VOLUME 20 | NUMBER 3 | SUMMER 2008

Journal of APPLIED CORPORATE FINANCE

A MORGAN STANLEY PUBLICATION

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Morgan Stanley

Corporate Cash Policy and How to Manage it with Stock Repurchases

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American public companies are now holding very large amounts of cash. In 2004, the aggregate level of U.S. corporate cash holdings reached an all-time high of just under $2 trillion[1]—an amount equal to roughly 15% of the total U.S. GDP. Although this amount has come down since then, the average level of cash holdings (as shown in Figure 1) has increased fourfold in the last 25 years. Further, as a percentage of total assets (see Figure 2), average cash holdings have jumped from 10% to 23% over roughly the same period.

Such high levels of cash may seem surprising, given the current depressed state of the U.S. economy. As a recent *New York Times* article noted, "Unlike most American consumers, whose failure to save has exasperated economists for years, the typical American corporation has increased its savings so sharply that it probably has enough cash on hand to completely pay off its debts."[2] But, as I argue in this paper, it is precisely because of the possibility of tough economic times that many companies hold such large amounts of cash. Reserves of cash are especially valuable during periods of financial trouble because they provide a buffer against shortfalls in operating profits—one that can be used to avoid financial distress or provide funding for valuable projects that might otherwise have to be put off. [3]

As one would also expect, the need for such a cash buffer differs greatly among companies and, as a result, there is considerable variation in corporate cash holdings. At the end of 2006, for example, one-quarter of all publicly traded U.S. companies held at least 36% of their assets in the form of cash. At the same time, the cash holdings of another quarter of U.S. firms amounted to less than 3.3% of their assets.

Why does the level of cash vary so dramatically across companies—and why do these levels change over time? These questions have been the focus of many academic studies, and one of the two main goals of this paper is to review the academic literature on corporate cash policy to provide guidance on how much cash companies should hold to weather possible storms. In so doing, I will try to shed light on why companies now hold so much cash and why this level has been rising.

Storms come to an end, of course. And when industries and markets stabilize, corporate cash requirements may fall. In other words, when the economy begins to turn up, many companies that have accumulated cash in anticipation of tougher times may decide that they have far more cash than they need.

For the shareholders of these companies, such high levels of cash can be cause for concern. A considerable body of academic work over the past two decades has provided extensive evidence that excess cash holdings and high levels of cash flow can lead to corporate waste and loss of value. The basic message of this research is that corporate managers with limited equity incentives and working under weak governance systems are likely to use these excess resources for their own benefit, giving rise to what financial economists call "agency costs." Agency costs can take the form of perk consumption or, much more costly to shareholders, corporate "empire building" through ill-advised and overpriced acquisitions. Reflecting this potential for companies to waste excess cash, studies have concluded that, in companies with weak governance systems, a dollar of cash may be worth significantly less than a dollar—indeed as little as 40 cents![4]

How can companies avoid these costs associated with holding too much cash? One option is to pay out excess cash by initiating or increasing cash dividends. Another is to buy back stock. Stock repurchases, particularly open-market repurchases, are a flexible way to distribute cash to shareholders. Unlike an increase in dividends, the announcement of an open-market repurchase program does not *commit* the firm to distribute funds. In such cases, management retains the option to start and stop the repurchase program based on the firm's cash needs and stock price, among other factors. This flexibility, as discussed later, is especially valuable to companies facing uncertainty about their performance and market value.

Just as the level of U.S. corporate cash holdings has increased over the last 25 years, so too has the corporate use of stock repurchases. But unlike the increase in cash holdings, the growth of repurchases has not been steady, but rather

* The author appreciates helpful comments and suggestions from Don Chew and Ran Duchin.

1. All figures are measured in real 2006 dollars.

2. Diana Henriques "Unlike Consumers, Companies Are Piling Up Cash," The New York Times, March 4, 2008.

3. Keynes (1936) was among the first economists to describe these benefits of cash, which he identified as the "precautionary motive" for large cash holdings.

4. As discussed later in this paper, this finding comes from my recent study with Jan Mahrt-Smith. See Dittmar and Mahrt-Smith (2007). Full citations of all studies can be found in the References section.

Figure 1 **Cash for Non-Financials by Year in Billions**

Depicts the cash and equivalents held by all frms listed on Compustat except fnancials and utilities (sic code begins with 6 or 49) from 1980 to 2006. All amounts are CPI-adjusted to 2006 dollars for comparison.

