

Equity Research—Americas

Industry: Value-Based Strategy
August 7, 1998
NI2823

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To Buy or Not to Buy

Issues and Considerations Surrounding Share Repurchase

Volume 5

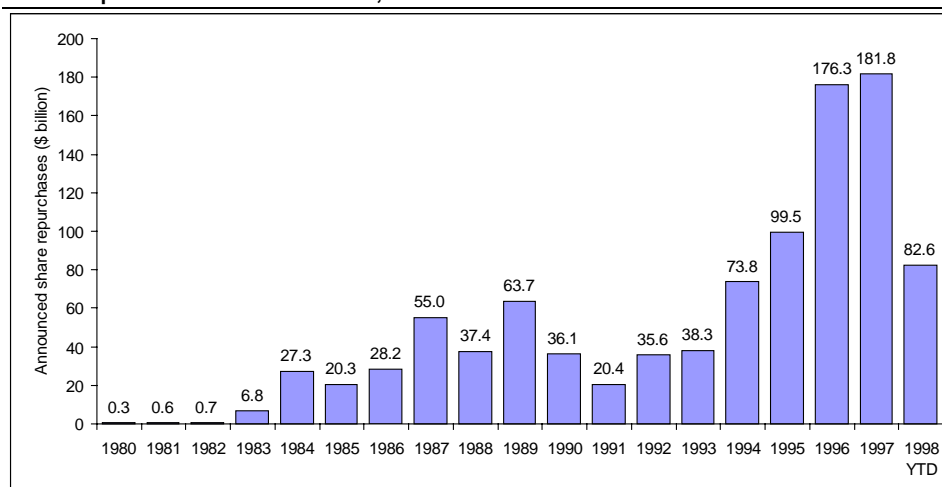
For further information on implementing a share repurchase program, please contact Jack Broderick, Director of Credit Suisse First Boston's Special Equities Group, at 212/325-3590.

Introduction

The issue of share repurchase is more relevant, and more complex, than ever. On the one hand, strong corporate surplus cash flows, favorable tax laws, and an increasing focus on shareholder value encourage managers to embrace buybacks. On the other hand, high price/earnings multiples, the surge of employee stock option programs, and the desire for internal growth make the virtues of repurchases less clear.

The vote of the marketplace, however, is unambiguous. In 1997, American companies announced \$182 billion worth of stock repurchase programs, nearly double the amount pledged in 1995 (see Chart 1). Dividends, on the other hand, grew only 5% during the same time.¹ Buybacks are also becoming more prominent in Europe and Asia,² reflecting easing regulations and a heightened focus on value creation. For example, share repurchase programs in Europe are expected to reach \$30 billion in 1998, up from \$14 billion in 1997.³

Chart 1
Share Repurchase Announcements, 1980–1998 to Date



Source: Securities Data Company.

While measuring and valuing dividends is relatively straightforward, buybacks—with a wide array of methods and goals—are more difficult to read. The goal of this report is to identify and weigh the key issues surrounding the share repurchase decision. We simultaneously consider the perspective of corporate managers and shareholders, both of whom seek a common goal: maximizing risk-adjusted returns.

As always, our focus is on the economic—not the accounting—consequences of corporate decisions. This economic/accounting difference often needlessly causes managers to be uncertain about their buyback decisions.

This report is divided into three parts. First, we lay out two general philosophies regarding share repurchases, and highlight the implications of each. Second, we explore corporate finance issues including goals, meanings, and methods of buybacks. Finally, we offer some views on how the economy is fundamentally evolving, and how those changes affect the role of share repurchases.

When Is Share Repurchase Relevant?

Before exploring philosophies on buybacks, it is important to examine when the issue is relevant. We find there are five main catalysts for a company to buy back stock. The first is the desire to return excess cash to shareholders. Second, management may sell or spin off a division and use a buyback to redirect the proceeds to shareholders. Third is a desire to alter a company's capital structure. Fourth, buybacks serve to offset dilution from employee stock option programs. In this case, buybacks essentially represent another form of employee compensation. Finally, management may view its shares as a good investment. These points are further developed below:

- *Redeployment of excess cash.* A company generates surplus cash when its earnings exceed its investment opportunities. A quick litmus test for this condition is any company that has a return on invested capital (ROIC) in excess of its earnings growth rate. As ROIC represents the maximum earnings growth rate a business can achieve excluding external financing, growth below ROIC leads to excess cash flow.
- *Redirecting proceeds from an asset sale or spinoff.* In many spinoffs, a cash dividend is paid to the parent company. Corporations often hesitate to sell businesses, even value destroyers, because the net impact—the benefit of cash redeployment versus the loss of operating profits—results in earnings per share dilution. Share buybacks can play an important role in returning nonproductive invested capital to shareholders.
- *Increasing the target debt/equity ratio.* An increase in financial leverage, which can be effected through a debt-financed share buyback program, often serves to lower a company's weighted average cost of capital. This is because relatively low-cost debt replaces high-cost equity in the capital structure. As future cash flows are discounted at the cost of capital, a lower cost of capital translates into a higher present value—enhancing shareholder value.
- *Neutralizing dilution from stock options.* Managers generally prefer to avoid an upward creep in the share count as a result of stock options, especially as such a trend is readily evident on the income statement. Share buybacks offset this embarrassment of riches, and can only be detected through the cash flow and balance sheet statements to boot.
- *The shares become a compelling investment opportunity.* Periodically, managers may find that their company's stock is undervalued. If management's assessment is valid, a share repurchase program offers the potential for excess returns for ongoing shareholders.

