
| Total Assets | 79,103 | 19.1 | 2.41 | 17.8 | 19.2 | 20.6 |

## Table 2. Payout over the Business Cycle: Baseline Regressions

This table presents firm-year level regressions of firm repurchase and dividend behaviors over the business cycle. The sample is restricted to two years around the start of a recession. The dependent variables are payout measures (*Actual Repurchase Amount*, *Actual Dividend Amount,* and *Repurchase Proportion*) and the number of repurchase announcements (*# of Repurchase Announcements, # of Market Repurchases,* and *# of Tender Offers*). The independent variable of interest is ***Recession***, which equals one in the first year of a recession and equals zero in the year before a recession; a recession is defined as a year with six or more months of recession according to peak and trough dates using the business cycle data from ECRI. The control variables include *Total Assets, Leverage, ROA, Market-to-Book Ratio, Tangibility, Liquidity, Sales Growth, Cash Flow Volatility*, and *Market Share*. All variables are defined in Appendix Table 1. Firm fixed effects and industry-year fixed effects are controlled in all columns. The p-values clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Actual Repurchase Amount | Actual Dividend Amount | Repurchase Proportion | # of Repurchase Announcements | # of Market Repurchases | # of Tender Offers |
| Recession | -0.121** | -0.0368 | -1.591** | 0.0648 | 0.0693* | -0.00451** |
| | (0.02) | (0.62) | (0.04) | (0.10) | (0.08) | (0.04) |
| Total Assets | 0.112** | -0.0562** | -1.049** | 0.0648*** | 0.0658*** | -0.00103 |
| | (0.02) | (0.02) | (0.03) | (0.00) | (0.00) | (0.35) |
| Leverage | -0.00111** | -0.00246*** | -0.0308 | -0.000543** | -0.000551*** | 8.42e-06 |
| | (0.01) | (0.00) | (0.16) | (0.01) | (0.00) | (0.91) |
| ROA | 0.00965*** | 0.00883*** | -0.0169 | 0.000933*** | 0.000971*** | -3.83e-05 |
| | (0.00) | (0.00) | (0.73) | (0.00) | (0.00) | (0.67) |
| Market-to-Book Ratio | 0.0104 | 0.0155*** | -0.0455 | 0.00104 | 0.000948 | 9.50e-05 |
| | (0.20) | (0.00) | (0.60) | (0.47) | (0.49) | (0.71) |
| Tangibility | -0.00554* | -0.00347** | -0.0405 | -0.000975** | -0.000928* | -4.73e-05 |
| | (0.07) | (0.05) | (0.16) | (0.04) | (0.06) | (0.47) |
| Liquidity | 0.0127 | 0.0106 | 0.0910 | 0.00215 | 0.00193 | 0.000219 |
| | (0.15) | (0.26) | (0.57) | (0.21) | (0.23) | (0.32) |
| Sales Growth | -0.000559** | -0.000290*** | 0.00350 | -0.000187*** | -0.000157*** | -3.02e-05** |
| | (0.02) | (0.00) | (0.35) | (0.00) | (0.00) | (0.03) |
| Cash Flow Volatility | -1.79e-05 | -0.000269 | 0.0822** | 6.57e-06 | 0.000111 | -0.000105 |
| | (0.98) | (0.54) | (0.04) | (0.98) | (0.68) | (0.17) |
| Market Share | 0.0130** | 0.00278 | 0.105 | 0.00101 | 0.000596 | 0.000416 |
| | (0.03) | (0.63) | (0.17) | (0.37) | (0.59) | (0.11) |
| Constant | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry-Year Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| Cluster at Country-Industry Level | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 54,124 | 74,404 | 48,472 | 31,649 | 31,649 | 31,649 |
| R-squared | 0.570 | 0.782 | 0.799 | 0.469 | 0.471 | 0.333 |

## Table 3. Repurchase Details and Announcement Returns over the Business Cycle

This table examines firms' repurchase details and announcement returns over the business cycle. The sample is restricted to two years around the start of a recession. The dependent variables are characteristics of repurchase cases (*Planned Percentage Sought in Repurchase Announcements* and *Completion Rate*), short-term market reaction measures (*CAR (-1, +1)*, *CAR (-2, +2)*, and *CAR (-5, +5)*, and long-term market reaction measures (*Abnormal Stock Return (3 months)*, *Abnormal Stock Return (6 months)*, and *Abnormal Stock Return (12 months)*. Panel A shows the t-test results of different short-term CARs and long-term abnormal stock returns around repurchase announcements in expansion and recession periods. Panel B presents the results of case-level regressions. The independent variable of interest is ***Recession***, which equals one if the repurchase case is announced in the ECRI peak-to-trough months and equals zero otherwise. The control variables include *Total Assets, Leverage, ROA, Market-to-Book Ratio, Tangibility, Liquidity, Sales Growth, Cash Flow Volatility*, and *Market Share*. All variables are defined in Appendix Table 1. Firm fixed effects and industry-year fixed effects are controlled in all columns. The p-values clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

**Panel A**. T-tests

| | Expansion | | | Recession | | | diff | t-Stat |
|---|---|---|---|---|---|---|---|---|
| | Obs | Mean | t-Stat | Obs | Mean | t-Stat | | |
| CAR (-1, +1) | 9,743 | 1.14% | 18.36*** | 1,438 | 1.61% | 6.84*** | -0.47% | -2.52** |
| CAR (-2, +2) | 9,743 | 1.14% | 16.71*** | 1,438 | 1.78% | 6.42*** | -0.63% | -2.65*** |
| CAR (-5, +5) | 9,743 | 1.12% | 13.40*** | 1,438 | 2.22% | 5.94*** | -1.10% | -4.21*** |
| Abnormal Stock Return (3 months) | 9,280 | 0.75% | 4.84*** | 1,352 | -0.76% | -1.13 | 1.51% | 3.15*** |
| Abnormal Stock Return (6 months) | 9,280 | 1.13% | 4.82*** | 1,352 | -2.52% | -2.56** | 3.65% | 5.07*** |
| Abnormal Stock Return (12 months) | 9,280 | 1.95% | 5.51*** | 1,352 | -4.64% | -2.88*** | 6.59% | 5.92*** |

**Panel B**. Case-level analysis

| | (1) Planned Percentage Sought in Repurchase Announcements | (2) Completion Rate | (3) CAR (-1, +1) | (4) CAR (-2, +2) | (5) CAR (-5, +5) | (6) Abnormal Stock Return (3 months) | (7) Abnormal Stock Return (6 months) | (8) Abnormal Stock Return (12 months) |
|---|---|---|---|---|---|---|---|---|
| Recession | -0.196** | -2.476** | 0.0172*** | 0.0158** | 0.0236** | -0.0667** | -0.120*** | -0.125* |
| | (0.01) | (0.02) | (0.01) | (0.04) | (0.02) | (0.02) | (0.00) | (0.09) |
| Total Assets | -0.241* | -1.521 | -0.00565* | -0.00965*** | -0.0135*** | -0.0293*** | -0.0716*** | -0.176*** |
| | (0.08) | (0.26) | (0.06) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Leverage | -0.000791 | -0.156*** | -0.000126** | -0.000182** | -0.000191* | 0.000160 | 0.000476 | 0.00105 |
| | (0.82) | (0.00) | (0.04) | (0.04) | (0.06) | (0.67) | (0.30) | (0.12) |
| ROA | -0.00721 | 0.321*** | -6.26e-05 | 0.000118 | -0.000112 | 0.00103* | 0.000756 | 6.08e-05 |
| | (0.15) | (0.00) | (0.66) | (0.33) | (0.62) | (0.06) | (0.27) | (0.95) |
| Market-to-Book Ratio | -0.0843** | -0.124 | 0.00256*** | 0.00263** | 0.00411*** | 0.0181*** | 0.0286*** | 0.0113 |
| | (0.01) | (0.83) | (0.01) | (0.04) | (0.00) | (0.00) | (0.00) | (0.20) |
| Tangibility | 0.00561 | -0.193*** | -0.000242 | -0.000200 | -0.000382 | -0.00126 | -0.00197** | -0.00212 |
| | (0.20) | (0.00) | (0.27) | (0.27) | (0.11) | (0.21) | (0.02) | (0.22) |
| Liquidity | 0.0148 | 0.615** | 0.000195 | 0.000318 | -0.000501 | -0.00159 | -0.000378 | -0.00985** |
| | (0.46) | (0.02) | (0.67) | (0.74) | (0.72) | (0.19) | (0.87) | (0.03) |
| Sales Growth | 0.000160 | 0.00369 | 9.83e-05** | 7.09e-05 | 2.42e-06 | 0.000341 | 0.000322 | -0.000205 |
| | (0.75) | (0.73) | (0.04) | (0.16) | (0.96) | (0.15) | (0.10) | (0.47) |
| Cash Flow Volatility | -0.000696 | -0.0536 | -6.18e-05 | -0.000322* | -0.000546*** | 0.00140*** | 0.000918 | 0.000717 |
| | (0.86) | (0.49) | (0.76) | (0.07) | (0.00) | (0.00) | (0.11) | (0.44) |
| Market Share | -0.0153 | 0.156 | -0.000903*** | -0.00128*** | -0.00193*** | -0.000185 | 0.000775 | 0.00127 |
| | (0.40) | (0.73) | (0.01) | (0.00) | (0.00) | (0.80) | (0.58) | (0.35) |
| Constant | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm Dummy | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry-Year Dummy | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cluster at Country-Industry Level | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 18,179 | 15,490 | 7,637 | 7,637 | 7,637 | 7,364 | 7,364 | 7,364 |
| R-squared | 0.869 | 0.705 | 0.502 | 0.517 | 0.527 | 0.472 | 0.489 | 0.530 |