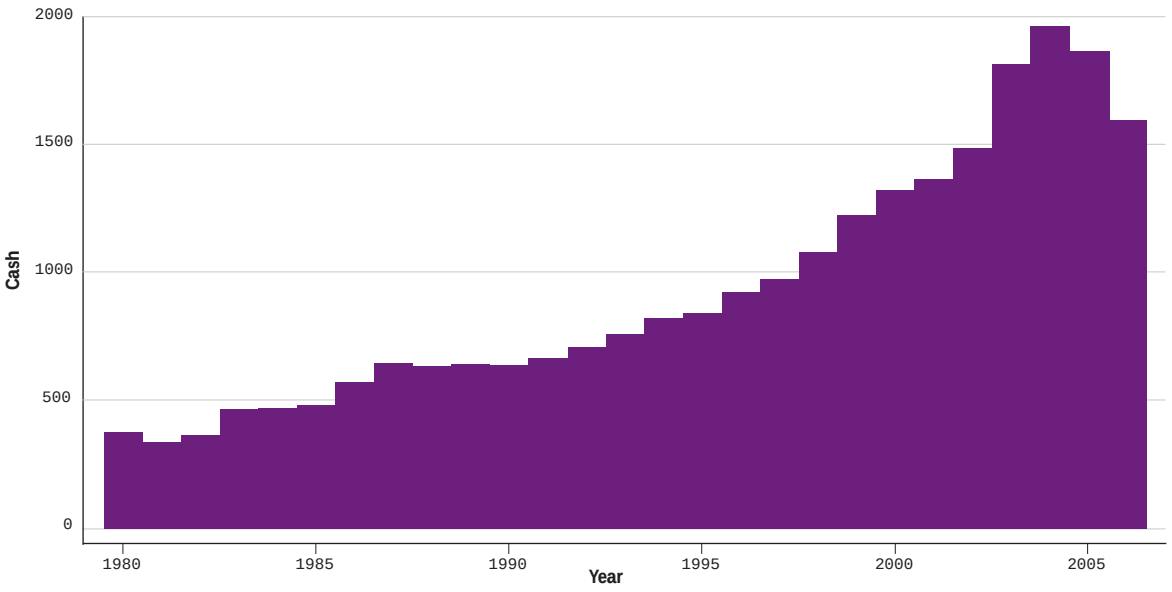
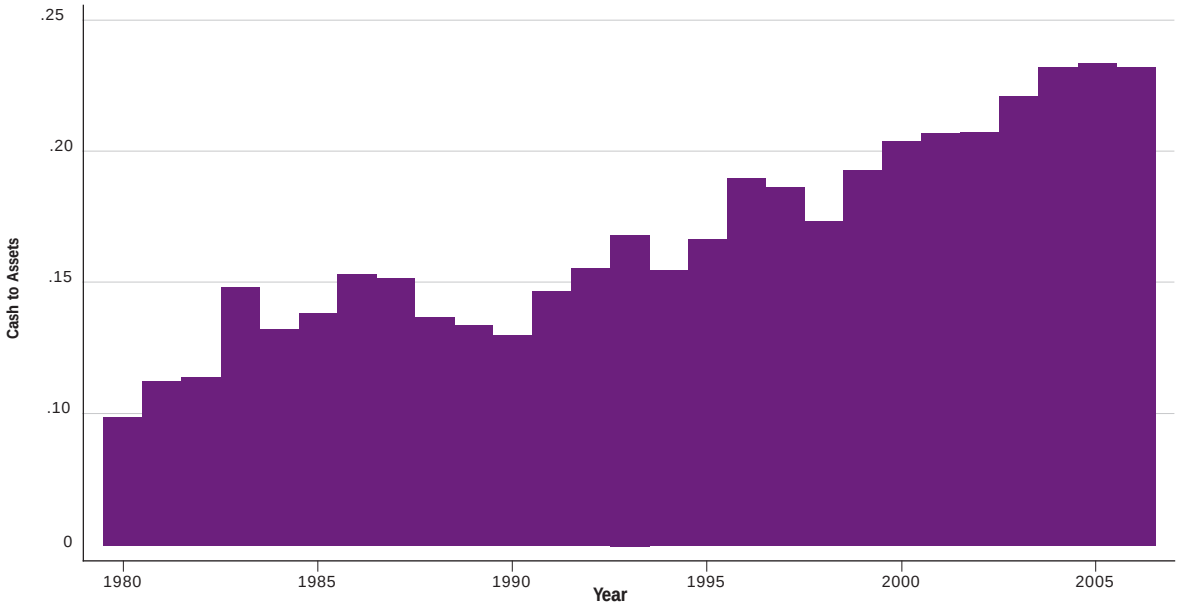


Figure 2 **Cash to Assets for Non-Financials by Year**

Depicts the cash and equivalents divided by total assets for all frms listed on Compustat except fnancials and utilities (sic code begins with 6 or 49) from 1980 to 2006.



one of sharp fluctuations around a rising trend line. These fluctuations, as my own recent research suggests, have been driven mainly by variations in corporate operating profits and cash flows. And, as I argue later, this variability goes a long way in explaining the growth in corporate cash holdings over the same period.[5]

In the second half of this article, I review the literature on corporate distributions of capital, with particular focus on the costs and benefits of stock repurchases (relative to dividends). In so doing, my aim is to provide a link between our understanding of corporate decisions to hold cash and decisions to pay it out.

Cash: A Buffer for Uncertain Times

Does cash policy matter? In other words, do companies have target cash ratios and, if so, what factors determine how much cash a firm should hold?

The answer to the first question is a clear yes; companies do act as if they have target cash ratios. In a pioneering study of corporate cash holdings published in 1999, Tim Opler, Lee Pinkowitz, René Stulz, and Rohan Williamson (hereafter referred to as "Opler et al.")[6] used regression analysis to develop a model that estimates a company's *expected* cash holdings as a function of several key characteristics, including size, risk, and growth potential. The basic premise underlying the model was that smaller, riskier companies with promising growth opportunities choose to hold more cash than large, stable, and relatively mature companies with reliable access to outside capital. Using this model, they estimated predicted cash ratios for all public companies in each year during the period 1952-1994. And by setting a company's actual cash holdings against the predicted level, they were then able to estimate levels of *excess* cash (which could be positive or negative) for each company in every year.

Opler et al. reasoned that if companies do have targeted levels of cash holdings, then over time their levels of cash should revert toward the targets. They confirmed this prediction by examining the trend in cash reserves. In other words, the changes in a company's cash holdings in any given year appear, on average, to have been designed to move back toward their targeted levels. Thus, for example, if company X had a 25% increase in its level of cash in one year (resulting, say, from an unexpected jump in its operating cash flow), the level of cash is likely to drop significantly in the following year, reflecting management's effort to get back to its target.[7]

But this brings us to our second question: How do companies determine their target cash ratios? The short answer is that they weigh the benefits and costs of holding the next dollar of cash. The primary benefits of holding cash, as suggested earlier, come from the use of cash reserves to offset shortfalls in operating cash flows during a general economic or industry downturn. By keeping large amounts of cash on hand, companies avoid the potentially large transactions costs associated with having to raise capital during tough times and on short notice.

The Role of Cash in Maintaining Strategic Investment. To see these benefits more clearly, imagine that a company has a highly valuable project but has exhausted its internal sources of funds. In that case, the company's managers must either raise outside capital or forgo the project.

For those companies with the size and stability to have an investment-grade bond rating, the answer is likely to be straightforward: Go to the public capital markets and, especially if the firm's stock price is depressed, issue debt.[8] In such cases—and for non-investment grade companies as well—the alternative of raising outside equity is likely to be very costly. The crux of the matter here is that because the managers of companies issuing new securities are in a better position than their investors to understand the true value of the firm, such securities must be issued at a "discount" from their value to compensate investors for their informational disadvantage. And because the uncertainty has a much more negative effect on the value of the firm's equity than on the value of its debt, the discount required to sell new equity is larger (in fact, the debt may not have to be discounted at all). In such circumstances, the sale of undervalued equity represents a major cost to the existing shareholders—one that I will refer to as "information costs."

Now, as I already suggested, for investment-grade companies with unused debt capacity, the solution to this financing problem is to issue debt. But for companies without an investment-grade rating, raising outside capital is likely to be very expensive. Recessions tend to reduce access to external, and particularly public, financing. And since companies with limited access to external capital feel the credit crunch during a recession more than other firms, they are more likely to be affected by an economic downturn.[9]

To avoid such high "information costs" when raising outside capital, we would expect companies with limited access to capital to maintain larger cash holdings (as a percentage of assets). This expectation was confirmed by Opler et al.'s

5. See Dittmar and Dittmar (2007), which, as discussed later, shows that aggregate frm cash fows are the primary driver of stock repurchase waves.