Two Philosophies on Share Buybacks

We find there are two fundamental schools of thought regarding share repurchase as a financial policy. We explore each of them below.

The “Efficient Market” School

This view is based on the idea that the stock market is efficient over time. As a result, buybacks can be effected consistently over time with the assurance that the company will get a “fair” price, on average. Adherents of this perspective stress the importance of returning cash to shareholders in a cost-effective and tax-efficient manner. Key underpinnings of this school include the following:

- The current tax rate differential suggests that buybacks are significantly more efficient than dividends for taxpaying individuals. Specifically, dividends are taxed at an individual's tax rate—now as high as 39.6%. In contrast, the long-

term capital gains tax rate is 20%, roughly half the highest individual rate. Even this huge tax rate differential understates the benefit of buybacks. Specifically, shareholders who want a cash yield similar to a dividend can sell a portion of their holdings, but only need to pay capital gains taxes on the difference between their cost and the selling price. In contrast, a dividend is fully taxable. For companies seeking to return cash to stockholders with minimum government interference, share buybacks are the best way to go.

- Share buybacks are more tax efficient than dividends in another important way. Ongoing shareholders can hold onto their stock and defer their tax payments until they sell (in theory, an indefinite period). Meanwhile, buybacks serve to increase their proportionate ownership of the business. Hence, share repurchases are advantageous as a result of the both the *rate* and the *timing* of taxes.
- Repurchases offer corporations greater flexibility than dividends. Share buybacks can be accelerated or decelerated as a company's cash flows changes. Dividends are more like a quasi-contract. Once a dividend is initiated, investors generally expect ongoing payments and periodic increases.
- Buybacks are cheaper for companies to execute. Dividends must be distributed to all shareholders and entail significant administrative time and expense. In contrast, open market purchases can be executed at a lower cost—often cents per share.

One well-known practitioner in the “efficient market” camp is Coca-Cola. In recent years KO has increasingly relied on share buybacks to return excess cash to shareholders. The company's dividend payout ratio—dividends divided by net income—declined from 44% in 1992 to roughly 35% in 1997. Notably, the pace of buybacks for Coca-Cola is dictated more by its available cash flow than by the stock's prevailing price/earnings multiple.

The “Intrinsic Value” School

Advocates of this perspective argue that companies should only repurchase shares when the stock trades below “intrinsic value.” Intrinsic value is defined as the cumulative present value of a company's future cash flows. This view implicitly assumes that managers have “asymmetric information,” that is, they have better knowledge of a company's future than do investors. It follows that share buybacks can be preferable to reinvesting in the business, including prospective acquisitions, if implicit returns with the repurchase are higher. Key considerations for this camp include:

- The “shareholder rate of return” from buybacks is estimated by dividing the cost of equity by the ratio of stock price to intrinsic value.⁴ For example, a company with a cost of equity of 10% and a stock that is 80% of intrinsic value would have an implied rate of return of 12.5%. This return can then be compared to other projects and ranked in relative attractiveness.
- The increase in intrinsic value per share that results from buying an undervalued stock can be estimated using a simple formula (see Appendix A). Key determinants of the value improvement are the discount to intrinsic value and the percentage of shares retired.
- This view supports the notion that buybacks are a powerful signal to the market. Academics have long maintained that one of the key virtues of a repurchase program is the positive message it sends about the attractiveness of the stock.

This impact is particularly pronounced either when debt is incurred to fund a program or if management is willing to pay a substantial premium to the prevailing price to acquire shares.

- This approach requires criteria for when buybacks should be pursued. Management should have an up-to-date view on a stock's appropriate value, given assumptions of key value drivers. In turn, discrepancies between market value and intrinsic value can be exploited to the benefit of ongoing shareholders.
- It must be noted that senior managers are consistently overoptimistic in appraising their company's prospects. History is littered with companies that repurchased "undervalued" shares only to see business prospects sour and the stocks go down. Hence, an announced buyback program—even an aggressive one—is not an automatic signal of value.

Ralston Purina serves as a good example of the intrinsic value school of thought.⁵ From the early 1980s through the mid 1990s, Ralston's CEO, William Stiritz, astutely directed the repurchase of over 50% of the company's outstanding shares. The company was aggressive in periods of modest investor expectations and inactive when the stock reflected sanguine prospects. Importantly, the stock delivered attractive total shareholder returns during Stiritz's tenure.

The famed investor Warren Buffett also adheres to this view. In his 1984 letter to Berkshire Hathaway shareholders, Buffett wrote:

"When companies with outstanding businesses and comfortable financial positions find their shares selling far below intrinsic value in the marketplace, no alternative can benefit shareholders as surely as repurchases."

Share Buyback Misperceptions

Before we move on, we must address two fundamental misperceptions regarding buybacks. The first is that repurchasing shares at a high multiple of earnings per share implies "overpaying" for the stock and hence is undesirable. For example, the "return" on a buyback of a stock with a P/E of 25 is deemed to be the inverse of the P/E—a poor 4%.

The second is that buybacks that boost reported earnings per share are necessarily good—and repurchases that dilute reported earnings are necessarily bad. As an illustration, companies are often reticent to sell value-destroying businesses and allocate the proceeds to repurchases because of the negative impact on earnings.

