

The Economics of Share Repurchase Programs

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What do firms hope to accomplish by repurchasing shares? I make the case that, when used properly, a share repurchase, or “stock buy-back,” program is a highly efficient way to distribute cash to shareholders. Firms may conclude that the decision to return cash to shareholders is a better choice than retaining it for unspecified corporate purposes. At their core, share repurchases are nothing more than an alternative mechanism for distributing cash.

Although similar, share repurchases differ from ordinary dividends in several important ways. The most compelling explanations address their ability to signal undervalued share price, as a mechanism for distributing excess cash, individual income tax advantages, and reallocation effects.

- *Signaling undervalued share price.* In general, the announcement of share repurchase programs is associated with share price increases of approximately 2%.¹ The positive wealth effects are typically attributed to management trying (and succeeding) to signal that their firms are undervalued.² Repurchasing shares are viewed as credible signals to investors because managers typically hold non-trivial ownership stakes and would not personally benefit from overpayment. By having the firm repurchase shares at what they believe to be “fair” prices, management is effectively “putting its money where its mouths is.”
- *Distributing excess cash reserves.* Investors have a tendency to view share repurchases as discretionary payments and ordinary dividends as non-discretionary obligations. In other words, when a firm announces a share repurchase program, investors do not interpret it as a long-term commitment. By contrast, once a firm begins paying ordinary dividends, investors expect them to continue to pay them, and will punish those that cut dividends. For example, Dielman and Oppenheimer (1984) find that firms cutting dividends by more than 25% or omitting dividends entirely respectively experience abnormal returns of -7.7% and -8.1% on the announcement date. Given the downside risk associated with a dividend cut, firms respond by treating ordinary dividends as though they are just as important as new investment.³
- *Individual income tax advantages.* Share repurchase programs confer significant tax advantages to shareholders relative to ordinary dividends. Ordinary dividends and long-term capital gains from the sale of shares (difference between the sale price and the shareholder’s tax basis) both qualify for a lower federal tax rate. When a shareholder receives an ordinary dividend, tax is due immediately and without regard to whether the shareholder has cash to pay the tax. Yet any additional value resulting from a share

¹ Brav, Graham, Harvey, and Michaely (BGHM, 2005) survey 384 CEOs and report that 86.4% of all CEOs agree or strongly agree that they are able to time share repurchases to coincide with periods when stock is undervalued. Papers by Dann (1981), Vermaelen (1981, 1984), Asquith and Mullins (1986), Comment and Jarrel (1991), Ikenberry, Lakonishok, and Vermaelen (1995), Stephens and Weisbach (1998), Grullon and Michaely (2004), and Bhattacharya and Jacobsen (2018) all report consistently positive announcement date returns.

² By contrast, dividends appear to be perceived by investors as regularly scheduled announcements that are designed to convey management’s on-going assessment of future profitability.

³ Brav, Graham, Harvey, and Michaely (BGHM, 2005) survey 384 CEOs and find that “maintaining the dividend level is on par with investment decisions, while repurchases are made out of residual cash flow after investment spending.”

repurchase is taxable only when shareholders elect to sell their shares, also eliminating any cash liquidity concerns.

- *Reallocation effects.* Another point that is often overlooked in the share repurchase debate is that the cash paid to shareholders does not disappear. Investors selling shares either spend the cash received on goods and services or reinvest it elsewhere. The reallocation of capital into consumption and other investments potentially redirects it to activities that have higher value than incremental investments available to firms.

These explanations contrast sharply with critics who view stock buybacks as financial gimmicks, primarily aimed at “artificially” inflating share price. Consider Elizabeth Warren’s comment that, “*stock buybacks create a sugar high for the corporations. It boosts prices in the short run, but the real way to boost value of a corporation is to invest in the future, and they are not doing that.*” The Warren quote is instructive because it highlights many of the misconceptions shared by critics of share repurchases.

- *Artificial price inflation.* Investors do, in fact, respond favorably to share repurchase announcements. This has led critics to conjecture that firms can engage in a type of price manipulation wherein they simply announce their intention to initiate share repurchase programs in the hope that prices will rise. This argument fails because it does not consider managerial incentives. When managers hold equity positions in the firms they manage, it would not be in their self-interest to overpay via share repurchase because to do so would subsidize departing shareholders at their expense.