## Table 4. Payout over the Business Cycle: By Financial Constraints

This table presents how firms' financial constraint affects payout behaviors over the business cycle. Columns (1) - (2) present the results of firm-year level analyses with *Actual Repurchase Amount* and *# of Repurchase Announcements* as the dependent variables, and the sample is restricted to two years around the start of a recession. Columns (3) - (5) present the results of case level analyses with *Completion Rate, CAR (-5, +5),* and *Abnormal Stock Return (12 months)* as the dependent variables. The independent variables of interest are ***Recession*** and its interaction with *KZ Index*. In firm-year level analyses, *Recession* equals one in the first year of a recession and equals zero in the year before a recession. In case level analyses, *Recession* equals one if the repurchase case is announced in the ECRI peak-to-trough months and equals zero otherwise. *KZ Index* is a relative measurement of reliance on external financing following Kaplan and Zingales (1997). The control variables include *Total Assets, Leverage, ROA, Market-to-Book Ratio, Tangibility, Liquidity, Sales Growth, Cash Flow Volatility*, and *Market Share*. All variables are defined in Appendix Table 1. Firm fixed effects and industry-year fixed effects are controlled in all columns. The p-values clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Firm-year Level | | | Case Level | |
| | Actual Repurchase Amount | # of Repurchase Announcements | Completion Rate | CAR (-5, +5) | Abnormal Stock Return (12 months) |
| Recession * KZ Index | -0.00829* | -0.00262** | -0.180** | -0.00261** | -0.0252** |
| | (0.06) | (0.01) | (0.02) | (0.03) | (0.05) |
| Recession | -0.181*** | 0.0645 | -2.682*** | 0.0159 | -0.227** |
| | (0.01) | (0.18) | (0.00) | (0.13) | (0.03) |
| KZ Index | -0.00408 | -0.000851 | -0.146 | 0.000259 | 0.0118*** |
| | (0.51) | (0.47) | (0.14) | (0.49) | (0.00) |
| Total Assets | 0.135*** | 0.0747*** | -2.551* | -0.0156*** | -0.179*** |
| | (0.00) | (0.00) | (0.07) | (0.00) | (0.00) |
| Leverage | -0.00240*** | -0.000730** | -0.151*** | -0.000164 | 0.000523 |
| | (0.00) | (0.02) | (0.00) | (0.11) | (0.22) |
| ROA | 0.0115*** | 0.00104*** | 0.256** | -0.000126 | 0.000639 |
| | (0.00) | (0.00) | (0.03) | (0.60) | (0.37) |
| Market-to-Book Ratio | 0.00371 | 0.000405 | 0.0345 | 0.00436*** | 0.00314 |
| | (0.78) | (0.80) | (0.95) | (0.00) | (0.65) |
| Tangibility | -0.00556* | -0.000701* | -0.192*** | -5.48e-05 | -0.00270 |
| | (0.10) | (0.09) | (0.01) | (0.83) | (0.14) |
| Liquidity | 0.0234* | 0.00152 | 0.458* | 0.000962 | -0.0149*** |
| | (0.08) | (0.47) | (0.07) | (0.51) | (0.00) |
| Sales Growth | -0.000695** | -0.000222*** | 0.0103 | 0.000117 | -0.000127 |
| | (0.03) | (0.00) | (0.29) | (0.18) | (0.65) |
| Cash Flow Volatility | -0.000338 | 2.89e-05 | -0.0517 | -0.000683*** | 0.00179** |
| | (0.59) | (0.94) | (0.52) | (0.00) | (0.03) |
| Market Share | 0.0133* | 0.000644 | 0.135 | -0.00183*** | 0.00168 |
| | (0.05) | (0.59) | (0.78) | (0.00) | (0.19) |
| Constant | Yes | Yes | Yes | Yes | Yes |
| Firm Dummy | Yes | Yes | Yes | Yes | Yes |
| Industry-Year Dummy | Yes | Yes | Yes | Yes | Yes |
| Cluster at Country-Industry Level | Yes | Yes | Yes | Yes | Yes |
| Observations | 46,624 | 28,729 | 14,287 | 6,853 | 6,599 |
| R-squared | 0.584 | 0.487 | 0.714 | 0.559 | 0.562 |

## Table 5. Payout over the Business Cycle: By Analyst Coverage

This table presents how firms' analyst coverage affects payout behaviors over the business cycle. Columns (1) - (2) present the results of firm-year level analyses with *Actual Repurchase Amount* and *# of Repurchase Announcements* as the dependent variables, and the sample is restricted to two years around the start of a recession. Columns (3) - (5) present the results of case level analyses with *Completion Rate, CAR (-5, +5),* and *Abnormal Stock Return (12 months)* as the dependent variables. The independent variables of interest are ***Recession*** and its interaction with *Residual Coverage*. In firm-year level analyses, *Recession* equals one in the first year of a recession and equals zero in the year before a recession. In case level analyses, *Recession* equals one if the repurchase case is announced in the ECRI peak-to-trough months and equals zero otherwise. *Residual Coverage* is the residual from the regression shown in the Appendix following Yu (2008). The control variables include *Total Assets, Leverage, ROA, Market-to-Book Ratio, Tangibility, Liquidity, Sales Growth, Cash Flow Volatility*, and *Market Share*. All variables are defined in Appendix Table 1. Firm fixed effects and industry-year fixed effects are controlled in all columns. The p-values clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Firm-year Level | | | Case Level | |
| | Actual Repurchase Amount | # of Repurchase Announcements | Completion Rate | CAR (-5, +5) | Abnormal Stock Return (12 months) |
| Recession * Residual Coverage | -0.0383*** | -0.00448*** | 0.883** | 0.00213* | 0.00439** |
| | (0.00) | (0.01) | (0.05) | (0.08) | (0.04) |
| Recession | -0.132** | 0.0393 | -3.192** | 0.0223** | -0.145** |
| | (0.02) | (0.32) | (0.03) | (0.04) | (0.02) |
| Residual Coverage | 0.0855*** | 0.00487*** | 0.206 | -0.00101 | -0.0120*** |
| | (0.00) | (0.00) | (0.28) | (0.14) | (0.00) |
| Total Assets | 0.0883 | 0.0498*** | -1.266 | -0.0113** | -0.152*** |
| | (0.15) | (0.00) | (0.38) | (0.04) | (0.00) |
| Leverage | -0.00181*** | -0.000822*** | -0.145*** | -0.000184* | 0.000601 |
| | (0.01) | (0.01) | (0.00) | (0.07) | (0.25) |
| ROA | 0.00885*** | 0.000914*** | 0.422*** | -0.000273 | -0.000241 |
| | (0.00) | (0.00) | (0.00) | (0.20) | (0.81) |
| Market-to-Book Ratio | 0.00779 | -0.00109 | 0.126 | 0.00546** | 0.0157* |
| | (0.30) | (0.57) | (0.78) | (0.01) | (0.09) |
| Tangibility | -0.00554 | -0.000917 | -0.227*** | -0.000244 | -0.00244* |
| | (0.13) | (0.10) | (0.00) | (0.29) | (0.09) |
| Liquidity | 0.00963 | 0.00131 | 0.503* | -0.000235 | -0.0117*** |
| | (0.29) | (0.46) | (0.07) | (0.87) | (0.00) |
| Sales Growth | -0.000498* | -0.000101** | -0.0107 | 2.77e-05 | -0.000450* |
| | (0.06) | (0.02) | (0.33) | (0.65) | (0.09) |
| Cash Flow Volatility | 0.000221 | -5.80e-05 | -0.124 | -0.000512*** | 0.00162* |
| | (0.59) | (0.85) | (0.11) | (0.00) | (0.08) |
| Market Share | 0.00949 | 0.00122 | 0.394 | -0.00195*** | 0.00125 |
| | (0.14) | (0.30) | (0.41) | (0.00) | (0.50) |
| Constant | Yes | Yes | Yes | Yes | Yes |
| Firm Dummy | Yes | Yes | Yes | Yes | Yes |
| Industry-Year Dummy | Yes | Yes | Yes | Yes | Yes |
| Cluster at Country-Industry Level | Yes | Yes | Yes | Yes | Yes |
| Observations | 47,910 | 21,384 | 13,338 | 7,094 | 6,845 |
| R-squared | 0.583 | 0.492 | 0.735 | 0.531 | 0.575 |