Both misperceptions hinge on the flawed logic that price/earnings multiples or changes in earnings per share mirror economic reality. The weakness in this line of thinking can be proven formally (see Appendix B) or through armchair reasoning. We build on the latter here. The value of any financial asset—including a stock—is the present value of a future stream of cash flows. Just as discounting future cash flows at an "expected return" translates everything into present value terms, shareholders look for their stock to increase in value at the same "expected return" over time. Accordingly, *the implied "return" from a share buyback in an efficient market is the cost of equity.*

The cost of equity capital cannot be reliably linked to P/E or cash flow multiples because those multiples reflect variables other than the discount rate. These include growth, capital intensity, and the sustainability of a company's franchise. The cost of equity for most companies in the United States is estimated to be in the 9-12% range—consistent with the long-term return of stocks.

Corporate Finance Issues

Similar thinking can be applied to the issue of earnings accretion/dilution from buybacks. The point is best illustrated with a simple example. Assume an otherwise successful company has a business unit that delivers a subpar 5% return on capital versus the company's 10% cost of capital. Assume further that the company's stock commands a P/E of 40 times.

Sale of the low-return unit at book value, with the proceeds used to repurchase shares, results in earnings per share dilution—a 5% return business is traded for a 2.5% “return” with a buyback. However, it enhances shareholder value. This is because the true return on the buyback is the 10% cost of equity, not the 2.5% implied by the inverse of the P/E. Swapping a 5% return project for a 10% return project may not seem like a difficult decision (see Appendix C). However, managers frequently balk at such trade-offs because of the negative earnings per share impact.

This section deals with the role of share repurchase in overall corporate finance. Here we consider a number of issues, including various methods of repurchase, key determinants of market signals, capital structure changes, and the use of derivative products in buybacks. While these issues may only appear relevant for companies, we believe that investors should understand the impact—as well as the thought process—underlying these decisions.

Methods

There are four main methods of repurchasing shares. Each has strengths and weaknesses relative to specific corporate finance objectives. A brief review of each technique follows:

- *Open market purchases.* This is the most widely used technique by far. Companies simply repurchase their own shares in the open market, similar to any other investor. While there are legal restrictions on open market purchases—for example, a company is limited in the daily volume it can represent—this method offers the greatest degree of flexibility. On the other hand, open market purchases generally provide the weakest signal of management conviction. Dilution from employee stock option programs is generally offset through open market purchases.
- *Dutch auction.* In a Dutch auction, management defines the number of shares it intends to buy, an expiration date, and a price range—generally a premium to the market—that it is willing to pay. Shareholders may tender stock at any price in the range. Starting at the bottom of the range, the company then adds up the cumulative number of shares necessary to fulfill the program. All tendering shareholders at or below the “clearing price” receive the clearing price for their stock. Dutch auctions are generally good signals⁶ and are relatively efficient to execute. Because of the range in prices offered, a Dutch auction has less risk of undersubscription than a fixed price offer.
- *Fixed price tender offer.* Here, management offers to repurchase a set number of shares at a fixed price through an expiration date. The price is often a significant premium to the market price, and companies generally tender for a substantial percentage of shares outstanding. Like a tender offer in an acquisition, shareholders may or may not elect to tender their shares. Fixed price tenders—especially those funded with debt—are generally powerful, positive signals to the market. However, the drawback is that management may not achieve its goals if too few shares are tendered.

Table 1
Pros and Cons of Various Share Repurchase Methods

	Benefits	Drawbacks	Strength of Signal to Market	Tax Benefit	Common Reasons for this Method
Gradual Open Market Share Repurchase	Most flexible method	May be announced, but not completed	Typically weak		Return cash to shareholders
	Can time repurchases to offset dilution from options		Can be strong if firm previously over-invested excess cash		Buy "undervalued" stock
	Inexpensive		Depends on management credibility		Change capital structure
	Gradually increases earnings per share by lowering share count				Offset stock option dilution
Accelerated Share Repurchase	Can be structured to be flexible		Stronger than gradual repurchase, as firm buys back shares immediately	Company receives tax efficient return on purchase price of shares for period specified in forward contract	Return cash to shareholders
	Inexpensive		Can be strong if firm previously over-invested excess cash		Buy "undervalued" stock
	Immediately increases earnings per share by lowering share count				Change capital structure
					Offset stock option dilution
Dutch Auction Tender Offer	Usually results in permanent increase in stock price from strong positive signal to market	If investors do not heed positive signal, premium paid over market price can result in wealth transfer from ongoing shareholders	Strong positive signal		Return cash to shareholders
	Offers lower risk of undersubscription than fixed price tender		Strength of signal increases if insiders do not tender, and the size of the tender offer and the premium to market increases		Buy "undervalued" stock
	Range of prices allows market forces to determine amount of shares tendered				Change capital structure
Fixed Price Tender Offer	Usually results in permanent increase in stock price from strong positive signal to market	If investors do not heed positive signal, premium paid over market price can result in wealth transfer from ongoing shareholders	Strong positive signal		Return cash to shareholders
	Often used to increase value via leveraged recapitalization		Strength of signal increases if insiders do not tender, and the size of the tender offer and the premium to market increases		Buy "undervalued" stock
					Change capital structure
Private	Can be used to buy back shares of shareholder who wants to sell	Usually associated with "greenmail"	Negative signal, as management displays willingness to transfer wealth from ongoing shareholders		Avoid takeover
		Management typically pays premium			
Puts/Collars	Lowers cost of repurchase if stock price goes up			Income from writing put warrants is tax-free to company	Hedge against share price appreciation

Source: CSFBC.