If stock buy-backs are solely designed to artificially inflate valuations, stock prices would be expected to revert to pre-announcement levels once it became clear that higher prices could not be justified on the basis of the available information. The empirical evidence is inconsistent with this conjecture and finds instead that announcement date price increases are permanent.⁴

- *Inadequate future investment.* It is not possible to observe investment opportunities that a firm considered but did not take, yet we can determine whether share repurchases crowd out investment or merely reflect the distribution of excess cash. Contrary to the view that firms cut back on capital investment to repurchase shares, I find that, on average, firms have been able to invest in new projects, pay dividends, and repurchase shares without constraint. In situations where such firms need additional funds, they are able to access capital markets to obtain the necessary funding. By contrast, “non-repurchase” firms are unable to fund current investment without accessing the capital markets.

⁴ Since firms tend to repurchase shares after stock price declines, managers tend to act in a manner consistent with their beliefs. Studies of stock market reactions to share repurchase programs report positive announcement date returns, indicating that investors react as if they find such announcements to be credible signals of undervaluation. For example, a recent study by Dittmar and Fields (2015) finds positive announcement date returns of 1.87% that do not reverse. Ikenberry, Lakonishok, and Vermaelen (1995) find that the equity of firms initiating repurchase programs outperform a set of peer firms by 12.1% over the next four years.

- *Managerial Short-Termism.* There is a widely held belief that pressure by activist shareholders creates incentives to meet short-term goals at the expense of long-term value maximization.⁵ Proponents argue that managers frequently respond by repurchasing shares in an attempt to placate disgruntled investors. An analysis by Lazonick (2014) suggests that share repurchases and dividends absorb 91% of net income.⁶ Using an appropriately adjusted definition of net income, I report numbers that are much lower. I find that firms only pay 26.48% of adjusted net income as dividends and share repurchases. My estimate is low enough that payments to shareholders would not be expected to significantly impair a firm’s ability to focus on long-term decisions.
- *Repurchase Plans Disproportionately Benefit the Wealthy.* Given the importance of equity investments to retirement planning, almost everyone benefits from a rising stock market. Seniors, in particular, rely on equity markets to provide them with the ability to meet threshold spending levels in retirement.
- *Repurchase Plans Disproportionately Benefit Corporate Insiders.* The argument that share repurchases disproportionately benefit corporate managers would only be true if share repurchases were being used to manipulate prices so that they trade at artificially high levels. Given the discussion presented above, there is no evidence that this is the case. If, instead, share repurchase programs are used to signal “fair” value, investors are simply realizing benefits that already should have accrued to them.⁷

⁵ Consider the SEC’s recent decision to study the possibility of semi-annual rather quarterly reporting. One of the motivating factors is the perception that managers feel compelled to meet short-term earnings targets rather than focusing on longer-term objectives,

⁶ Fried and Wang (2018) find that after controlling for new share issuances and intangible investments, S&P 500 firms only return 46% of net income to shareholders. They base their findings on the observation that the Lazonick (2018) estimates are biased upward because net income does not consider intangible investments in research and development. Although the Fried and Wang (2028) estimates are much lower than Lazonick’s, they continue to reflect an upward bias because net income also reflects a deduction for depreciation and amortization – a non-cash expense. In my analysis, I adjust net income by adding back depreciation and amortization *and* research and development expense.

⁷ A recent speech by SEC Commissioner Robert Jackson (“Stock Buybacks and Corporate Cashouts” (2018a)) discusses the results of an SEC empirical analysis (2018b) that shows managers have a higher propensity to sell shares following the announcement of a share repurchase program. Commissioner Jackson notes that

“It’s one thing for a corporate board and top executives to decide that a buyback is the right thing to do with the company’s capital. It’s another for them to use that decision as an opportunity to pocket some cash at the expense of the shareholders they have a duty to protect, the workers they employ, or the communities they serve.”