## Table 6. Payout over the Business Cycle: By Cash Flow Shock

This table presents how firms' cash flow shock affects payout behaviors over the business cycle. Columns (1) - (2) present the results of firm-year level analyses with *Actual Repurchase Amount* and *# of Repurchase Announcements* as the dependent variables, and the sample is restricted to two years around the start of a recession. Columns (3) - (5) present the results of case level analyses with *Completion Rate, CAR (-5, +5),* and *Abnormal Stock Return (12 months)* as the dependent variables. The independent variables of interest are ***Expansion*** and its interaction with *Cash Flow Shock.* In firm-year level analyses, *Expansion* equals zero in the first year of a recession and equals one in the year before a recession. In case level analyses, *Expansion* equals one if the repurchase case is announced in the ECRI trough-to-peak months and equals zero otherwise. *Cash Flow Shock* measures the degree of temporariness for cash flows, in the spirit of Guay and Harford (2000). The control variables include *Total Assets, Leverage, ROA, Market-to-Book Ratio, Tangibility, Liquidity, Sales Growth, Cash Flow Volatility*, and *Market Share*. All variables are defined in Appendix Table 1. Firm fixed effects and industry-year fixed effects are controlled in all columns. The p-values clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Firm-year Level | | | Case Level | |
| | Actual Repurchase Amount | # of Repurchase Announcements | Completion Rate | CAR (-5, +5) | Abnormal Stock Return (12 months) |
| Expansion * Cash Flow Shock | 0.000661** | 0.000436** | 0.302** | 0.00136** | 0.00729* |
| | (0.04) | (0.03) | (0.04) | (0.03) | (0.09) |
| Expansion | 0.133** | -0.0589 | 2.451** | -0.0243** | 0.0789 |
| | (0.01) | (0.14) | (0.05) | (0.01) | (0.15) |
| Cash Flow Shock | 0.000294 | 0.000110 | -0.257** | -0.00118** | -0.00851** |
| | (0.57) | (0.46) | (0.05) | (0.03) | (0.03) |
| Total Assets | 0.0825 | 0.0455*** | -0.931 | -0.0122** | -0.180*** |
| | (0.11) | (0.00) | (0.57) | (0.01) | (0.00) |
| Leverage | -0.00217*** | -0.000711*** | -0.154*** | -0.000188 | 0.000944 |
| | (0.00) | (0.00) | (0.00) | (0.10) | (0.25) |
| ROA | 0.00999*** | 0.000987*** | 0.313** | -0.000177 | -5.64e-05 |
| | (0.00) | (0.00) | (0.02) | (0.46) | (0.95) |
| Market-to-Book Ratio | 0.00736 | 0.000543 | -0.0880 | 0.00473*** | 0.0137 |
| | (0.49) | (0.80) | (0.88) | (0.00) | (0.11) |
| Tangibility | -0.00494 | -0.000494 | -0.228*** | -0.000238 | -0.00309** |
| | (0.12) | (0.40) | (0.00) | (0.39) | (0.02) |
| Liquidity | 0.0123 | 0.00189 | 0.555** | -0.000402 | -0.0128*** |
| | (0.14) | (0.26) | (0.03) | (0.78) | (0.00) |
| Sales Growth | -0.000543*** | -0.000106** | -0.00153 | 6.53e-06 | -0.000201 |
| | (0.01) | (0.04) | (0.89) | (0.90) | (0.45) |
| Cash Flow Volatility | -0.00107*** | -0.000400* | 0.0396 | -0.000554*** | -0.000576 |
| | (0.01) | (0.06) | (0.59) | (0.00) | (0.72) |
| Market Share | 0.0135** | 0.00105 | 0.130 | -0.00195*** | 0.00138 |
| | (0.03) | (0.36) | (0.78) | (0.00) | (0.30) |
| Constant | Yes | Yes | Yes | Yes | Yes |
| Firm Dummy | Yes | Yes | Yes | Yes | Yes |
| Industry-Year Dummy | Yes | Yes | Yes | Yes | Yes |
| Cluster at Country-Industry Level | Yes | Yes | Yes | Yes | Yes |
| Observations | 50,420 | 22,853 | 14,043 | 7,510 | 7,246 |
| R-squared | 0.584 | 0.482 | 0.710 | 0.523 | 0.551 |

## Table 7. Payout over the Business Cycle: Institutional Ownership

This table presents how firms' institutional ownership affects payout behaviors over the business cycle. Columns (1) - (2) present the results of firm-year level analyses with *Actual Repurchase Amount* and *# of Repurchase Announcements* as the dependent variables, and the sample is restricted to two years around the start of a recession. Columns (3) - (5) present the results of case level analyses with *Completion Rate, CAR (-5, +5),* and *Abnormal Stock Return (12 months)* as the dependent variables. The independent variables of interest are ***Expansion*** and its interaction with *Institutional Ownership.* In firm-year level analyses, *Expansion* equals zero in the first year of a recession and equals one in the year before a recession. In case level analyses, *Expansion* equals one if the repurchase case is announced in the ECRI trough-to-peak months and equals zero otherwise. *Institutional Ownership* is a firm-year variable indicating shares held by institutional investors in percentage. The control variables include *Total Assets, Leverage, ROA, Market-to-Book Ratio, Tangibility, Liquidity, Sales Growth, Cash Flow Volatility*, and *Market Share*. All variables are defined in Appendix Table 1. Firm fixed effects and industry-year fixed effects are controlled in all columns. The p-values clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Firm-year Level | | | Case Level | |
| | Actual Repurchase Amount | # of Repurchase Announcements | Completion Rate | CAR (-5, +5) | Abnormal Stock Return (12 months) |
| Expansion * Institutional Ownership | 1.081*** | 0.115*** | 14.08*** | 0.0614* | 0.359* |
| | (0.00) | (0.00) | (0.00) | (0.10) | (0.06) |
| Expansion | -0.0674 | -0.0871 | -0.438 | -0.0729** | -0.194 |
| | (0.49) | (0.11) | (0.70) | (0.03) | (0.16) |
| Institutional Ownership | 0.804** | 0.0845* | 1.826 | -0.0718 | -0.492** |
| | (0.02) | (0.07) | (0.86) | (0.19) | (0.02) |
| Total Assets | 0.126** | 0.0692*** | -3.721*** | -0.00864 | -0.159*** |
| | (0.03) | (0.00) | (0.00) | (0.19) | (0.00) |
| Leverage | -0.00181 | -0.000801** | -0.184*** | -0.000193 | 7.15e-05 |
| | (0.26) | (0.03) | (0.00) | (0.23) | (0.94) |
| ROA | 0.0157*** | 0.000783* | 0.319*** | -0.000254 | 0.000131 |
| | (0.00) | (0.10) | (0.00) | (0.61) | (0.91) |
| Market-to-Book Ratio | 0.0147 | -0.000622 | -0.377 | 0.00706*** | 0.00945 |
| | (0.39) | (0.59) | (0.54) | (0.00) | (0.46) |
| Tangibility | -0.0102** | -0.000228 | -0.211** | 1.98e-05 | -0.00246 |
| | (0.02) | (0.59) | (0.01) | (0.95) | (0.13) |
| Liquidity | 0.00421 | 0.000985 | 0.477 | -0.00152 | -0.00361 |
| | (0.80) | (0.56) | (0.16) | (0.50) | (0.65) |
| Sales Growth | -0.00159*** | -0.000130*** | 0.00165 | 1.75e-05 | -2.91e-05 |
| | (0.00) | (0.01) | (0.90) | (0.72) | (0.95) |
| Cash Flow Volatility | 0.000934 | -0.000458 | -0.136* | -0.000529*** | 8.74e-05 |
| | (0.60) | (0.26) | (0.09) | (0.00) | (0.93) |
| Market Share | 0.0164 | 0.00182 | 0.222 | -0.00246*** | 0.000462 |
| | (0.27) | (0.27) | (0.63) | (0.00) | (0.82) |
| Constant | Yes | Yes | Yes | Yes | Yes |
| Firm Dummy | Yes | Yes | Yes | Yes | Yes |
| Industry-Year Dummy | Yes | Yes | Yes | Yes | Yes |
| Cluster at Country-Industry Level | Yes | Yes | Yes | Yes | Yes |
| Observations | 25,440 | 18,018 | 10,957 | 4,612 | 4,519 |
| R-squared | 0.572 | 0.497 | 0.725 | 0.491 | 0.537 |

*Appendix to*
*"Global Share Repurchases over the Business Cycle"*

## Appendix Table 1. Variable Definition

This table reports details on the data source and means of constructing the independent variables and control variables used in our paper.

| | **Dependent Variables** | **Source** |
|---|---|---|
| # of Market Repurchase | Firm-year variable. The total number of open market repurchase cases announced in the year. | S&P Global Market Intelligence |
| # of Repurchase Announcements | Firm-year variable. The total number of repurchase cases announced in the year. | S&P Global Market Intelligence |
| # of Tender Offer | Firm-year variable. The total number of tender offer repurchase cases announced in the year. | S&P Global Market Intelligence |
| Abnormal Stock Return (3 months) | Abnormal (market-adjusted) returns for 3 months. Calculated as the differences between the actual return and the expected return in 3 months after the announcement date. The expected return is defined as the index return of the market. Stock data is obtained from Compustat Global and index data is obtained from World Indices by WRDS. | Compustat Global |
| Abnormal Stock Return (6 months) | Abnormal (market-adjusted) returns for 6 months. Calculated as the differences between the actual return and the expected return in 6 months after the announcement date. The expected return is defined as the index return of the market. Stock data is obtained from Compustat Global and index data is obtained from World Indices by WRDS. | Compustat Global |
| Abnormal Stock Return (12 months) | Abnormal (market-adjusted) returns for 12 months. Calculated as the differences between the actual return and the expected return in 12 months after the announcement date. The expected return is defined as the index return of the market. Stock data is obtained from Compustat Global and index data is obtained from World Indices by WRDS. | Compustat Global |
| Actual Dividend Amount | Firm-year variable. The ratio of dividends to total assets (in percentage). Calculated as [Cash Dividends (Worldscope item 04551) / Lagged Total Assets (Worldscope item 02999)] * 100. Winsorized at 1% and 99% levels. | Worldscope |
| Actual Repurchase Amount | Firm-year variable. The ratio of share repurchase to total assets (in percentage). Calculated as [Common/Preferred Redeemed, Retired, Converted (Worldscope item 04751) / Total Assets (Worldscope item 02999)] * 100. Common/Preferred Redeemed, Retired, Converted (Worldscope item 04751) represents funds used to decrease the outstanding shares of common and/or preferred stock. Winsorized at 1% and 99% levels. | Worldscope |
| CAR (-1, +1) | Cumulative abnormal (market-adjusted) returns for 3-day (-1, +1). Calculated as the sum of the differences between the actual return and the expected return over a 3-day window around the announcement date. The expected return is defined as the index return of the market. Stock data is obtained from Compustat Global and index data is obtained from World Indices by WRDS. | Compustat Global |