- *Private transactions.* Companies may elect to repurchase stock directly from certain shareholders. In the 1980s, a number of companies engaged in “greenmail,” private repurchase transactions that served to fend off unwanted overtures. The practice of greenmail is markedly less friendly to shareholder value than other types of buybacks. By paying raiders a premium for their large stakes, managers effectively transfer wealth from ongoing shareholders. Accordingly, private transactions have become much less common in the 1990s.

Signals

Finance professors argue that stocks generally react favorably to share repurchases largely because of the positive signals they send to the market.⁷ The characteristics of each buyback program can generate varying signal intensities. The research suggests that there are four key drivers of the stock market signal.

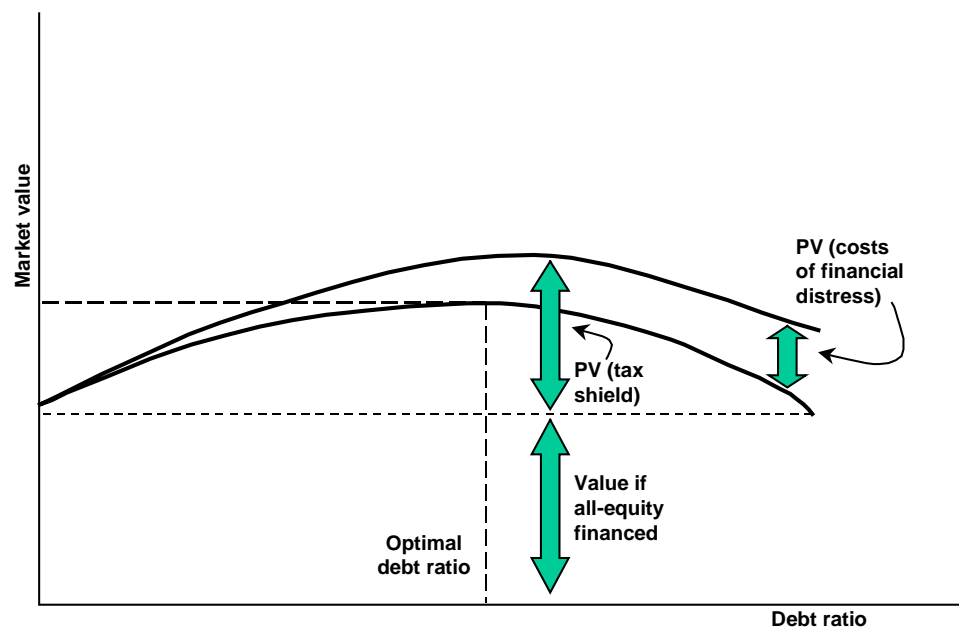
The first is the percentage of float that is retired. All things equal, a larger program indicates greater management conviction. The second is the premium the company is willing to pay versus the last trade—the bigger the better. Sizable premiums suggest not only a belief that business prospects are more bullish than the market reflects but also a willingness to act on such conviction.

Third is the percentage ownership by insiders. High inside ownership means that the interests of managers and shareholders are aligned; but it also suggests that risk-averse managers would pursue financial restructuring only if they were confident of a favorable outcome. The final issue is insider selling. When management effects a sizable repurchase program and indicates it will not sell any shares, it is increasing its bet on the success of the firm. This sends a favorable message to the market.

Capital Structure

Share repurchase can play a central role in changing a company’s capital structure. Specifically, buybacks are an efficient way to increase the debt/equity ratio for underleveraged firms. An appropriate level of financial leverage results in an “optimal capital structure”—a healthy balance between beneficial tax shields and the risk of financial distress (see Chart 2). This minimizes the cost of capital, which enhances shareholder value.

Chart 2
Optimal Capital Structure



Source: Brealey and Myers.

A firm's capital structure determines whether operating income is paid out as interest expense or as equity income.⁸ Interest is only taxed at the personal level (currently 39.6% at the top rate in the U.S.) while equity income is taxed at both the corporate rate (35%) and the personal level (20% on capital gains). As a result, debt financing is more desirable than equity financing, up to a point (see Table 2). The debt-versus-equity advantage is even greater for dividend-paying companies, as dividends are taxed at the higher personal income tax rate.

Table 2
The Advantage of Debt versus Equity Financing

	Interest	Equity income
Operating income	\$1.00	\$1.00
Corporate tax (@ 35%)	0.00	0.35
Income after corporate tax	1.00	0.65
Personal tax (@ 39.6%)	0.396	0.00
Capital gains tax (@ 20%)*	0.00	0.065
Income after all taxes	\$0.604	\$0.585

(*) = Assumes the effective capital gains rate is 50% of statutory rate.

Source: Brealey and Myers.