Although provocative, there are a number of mitigating factors that undermine this assertion. First, the empirical evidence suggests that investor reactions to buybacks are permanent rather than transitory. In effect, share repurchase programs help an undervalued stock reflect its true value. Consequently, it shouldn’t matter when executives sell their shares following a buyback. Second, since most equity-based compensation has significant vesting periods, managers that sell their shares may be capturing performance improvements that have helped create. A third factor that the SEC analysis does not consider is the extent to which executives continue to hold significant stakes in the firms they manage after the repurchase program is completed. Finally, the period immediately following the announcement of a stock buyback is likely to be a time when an insider has a clear window within which to sell shares because it can be assumed that the market is fully informed. The decision to sell may simply reflect that this is a period that is free from potential conflicts of interest.

Based on the relative merits of the each side of the share repurchase debate, I conclude that all shareholders benefit from share repurchases and recent criticism of share repurchases does not hold up to careful analysis. Importantly, the associated benefits are firmly grounded in economic first-principles and are strongly supported by peer-reviewed empirical evidence. By contrast, the arguments of those that oppose share repurchase programs are largely based on politically motivated conjecture that bears little relation to the empirical evidence.

In the remainder of this paper, I discuss how share repurchase programs work using a simple numerical example. I then provide empirical evidence that evaluates the extent to which firms investment choices are constrained, and conclude that, on average, firms are not financially constrained. I then document cash payout rates and finish with a discussion of how dividends and share repurchases affect seniors. This final section notes that seniors are active investors in equity markets and would be expected to benefit from share repurchase programs. These benefits primarily relate to senior demands to convert wealth into retirement income, which is eased by the enhanced liquidity and “fair” valuations associated with firms that repurchase shares.

1. The Mechanics of Share Repurchases: A Numerical Example

To put the share repurchase debate into context, it is helpful to start with a simple example that illustrates how share repurchase programs work. The example proceeds by considering three separate scenarios:

- *Scenario 1.* When a firm announces a share repurchase program and its equity is fairly valued, investors are *indifferent* between selling shares and retaining them.
- *Scenario 2.* This scenario considers what happens if the firm is currently undervalued and management pays the “fair” price as part of a share repurchase program. I show that, once again, investors are *indifferent* between selling and retaining shares. This demonstrates that an undervalued firm can successfully signal fair value using share repurchases. A key implicit assumption is that managers are shareholders and public shareholders understand that it is management’s self-interest to pay the fair price.
- *Scenario 3.* I demonstrate that management would not have an incentive repurchase shares at inflated prices if they own stock in the firm.

The main takeaway from this section is that when shares are repurchased at fair value, stock buy-backs function like a substitute dividend with embedded shareholder optionality. I demonstrate that the decision to sell or retain shares has the same impact on shareholder wealth. This implies that an investor can sell shares to create a customized “dividend” or it can remain a longer-term buy-and-hold investor. The ability to customize cash distributions is particularly attractive to retirees who rely on equity investments to fund living expenses in retirement.

1.1 The firm is fairly valued in the market

Suppose a firm is capitalized with \$30,000 of debt and 10,000 shares of stock that are currently valued in the market at \$10 per share. The combined value of the debt and equity firm is

\$130,000 (debt + equity = \$30,000 + \$10 x 10,000). Assuming that the value of the debt and equity is based on the present value of the free cash flows from operations (\$105,000) and cash (\$25,000), Table 1 depicts the firm in terms of a market-based balance sheet.

Table 1

Market-Based Balance Sheet			
Cash	25,000	Debt	30,000
Value of Operations	<u>105,000</u>	Equity (10,000 shares)	<u>100,000</u>
	<u><u>130,000</u></u>		<u><u>130,000</u></u>

Suppose the firm announces plans to repurchase 2,000 shares of common stock on the open market in which it pays \$10.00 per share. After the share repurchase is completed, the firm's productive assets are still valued at \$105,000, but the post-repurchase cash balance is now \$5,000. The repurchase transaction reduces cash and equity levels by \$5,000, resulting in the post-repurchase balance sheet shown in Table 2.