| | | |
|---|---|---|
| CAR (-2, +2) | Cumulative abnormal (market-adjusted) returns for 5-day (-2, +2). Calculated as the sum of the differences between the actual return and the expected return over a 5-day window around the announcement date. The expected return is defined as the index return of the market. Stock data is obtained from Compustat Global and index data is obtained from World Indices by WRDS. | Compustat Global |
| CAR (-5, +5) | Cumulative abnormal (market-adjusted) returns for 11-day (-5, +5). Calculated as the sum of the differences between the actual return and the expected return over an 11-day window around the announcement date. The expected return is defined as the index return of the market. Stock data is obtained from Compustat Global and index data is obtained from World Indices by WRDS. | Compustat Global |
| Completion Rate | Fraction of the announced buyback that is actually completed. Calculated as (Repurchase Monetary Value / Plan Terms - Monetary Value) * 100 or (Repurchase Number of Shares / Plan Terms - Number of Shares) * 100 or (Repurchase Percent of Shares / Plan Terms - Percent of Shares) * 100. | S&P Global Market Intelligence |
| Discretionary Accruals | According to Chan et al. (2005), earnings quality could be a proxy of managerial intent to mislead investors. In this case, we consider earnings quality as a proxy for the propensity of managers to falsely signal or otherwise potentially mislead investors. To estimate discretionary accruals, we follow the methods introduced by Sloan (1996) and Chan et al. (2010). Accruals are measured at the fiscal year-end prior to a repurchase announcement. To create relative measures of earnings quality, we calculate values of discretionary accruals for all firms with available data on Worldscope. Quintile cutoff points are then defined across each country-year, thus allowing us to identify a quintile rank of discretionary accruals for each sample firm. Discretionary Accruals ranges from 1 (highest earnings quality) to 5 (lowest earnings quality). | Worldscope |
| Repurchase Proportion | The proportion of repurchase payments in total payout. Calculated as {Common/Preferred Redeemed, Retired, Converted (Worldscope item 04751) / [Common/Preferred Redeemed, Retired, Converted (Worldscope item 04751) + Cash Dividends (Worldscope item 04551)]} * 100. Winsorized at 1% and 99% levels. | Worldscope |
| Planned Percentage Sought in Repurchase Announcements | Percentage of the outstanding shares that the firm intends to buy back. It is the Plan Terms - Percent of Shares (%). Obtained from S&P Global Market Intelligence directly. | S&P Global Market Intelligence |
| U-Index | Firm-year variable. Undervaluation index, in the spirit of Peyer and Vermaelen (2009) and Manconi et al. (2019). It is constructed as follows: All firms in the sample are assigned a score based on their cumulative raw return over the year prior to the repurchase, size, and book-to-market ratio relative to the distribution of prior returns, size, and book-to-market ratios in their market. A given firm will receive a prior return "score" of one if its return prior to the buyback announcement is above the 67th percentile, two if it is between the 33th and the 67th percentile, and three if it is below the 33th percentile. Size and book-to-market scores are similarly assigned. The U-index is the sum of the prior return, size, and book-to-market scores, and ranges from three (least undervalued) to nine (most undervalued). | Worldscope |

| | **Independent Variables** | **Source** |
|---|---|---|
| Analyst Coverage | The number of analysts who made forecasts about firm's earnings in the year. | I/B/E/S |
| Cash Flow Shock | Firm-year variable. A measure of the degree of temporariness for cash flows, in the spirit of Guay and Harford (2000). Cash flow is the sum of Funds from Operations (Worldscope item 04201) and Total Other Cash Flow (Worldscope item 04151). Cash flow is scaled by total assets. Cash flow shock is defined as the difference between the average cash flows in years -1 and 0 and the average cash flows in years -4, -3 and -2. | Worldscope |
| Expansion | A dummy variable that equals zero in the first year of recession. It equals 1 in the year before recession. We assign peak and trough dates using business cycle data from ECRI, defining a recession year as 6 or more months of recession. | ECRI |
| Institutional Ownership | Firm-year variable. The percent of shares held by institutional investors (in percentage). Calculated as [SharesHeld / Common Shares Outstanding (Worldscope item 05301)] * 100. SharesHeld represents the number of shares held by institutional investors. Winsorized at 1% and 99% levels. | Thomson Reuters (Ownership) |

| | | |
|---|---|---|
| KZ Index | Firm-year variable. Kaplan-Zingales index is based on the Kaplan-Zingales (1997) paper on financing constraints. It measures corporate relative reliance on external financing, with a higher value indicating a higher likelihood of experiencing difficulties in financing ongoing operations when financial conditions tighten. | Worldscope |
| Recession | A dummy variable that equals one in the first year of recession. It equals 1 in the year before recession. We assign peak and trough dates using the business cycle data from ECRI, defining a recession year as 6 or more months of recession. | ECRI |
| Recession (GDP Measure) | A dummy variable that equals one in the first year of recession. It equals 1 in the year before recession. We assign peak and trough dates using quarterly GDP data from the OECD, defining a recession year as 2 or more consecutive quarters of negative GDP growth. | OECD |

| | **Control Variables** | **Source** |
|---|---|---|
| Cash Flow Volatility | The standard deviation of the ratio of cash flow to total assets measured over the past 5-year period. Cash flow is the sum of Funds from Operations (Worldscope item 04201) and Total Other Cash Flow (Worldscope item 04151). Cash flow is scaled by total assets. | Worldscope |
| Leverage | Firm-year variable. Worldscope item 08236. Calculated as the ratio of total debt to total assets. Winsorized at 1% and 99% levels. | Worldscope |
| Liquidity | Liquidity. Firms with more liquid assets can use them as another internal source of funds instead of debt, leading to lower optimal debt equity ratio. Calculated as Total Current Assets (Worldscope item 02201) / Total Current Liabilities (Worldscope item 03101). Total Current Assets represents cash and other assets that are reasonably expected to be realized in cash, sold or consumed within one year or one operating cycle. Total Current Liabilities represent debt or other obligations that the company expects to satisfy within one year. Winsorized at 1% and 99% levels. | Worldscope |
| Market Share | Firm-year variable. Firm's percentage share of sales by all public firms in the same Fama & French 12 industry and the same country. Winsorized at 1% and 99% levels. | Worldscope |
| Market-to-Book | A higher market-to-book tends to be a sign of more attractive future growth options, which a firm tends to protect by limiting its leverage. Calculated as Market Capitalization / (Total Assets - Total Liabilities), where Total Liabilities (Worldscope item 03351) represent all short- and long-term obligations expected to be satisfied by the company. Winsorized at 1% and 99% levels. | Worldscope |
| ROA | Firm-year variable. Calculated as [Net Income (Worldscope item 01651) / Total Assets (Worldscope item 02999)] * 100. Winsorized at 1% and 99% levels. | Worldscope |
| Sales Growth | Firm-year variable. Worldscope item 08631. The growth rate of firm's net sales (in percentage). Calculated as (Current Year's Net Sales or Revenues / Last Year's Total Net Sales or Revenues - 1) * 100. Winsorized at 1% and 99% levels. | Worldscope |
| Tangibility | Firms operating with greater tangible assets have a higher debt capacity. Calculated as Property, Plant And Equipment (Worldscope item 02501) / Total Assets (Worldscope item 02999). Property, Plant And Equipment represents Gross Property, Plant and Equipment less accumulated reserves for depreciation, depletion and amortization. Winsorized at 1% and 99% levels. | Worldscope |
| Total Assets | Natural logarithm of [1 + Raw Total Assets (Worldscope item 07230)]. Raw Total Assets represent the total assets of the company converted to U.S. dollars using the fiscal year-end exchange rate. | Worldscope |