Increases in financial leverage can be beneficial beyond the capture of tax shields. Specifically, high interest expense payments mean that a company has less discretionary cash to invest in value-destroying projects. As such, debt serves as a built-in “check” on the capital allocation process as it forces management to submit to the market's judgment every time it wants to raise capital to invest. Not surprisingly, then, investors generally cheer debt-increasing financial maneuvers with a higher stock price.⁹

Other relevant capital structure considerations include the following:

- *The value of a tax shield is measurable.* For a company with positive pretax profits, tax-deductible interest expense creates a valuable tax shield. We can estimate the value of this shield using one of two ways. The first approach, which assumes a permanent change in capital structure, is to capitalize the tax savings. This is calculated by dividing the tax savings (interest expense times the marginal tax rate) by the pretax cost of debt. The second approach is the adjusted present value (APV) method.¹⁰ APV determines the value of business by summing its unlevered value and the value of its financial strategy. APV offers more flexibility than capitalizing tax shields because it accommodates changing capital structures.
- *Varying tax rates complicate the debt versus equity decision.* As seen above, changes in corporate, personal, and capital gains tax rates can amplify or dampen the advantage of debt versus equity financing.¹¹ The current tax code slightly favors the prudent use of debt.
- *At a certain point, the risks of financial distress outweigh the benefit of debt.* Too much debt can lead to an inability to meet contractually obligated commitments, even for a business with healthy cash flows. Financial distress is onerous, with substantial direct and indirect costs. Direct costs include legal and administrative fees in bankruptcy. Indirect costs include forgone business with suppliers and customers that are uncertain about the future of a financially distressed firm. Managers should weigh the benefit of financial leverage against the potential cost.
- *What about “financial flexibility?”* Managers often argue that a conservative capital structure is important in order to maintain financial flexibility. Financial flexibility can be defined as the ability to quickly access capital for an attractive investment opportunity or to weather a business downturn. The value of this option is questionable for a couple of reasons. First, the capital required to fund value-creating projects, be it debt or equity, can be generally raised rapidly and cheaply. Second, managers often do not take into account the opportunity cost of excess capital parked on the balance sheet. If shareholders can redeploy funds at a rate higher than what the cash earns, the capital should be returned to shareholders.

Derivative Products

While thousands of companies have repurchased shares in recent years, a relatively small percentage have used derivative products to execute their programs. Such products can offer valuable benefits to companies seeking to actively buy back stock.

The most widely used derivative technique is the sale of put warrants.¹² A put warrant is the right to sell a security at a given price and time. In this case, the company determines a strike price and life of the warrant, and collects a premium from the buyer. Interestingly, the premium collected is tax-free. Also, companies only need to report their programs if they are deemed to be “material.”

The potential consequences of put warrant sales are straightforward. If the stock is flat or rises, the premium gathered lowers the net cost of the repurchase program. It is only if the stock goes down more than the difference between the strike price and the premium that the company loses.

The Evolving Economy and ESOs

A more sophisticated procedure is the use of “collars.” Here, the company sells put options and uses the premium to buy call options. This increases downside risk but offers more attractive purchase levels in the event the stock rises significantly.

Finally, “accelerated share repurchase” programs (ASRs), are gaining in popularity. In an ASR, a company purchases shares from an investment bank (which goes short the stock), allowing it to retire a large block of shares immediately. Simultaneously, the company enters into a forward contract with the investment bank in which it agrees to pay the bank the average market price of the shares repurchased over a specified period—typically six months.

At the end of the period, there is a net settlement (in cash or stock) between the parties. The company pays the investment bank—or gets credited—the difference between the initial and average share buyback price. The bank pays the company the time value of the funds, less dividends.

Both parties win. The investment bank earns a fee for its participation. The company immediately reduces its shares outstanding and receives a tax-efficient return on the cash held by the investment bank. In contrast, an open market program reduces the share count slowly, and the interest income earned on the original purchase price is taxable.

One of the major catalysts for the surge in announced share repurchase programs is the desire to mitigate earnings per share dilution from employee stock option (ESO) programs. Buybacks in this context are best viewed as “off-income-statement” employee compensation, rather than a mechanism to return cash to shareholders or a tool to manage the capital structure.

While the debate about the virtues and drawbacks of ESOs rages on,¹³ three points are clear.¹⁴ First, the growth in ESOs is a symptom of more profound changes occurring within the economy. Second, it is important to understand the economics of ESOs—especially given that the bulk of the information about them is not found in standard financial statements. Finally, managers with hefty ESO packages have a real economic incentive to repurchase shares instead of paying dividends.

The global economy is evolving. Physical capital—bricks and mortar—is being replaced by intellectual, structural, and human capital—harnessed brainpower. People have become the new foundation for competitive advantage. And people want something that bricks and mortar never asked for: a piece of the action. That means equity ownership. For investors, this is good news and bad news.

The good news is that earnings from “new economy” companies are worth more than the earnings of “old economy” companies. This point is best supported by the derivation of “free cash flow” using standard finance terms (see Table 3).

Table 3
“Old” versus “New” Business Models

Old Economy	New Economy
Sales	Sales
- Expenses (includes <i>all</i> employee expenses)	- Expenses (includes <i>partial</i> employee expenses)
- Taxes	- Taxes
= Cash Earnings	= Cash Earnings
- Investment in future growth*	- Investment in future growth*
= Free Cash Flow	= Free Cash Flow
	- Share buyback and/or share count dilution
	= Adjusted Free Cash Flow

(*) = Investments include net fixed capital and working capital. New economy “investments” are largely *expensed*.

Source: Credit Suisse First Boston Corporation.

In the old-economy model, earnings are determined subtracting expenses, including all employee costs, and taxes from sales. Free cash flow is the difference between earnings and required investments—working and fixed capital. As most of these investments are *capitalized*, they do not show up on the income statement. Since a substantial amount of capital is required to maintain and grow old economy businesses, free cash flow is typically substantially less than reported earnings.

Earnings for new economy businesses are calculated in the same way as their old economy brethren. However, there is one distinction: only partial employee compensation is reflected on the expense line. Free cash flow, too, nets investments against earnings. But here is the significant difference between the old and the new. In new economy businesses, investments—such as R&D and marketing—are largely *expensed*. As a result, free cash flow and earnings are similar.