Table 2

Market-Based Balance Sheet			
Cash	5,000	Debt	30,000
Value of Operations	<u>105,000</u>	Equity (8,000 shares)	<u>80,000</u>
	<u><u>110,000</u></u>		<u><u>110,000</u></u>

Now, consider the choice faced by an investor that owns 5% of the outstanding equity (500 shares) prior to the repurchase. Our investor has a pre-repurchase position that is valued at \$5,000. When the firm is fairly priced at \$10 per share, a decision to repurchase shares at \$10 leaves investors indifferent between selling or doing nothing:

- *Sell shares*: The decision to sell all 500 shares at \$10.00 per share nets \$5,000. Because \$10 is the fair price, this is the same value as the investor's pre-repurchase position.
- *Retain shares*: The decision to retain shares leaves the investor with a larger stake in the firm. After the firm purchases 2,000 shares, the investor now owns 6.25% of the equity (500/8,000), which is valued at \$5,000 (\$80,000 x 6.25%), or \$10 per share.

1.2 The firm is undervalued in the market

What happens if management believes that the Value of Operations is undervalued by \$10,000. Assuming this belief is accurate, The Value of Operations is \$115,000 and the pre-repurchase value of the firm's equity should be \$110,000 or \$11 per share as shown in Table 3.

Table 3

Market-Based Balance Sheet			
Cash	25,000	Debt	30,000
Value of Operations	<u>115,000</u>	Equity (10,000 shares)	<u>110,000</u>
	<u><u>140,000</u></u>		<u><u>140,000</u></u>

Suppose that management wants to signal that the firm is undervalued by announcing that the firm will repurchase 2,000 shares of common stock at \$11 per share. If the market finds the signal credible, Table 4 shows how the post-repurchase balance sheet will change.

Table 4

Market-Based Balance Sheet			
Cash	3,000	Debt	30,000
Value of Operations	<u>115,000</u>	Equity (8,000 shares)	<u>88,000</u>
	<u><u>118,000</u></u>		<u><u>118,000</u></u>

If our investor sells all 500 shares at \$11, she now receives \$5,500. If she chooses instead to retain all of her shares, her equity position is valued at \$5,500 ($6.25\% \times \$88,000$), or \$11 per share. This shows that, even in the case where the firm is undervalued, an investor would be indifferent between selling the shares and retaining shares if the signal is credible.

1.3 The firm attempts to inflate share price by overpaying

Let's consider what happens if the firm wants to *improperly* signal that the Value of Operations is \$115,000 rather than its "fair" value of \$105,000 by announcing that it will repurchase 2,000 shares of common stock at \$11 per share. After the repurchase plan is executed, the management team, which is assumed to hold shares, understands that the fair value of the firm is reflected in Table 5.

Table 5

Market-Based Balance Sheet			
Cash	3,000	Debt	30,000
Value of Operations	<u>105,000</u>	Equity (8,000 shares)	<u>78,000</u>
	<u><u>108,000</u></u>		<u><u>108,000</u></u>

Since equity is only valued at \$78,000, management knows that share price should drop from \$10.00 to \$9.75. If management were to thus subsidize the selling shareholders by \$0.25 per share, they would erode the share value of the company and the value of the shares they continue to hold. Since overpaying for shares destroys managerial wealth, one would not expect self-interested managers to overpay for shares in an attempt to artificially inflate price.

2. Do Share Repurchase Programs Constrain Investment?

The short answer is no.

Much of the current debate surrounding share buybacks stems from provisions in the Tax Cuts & Jobs Act of 2017 (TCJA) to tax unrepatriated foreign earnings. To the extent that the repatriation tax frees previously inaccessible cash, one would expect these firms to redeploy excess cash. Reacting to the propensity for firms to repurchase shares with this cash, Dr. Kevin Hassett, the White House's Chairman of the Council of Economic Advisors, offered the following at a February 2018 press conference:

“Well, the thing that you have to remember is that we’re starting out with trillions of dollars that were parked overseas. And that trillions of dollars — those monies are coming home right now and that’s a one-time adjustment. And a lot of firms are taking that money and they’re paying bonuses, but they’re also doing things like increasing dividends and doing share buybacks, which sometimes happens when firms find money.”

The idea that some firms announce share buybacks when they “find” money is hardly surprising. As Dr. Hassett suggests, there are many valid ways to redeploy “found” money. Firms that previously faced financial constraints may optimally increase investment spending. Alternatively, firms that were able to fully invest may not need the cash. For these firms, the decision to return cash to shareholders could be a better choice than retaining it for unspecified corporate purposes.