## Appendix Table 2. Payout over the Business Cycle: Full Sample Analyses

This table presents firm-year level regressions of firm repurchase and dividend behaviors over the business cycle. The sample is ***not*** restricted to two years around the start of a recession. The dependent variables are payout measures (*Actual Repurchase Amount*, *Actual Dividend Amount,* and *Repurchase Proportion*) and the number of repurchase announcements (*# of Repurchase Announcements, # of Market Repurchases,* and *# of Tender Offers*). The independent variable of interest is ***Recession***, which equals one in recession years and equals zero otherwise; a recession is defined as a year with six or more months of recession according to peak and trough dates using the business cycle data from ECRI. The control variables include *Total Assets, Leverage, ROA, Market-to-Book Ratio, Tangibility, Liquidity, Sales Growth, Cash Flow Volatility*, and *Market Share*. All variables are defined in Appendix Table 1. Firm fixed effects and industry-year fixed effects are controlled in all columns. The p-values clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Actual Repurchase Amount | Actual Dividend Amount | Repurchase Proportion | # of Repurchase Announcements | # of Market Repurchases | # of Tender Offers |
| Recession | -0.0242* | -0.0346* | -1.051** | 0.0527*** | 0.0517*** | -0.00125** |
| | (0.09) | (0.05) | (0.04) | (0.00) | (0.00) | (0.03) |
| Total Assets | 0.0693** | -0.0797*** | -0.984*** | 0.0341*** | 0.0339*** | 0.000287 |
| | (0.03) | (0.00) | (0.00) | (0.00) | (0.00) | (0.51) |
| Leverage | -0.00167*** | -0.00347*** | -0.0135 | -0.000695*** | -0.000640*** | -5.12e-05*** |
| | (0.00) | (0.00) | (0.24) | (0.00) | (0.00) | (0.00) |
| ROA | 0.00567*** | 0.0120*** | -0.117*** | 0.00126*** | 0.00124*** | 1.53e-05 |
| | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.20) |
| Market-to-Book Ratio | 0.0180*** | 0.0231*** | -0.100** | 0.00156* | 0.00160** | -2.36e-05 |
| | (0.00) | (0.00) | (0.03) | (0.05) | (0.04) | (0.81) |
| Tangibility | -0.00361*** | -0.00412*** | -0.0152 | -0.00131*** | -0.00127*** | -3.63e-05* |
| | (0.00) | (0.00) | (0.16) | (0.00) | (0.00) | (0.10) |
| Liquidity | 0.00844*** | -0.000818 | 0.216*** | 0.00154** | 0.00149** | 5.03e-05 |
| | (0.00) | (0.78) | (0.00) | (0.03) | (0.03) | (0.62) |
| Sales Growth | -0.000230*** | 5.98e-05 | -0.00198* | -2.58e-05* | -1.78e-05 | -6.55e-06** |
| | (0.00) | (0.46) | (0.06) | (0.06) | (0.20) | (0.03) |
| Cash Flow Volatility | -8.56e-05 | -0.000698*** | 0.0650*** | 6.31e-05 | 8.08e-05 | -3.02e-05** |
| | (0.57) | (0.00) | (0.01) | (0.45) | (0.34) | (0.04) |
| Market Share | 0.00182 | -0.00172 | 0.0396 | 0.000569 | 0.000666 | -7.45e-05 |
| | (0.37) | (0.64) | (0.16) | (0.31) | (0.23) | (0.39) |
| Constant | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry-Year Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| Cluster at Country-Industry Level | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 413,334 | 498,068 | 315,954 | 177,969 | 177,969 | 177,969 |
| R-squared | 0.360 | 0.649 | 0.652 | 0.231 | 0.234 | 0.119 |

## Appendix Table 3. Alternative Measure of the Business Cycle

This table presents firm-year level regressions of firms' payout behaviors over the business cycle using an alternative definition. The sample is restricted to two years around the start of a recession. The dependent variables are payout measures (*Actual Repurchase Amount*, *Actual Dividend Amount,* and *Repurchase Proportion*) and the number of repurchase announcements (*# of Repurchase Announcements, # of Market Repurchases,* and *# of Tender Offers*). The independent variable of interest is ***Recession (GDP Measure)***, which equals one in the first year of a recession and equals zero in the year before a recession; a recession is defined as a year with two or more consecutive quarters of negative GDP growth based on peak and trough dates using quarterly GDP data from the OECD (Graetz and Michaels, 2017). The control variables include *Total Assets, Leverage, ROA, Market-to-Book Ratio, Tangibility, Liquidity, Sales Growth, Cash Flow Volatility*, and *Market Share*. All variables are defined in Appendix Table 1. Firm fixed effects and industry-year fixed effects are controlled in all columns. The p-values clustered at the country level are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Actual Repurchase Amount | Actual Dividend Amount | Repurchase Proportion | # of Repurchase Announcements | # of Market Repurchases | # of Tender Offers |
| Recession (GDP Measure) | -0.182*** | -0.0345 | -3.345*** | 0.00331 | 0.00763 | -0.00432** |
| | (0.00) | (0.63) | (0.00) | (0.95) | (0.88) | (0.04) |
| Total Assets | 0.0568* | -0.0425 | -2.536*** | 0.0389*** | 0.0382*** | 0.000681 |
| | (0.09) | (0.14) | (0.00) | (0.00) | (0.00) | (0.43) |
| Leverage | -0.00168*** | -0.00419*** | 0.0170 | -0.000894*** | -0.000901*** | 6.71e-06 |
| | (0.00) | (0.00) | (0.39) | (0.00) | (0.00) | (0.88) |
| ROA | 0.00727*** | 0.0120*** | -0.205*** | 0.00205*** | 0.00204*** | 6.37e-06 |
| | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.92) |
| Market-to-Book Ratio | 0.0267*** | 0.0338*** | 0.0418 | 0.00295* | 0.00290* | 4.98e-05 |
| | (0.00) | (0.00) | (0.56) | (0.08) | (0.08) | (0.81) |
| Tangibility | -0.00357*** | -0.00321** | -0.0138 | -0.00126*** | -0.00117*** | -8.59e-05* |
| | (0.00) | (0.01) | (0.52) | (0.00) | (0.00) | (0.08) |
| Liquidity | 0.0120* | 0.00391 | 0.121 | 0.00415** | 0.00387** | 0.000282 |
| | (0.05) | (0.43) | (0.39) | (0.03) | (0.03) | (0.29) |
| Sales Growth | -0.000248* | -0.000292*** | 0.00564* | -8.78e-05** | -7.91e-05** | -8.67e-06 |
| | (0.07) | (0.00) | (0.07) | (0.03) | (0.04) | (0.45) |
| Cash Flow Volatility | -1.59e-05 | -0.000197 | 0.132*** | 5.85e-05 | 0.000104 | -4.54e-05 |
| | (0.96) | (0.49) | (0.00) | (0.74) | (0.53) | (0.33) |
| Market Share | 0.00403 | 0.000109 | 0.0669 | -0.000655 | -0.000654 | -6.04e-07 |
| | (0.16) | (0.99) | (0.30) | (0.49) | (0.49) | (0.99) |
| Constant | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry-Year Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| Cluster at Country-Industry Level | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 87,258 | 109,667 | 74,219 | 45,635 | 45,635 | 45,635 |
| R-squared | 0.534 | 0.752 | 0.693 | 0.332 | 0.334 | 0.324 |

## Appendix Table 4. Dominating Motivation of Repurchase Announcement

This table examines dominating motivation of repurchase announcements. It shows the t-test results of *U-index* and *Discretionary Accruals* prior to repurchase announcements in expansion and recession periods, respectively. *U-index* (Undervaluation index) is a proxy for the likelihood of undervaluation proposed by Peyer and Vermaelen (2009) and Manconi et al. (2019). To construct the U-index, firms are classified into terciles based upon their stock return, size, and book-to-market ratio prior to the repurchase announcement. The index ranges from 3 (least undervalued) to 9 (most undervalued), based on the repurchasing firm's rank in terms of prior return, size, and book-to-market ratio. Higher values of the U-index are indicative of undervaluation, following Peyer and Vermaelen's (2009) argument that small, beaten-up value stocks are more likely undervalued. *Discretionary Accruals* is a proxy for earnings quality. According to Chan et al. (2005), earnings quality could be a proxy of managerial intent to mislead investors. In this case, we consider earnings quality as a proxy for the propensity of managers to falsely signal or otherwise potentially mislead investors. To estimate discretionary accruals, we follow the methods introduced by Sloan (1996) and Chan et al. (2010). Accruals are measured at the fiscal year-end prior to a repurchase announcement. To create relative measures of earnings quality, we calculate values of discretionary accruals for all firms with available data on Worldscope. Quintile cutoff points are then defined across each country-year, thus allowing us to identify a quintile rank of discretionary accruals for each sample firm. *Discretionary Accruals* ranges from 1 (highest earnings quality) to 5 (lowest earnings quality). These two variables are defined in Appendix Table 1.

| | | Repurchasing Firms | Non-repurchasing Firms | diff | Std. err. |
|---|---|---|---|---|---|
| | | Mean | Mean | | |
| Recession | U-index | 5.42 | 5.98 | -0.56*** | 0.022 |
| | Discretionary Accruals | 3.04 | 3.00 | 0.04* | 0.023 |
| Expansion | U-index | 5.43 | 5.95 | -0.52*** | 0.009 |
| | Discretionary Accruals | 2.99 | 3.00 | -0.01 | 0.009 |

## Online Appendix A. Distribution of Repurchase Cases in SDC and S&P GMI

This figure summarizes the distribution of case-level observations in SDC and S&P Global Market Intelligence for the 21 countries or regions that are covered by ECRI. Panel A presents the distribution of repurchase cases in S&P GMI. Panel B shows the distribution of repurchase cases in SDC.

Panel A. Distribution of repurchase cases in S&P GMI

| | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Australia | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 6 | 5 | 8 | 29 | 85 | 78 |
| Austria | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 13 |
| Brazil | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 5 | 5 | 10 |
| Canada | 0 | 2 | 0 | 1 | 2 | 1 | 2 | 4 | 6 | 4 | 6 | 31 | 84 | 218 | 256 |
| China | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 14 | 17 |
| France | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 9 | 43 | 62 |
| Germany | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 9 | 43 | 103 |
| India | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 16 | 8 |
| Italy | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 14 | 30 |
| Japan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 24 | 178 | 180 |
| Mexico | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 3 | 0 |
| New Zealand | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 8 | 7 |
| Russia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 19 |
| South Africa | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 20 | 68 |
| South Korea | 7 | 4 | 8 | 7 | 1 | 5 | 0 | 0 | 12 | 23 | 39 | 40 | 29 | 21 | 47 |
| Spain | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 2 | 14 | 14 |
| Sweden | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 5 | 18 | 30 |
| Switzerland | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 3 | 13 | 21 | 23 |
| Taiwan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 4 | 11 | 16 | 9 |
| United Kingdom | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 1 | 5 | 12 | 41 | 192 | 380 |
| United States | 1 | 2 | 2 | 2 | 8 | 7 | 41 | 29 | 72 | 109 | 226 | 539 | 925 | 1125 | 1169 |
| Total | 8 | 8 | 10 | 10 | 11 | 14 | 45 | 35 | 94 | 148 | 293 | 673 | 1205 | 2,062 | 2,523 |

| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Australia | 72 | 131 | 122 | 89 | 130 | 91 | 84 | 102 | 102 | 65 | 96 | 89 | 81 | 67 | 1,535 |
| Austria | 24 | 42 | 24 | 23 | 15 | 15 | 8 | 10 | 5 | 9 | 2 | 7 | 6 | 4 | 215 |
| Brazil | 9 | 52 | 23 | 36 | 69 | 51 | 69 | 83 | 82 | 57 | 71 | 51 | 38 | 56 | 771 |
| Canada | 281 | 436 | 275 | 257 | 312 | 257 | 255 | 251 | 264 | 231 | 252 | 301 | 296 | 262 | 4,547 |
| China | 14 | 68 | 185 | 217 | 305 | 288 | 300 | 131 | 126 | 93 | 121 | 520 | 461 | 349 | 3,213 |
| France | 101 | 157 | 233 | 237 | 204 | 151 | 103 | 104 | 59 | 48 | 64 | 76 | 62 | 53 | 1,770 |
| Germany | 143 | 195 | 195 | 192 | 46 | 23 | 24 | 25 | 23 | 33 | 36 | 38 | 37 | 37 | 1,209 |
| India | 5 | 37 | 41 | 20 | 36 | 27 | 36 | 17 | 17 | 50 | 66 | 70 | 63 | 60 | 571 |
| Italy | 47 | 73 | 74 | 87 | 74 | 71 | 60 | 73 | 17 | 19 | 22 | 21 | 24 | 69 | 777 |
| Japan | 127 | 129 | 75 | 446 | 756 | 652 | 590 | 606 | 787 | 985 | 1049 | 897 | 963 | 725 | 9,186 |
| Mexico | 5 | 9 | 10 | 10 | 11 | 7 | 5 | 7 | 3 | 1 | 4 | 4 | 4 | 4 | 90 |
| New Zealand | 6 | 14 | 11 | 10 | 17 | 7 | 8 | 11 | 14 | 7 | 3 | 7 | 5 | 2 | 139 |
| Russia | 20 | 9 | 6 | 30 | 39 | 26 | 24 | 45 | 26 | 20 | 99 | 44 | 9 | 13 | 431 |
| South Africa | 117 | 178 | 228 | 249 | 235 | 238 | 230 | 90 | 51 | 25 | 37 | 58 | 37 | 18 | 1,887 |
| South Korea | 42 | 99 | 69 | 207 | 396 | 237 | 210 | 256 | 244 | 306 | 302 | 406 | 259 | 556 | 3832 |
| Spain | 20 | 28 | 52 | 42 | 29 | 48 | 49 | 35 | 25 | 22 | 15 | 14 | 21 | 18 | 453 |
| Sweden | 62 | 75 | 78 | 104 | 104 | 107 | 100 | 79 | 34 | 30 | 29 | 24 | 24 | 23 | 930 |
| Switzerland | 30 | 41 | 21 | 25 | 21 | 22 | 13 | 24 | 19 | 16 | 17 | 25 | 18 | 12 | 370 |
| Taiwan | 19 | 132 | 33 | 75 | 193 | 27 | 37 | 80 | 258 | 146 | 119 | 76 | 35 | 71 | 1,345 |
| United Kingdom | 667 | 743 | 810 | 802 | 764 | 739 | 707 | 420 | 101 | 120 | 125 | 110 | 106 | 71 | 6,920 |
| United States | 1,506 | 1,359 | 646 | 849 | 1023 | 837 | 813 | 927 | 1039 | 774 | 673 | 875 | 838 | 671 | 17,087 |
| Total | 3,317 | 4,007 | 3,211 | 4,007 | 4,779 | 3,921 | 3,725 | 3,376 | 3,296 | 3,057 | 3,202 | 3,713 | 3,387 | 3,141 | 57,278 |

Panel B. Distribution of repurchase cases in SDC

| | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Australia | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 7 | 7 | 9 | 17 | 13 | 14 | 16 |
| Austria | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 3 | 0 |
| Brazil | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 6 | 7 | 12 | 4 |
| Canada | 0 | 1 | 0 | 1 | 2 | 4 | 7 | 20 | 12 | 11 | 23 | 26 | 24 | 25 | 50 | 44 | 43 | 23 | 20 |
| China | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| France | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 2 | 2 | 9 | 118 | 13 | 8 | 1 |
| Germany | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 26 | 32 | 14 | 12 |
| India | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 1 | 24 |
| Italy | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 6 | 7 | 2 | 0 | 1 |
| Japan | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 | 12 | 13 | 14 | 26 | 22 | 126 |
| Mexico | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 4 | 1 | 0 | 2 | 3 | 2 |
| New Zealand | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 1 | 3 | 2 | 2 | 0 | 1 |
| Russia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 1 |
| South Africa | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 1 |
| South Korea | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 9 | 45 | 5 | 1 | 0 | 2 | 2 | 3 |
| Spain | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 1 | 0 | 2 | 8 | 0 | 7 | 1 | 2 |
| Sweden | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 9 | 0 | 0 |
| Switzerland | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 2 | 4 | 1 | 5 |
| Taiwan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 14 |
| United Kingdom | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 8 | 1 | 11 | 12 | 14 | 26 | 41 | 12 | 12 | 4 | 14 |
| United States | 1 | 34 | 27 | 52 | 36 | 68 | 257 | 84 | 186 | 271 | 1,194 | 1,332 | 1,490 | 1,519 | 2,495 | 1,770 | 1,639 | 1,282 | 1,101 |
| Total | 1 | 35 | 28 | 53 | 38 | 73 | 268 | 111 | 209 | 287 | 1,232 | 1,389 | 1,590 | 1,607 | 2,648 | 2,023 | 1,826 | 1,395 | 1,348 |

| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Australia | 13 | 15 | 20 | 17 | 21 | 45 | 17 | 13 | 19 | 20 | 25 | 32 | 27 | 44 | 105 | 109 | 97 | 56 | 783 |
| Austria | 1 | 1 | 4 | 0 | 2 | 8 | 0 | 1 | 2 | 4 | 2 | 1 | 6 | 0 | 0 | 3 | 4 | 0 | 49 |
| Brazil | 0 | 0 | 0 | 1 | 0 | 18 | 2 | 3 | 4 | 2 | 23 | 27 | 28 | 12 | 14 | 15 | 2 | 14 | 198 |
| Canada | 13 | 23 | 33 | 48 | 69 | 88 | 79 | 41 | 60 | 60 | 121 | 200 | 157 | 44 | 112 | 101 | 74 | 35 | 1,694 |
| China | 1 | 4 | 14 | 14 | 12 | 49 | 56 | 15 | 11 | 11 | 13 | 16 | 26 | 17 | 13 | 265 | 118 | 71 | 728 |
| France | 12 | 8 | 3 | 13 | 10 | 17 | 4 | 9 | 11 | 7 | 33 | 53 | 50 | 22 | 31 | 40 | 14 | 7 | 502 |
| Germany | 4 | 4 | 2 | 2 | 11 | 8 | 6 | 9 | 10 | 5 | 13 | 12 | 14 | 7 | 11 | 11 | 10 | 8 | 233 |
| India | 11 | 7 | 9 | 7 | 4 | 14 | 4 | 3 | 8 | 6 | 23 | 16 | 14 | 26 | 34 | 43 | 43 | 29 | 331 |
| Italy | 3 | 5 | 1 | 2 | 7 | 16 | 5 | 2 | 0 | 2 | 0 | 0 | 2 | 4 | 6 | 17 | 15 | 20 | 127 |
| Japan | 342 | 30 | 20 | 38 | 57 | 114 | 62 | 63 | 62 | 60 | 143 | 208 | 277 | 303 | 189 | 212 | 219 | 175 | 2,793 |
| Mexico | 1 | 0 | 1 | 0 | 3 | 10 | 2 | 2 | 3 | 11 | 6 | 23 | 50 | 44 | 4 | 4 | 2 | 0 | 182 |
| New Zealand | 4 | 2 | 4 | 2 | 3 | 2 | 1 | 0 | 0 | 1 | 1 | 2 | 0 | 5 | 1 | 13 | 4 | 2 | 60 |
| Russia | 1 | 0 | 1 | 1 | 2 | 1 | 1 | 7 | 7 | 4 | 3 | 2 | 3 | 1 | 5 | 8 | 4 | 5 | 60 |
| South Africa | 1 | 2 | 0 | 1 | 0 | 6 | 6 | 5 | 1 | 4 | 2 | 5 | 6 | 5 | 6 | 7 | 5 | 12 | 81 |
| South Korea | 0 | 0 | 2 | 1 | 19 | 54 | 11 | 18 | 19 | 17 | 13 | 30 | 43 | 42 | 39 | 41 | 26 | 44 | 487 |
| Spain | 5 | 2 | 1 | 2 | 2 | 2 | 10 | 0 | 4 | 4 | 2 | 9 | 12 | 13 | 8 | 10 | 10 | 9 | 130 |
| Sweden | 0 | 0 | 0 | 1 | 3 | 2 | 2 | 3 | 32 | 6 | 1 | 2 | 9 | 1 | 5 | 6 | 10 | 3 | 98 |
| Switzerland | 1 | 4 | 3 | 1 | 14 | 8 | 3 | 7 | 5 | 4 | 7 | 12 | 6 | 5 | 6 | 17 | 6 | 3 | 131 |
| Taiwan | 9 | 21 | 14 | 5 | 5 | 10 | 3 | 11 | 57 | 34 | 28 | 54 | 191 | 106 | 47 | 83 | 19 | 93 | 807 |
| United Kingdom | 19 | 10 | 11 | 12 | 16 | 17 | 7 | 14 | 4 | 12 | 10 | 27 | 22 | 24 | 16 | 22 | 33 | 25 | 461 |
| United States | 825 | 965 | 1,161 | 1,049 | 1,443 | 1,272 | 600 | 706 | 961 | 775 | 708 | 1,047 | 1,032 | 750 | 638 | 751 | 351 | 134 | 30,006 |
| Total | 1,266 | 1,103 | 1,304 | 1,217 | 1,703 | 1,761 | 881 | 932 | 1,280 | 1,049 | 1,177 | 1,778 | 1,975 | 1,475 | 1,290 | 1,778 | 1,066 | 745 | 39,941 |