6. See Opler, Pinkowitz, Stulz, and Williamson (1999) and, also, Kim, Mauer, and Sherman (1998).

7. The median coeffcient from regressing the change in cash on the change in cash in the prior year is -0.242; thus, a $1 increase in cash (holding non-cash assets constant) is expected to lead to a $0.24 drop in cash the following year.

8. According to a fnance theory known as "the pecking order," debt is preferred to equity because, under conditons of uncertainty where managers know more than investors about the true value of the frm, investors will require a "discount" when purchasing the security to compensate for this uncertainty (or, alternatively, they will revise downward their own estimates of frm value). See Myers and Majluf (1984). The best indication of the size of the discount is the roughly 3% average negative stock price reaction to announcements of seasoned equity offerings. (See Asquith and Mullins (1982).) And provided a company is fairly valued before the announcement, this 3% drop represents a dilution of the existing shareholders' value and hence a major cost of (and in many cases the main deterrent to) raising of new equity.

9. Cohn (2007).

finding that larger companies with investment-grade credit ratings tend to have significantly lower cash balances (again, as a percentage of total assets) than smaller firms that do not have investment-grade ratings.

Of course, it's not just the cost of raising outside capital that drives corporate cash decisions. Another critical factor is the extent and value of the investment opportunities that would have to be passed up for lack of cash and capital. In support of this argument, Opler et al. and a number of follow-up studies have shown that companies with high recent sales growth rates, high market-to-book ratios, and large R&D budgets (as a percentage of sales)—all proxies for growth firms—tend to hold larger cash reserves as a percentage of total assets.[10]

Cash as a Risk Management Tool. Another way of viewing corporate cash holdings is as an insurance policy against the possibility of a shortfall in the company's operating cash flow. To determine how much cash they should hold, companies must have a good sense of the size and probability of this shortfall as well as the capital requirements for funding their key investments. The greater the uncertainty or volatility of a company's cash flow, the larger the (probability-weighted) expected shortfall in operating cash, and hence the more cash the firm will need to hold. Or, to put this in slightly different words, the riskier a company's operations, the higher the expected level of cash reserves. Consistent with this prediction, Opler et al. found that companies with greater business risk, as measured by the standard deviations of their industry's operating returns on capital, have larger cash holdings as a percentage of total assets.[11]

What's more, one of the clear findings of a very recent study (which I discuss in more detail below) is that U.S. public companies have become riskier during the past 25 years. And, as theory would predict (and mentioned at the outset of this article), aggregate corporate cash holdings have increased dramatically during that time.[12]

But to sum up briefly, a company's demand for cash tends to reflect its sources of capital (and their cost) in relation to its potential uses (and their value). Companies with the greatest demand for cash have the most limited access to capital combined with the most valuable investment opportunities (at least when expressed as a percentage of total firm value).[13]

The Potential for Wasting Cash

Having explored the benefits of holding larger cash reserves, let's turn to the costs of holding cash over and above what is needed for operating and precautionary reasons?

The primary cost of holding cash is that, in the absence of valuable investment opportunities, corporate managers are likely to waste excess cash reserves by making bad acquisitions or otherwise pursuing growth or market share at the expense of profitability and value. Or they may reduce the value of their companies just by using the cash as a pretext for avoiding tough decisions to downsize when necessary.[14]

In a study published in the *Journal of Financial Economics* in 2007,[15] Jan Mahrt-Smith and I examined the operating performance of companies with excess cash and weak corporate governance, as indicated by several corporate bylaws and charters (notably staggered boards and antitakeover provisions) and low institutional equity ownership. What we found is that such companies appear to use their excess cash in ways that significantly reduce their operating performance (as measured by their ROAs relative to their peers). While well-governed companies tend to maintain their industry-adjusted ROAs and hold onto their cash, possibly saving it for future needs, poorly governed firms see their levels of excess cash fall by as much as 50% in just a few years while reporting declining ROAs.

What happened to the excess cash? One possible explanation is that it went to fund low-return investments, which would account for the lower ROAs. Consistent with this hypothesis, other studies have shown that companies with large cash reserves and weak governance systems spend more capital on acquisitions and that, after such acquisitions, the operating performance of the combined firm suffers.[16] Another possible explanation of our findings is that the mere availability of the excess cash reduces the urgency of managers' incentives to control costs and increase margins and returns on capital.

Either way, our study suggests that large cash reserves in combination with weak governance is a prescription for waste and loss of value. And this behavior is by no means limited to the United States. In fact, holding excess cash has been shown to be especially problematic in countries with limited shareholder rights.[17]

These findings are not meant to suggest that good governance is a substitute for disciplined cash policy—only that good governance can limit the destructive effects of a suboptimal cash policy. In fact, effective governance, as a general rule, is probably more likely to lead to optimal cash holdings.[18]

10. Opler et al. (1999), see also Dittmar and Mahrt-Smith (2007).

11. Opler et al. (1999) examines the impact of the volatility of industries, Duchin (2007) examines the impact of more volatile non-diversifed frms, and study predation risk.

12. Bates, Kahle, and Stulz (2007).

13. Another reason U.S. multinational frms hold cash is that, in the case of their foreign subsidiaries, the taxes associated with repatriating foreign income prevent the frm from cost effectively distributing or using the cash elsewhere [Foley, Hartzell, Titman, and Twite (2007)].

14. Myers and Rajan (1998) hypothesize that more liquid assets can lead to increased agency problems. Jensen (1986) discusses how excess cash fow leads to agency problems and wasting.

15. Dittmar and Mahrt-Smith (2007).

16. Harford (1999) and Harford, Mansi, and Maxwell (2008).

17. Dittmar, Mahrt-Smith, and Servaes (2003), Pinkowitz, Stulz, and Williamson (2006), and Kalcheva and Lins (2007).

18. That clearly seems to be the case, for example, with companies controlled by private equity.

The Value of a Dollar of Cash

How important are these costs and benefits of holding cash? One way to assess their importance is to ask the question: What is the value to a company's investors of a dollar of cash on the firm's balance sheet? One's first thought, of course, is that a dollar of cash should be worth a dollar—no more, no less. But if, as a result of holding that dollar, the company is able to take projects it would have otherwise passed up, the value of the dollar may be greater than its face value. Conversely, if the dollar is excess cash and has no profitable uses, the likelihood that it will end up being wasted makes its marginal value less than a dollar.

To help understand the importance of the costs and benefits of holding cash, a number of studies have used regression analysis to try to estimate the contribution (whether positive or negative) of a company's cash holdings to its total value. The challenge in identifying this contribution is to come with a regression model that controls for all other variables (in addition to cash holdings) that are likely to have important effects on value, such as earnings, capital expenditures, and so forth.