One factor motivating the decision to repurchase shares could be a decision by the board to actively limit managerial discretion over the unspent cash balances. Finance theory suggests that as managerial discretion increases, it becomes easier for managers to take actions that benefit themselves to the detriment of shareholders.⁸ One way to reduce the potential costs of managerial discretion is by repurchasing shares.⁹ With less available cash, managers are forced to make better investment choices. If cash balances are insufficient to fund new investment, firms can only finance new projects by reentering the capital markets and facing the scrutiny of external investors, which results in increased monitoring and leads to better decision making.

⁸ These conflicts range from excessive perquisite consumption to empire building. The former describes the fact that managers pay relatively small fractions of the cost of the perquisites they consume. The latter reflects the observation that managerial compensation is typically benchmarked to comparable firms. Since manager salary, benefits and status rises with firm size, managers have incentives to increase firm size, even if projects do not have positive net present value.

⁹ Jensen (1986) has argued that agency costs of managerial discretion associated with excess cash leads to suboptimal investment.

This raises a series of questions – What are the characteristics of firms that repurchase shares? Are they able to finance projects from cash flows? Do they access capital markets? What should firms do with cash that no longer required for investment?

Common sense dictates that new investment should only be taken if it increases shareholder wealth. Value creation occurs when a firm invests in projects with returns that are expected to exceed the opportunity cost of capital. That is, a firm should only invest in projects that have positive net present value (NPV).¹⁰ Suboptimal investments - those with negative NPVs - destroy firm value. When firms do not have attractive investment opportunities, repurchasing shares is a sensible alternative to investment in negative net present value projects.¹¹

2.1 The empirical evidence of investment by firms that do and do not repurchase shares

I address this question by examining the investment activity of publicly traded companies over the years 2010 through 2017. Table 6 provides an analysis of gross investment rates (GI) relative to adjusted net income (NI). Gross investment represents the amount spent on capital assets, acquisitions, and research and development expense. Adjusted net income is a measure of the cash generated by operations that could be used by shareholders for investment purposes. I add back research and development expense because it is recognized as an expense for financial reporting purposes even though it is more appropriately viewed as a speculative investment in future growth. I also add back depreciation expense because it is a non-cash expense that does not require the use of any funds. Adjusted net income is the amount that could be used to spend on investment, dividends, and share repurchases.

¹⁰ Net present value is an estimate of the wealth that is created (destroyed) when a projects cash flows are expected to earn more (less) than the opportunity cost of capital.

¹¹ One could argue that MNCs could simply continue to maintain large internal cash balances as a way to hedge against future funding uncertainties. This, of course, would not satisfy critics that would like to see the cash redeployed into new investment “opportunities” nor would it be a particularly effective use of corporate resources. One way to limit managerial discretion concerns is to liquidate excess cash balances by repurchasing shares.

Table 6. Gross Investment (GI) Rates Relative to Adjusted Net Income (NI), 2010-2017

Year	GI/ NI (1)	(GI - Debt)/ NI (2)	(GI-Cap)/ NI (3)	(GI-Cap+Div)/ NI (4)	(GI-Cap+Pay)/ NI (5)
<i>Panel A. Firms that repurchased shares</i>					
2010	66.30%	49.96%	29.34%	39.59%	68.79%
2011	74.88%	37.99%	15.45%	26.15%	63.46%
2012	76.57%	44.08%	29.74%	42.51%	74.01%
2013	73.69%	30.64%	7.88%	17.50%	49.78%
2014	92.95%	32.75%	6.05%	17.57%	60.51%
2015	82.26%	36.40%	15.26%	29.18%	72.83%
2016	73.41%	37.07%	23.18%	36.14%	70.15%
2017	80.19%	35.73%	17.99%	29.28%	58.51%
All years	78.04%	37.65%	17.64%	29.35%	64.74%

Panel B. Firms that did not repurchase shares

2010	88.51%	73.76%	18.95%	30.69%
2011	110.33%	105.25%	57.39%	71.17%
2012	110.89%	73.48%	27.84%	38.17%
2013	116.62%	73.39%	-10.53%	-1.31%
2014	145.21%	79.28%	-25.92%	-14.17%
2015	121.77%	64.11%	-6.85%	6.85%
2016	113.32%	82.13%	16.54%	27.22%
2017	114.07%	72.54%	25.18%	37.03%
All years	115.44%	77.50%	11.59%	23.12%