Both old and new economy businesses have investment needs; they are just recorded differently by the accountants. Because new-economy businesses generate more cash for a given level of earnings, they deserve higher earnings multiples, all things being equal.

Now, here is the bad news. All things are not equal. For new economy companies, there is a substantial employee compensation claim in the form of ESOs that is not captured in traditional financial statements. Investors must try to value this claim, and consider it in the investment decision process.

How do you value the claim? There are two basic approaches. The first is to use an option-pricing model, like Black-Scholes, to value the outstanding options. Black-Scholes is driven by a few key variables including interest rates, life of the options, strike prices, and volatility of the stock. Assumptions for these data are found in the footnotes of a company’s annual report. The value of the options should be subtracted from corporate value—like debt or other liabilities—to determine shareholder value.

An alternative approach is to make an upward adjustment in the cost of equity estimate to reflect a steady rate of dilution. This simplified model only works if the percentage of dilution is constant year to year, a constrictive assumption. The formula is as follows:

$$\text{Adjusted } K_e = [\text{Base } K_e + (1.1(\% \text{ dilution}))]$$

For example, a company with a base cost of equity of 10% that faces a 3% annual rise in shares outstanding has an adjusted cost of equity of 13.3%. Under certain restrictive conditions, this approach generates the same per-share value as the options pricing model. However, we prefer the option pricing method as it offers substantially more transparency and flexibility.

This shift toward paying new economy executives with stock options also gives companies a real economic incentive to return excess cash via a share repurchase instead of paying a dividend. This is because the owner of a stock option benefits only when the price of the underlying stock goes up. However, after an investor receives cash-in-hand from a dividend payment, the stock's price will fall by precisely that amount.

Thus, while dividends may be an important part of total shareholder returns, they always lower a stock's absolute price level. Accordingly, the value of an option to buy that stock will also fall. Conversely, a share buyback returning the same amount of cash to shareholders does not lower the market value of ongoing shares. This difference gives option-laden managers an economically compelling reason to return cash to stockholders via share buybacks instead of dividends. Indeed, as new economy companies increasingly rely on stock options to compensate executives, we expect the shift toward share repurchase to accelerate.¹⁵

N.B.: CREDIT SUISSE FIRST BOSTON CORPORATION may have, within the last three years, served as a manager or co-manager of a public offering of securities for or makes a primary market in issues of any or all of the companies mentioned. Closing prices are as of August 4, 1998:

Coca-Cola (KO, 78⁵/₈, Buy)*

Microsoft (MSFT, 104¹/₂, Strong Buy)*

Ralston Purina (RAL, 29⁵/₈, Not Rated)

*Followed by a different Credit Suisse First Boston analyst.

Appendix A

How Buying Back Undervalued Shares Can Increase Shareholder Value

As mentioned in the body of this report, repurchasing undervalued shares can create substantial value. Indeed, if a stock is trading at a significant discount to its intrinsic value, buying back shares can offer returns significantly above the cost of equity.

In this appendix, we develop this point, through an example and through a formal proof that gives us a formula to calculate just how much a company can increase per-share intrinsic value by buying back undervalued shares.

In our example, a CFO correctly believes that the market undervalues her \$10 stock by 20%. Despite communicating the firm's excellent prospects to investors, this discount persists (see Table 4).

Table 4
CFO's Perception versus Market Reality

Trading value of total firm	\$ 800
Intrinsic value of total firm	\$ 1,000
Trading value per share	\$ 8.00
Intrinsic value per share	\$ 10.00
Shares outstanding	100.0

Source: CSFBC analysis.

Taking decisive action, the CFO decides to repurchase 20% of the outstanding shares to take advantage of this opportunity. She uses the firm's \$160 in cash to purchase 20 shares at the market price of \$8 per share. This lowers the intrinsic value of the firm by the \$160 spent, from \$1,000 to \$840. However, the firm now has 20 less shares. On a per-share basis, then, intrinsic value rises from \$10 to \$10.50—an increase of 5% (see Table 5).

Table 5
Intrinsic Value Rises After Buying Undervalued Shares

Shares repurchased	20.0
New shares outstanding	80.0
Amount of cash needed to finance buyback	\$ 160
New intrinsic value of firm	\$ 840
Intrinsic value per share	\$ 10.50
Increase in intrinsic value per share	5.0%

Source: CSFBC analysis.

We can derive a formula to yield the same result. We start with the formula for the percent increase in intrinsic value per share:

$$\% \text{ Increase in Intrinsic Value per Share} = \frac{\text{Post - Buyback Intrinsic Value/Share}}{\text{Pre - Buyback Intrinsic Value/Share}} - 1$$

Next, we can calculate Post-Buyback Intrinsic Value per Share as:

$$\text{Post - Buyback Intrinsic Value per Share} = \frac{\text{Pre - Buyback Intrinsic Value Share} - \text{Cash Spent on Repurchase}}{\text{Initial Share Count} - \text{Shares Repurchased}}$$

The cash spent on the repurchase is simply the equity market capitalization of the firm times the percentage of the company's shares repurchased.