Using a regression technique that relates annual changes in cash holdings to annual changes in value, a 2006 study by Mike Faulkender and Rong Wang reported finding that the value of a dollar of cash to a company with limited access to external capital markets was as high as $1.15.[19] The premium value effectively assigned to cash in this case can be seen as reflecting the potential value of projects that might otherwise have gone unfunded. At the same time, using a similar technique, my 2007 study with Jan Mahrt-Smith estimated the market value of a dollar of cash to be as low as 42 cents, which we interpreted as conveying the market's expectation of value to be lost from the waste of cash reserves.

In the case of companies outside the U.S., the markets seem even more skeptical about their ability to manage excess cash. Using a sample of companies from 35 countries over the period 1988-1998, Lee Pinkowitz, Rohan Williamson, and René Stulz found that, in countries they deemed to provide effective investor protection, a dollar of liquid assets was worth roughly a dollar to minority investors. But, in countries with limited investor protection, a dollar of cash was found to be worth less than 30 cents.[20]

Finding the Optimal Level of Cash

While the research discussed in the previous section shows that excessive cash reserves can reduce performance and value in some companies, the evidence also shows that large cash reserves can increase the value of other companies by enabling them to avoid financial distress and invest in economic downturns. Thus, the literature highlights the fine line between cash providing managers flexibility to maximize the value of their investment policy and the access to excessive cash that may lead to waste and agency costs.

As with most economic decisions, the optimal amount of cash reserves can be estimated by finding the level where the marginal benefit (in terms of flexibility) from holding the next dollar is equal to the marginal cost (in terms of waste). While there are no direct ways of observing or measuring these costs and benefits, we can use the existing research to identify financial ratios and data that can serve as useful "proxies" or indicators for the key factors in the corporate cash decision.

The study by Opler et al. provides a good starting point for this analysis. As noted earlier, the study uses regression analysis to develop a model that calculates the expected level of corporate cash holdings as a function of a number of important "independent" variables:

- company size (as measured by the log of net assets);
- profitability (cash flow to net assets);
- liquidity (net working capital to assets):
- leverage (debt to net assets);
- growth opportunities (as indicated by market to book ratios, capital expenditures to net assets, and R&D to sales);
- risk (mean of standard deviations of cash flow over assets over 20 years for firms in the same industry as defined by two-digit SIC code); and
- dividend policy (a dummy variable equal to one if the firm pays a dividend).

Summarized as briefly as possible, the regression model of Opler et al. says that cash holdings are a positive function of variables like (industry) risk and growth opportunities, and a negative function of size and other proxies for stability, such as higher leverage and dividends. And by providing a reasonably reliable indication of the relative importance of each of these variables, the model can be viewed as an approach for estimating the amount of cash needed to support a company's operations—one that uses the cash holdings of comparable firms as a benchmark.

Do companies hold cash in excess of these predicted levels and, if so, how much? In an attempt to determine the extent to which actual cash holdings exceed the levels calculated by Opler et al., Jan Mahrt-Smith and I ran a regression similar to Opler et al.'s and used the resulting coefficients together with firm-specific data to estimate predicted or target leverage ratios.[21] When we compared the actual cash ratios to the targets, we found many companies holding very large amounts of excess cash. For instance, in 2003 Microsoft's excess cash amounted to 60% of its total non-cash assets.

19. These calculations are presented in Dittmar and Mahrt-Smith (2007) and Faulkender and Wang (2006), who regress the change in value on the change in cash and several indicator variables to identify types of frms. These indicator variables are interacted with (multiplied by) cash to calculate how each impacts the value of a dollar of cash. Pinkowitz and Williamson (2007) examine a similar question with a different approach to the calculations.

20. Pinkowitz, Stulz, and Williamson (2006).

21. Dittmar and Mahrt-Smith (2007).

What's more, in the same year, five percent of all U.S. public companies held 20% more in excess cash than in all other non-cash assets combined. And, as noted earlier, we also found that, in poorly governed companies, higher levels of excess cash were associated with diminishing performance.

Increasing Cash Holdings over Time

As we saw earlier in Figures 1 and 2, the level of cash holdings has increased dramatically over the last 25 years. In a recent working paper, Thomas Bates, Kathleen Kahle, and Rene Stulz attempted to explain this increase by looking for changes over time in the key variables in the regression model developed by Opler et al.[22] The study's principal finding is that companies hold more cash because their operating cash flows have become riskier, their inventories and accounts receivable have fallen, and their R&D expenditures have increased. By far the largest of these effects, however, has been the increase over time in corporate risk.

In sum, the evidence of this new study suggests that corporate cash levels have changed over time primarily because the companies themselves have changed. What has not changed, however, is the considerable explanatory power of the regression model. This in turn, suggests that companies rethinking their own cash levels should consider fitting their own current data to the model, at least as a starting point in their analysis. But, as I've also suggested, companies need to monitor developments in the broader economy. For example, when the currently sluggish economic conditions begin to improve, many companies may see their access to capital expand and their precautionary need for cash holdings fall.

This brings us to our second main question: When a company has too much cash on its balance sheet or is generating more cash flow than it can reinvest profitably, what is the best way of distributing this excess cash?

Distributing Cash: Dividends and Stock Repurchases

Companies can distribute cash to shareholders in one of three main ways: regular dividends, special dividends, and stock repurchases.[23] In the past 25 years, as can be seen in Figures 3 and 4, the corporate use of repurchases has fluctuated around a general upward trend line, with a remarkable surge in the last few years, starting with 2004.[24] Indeed, as shown in Figure 5, the annual aggregate volume of repurchases surpassed that of dividends for the first time in 2005, and the margin of buybacks over dividends widened significantly in 2006 (the last year for which we have data).[25]

Are repurchases substituting for dividends? It appears that the answer is yes, in part. Since around 1980, the percentage of public companies that pay dividends has fallen steadily over time, from about 60% in 1980 to about 20% in 2002.[26] This drop in dividend-paying companies is attributable to changes in the companies themselves as well as a general decline in what might be called the corporate "propensity" to pay dividends. At least part of this declining propensity may be attributable to the increase in repurchases.

While at Harvard in the 1950s, John Lintner came up with a model that explains dividends as a function of what might be called "permanent" earnings. The basic insight of the model is that, because of managers' reluctance to cut dividends, companies are reluctant to raise them faster than the rate of permanent or sustainable earnings. And finance academics since then have hypothesized that while dividends tend to be paid out of permanent earnings, repurchases are used mainly to distribute "temporary" or non-recurring earnings. In this sense, the role of dividends and repurchases can be seen as *complementary*.