Gross investment (GI) is defined as the sum of capital expenditures net of capital asset sales, acquisitions net of divestitures, and research and development expense; Net new debt financing (Debt) is defined as the proceeds from the issuance of debt net repayments of debt; net new capital (Cap) is the sum of net new debt plus new equity capital; new equity capital is defined as the sum of the proceeds from the issuance of common stock the issuance of preferred stock, and the sale of treasury shares; ordinary dividends (Div) are defined as payments of dividends to common stock; total cash payouts (pay) are the sum of ordinary dividends and the amount paid to repurchase common stock; adjusted net income (NI) is defined as the sum of reported net income, depreciation expense, and research and development expense. All estimates are winsorized at the 1-percentile and 99-percentile levels.

Table 6 reports results for all publicly traded firms.¹² I separate firms into two groups: Panels A and B respectively report results for firms that repurchase shares within a specific year and those that do not.

¹² I apply several data filters: 1) firms must report revenue greater than 0, 2) firms must report total assets greater than 0, 3) to control for reporting errors, firms must have an end of period stock price greater than \$10 and less than \$2,000, 4) a firm's market capitalization of equity must exceed \$1.0 million, and 5) Adjusted net income must be

2.2.1 Uses of cash for firms that repurchase shares

Column (1) of Panel A indicates that, on average, firms spend 78.04% of adjusted net income on gross investment. While this is a substantial amount, these firms also are active in debt and equity markets. For example, Column (2) shows that net debt issues are used to finance approximately 47% of gross investment ($47\% = (78.04 - 37.65) / 78.04$). This suggests that even though these firms could have financed gross investment from current cash flows, they chose to borrow funds. The decision to borrow may be a reflection of the relatively low interest rate environment that persisted over the sample period. Firms also financed new investment with equity (Column (3)). On average, equity issuances further reduced the impact of new gross investment relative to adjusted net income by 26% ($26\% = (37.65\% - 17.64\%) / 78.04\%$). The yearly numbers indicate that firms were particularly active in equity markets in 2013 and 2014.

Panel A also indicates the fraction of adjusted net income net of new capital that was used for investment and to pay dividends and repurchase shares. Column (4) reports that, on average, firms used 29.35% of adjusted net income to invest and pay ordinary dividends net of net borrowing and equity issuances. This suggests that, on average, firms were able to invest and pay ordinary dividends in a relatively unconstrained manner.

On average, firms use 64.74% of adjusted net income (net of new financing) for new investment and cash payments to shareholders. Given that “repurchase” firms retain 35.26% of adjusted net income, they show no signs of being financially constrained, even after using 35.39% of adjusted net income to repurchase shares ($64.74\% - 29.35\%$). Table 6 shows that these firms have the capacity to invest in capital assets, pay dividends, repurchase shares and still have over one-third of adjusted net income remaining for other corporate uses.

2.2.2 Uses of cash for firms that do not repurchase shares

Panel B shows that firms that do not repurchase shares have gross investment levels that exceed adjusted net income. Column (1) reports that, on average, these firms would not be able to invest without accessing external capital markets – the ratio of gross investment to adjusted net income is 115.44%.

“Non-repurchase” firms have a tendency to rely on debt almost as much as firms that repurchase shares. For example, Column 2 of Panel B indicates that they borrow 40.39% of adjusted net income compared to 37.94% for firms that repurchase shares.¹³ By contrast, “non-repurchase” firms issue significantly more equity than “repurchase” firms. Column 3 of Panel B finds that new equity issues are 65.91% ($77.50\% - 11.59\%$) of adjusted net income for “non-repurchase” compared to 20.01% ($37.65\% - 17.64\%$) for “repurchase” firms. Not surprisingly, firms that issue substantial amounts of new equity are unlikely to repurchase shares at the same time.

3. Cash Payout Rates

This section examines cash yields and payout rates for dividends and share repurchases. This allows one to consider how firms have historically chosen to allocate cash payouts between

greater than zero. I rerun the analysis without imposing the adjusted net income constraint and the results are highly similar.

¹³ These amounts are calculated as 40.39% ($78.04\% - 37.65\%$) and 37.94% ($115.44\% - 77.50\%$), respectively.

ordinary dividends and share repurchases. Columns (1) through (3) in Table 7 present payout yields relative to equity market capitalization, and Columns (4) through (6) report payout rates relative to adjusted net income.