## Online Appendix B. Regression that Generates Residual Coverage

This table reports the results of the ordinary least squares regression that generates the variable *Residual Analyst Coverage* following Yu (2008) by estimating the residual of the regression that controls for several firm characteristics following prior literatures (Bhushan 1989; Dechow and Dichev 2002; Kasznik 1999). *Analyst Coverage* refers to the number of analysts who made forecasts about firm's earnings in the year from I/B/E/S. *Total Assets* is the natural logarithm of firm's total assets. *ROA (Lagged)* is calculated by net income divided by total assets from the previous year. *Sales Growth* is the growth rate of firm's net sales. *External Financing* activities are measured by the sum of net cash received from equity and debt issuance scaled by total assets. *Cash Flow Volatility* is the standard deviation of the ratio of cash flow to total assets measured over the past 5-year period. Year fixed effect is controlled. The p-values clustered are in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

| | (1)<br>Analyst Coverage |
|---|---|
| Total Assets | 1.368*** |
| | (0.00) |
| ROA (Lagged) | 0.0139*** |
| | (0.00) |
| Sales Growth | 0.00150*** |
| | (0.00) |
| External Financing | -0.00866*** |
| | (0.00) |
| Cash Flow Volatility | -0.0160*** |
| | (0.00) |
| Constant | Yes |
| Year Dummy | Yes |
| Observations | 506,834 |
| R-squared | 0.313 |

## Online Appendix C. Summary of Recent Empirical Studies on Share Repurchases

This table presents an incomplete list of influential studies related to share repurchases published between 1980 and 2021 in *Journal of Finance, Journal of Financial Economics, Review of Financial Studies, Journal of Accounting and Economics, The Accounting Review, Journal of Accounting Research, Management Science, Journal of Financial and Quantitative Analysis, Review of Finance,* and *Journal of Business*. Papers that focus primarily on dividend payments or payout policies in general without focusing on share repurchases are not included.

| Title | Journal | Year | Author |
|---|---|---|---|
| Real Effects of Share Repurchases Legalization on Corporate Behaviors | JFE | 2021 | Zigan Wang, Qie Ellie Yin, Luping Yu |
| The Effect of Stock Liquidity on Cash Holdings: The Repurchase Motive | JFE | 2021 | Kjell Nyborg, Zexi Wang |
| Managerial Trustworthiness and Buybacks | JFQA | 2021 | Sterling Huang, Kaisa Snellman, Theo Vermaelen |
| Payout Policy Trade-Offs and the Rise of 10b5-1 Preset Repurchase Plans | MS | 2020 | Alice Bonaimé, Jarrad Harford, David Moore |
| Are Buybacks Good for Long-Term Shareholder Value? Evidence from Buybacks around the World | JFQA | 2019 | Alberto Manconi, Urs Peyer, Theo Vermaelen |
| Organizational Form and Corporate Payout Policy | JFQA | 2018 | Bradford Jordan, Mark Liu, Qun Wu |
| Executive Bonus Contract Characteristics and Share Repurchases | TAR | 2018 | Sunyoung Kim, Jeff Ng |
| Voluntary Disclosure and Strategic Stock Repurchases | JAE | 2017 | Praveen Kumar, Nisan Langberg, Jacob Oded, Konduru Sivaramakrishnan |
| Payout Yields and Stock Return Predictability: How Important Is the Measure of Cash Flow? | JFQA | 2017 | Gregory Eaton, Bradley Paye |
| The Timing and Source of Long-Run Returns Following Repurchases | JFQA | 2017 | Leonce Bargeron, Alice Bonaimé, Shawn Thomas |
| The Persistence of Long-Run Abnormal Returns Following Stock Repurchases and Offerings | MS | 2017 | Fangjian Fu, Sheng Huang |
| Stock Repurchases and Liquidity | JFE | 2016 | Alexander Hillert, Ernst Maug, Stefan Obernberger |
| The Real Effects of Share Repurchases | JFE | 2016 | Heitor Almeida, Vyacheslav Fos, Mathias Kronlund |
| Asymmetric Information, Financial Reporting, and Open-Market Share Repurchases | JFQA | 2016 | Matthew Billett, Miaomiao Yu |
| Actual Share Repurchases, Price Efficiency, and the Information Content of Stock Prices | RFS | 2016 | Pascal Busch, Stefan Obernberger |
| Buying High and Selling Low: Stock Repurchases and Persistent Asymmetric Information | RFS | 2016 | Philip Bond, Hongda Zhong |
| The Share Repurchase Announcement Puzzle: Theory and Evidence | RoF | 2016 | Utpal Bhattacharya, Stacey Jacobsen |
| Can Managers Time the Market? Evidence Using Repurchase Price Data | JFE | 2015 | Amy Dittmar, Laura Field |
| Payout Policy through the Financial Crisis: The Growth of Repurchases and the Resilience of Dividends | JFE | 2015 | Eric Floyd, Nan Li, Douglas Skinner |
| Bonus-Driven Repurchases | JFQA | 2015 | Yingmei Cheng, Jarrad Harford, Tianming Zhang |
| Mandatory Disclosure and Firm Behavior: Evidence from Share Repurchases | TAR | 2015 | Alice Bonaimé |
| Product Market Threats, Payouts, and Financial Flexibility | JF | 2014 | Gerard Hoberg, Gordon Phillips, Nagpurnanand Prabhala |
| Financial Flexibility, Risk Management, and Payout Choice | RFS | 2014 | Alice Bonaimé, Kristine Hankins, Jarrad Harford |
| Do Firms Buy Their Stock at Bargain Prices? Evidence from Actual Stock Repurchase Disclosures | RoF | 2014 | Azi Ben-Rephael, Jacob Oded, Avi Wohl |
| Market Timing, Investment, and Risk Management | JFE | 2013 | Patrick Bolton, Hui Chen, Neng Wang |

| | | | |
|---|---|---|---|
| Payout Taxes and the Allocation of Investment | JFE | 2013 | Bo Becker, Marcus Jacob, Martin Jacob |
| Taxation, Dividends, and Share Repurchases: Taking Evidence Global | JFQA | 2013 | Marcus Jacob, Martin Jacob |
| The Sarbanes-Oxley Act, Earnings Management, and Post-Buyback Performance of Open-Market Repurchasing Firms | JFQA | 2013 | Sheng-Syan Chen, Chia-Wei Huang |
| The Shareholder Base and Payout Policy | JFQA | 2013 | Andriy Bodnaruk, Per Östberg |
| Investor Heterogeneity, Investor-Management Disagreement and Share Repurchases | RFS | 2013 | Sheng Huang, Anjan Thakor |
| Financial Constraints and Share Repurchases | JFE | 2012 | Sheng-Syan Chen, Yanzhi Wang |
| Repurchases, Reputation, and Returns | JFQA | 2012 | Alice Bonaimé |
| The Credibility of Open Market Share Repurchase Signaling | JFQA | 2012 | Ilona Babenko, Yuri Tserlukevich, Alexander Vedrashko |
| Audit Quality and the Trade-Off between Accretive Stock Repurchases and Accrual-Based Earnings Management | TAR | 2012 | Brian Burnett, Bradrick Cripe, Gregory Martin, Brian McAllister |
| Accelerated Share Repurchases | JFE | 2011 | Leonce Bargeron, Manoj Kulchania, Shawn Thomas |
| Does Geography Matter? Firm Location and Corporate Payout Policy | JFE | 2011 | Kose John, Anzhela Knyazeva, Diana Knyazeva |
| Why Do Convertible Issuers Simultaneously Repurchase Stock? An Arbitrage-based Explanation | JFE | 2011 | Abe de Jong, Marie Dutordoir, Patrick Verwijmeren |
| Dividends, Share Repurchases, and Tax Clienteles: Evidence from the 2003 Reductions in Shareholder Taxes | TAR | 2011 | Jennifer Blouin, Jana Raedy, Douglas Shackelford |
| Stock Repurchases and Executive Compensation Contract Design: The Role of Earnings per Share Performance Conditions | TAR | 2011 | Steven Young, Jing Yang |
| Share Repurchases and Pay-Performance Sensitivity of Employee Compensation Contracts | JF | 2009 | Ilona Babenko |
| Stock Options and Total Payout | JFQA | 2009 | Charles Cuny, Gerald Martin, John Puthenpurackal |
| The Nature and Persistence of Buyback Anomalies | RFS | 2009 | Urs Peyer, Theo Vermaelen |
| Earnings Management and Firm Performance Following Open-Market Repurchases | JF | 2008 | Guojin Gong, Henock Louis, Amy Sun |
| Dividends and Share Repurchases in the European Union | JFE | 2008 | Henk von Eije, William Megginson |
| Firms as Buyers of Last Resort | JFE | 2008 | Harrison Hong, Jiang Wang, Jialin Yu |
| The Evolving Relation between Earnings, Dividends, and Stock Repurchases | JFE | 2008 | Douglas Skinner |
| The Timing of Financing Decisions: An Examination of the Correlation in Financing Waves | JFE | 2008 | Amy Dittmar, Robert Dittmar |
| Voluntary Disclosures around Share Repurchases | JFE | 2008 | Paul Brockman, Inder Khurana, Xiumin Martin |
| Insiders' Tax Preferences and Firms' Choices between Dividends and Share Repurchases | JFQA | 2008 | Jim Hsieh, Qinghai Wang |
| Executive Financial Incentives and Payout Policy: Firm Responses to the 2003 Dividend Tax Cut | JF | 2007 | Jeffrey Brown, Nellie Liang, Scott Weisbenner |
| On the Importance of Measuring Payout Yield: Implications for Empirical Asset Pricing | JF | 2007 | Jacob Boudoukh, Roni Michaely, Matthew Richardson, Michael Roberts |
| The Takeover Deterrent Effect of Open Market Share Repurchases | JF | 2007 | Matthew Billett, Hui Xue |
| Do Managers Intentionally Use Repurchase Tender Offers to Signal Private Information? Evidence from Firm Financial Reporting Behavior | JFE | 2007 | Henock Louis, Hal White |
| Mimicking Repurchases | JFE | 2007 | Massimo Massa, Zahid Rehman, Theo Vermaelen |
| The Effect of Shareholder Taxes on Corporate Payout Choice | JFQA | 2007 | William Moser |
| Time-Series Behavior of Share Repurchases and Dividends | JFQA | 2007 | Bong-Soo Lee, Oliver Meng Rui |
| Stock Repurchases as an Earnings Management Device | JAE | 2006 | Paul Hribara, Nicole Jenkinsb, Bruce Johnson |
| Operating Performance following Open Market Share Repurchase Announcements | JAE | 2005 | Erik Lie |
| Institutional Holdings and Payout Policy | JF | 2005 | Yaniv Grinstein, Roni Michaely |