Other researchers, however, have proposed that repurchases may be functioning more as *substitutes* for dividends—that is, providing a means of distributing permanent as well as temporary earnings. Consistent with this latter argument, a 2002 study by Gustavo Grullon and Roni Michaely provided evidence that repurchases substitute for dividends by showing that stock repurchases explain the difference in actual and predicted dividends when using the Lintner model to predict dividends.[27] Also providing evidence of this substitution effect, a 2004 study by Robert Dittmar and I found while examining the aggregate pattern (or waves) of corporate payouts that *both* repurchases and dividends are used to pay out permanent earnings.[28] Our study also showed that the sensitivity of dividends to changes in permanent earnings fell significantly in the early 1980s, when companies began to use more stock repurchases, and has since then remained at this low level, indicating that a shrinking portion of permanent earnings were being paid out as dividends.

In sum, repurchases can be seen as functioning both as a substitute for dividends (to the extent they pay out permanent

22. Bates, Kahle, and Stulz (2007). The study finds that the economic significance of the intercept does not increase over time, indicating that the explanation for the time trend is in the variables in the model. They then allow the coefficients to change and find that the overall power of the model does not increase, suggesting that the overall relative importance of the coefficients is unchanged.

23. A firm can repurchase stock through an open market stock repurchase or a self-tender offer. The vast majority of all repurchases are done through an open market stock repurchase and, thus, in this paper I will focus on the motives for implementing these programs. More recently, firms also can repurchase stock by contracting with an investment bank to do an accelerated stock repurchase. These transactions are described in Grullon and Ikenberry (2000).

24. The history of corporate stock repurchases really begins with a regulatory change in the early 1980s. In November 1982, 10b-18 was approved and went into effect. This regulation limits the litigation uncertainty from repurchasing stock and therefore protects firms in an open market stock repurchase. Open market stock repurchases were almost non-existent before this regulation. Regulation 10b-18 applies only to trades of a firm's own stock. It is a "safe-harbor" rule and thus provides legal protection but does not limit what a firm can do. Cook, Krigman, and Leach (2003), however, show that many firms violate these safe-harbor restrictions, especially following a stock price decline.

25. This trend has been documented in many papers, including Bagwell and Shoven (1989), Dittmar (2000), Grullon and Michaely (2002), and Dittmar and Dittmar (2007) among others.

26. Fama and French (2001)

27. See Grullon and Michaely (2002). For the Lintner model, see Lintner (1956)

28. Dittmar and Dittmar (2004)

Figure 3 **Repurchase for Non-Financials by Year in Millions**

Depicts stock repurchases for all firms listed on Compustat except financials and utilities (sic code begins with 6 or 49) from 1980 to 2006. Stock repurchases are determined as using the purchase of stock variables from the statement of cash flows in Compustat. All amounts are CPI-adjusted to 2006 dollars for comparison.

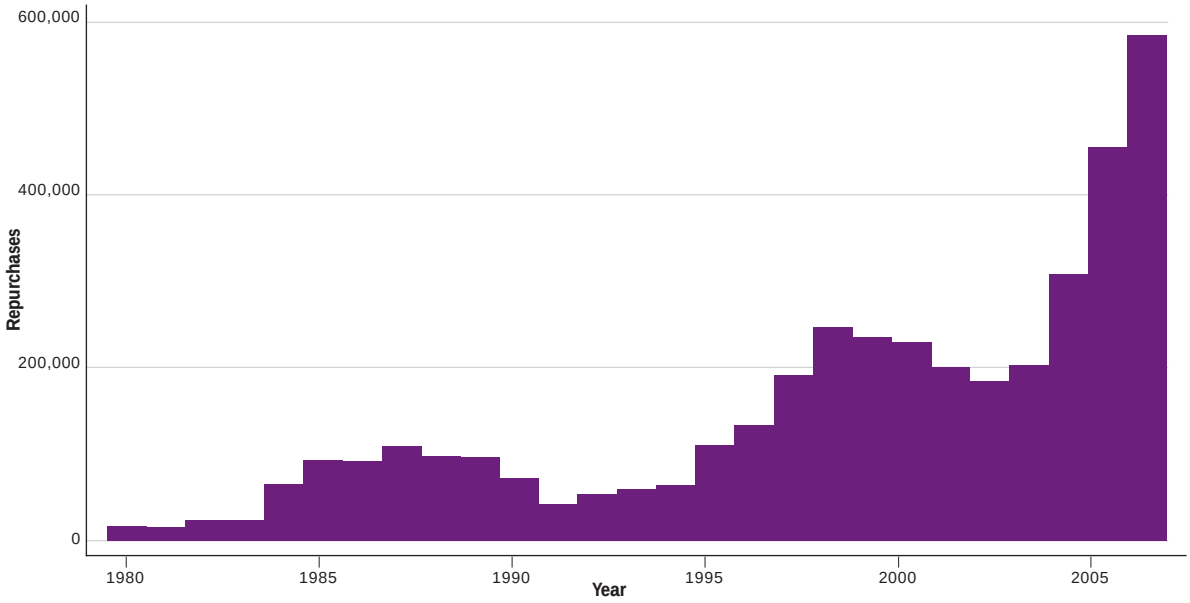


Figure 4 **Repurchases to Market Value for Non-Financials by Year**

Depicts stock repurchases relative to market value of equity for all firms listed on Compustat except financials and utilities (sic code begins with 6 or 49) from 1980 to 2006. Stock repurchases are determined as using the purchase of stock variables from the statement of cash flows in Compustat. Market value is calculated using fiscal year-end closing prices and common shares outstanding.