Table 7. Dividend, Repurchase, and Cash Payout Yields and Rates Relative to Net Income (NI) , 2010-2017

Year	Dividend Yield (1)	Repurchase Yield (2)	Payout Yield (3)	Dividend Rate (4)	Repurchase Rate (5)	Payout Rate (6)
<i>Panel A. All Firms</i>						
2010	0.86%	1.51%	2.41%	9.88%	13.07%	23.40%
2011	0.93%	2.21%	3.20%	9.36%	18.98%	28.69%
2012	1.06%	1.60%	2.73%	10.90%	15.79%	27.77%
2013	0.72%	1.33%	2.13%	8.72%	14.70%	23.69%
2014	0.77%	1.59%	2.40%	9.35%	18.76%	29.27%
2015	0.95%	2.16%	3.20%	10.70%	21.20%	32.05%
2016	0.80%	1.46%	2.29%	10.41%	16.05%	26.41%
2017	0.74%	1.07%	1.85%	9.90%	12.79%	23.29%
All years	0.85%	1.60%	2.51%	9.89%	16.44%	26.84%
<i>Panel B. Firms with Unremitted Foreign Earnings</i>						
2010	0.61%	1.80%	2.42%	6.37%	16.32%	22.93%
2011	0.70%	2.86%	3.61%	6.28%	24.15%	30.62%
2012	0.85%	2.07%	2.98%	8.63%	19.79%	29.31%
2013	0.58%	1.77%	2.41%	6.90%	20.13%	27.16%
2014	0.66%	2.25%	2.93%	7.60%	26.49%	34.26%
2015	0.82%	2.91%	3.78%	8.12%	28.92%	37.02%
2016	0.66%	1.88%	2.54%	8.13%	20.93%	28.84%
2017	0.62%	1.55%	2.19%	7.81%	19.84%	27.69%
All years	0.69%	2.13%	2.86%	7.50%	22.12%	29.79%

Dividend yield (Column 1) is defined as payments of dividends to common stock (Dividends) divided by equity market capitalization (MV), where MV is defined as shares outstanding at the end of period multiplied by end of period share price; repurchase yield (Column 2) is defined as amount paid to repurchase common stock (Repurchases) divided by MV; payout yield (Column 3) is defined as the Payouts (sum of Dividends and Repurchases) divided by MV; dividend rate (Column 4) is defined as Dividends divided by adjusted net income, where adjusted net income (Net Income) is defined as the sum of reported net income, depreciation expense, and research and development expense; repurchase rate (Column 5) is defined as Repurchases divided by Net Income; payout rate (Column 6) is defined as the Payouts divided by Net Income;. Firms are classified as having unremitted foreign earnings if they reported having Unremitted Foreign Earnings, Unremitted Foreign Earnings, Tax Liability If Repatriated, or Deferred Tax Liabilities Undistributed Foreign Earnings at some point during the years 2010 through 2017. All estimates are winsorized at the 1-percentile and 99-percentile levels.

Panel A reports that, on average, firms have a cash payout yield of 2.51%, which is comprised of an ordinary dividend yield of 0.85% and a share repurchase yield of 1.60%. Looking at the yearly results, one can see that, on average, firms pay about twice as much through share buybacks as they do with ordinary dividends. Firms only distribute 26.84% of adjusted net

income to shareholders on an annual basis, which provides significant flexibility to invest in capital and intangible assets. Interestingly, in 2017, the year before the TCJA, the repurchase yield is at lowest level for any of the eight years we examine.

Due to interest in the recent passage of the TCJA, Panel B of Table 7 separately reports the same estimates for all companies that disclosed unremitted foreign earnings over the 2010-2017 period.¹⁴ The main takeaway is that payout yields and payout rates (relative to adjusted net income) are very similar to those reported for all firms in Panel A. Firms classified as having reported unremitted foreign earnings have consistently repurchased shares from 2010 through 2017. As one considers how this will change in 2018, it would not be surprising to find that firms continue to repurchase shares. The only question that cannot be addressed at this time is how much the repurchase yields and rates will change relative to prior years.