Plugging these formulas into one another, and canceling out terms, we arrive at the formula:

$$\% \text{ Increase in Intrinsic Value/Share} = \frac{(1 - (\% \text{ of Shares Repurchased} \times \frac{\text{Stock Price}}{\text{Intrinsic Value}}))}{(1 - \% \text{ of Shares Repurchased})} - 1$$

Testing this equation against the answer given by our spreadsheet, we find that both methods give us the same answer of a 5% increase in intrinsic value per share.

$$\% \text{ Increase in Intrinsic Value/Share} = \frac{(1 - (20\% \times \frac{\$8}{\$10}))}{(1 - 20\%)} - 1 = \frac{1 - (0.2 \times 0.8)}{0.8} - 1 = \frac{.84}{.8} - 1 = 5\%$$

Appendix B

Why a Stock Buyback Earns the Cost of Equity in an Efficient Market

Because a risky dollar is worth less than a safe dollar, an investor will put money into the market only if he can at least earn a return that compensates him for putting his money at risk. The more risk, the higher the return demanded. This explains why investors in risk-free government bonds accept meager returns of less than 6%, but venture capital firms demand lofty 20% to 30% returns before they will provide capital to risky high-tech startups.

Stocks lie somewhere in the middle of this range. Equity investors in public companies generally require a return in the neighborhood of 9 to 12%. This number is not set in stone because each company faces a different risk profile—from the stable cash flows of a utility to the volatile cash flows of an Internet startup. In addition, debt can make equity more expensive, as it is a prior claim on cash flows.

However, whatever the demanded cost of equity, investors will price a stock so that they will at least earn that return. Indeed, in an efficient market, investors will bid stocks up and down until it becomes impossible—or at least very difficult—for an equity investor to earn more than that cost of equity from dividends and capital gains. This is true whether we are talking about investors purchasing stock for their personal accounts, or companies repurchasing their shares in the open market.

A Simple Example

A simple example can make this clearer. Say two entities make separate promises to pay an investor \$1,000 next year. The first entity, the U.S. Treasury, is backed by the full faith and credit of the U.S. government while the other, a risky high-tech startup company, is backed only by the start-up's somewhat flimsy earnings power. If this investor were to sell both IOUs to a third party, it's natural to expect that the risk-free promise from the Treasury would be worth more than the riskier promise from the startup. Put more formally, while the timing and magnitude of the \$1,000 cash flow is the same for both entities, the increased riskiness of the startup's promise makes it less valuable.

To value these promises, we turn to the standard discounting formula:

$$\text{Present Value} = \frac{\text{Cash Flow}}{(1 + \text{Demanded Rate of Return})^{\text{number of years before you receive the cash flow}}}$$

If we value the government's promise to pay \$1,000 a year from today using a risk-free rate of 6%, we find that this promise's present value is \$943.40.

$$\text{Present Value} = \frac{\$1,000}{(1 + 6\%)^1} = \frac{\$1,000}{(1.06)} = \$943.40$$

Similarly, we can value the startup's same promise, albeit with a higher demanded rate of return to compensate for the higher business risk inherent in Internet startups. Using a higher discount rate of 15%, we can calculate that the present value of the startup's promise is a much lower \$869.57.

$$\text{Present Value} = \frac{\$1,000}{(1 + 15\%)^1} = \frac{\$1,000}{(1.15)} = \$869.57$$

Using this simple example highlights that different prices have different demanded rates of return embedded in them. All things equal, a lower risk level translates to a lower discount rate, which means a higher stock price. Conversely, higher risk translates into a higher discount rate, which means a lower stock price.

A Realistic Example

We can also demonstrate this with a more complex, realistic example as well. To do this, we created pro forma financial statements for a hypothetical company with a constant return on capital of 18%, and cash earnings that start at \$90 million. We assume the company has a competitive advantage period (CAP) of five years—that is, that investors believe the company will grow revenues for five years (at a modest 5%).¹⁶ This growth also necessitates additional capital expenditure, as reflected by the increasing annual investment during that same period. For computational convenience, we also assume that the company has no debt and that investors use a 10% cost of equity to discount the company's cash flows. Finally, we translated these pro forma statements into a standard discounted cash flow analysis. This calculation values the company at \$968 million (see Table 6).

Table 6
Discounted Cash Flow Analysis for Company

Economic Profit Method of Valuation						
Year	1	2	3	4	5	6
Invested Capital (t)	500	525	551	579	608	608
Cash Earnings (t)	90	95	99	104	109	109
Return on Capital (%)	18.0%	18.0%	18.0%	18.0%	18.0%	
Cost of Capital (%)	10%	10%	10%	10%	10%	
Excess Return (%)	8%	8%	8%	8%	8%	
Economic profit (\$)	40	42	44	46	49	
PV of Economic Profit (t)	36	35	33	32	30	
Perpetuity of Economic Profit	375	394	413	434	486	
Σ PV of Economic Profit (0 ... t)	36	71	104	136	166	
PV of perpetuity	341	325	311	297	302	
Beginning Invested Capital	500	500	500	500	500	
Core Enterprise Value	877	896	915	932	968	
Excess Cash						-
Total Enterprise Value						968
Shareholder Value				\$	968	
Price per share				\$	968	
Price to cash earnings multiple					10.8	
FCF Method of Valuation						
Year	1	2	3	4	5	6
Cash Earnings (t)	90	95	99	104	109	109
Annual Investment (t)	25	26	28	29	-	-
FCF (t)	65	68	72	75	109	109
PV of FCF (t)	59	56	54	51	68	
Σ PV of FCF (0 ... t)	59	115	169	221	289	
Perpetuity of Cash Earnings (t)	900	945	992	1,042	1,094	
PV of perpetuity (t)	818	781	745	712	679	
Core Enterprise Value	877	896	915	932	968	
Excess Cash						-
Total Enterprise Value						968

Source: CSFBC.