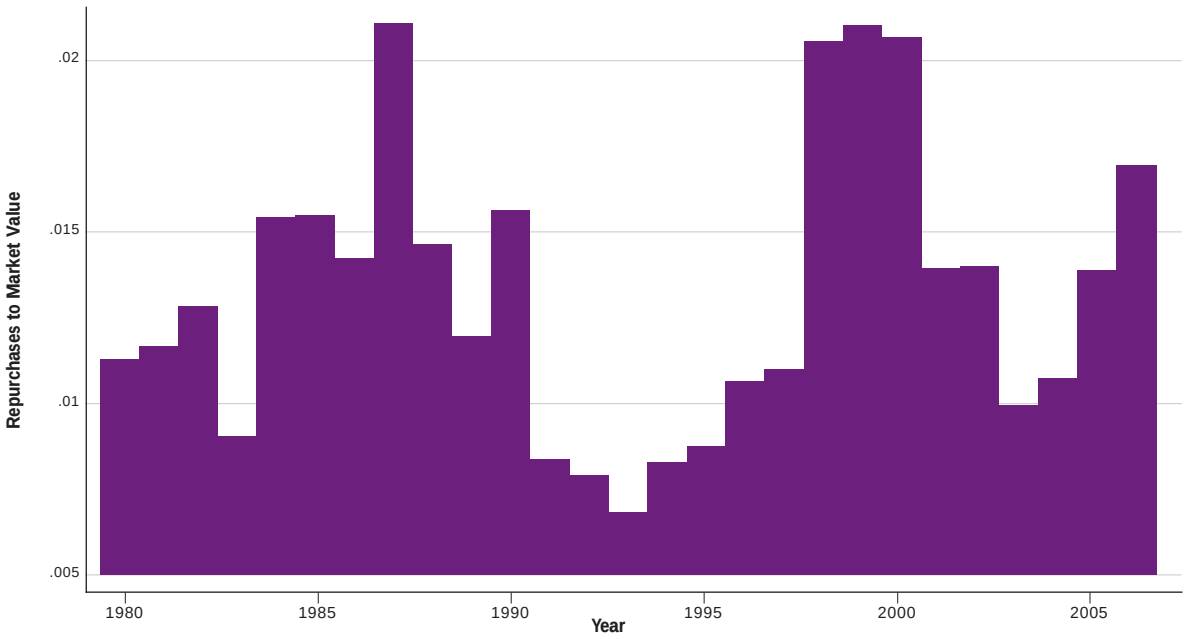
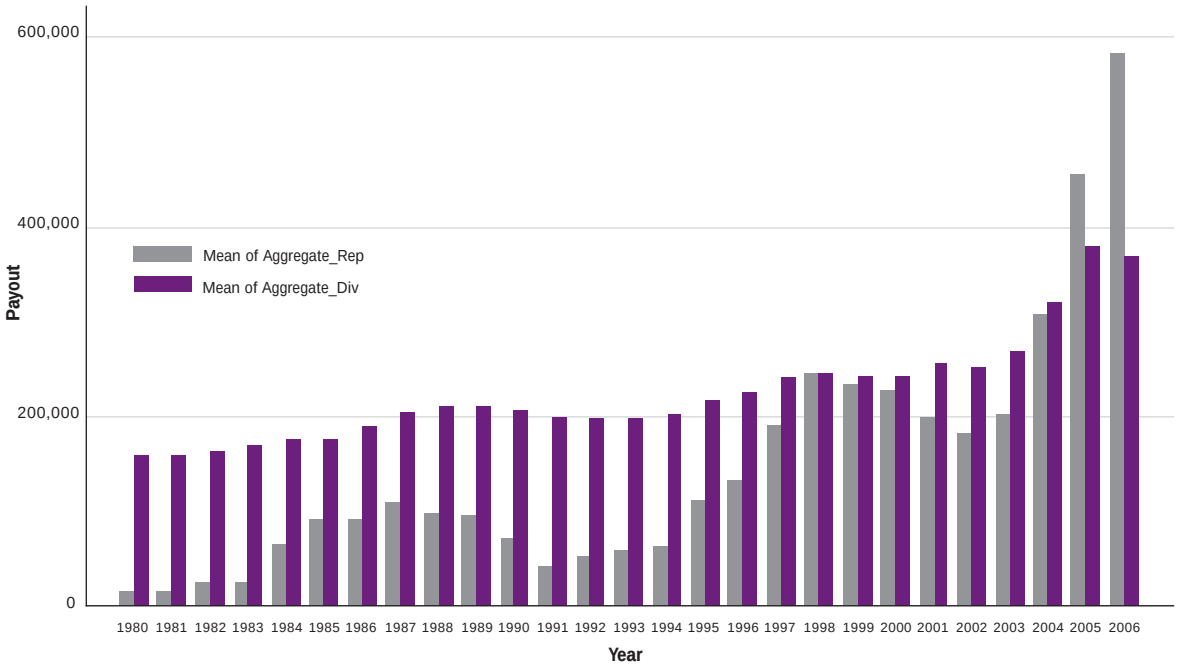


Figure 5 **Aggregate Repurchases and Dividends by Year**

Depicts stock repurchases and dividends for all firms listed on Compustat except financials and utilities (sic code begins with 6 or 49) from 1980 to 2006. Stock repurchases are determined as using the purchase of stock variables from the statement of cash flows in Compustat. Dividends are cash dividends paid. All amounts are CPI-adjusted to 2006 dollars for comparison.



earnings) and as a complement (by paying out unexpected earnings). This interpretation has received further support from an even more recent study showing that the correlation between earnings and total payouts (that is, dividends and buybacks) has increased over time, and that this increased correlation can be traced primarily to variations in the level of repurchases.[29] In other words, since the corporate use of dividends has been relatively stable (with a modest rise after the tax reform of 2003), these results suggest that corporate managements have used stock repurchases to keep their total payouts roughly in line with variations in earnings.

Stock Repurchases: A Flexible Distribution Mechanism

Why do companies repurchase stock and what advantage do repurchases have over dividends? One of the largest benefits of stock repurchases—particularly open market stock repurchases—is their flexibility.[30] In establishing an open market stock repurchase program, a company will begin by announcing that its board of directors has authorized the repurchase of a specified number of shares over a certain period of time (typically two-to-four years). But this announcement tells the public only that the firm *may* repurchase stock; it is not a firm commitment and thus the company is not obligated to buy back stock after announcing an open market program. And, as studies have shown, only about 75% of the shares that have been authorized to be repurchased end up getting repurchased.[31] Moreover, almost 20% of the companies that announce repurchase programs do not repurchase a single share within the next four years, though the majority of companies (about 54%) begin to buy back shares in the quarter following the repurchase announcement.[32] The length of the average open market repurchase program is 115 trading days for NASDAQ companies and 195 trading days for NYSE firms.[33]

Are there negative consequences to announcing repurchase programs and failing to follow through? Most corporate managers don't seem to think so. In a recent survey of CFOs, almost 90% of the respondents stated that there were negative consequences from cutting dividend payouts. But only about

29. Skinner (2008).

30. Special dividends are also fexible relative to regular dividends in the sense that they are one-time events. However, as shown in DeAngelo, DeAngelo, and Skinner (2004), special dividends were once common but are now used infrequently.

31. Jagannathan, Stephens, and Weisbach (2000).

32. Bhattacharya and Dittmar (2004).

33. Cook, Krigman, and Leach (2003).

20% said the same about stock repurchases.[34] When interpreting the survey evidence, the authors concluded that, "Managers value the flexibility of repurchases and dislike the rigidity of dividends." And providing support for this claim, a 2000 study by Ravi Jagannathan, Clifford Stephens, and Michael Weisbach found that companies that make greater use of repurchases than dividends in distributing excess cash tend to have higher levels of non-operating cash flow as well as more volatile cash flows and total distributions. [35] In other words, companies with greater uncertainty about their income are more likely to use repurchases.