4. Dividends, Share Repurchases, and Seniors

Seniors rely on savings and Social Security to finance current consumption. While some seniors rely exclusively on Social Security, many have accumulated financial assets that result in significant exposure to equity markets, either directly or indirectly through 401(k) plans and mutual funds. Seniors with substantial exposure to equity markets are better off in stronger markets. This is particularly important for seniors who rely, at least in part, on equity markets to provide them with the ability to meet threshold spending levels in retirement.

Dividends and share repurchases are particularly important to seniors because it allows them to manage retirement income levels.¹⁵ While dividend payments provide a relatively stable source of income, seniors may also liquidate part of their wealth to facilitate desired consumption levels. Seniors that plan to sell stock are likely to find share repurchase programs an attractive option for two primary reasons: 1) there should be minimal price impact because liquidity is high when firms are repurchasing their own stock and 2) prices are likely selling close to “fair value” so seniors are less concerned about selling undervalued stock.

To provide insight into senior participation in the stock market, a recent study by Brady (2017) examines individual W-2 tax return data and finds that participation and contribution rates for employer-sponsored retirement plans increase with age as individuals become more concerned about retirement. Brady (2017) reports that 68% of individuals aged 55 to 64 are active

¹⁴ Firms are classified as having unremitted foreign earnings if they reported having Unremitted Foreign Earnings, Unremitted Foreign Earnings, Tax Liability If Repatriated, or Deferred Tax Liabilities Undistributed Foreign Earnings at some point during the years 2010 through 2017. Undistributed earnings of foreign subsidiaries that are intended to be permanently reinvested offshore is a required reporting element in a public filer’s XBRL submission if it has not been reported as a deferred tax liability. XBRL US reports that this reporting element “is rarely used and companies have either created an extension element or used an inappropriate element to represent this concept. In addition, when reporting this data from period to period, a number of companies have changed the name of the extension element. The use of inappropriate extensions makes it extremely difficult for users to extract this information.” Rather than rely on the amounts reported, we use these elements to identify firms that are affected by the repatriation provisions of the TCJA. See <https://xbrl.us/guidance/reporting-deferred-tax-liability-not-recognized/>

¹⁵ Baker, Nagel, and Wurgler (2007) study household consumption and investment decisions and report that the mean dividend income for households with a household head below age 65 is \$614, versus \$1,818 for households with a household head of age 65 or older.

participants in a retirement plan or have a spouse who is an active participant, and this age group contributes an average of 7.7% of their wages to retirement plans.¹⁶

The Survey of Income and Program Participation conducted by the U.S. Census Bureau reports that in 2014 seniors (the 65 and over age group) make significant directly investments in stocks and mutual funds. Table 1 of Wealth, Asset Ownership, & Debt of Households Detailed Tables: 2014 reports that seniors, on average, hold about 40% of their net worth in (\$80,000/\$198,000) in stocks and mutual funds that are invested outside of retirement accounts.¹⁷

Not only are seniors more active in preparing for retirement needs than younger people, but they have significant exposure to equities. Contrary to idea that seniors allocate relatively small amounts of their retirement assets to equity, Holden, VanDerhei, Alonso, and Bass (2017) find that 401(k) plan participants in their 60s invest 43.9% of their plan assets in equity funds or the common stock of their employer. If one also includes the fraction of equities associated with balanced funds – a target date fund is an example of a balanced fund – their aggregate exposure is 55.2%.¹⁸

¹⁶ By contrast, the corresponding participation rate for individuals aged 26 to 34 only is 52% to which they contribute an average of 4.4% of their wages.

¹⁷ Seniors have larger investments in stocks and mutual funds compared to other age groups: \$9,700 for less than 35 years, \$20,000 for 35 to 44 years, \$31,000 for 45 to 64, and \$50,000 for 55 to 64 years. See Survey of Income and Program Participation, “Wealth, Asset Ownership, & Debt of Households Detailed Tables: 2014.” https://www2.census.gov/programs-surveys/demo/tables/wealth/2014/wealth-asset-ownership/wealth_tables_cy2014.xlsx

¹⁸ Holden, VanDerhei, Alonso, and Bass (2017) report that 11% of 401(k) plan participants are in their 60s and that this age group holds 20% of all plan assets. By contrast, participants in their 20s represent 14% of the participants but only 1% of plan assets.

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