| | | | |
|---|---|---|---|
| Payout Policy in the 21st Century | JFE | 2005 | Alon Brav, John Graham, Campbell Harvey, Roni Michaely |
| The Many Facets of Privately Negotiated Stock Repurchases | JFE | 2005 | Urs Peyer, Theo Vermaelen |
| Financial Flexibility, Performance, and the Corporate Payout Choice | JoB | 2005 | Erik Lie |
| Why Do Firms Announce Open-Market Repurchase Programs? | RFS | 2005 | Jacob Oded |
| Shareholder Wealth Effects of Pooling-of-interests Accounting: Evidence from the SEC's Restriction on Share Repurchases following Pooling Transactions | JAE | 2004 | Joseph Weber |
| The Information Content of Share Repurchase Programs | JF | 2004 | Gustavo Grullon, Roni Michaely |
| Economic Sources of Gain in Stock Repurchases | JFQA | 2004 | Konan Chan, David Ikenberry, Inmoo Lee |
| Managerial Entrenchment and Payout Policy | JFQA | 2004 | Aidong Hu, Praveen Kumar |
| On the Timing and Execution of Open Market Repurchases | RFS | 2004 | Douglas Cook, Laurie Krigman, J Chris Leach |
| Employee Stock Options, EPS Dilution, and Stock Repurchases | JAE | 2003 | Daniel Bens,Venky Nagar, Douglas Skinner, Franco Wong |
| The Wealth Effects of Repurchases on Bondholders | JF | 2003 | William Maxwell, Clifford Stephens |
| Real Investment Implications of Employee Stock Option Exercises | JAR | 2002 | Daniel Bens, Venky Nagar, Franco Wong |
| Dividends, Share Repurchases, and the Substitution Hypothesis | JF | 2002 | Gustavo Grullon, Roni Michaely |
| When a Buyback isn't a Buyback: Open Market Repurchases and Employee Options | JFE | 2002 | Kathleen Kahle |
| Do Firms Undertake Self-Tender Offers to Optimize Capital Structure? | JoB | 2002 | Erik Lie |
| Regulation, Taxes, and Share Repurchases in the United Kingdom | JoB | 2002 | Raghavendra Rau, Theo Vermaelen |
| Corporate Payout Policy and Managerial Stock Incentives | JFE | 2001 | George Fenna, Nellie Liang |
| Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay? | JFE | 2001 | Eugene Fama, Kenneth French |
| Managerial Timing and Corporate Liquidity: Evidence from Actual Share Repurchases | JFE | 2001 | Paul Brockman, Dennis Chung |
| Equity Undervaluation and Decisions Related to Repurchase Tender Offers: An Empirical Investigation | JF | 2000 | Ranjan D'Mello, Pervin Shroff |
| Stock Repurchases in Canada: Performance and Strategic Trading | JF | 2000 | David Ikenberry, Josef Lakonishok, Theo Vermaelen |
| Financial Flexibility and the Choice between Dividends and Stock Repurchases | JFE | 2000 | Murali Jagannathan, Clifford Stephens, Michael Weisbach |
| The Cash-flow Permanence and Information Content of Dividend Increases versus Repurchases | JFE | 2000 | Wayne Guay, Jarrad Harford |
| Why do Firms Repurchase Stock | JoB | 2000 | Amy Dittmar |
| Share Repurchases and Intangible Assets | JAE | 1999 | Mary Barth, Ron Kasznik |
| The Role of Personal Taxes in Corporate Decisions: An Empirical Analysis of Share Repurchases and Dividends | JFQA | 1999 | Erik Lie, Heidi Lie |
| Actual Share Reacquisitions in Open-Market Repurchase Programs | JF | 1998 | Clifford Stephens, Michael Weisbach |
| Earnings Signals in Fixed Price and Dutch Auction Self-tender Offers | JFE | 1998 | Erik Lie, John McConnell |
| Share Repurchases and Firm Performance: New Evidence on the Agency Costs of Free Cash Flow | JFE | 1998 | Tom Nohel, Vefa Tarhan |
| Shareholder Heterogeneity, Adverse Selection, and Payout Policy | JFQA | 1998 | Deborah Lucas, Robert MoDonald |
| Open-Market Stock Repurchase Announcements and Revaluation of Prior Accounting Information | TAR | 1997 | Li-Chin Ho, Chao-Shin Liu, Ramachandran Ramanan |
| Market Underreaction to Open Market Share Repurchases | JFE | 1995 | David Ikenberry, Josef Lakonishok, Theo Vermaelen |
| Open-Market Share Repurchase Programs and Bid-Ask Spreads on the NYSE: Implications for Corporate Payout Policy | JFQA | 1995 | James Miller, John McConnell |
| Repurchase Premia as a Reason for Dividends: A Dynamic Model of Corporate Payout Policies | RFS | 1994 | Bhagwan Chowdhry, Vikram Nanda |

| | | | |
|---|---|---|---|
| Dutch Auction Repurchases: An Analysis of Shareholder Heterogeneity | JF | 1992 | Laurie Bagwell |
| Managers' Trading Around Stock Repurchases | JF | 1992 | Scott Lee, Wayne Mikkelson, Megan Partch |
| One-Time Cash Flow Announcements and Free Cash-Flow Theory: Share Repurchases and Special Dividends | JF | 1992 | Keith Howe, Jia He, Wenchi Kao |
| Earnings and Risk Changes around Stock Repurchase Tender Offers | JAE | 1991 | Michael Hertzel, Prem Jain |
| Open-market Stock Repurchases as Signals for Earnings and Risk Changes | JAE | 1991 | Eli Bartov |
| Repurchase Tender Offers and Earning Information | JAE | 1991 | Larry Dann, Ronald Masulis |
| The Effects of Stock Repurchases on Rival Firms | JF | 1991 | Michael Hertzel |
| The Relative Power of Dutch-Action and Fixed-Priced Self-Tender Offers and Open Market Share Repurchases | JF | 1991 | Robert Comment, Gregg Jarrell |
| Share Repurchase as a Takeover Defense | JFQA | 1991 | Sidharth Sinha |
| Anomalous Price Behavior Around Repurchase Tender Offers | JF | 1990 | Josef Lakonishok, Theo Vermaelen |
| Share Repurchase through Transferable Put Rights: Theory and Case Study | JFE | 1989 | Jayant Kale, Thomas Noe, Gerald Gay |
| Optimal Investment with Stock Repurchase and Financing as Signals | RFS | 1989 | George Constantinides, Bruce Grundy |
| Stock Repurchase as a Takeover Defense | RFS | 1989 | Mark Bagnoli, Roger Gordon, Barton Lipman |
| Corporate Payout Policy: Cash Dividends Versus Open-Market Repurchases | JFE | 1988 | Michael Barclay, Clifford Smith |
| A Theory of Stock Price Responses to Alternative Corporate Cash Disbursement Methods: Stock Repurchases and Dividends | JF | 1987 | Aharon Ofer, Anjan Thakor |
| Repurchase Tender Offers, Signaling, and Managerial Incentives | JFQA | 1984 | Theo Vermaelen |
| Standstill Agreements, Privately Negotiated Stock Repurchases, and the Market for Corporate Control | JFE | 1983 | Larry Dann, Harry DeAngelo |
| The Wealth Effects of Targeted Share Repurchases | JFE | 1983 | Michael Bradley, Macdonald Wakeman |
| Common Stock Repurchases and Market Signaling: An Empirical Study | JFE | 1981 | Theo Vermaelen |
| Common Stock Repurchases: An Analysis of Returns to Bondholders and Stockholders | JFE | 1981 | Larry Dann |
| Stock Repurchase by Tender Offer: An Analysis of the Causes of Common Stock Price Changes | JF | 1980 | Ronald Masulis |