Though repurchases provide a flexible mechanism for paying out excess cash, they also appear to be effective in limiting the agency costs that tend to arise from holding too much cash. For example, a 2004 study by Grullon and Michaely cited earlier found that companies that buy back stock tend to reduce their capital expenditures, and that the generally positive market reaction to share repurchase announcements is even more positive for those companies that are most likely to "overinvest" (as indicated by high cash flow and limited investment opportunities). And my own 2000 study provides further support for this argument by showing that companies are more likely to repurchase stock when they have high cash flow and low investment opportunities.[36]

Dividends, of course, are also a potential solution to this corporate agency problem. But, until recently, dividends had the disadvantage of being taxed at higher personal tax rates than repurchases. Until 2003, stock repurchases in the U.S. were taxed at the capital gains rate and dividends at the ordinary income rate. During most of the last 25 years (with the exception of a few years following the 1986 tax change), the capital gains rate has been lower than the maximum ordinary income tax rate. Thus, for tax purposes, most investors would have preferred that companies distribute their excess cash in the form of repurchases. As if to confirm the importance of these tax differences, the 2002 study by Grullon and Michaely cited earlier found that investors reacted more favorably to the announcement of stock repurchases during periods when the differential between the top marginal tax rate on ordinary income and the top marginal tax rate on capital gains was relatively large.[37]

But, with the Tax Reform of 2003, the tax rate for ("qualifying") dividends was set equal to the capital gains tax rate, once again limiting the tax advantage of repurchases.[38] This tax change was accompanied by (some would argue that it "caused") an increase in the number of dividend-paying companies as well as a considerable increase in the aggregate level of dividends during the period 2003-2005 (that can be seen in Figure 5). In the year after the tax reform became effective, 113 (out of 3,800 public companies) initiated a dividend, as compared to 22 companies in the previous year. But whether—and the extent to which—such increases came at the expense of stock repurchases is hard to know. One recent study reported that a third of the companies that initiated dividends in 2003 also cut back their repurchases in that year.[39] But such increases in dividends have been dwarfed by the remarkable surge in repurchases since 2004 (shown in Figure 5).

Repurchasing and Undervaluation

Flexibility is not the only reason for choosing repurchases over dividends. Another often cited motive is to benefit the firm's existing shareholder by buying back undervalued stock. For example, in the survey of CFOs mentioned earlier,[40] the proposition that having an undervalued stock was a good reason to buy back shares received the most enthusiastic response, with more than 86% of the responding executives expressing their agreement.

But are companies that buy back their stock (or at least announce their intent to do so) really undervalued? According to a number of event studies, the announcements of open market stock repurchase have resulted in positive abnormal returns that range from 2.6% to 4.5% (during a three-day window surrounding the event), depending on the study and sample period.[41] How do we interpret this response? By offering to use corporate cash to buy back shares at around their current values, management may be telling investors that it believes the shares are undervalued based on its current performance and the expectation that such performance will continue. Or, it may be telling investors that the firm's performance is about to exceed current expectations, in part because the payout of excess capital will help increase efficiency and raise the company's returns on capital (without a proportionate increase in risk).[42]

In an effort to determine whether these announcement effects are short-lived or represent "permanent" increases in value, a number of studies have examined long-run stock returns both leading up to and following the repurchase announcements.[43] These studies find, first of all, that during the year leading up the repurchase announcements, the repurchasing companies experience abnormal negative returns, with the possible implica-

34. Brav, Graham, Harvey, and Michaely (2005).
35. Jagannathan, Stephens, and Weisbach (2000).
36. Grullon and Michaely (2004) and Dittmar (2000).
37. Grullon and Michaely (2002).
38. Even when the tax rates are equal, repurchases may enjoy a tax advantage because investors can choose not to sell and thus push the capital gain off into the future. This will reduce the tax effect to investors due to the effects of time value of money.
39. Brown, Liang, and Weisbenner (2007) show that about one-third of frms that initiated dividends in 2003 scaled back repurchases. On the other hand, Chetty and Saez (2006) shows that although the tax change is at least partly responsible for the increase in dividend payers, confounding effects prevent them from concluding that this increase came at the expense of stock repurchases.
40. Brav, Graham, Harvey, and Michaely (2005).
41. Vermaelen (1984), Comment and Jarrell (1991), Ikenberry et al. (1995), and Grullon and Michaely (2002).
42. See Grullon and Michaely (2004).
43. Lakonishok and Vermaelen (1990), Ikenberry, Lakonishok, and Vermaelen (1995), and Peyer and Vermaelen (2007).

tion that the prices of these firms have been driven too low and now require "corrective" action by management. And, at least consistent with this possibility of undervaluation, the studies also show that the repurchasing companies as a group outperform the market over periods as long as three years following the announcements. On the other hand, the fact that the positive abnormal performance tends to be concentrated among certain kinds of companies—specifically, smaller companies with low market-to-book ratios—suggests that something more than market misunderstanding may be at work here. (For example, companies with low market-to-book ratios may be precisely the kind of firm whose operating performance can be improved by returning excess capital.)

In more direct attempts to distinguish between market misvaluation and management's "signal" of improved operating efficiency, several studies have examined the operating performance of companies following their announcements of repurchase programs. In the case of major, fixed-price tender offers and Dutch auctions, operating returns tend to increase significantly.[44] But in the case of open market repurchases, the evidence does not provide a clear answer. For example, the 2004 study by Grullon and Michaely cited earlier reports finding no "abnormal" increases in operating performance (ROA) in the three years following open-market repurchase announcements. On the other hand, a 2005 study by Erik Lie (using similar companies and period) finds increases in ROA during the same three-year post announcement period.[45] Casting doubt on these findings, a 2008 study finds similar increases in operating performance but provides evidence that such improvements were partly attributable to pre-repurchase downward earnings management (as indicated by significantly more negative abnormal accruals) that depressed the value of the stocks, thereby allowing the firm to repurchase at more attractive prices (with the accruals naturally reversing, and the prices perhaps correcting, after the repurchases).[46]

One limitation of these studies of open market programs, however, is that most fail to distinguish between cases where repurchases were announced and carried out and those in which the announced buybacks never happened. With more reliable data on actual share repurchases, researchers might have more success in linking repurchases with better operating performance.

Before leaving this subject, let me mention one other possible approach to this question of market misvaluation. In a 2007 study, Robert Dittmar and I compared patterns of aggregate repurchases over time with those of mergers, SEOs, and IPOs with the aim of detecting their relationship to broad stock market movements. Somewhat to our surprise, given recent evidence of market cycles in driving mergers and equity issuances, our study suggests that market timing and broad stock market performance have very little to do with waves of *actual* (as opposed to announced) repurchases.[47] In fact, our study found that the pattern of repurchases was essentially *the same* as that of mergers and equity issuances—namely, lots of transactions when markets are "hot" and far fewer when markets are depressed.[48]

What these findings suggest is that corporate repurchases in the aggregate are not motivated primarily by undervaluation—or at least not by valuation in any absolute sense. And, we the same is probably true of M&A, SEOs, and IPOs. But if it's not valuation, then what explains these waves and cycles of activity?

Our best guess is that these transactions are different responses to the same economic stimulus. More specifically, our analysis suggests that *growth in GDP* is the most important determinant of repurchase *and* M&A *and* equity issuance activity. What is the explanation? Economic expansion reduces the cost of equity relative to the cost of debt, which induces some companies to issue equity—particularly smaller companies in need of growth capital. At the same time, it makes (generally larger) companies more willing to use their stock as currency for M&A deals. But what about the repurchasing companies? For them, economic expansion has the effect of increasing their operating cash flow. And, at least in the case of larger, more mature companies, such increases are likely to exceed their requirements for new investment, thereby creating a "free cash flow" problem that we discussed earlier. Such companies also typically respond by increasing their dividends. But, given the cyclical character of such earnings, and the increase in risk that comes with it, they are likely to choose repurchases over dividends.

In sum, it is the changes in underlying economic conditions that are driving the waves of corporate finance transactions and not the tendency of markets to undervalue stocks.[49]

Other Reasons to Repurchase Stock

In addition to reducing agency costs and signaling undervaluation (perhaps because of expected improvements in operating performance), there are other reasons firms repurchase stock.[50] For example, stock repurchases can be used

44. Vermaelen (1984) and Dann, Masulis, and Mayers (1991) document a significant increase in earnings per share (EPS) in the years following fixed-price self-tender repurchases.

45. Grullon and Michaely (2004) and Lie (2005) respectively.

46. Gong, Louis, and Sun (2008).

47. Dittmar and Dittmar (2007).

48. In more technical terms, the time series pattern of aggregate repurchases is not explained by absolute or relative past or future market returns, market-to-book ratios, or investor sentiment.

49. Grullon and Michaely (2004) provide an alternative interpretation for the long-run performance. They show that the systematic risk and the cost of capital of these firms decline after these events, and investors underreact to repurchase announcements because they initially underestimate the decline in systematic risk.

50. For a complete review of all reasons companies repurchase stock and how these motives change over time, see Dittmar (2000). I discuss each of these below except the use of repurchases as a takeover defense since this reason is less likely implemented with an open market stock repurchase. Bagwell (1991, 1992) discusses and examines the importance of this hypothesis, and Dittmar (2000) finds support for its use during takeover waves.

to increase the company's debt-to-capital ratio if the firm is believed to be underleveraged. But if that is a primary motive for buying back shares, then a large, fixed price tender offer financed by a new debt issue would accomplish this effect far more quickly and decisively than an open-market repurchase program.[51]

Another reason companies repurchase stock is to offset the costs of issuing employee stock options as compensation. Since 1990, U.S. companies have increasingly used stock options to compensate their employees. Because the issuance of shares in the stock option programs has a dilutive effect on earnings per share, some companies reportedly repurchase stock with the aim of keep shares outstanding roughly constant.

Moreover, when these option programs involve executives, as they generally do, there is an added incentive to repurchase instead of paying dividends. Because executive options are not typically "dividend-protected," the value of such options is effectively reduced by any dividend payments. But if the same amount of cash is instead used to buy back shares, the options effectively participate in the value of the distributions because the firm's stock maintains its value (rather than falling by the amount of the dividend). Consistent with this argument, studies have shown that companies that use stock options are more likely to repurchase stock, and thus stock repurchase activity may have increased during the 1990s in part because this form of compensation became increasingly common.[52]

One final comment on the effect of share buybacks on reported EPS: although this is a commonly stated motive for repurchases, buying back shares to boost EPS does not add value in and of itself. Repurchasing stock increases EPS (and returns on capital) only in those cases where the funds used to repurchase stock have no productive alternative use; in other words, they represent "idle cash" or unused debt capacity. And, in such cases, it is essentially the elimination of excess capital that is responsible for the increase in value. If companies were instead to cut back on "productive investment" to fund a repurchase, their value would fall—and so eventually would their EPS.

Looking Ahead

How do business conditions affect corporate decisions on how much cash to hold, and whether to distribute any excess in the form of stock repurchases or dividends? As discussed in this paper, the dramatic increase in corporate cash holdings between 1980 and the present has been driven mainly by an increase in the risk of companies.

Why have companies become riskier? Macro-economic factors are part of the explanation. As markets have become more global, some industries have become more competitive, resulting in more volative earnings and stock prices. For example, a 2007 study by Paul Irvine and Jeffrey Pontiff reports that the "unsystematic," or "firm-specific," part of a company's overall stock price volatility (that is, the part of a company's volatility that *cannot* be explained by broad stock market movements) has increased by 6% per year over the last 40 years. The study also concludes that this increase in the firm-specific volatility of stock prices reflects a proportionate increase in the firm-specific volatility of the underlying corporate cash flows.[53] Irvine and Pontiff attribute these findings mainly to more intense economy-wide competition.

Further, a study by Ran Duchin points to another important factor that increases risk: the tendency of companies to become more "focused" on a set of core businesses. As a consequence, along with generally higher average levels of profitability has come an increase in the correlation of the cash flows among their divisions[54]—and this means higher levels of risk and increased cash holdings.

But, as we have also discussed, holding too much cash can raise shareholder concerns about the potential for waste and overinvestment. And when markets stabilize and companies become less risky, the optimal level of cash reserves may fall. For example, the modest decline of cash holdings between 2004 and 2006 may well be interpreted as a general corporate response to investor concerns about excess cash.

What should managers do with excess cash if and when markets stabilize and risk decreases? Stock repurchases provide a flexible mechanism to distribute cash to shareholders. Unlike the corporate "commitment" to making dividend payments, an open market stock repurchase program gives managers the option but not the obligation to distribute funds. This flexibility, which is particularly valuable during periods of uncertainty, may explain much of the apparent substitution of repurchases for dividend income in recent years, with repurchases becoming equal to dividends for the first time in 1998, overtaking dividends in 2005, and then widening the margin significantly in 2006.

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51. Dittmar (2000) also found that, unless the frm fnances the repurchase with debt and therefore performs a recapitalization, altering leverage is not the primary motive for repurchase. However, even open market repurchases can be used to achieve modest gradual increases in leverage.

52. Fenn and Liang (2001), Kahle (2002), and Bens, Nagar, Skinner, and Wong (2003).

53. Irvine and Pontiff (2007).

54. Duchin (2007).

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