The next step is to repeat this exercise for the company after a year has passed. This will give us the share price an investor would expect to enjoy with no change in the company's business plan, and the passing of a year.

While expected cash flows for this company will remain the same, the most important difference will be the natural shortening of the CAP—the period during which the company can generate excess returns—from five to four years. After all, since a year has passed and there has been no change in the business plan, the CAP will naturally shorten. The other important difference will be that the company will have generated a certain amount of excess cash. This “cash in hand” results from the company’s successful generation of \$65 million of free cash flow in its first year of operations. Thus, in addition to the \$1 billion in value from the company’s core operations, investors will give the company credit for an extra \$65 million from this cash in hand (see Table 7).

Table 7
Discounted Cash Flow Analysis for Company after One Year

Economic Profit Method of Valuation					
Year	1	2	3	4	5
Invested Capital (t)	525	551	579	608	608
Cash Earnings (t)	95	99	104	109	109
Return on Capital (%)	18.0%	18.0%	18.0%	18.0%	
Cost of Capital (%)	10%	10%	10%	10%	
Excess Return (%)	8%	8%	8%	8%	
Economic profit (\$)	42	44	46	49	
PV of Economic Profit (t)	38	36	35	33	
Perpetuity of Economic Profit	394	413	434	486	
Σ PV of Economic Profit (0 ... t)	38	75	109	143	
PV of perpetuity	358	342	326	332	
<u>Beginning Invested Capital</u>	<u>525</u>	<u>525</u>	<u>525</u>	<u>525</u>	
Core Enterprise Value	921	941	961	1,000	
Excess Cash					65
Total Enterprise Value				\$ 1,065	
Price per share				\$ 1,065	
Price to cash earnings multiple				11.3	
FCF Method of Valuation					
Year	1	2	3	4	5
Cash Earnings (t)	95	99	104	109	109
<u>Annual Investment (t)</u>	<u>26</u>	<u>28</u>	<u>29</u>	<u>-</u>	<u>-</u>
FCF (t)	68	72	75	109	109
PV of FCF (t)	62	59	57	75	109
Σ PV of FCF (0 ... t)	62	121	178	253	362
Perpetuity of Cash Earnings (t)	945	992	1,042	1,094	
PV of perpetuity (t)	859	820	783	747	
Core Enterprise Value	921	941	961	1,000	
Excess Cash					65
Total Enterprise Value				\$ 1,065	

Source: CSFBC.

The interesting result is that, although the company’s business plan and investors did not change at all, the company’s stock price goes from \$968 million to \$1.065 billion. As predicted, this 10% increase in share price means that investors will earn exactly their demanded cost of equity of 10%, as long as expectations do not change.

A Theoretical Proof

A hardened skeptic may want more than examples to prove that the expected return on any stock—whether it be an open-market purchase or a company buying back stock—will be the cost of equity. Fortunately, we can also solve a proof that demonstrates that this relationship will always hold.

The logic starts with the premise that a stock's value is the present value of all future equity free cash flows, discounted at the cost of equity:

$$\text{Present Value (in Year 0)} = \sum_{time=1}^{\infty} \frac{\text{Free Cash Flow}_{time}}{(1 + \text{cost of equity})^{time}}$$

The formula for the value of a stock in a year is very similar. If we maintain the convention of calling the free cash flow (FCF) in each year by the same year number we used previously, the formula is:

$$\text{Present Value (in Year 1)} = \text{FCF}_1 + \sum_{time=2}^{\infty} \frac{\text{FCF}_{time}}{(1 + \text{cost of equity})^{time-1}}$$

where FCF_1 represents the cash-in-hand that results from the free cash flow that the company generated in its first year of operation.

If we multiply both sides of the first equation by the quantity $(1 + \text{cost of equity})$, we arrive at the following equation.¹⁷

$$\text{PV}_0 \times (1 + k_e) = \sum_{time=1}^{\infty} \frac{\text{FCF}_{time}}{(1 + k_e)^{time}} \times (1 + k_e)$$

Canceling out the numerator and denominator on the right side of this equation, we arrive at this equation:

$$\text{PV}_0 \times (1 + k_e) = \sum_{time=1}^{\infty} \frac{\text{FCF}_{time}}{(1 + k_e)^{time-1}}$$

We can expand the summation to arrive at this equation:

$$\text{PV}_0 \times (1 + k_e) = \text{FCF}_1 + \sum_{time=2}^{\infty} \frac{\text{FCF}_{time}}{(1 + k_e)^{time-1}}$$

Because this equation describing the present value of a stock in year 0 is exactly equal to our previous equation describing the present value of a stock in year 1, we can equate the two:

$$\text{PV}_1 = \text{PV}_0 \times (1 + k_e).$$

Thus, after several algebraic manipulations, we arrive at our conclusion: the value of a stock next year is equal to the current value of a stock multiplied by 1 plus its cost of equity.

Appendix C

Why an Asset Sale-Financed Share Repurchase Can Be Dilutive to Earnings and Accretive to Value

With Wall Street focused so much on earnings per share growth, we should expect that many corporate managers work to boost earnings per share—and avoid diluting earnings at all costs. Indeed, many managers like share repurchase for precisely that reason. By lowering the number of shares outstanding, buybacks have become a popular way to augment earnings per share.

However, the accounting consequences of share buybacks are not always positive. For instance, most accounting-focused managers avoid selling a value-destroying division—even at a price above intrinsic value—if it lowers reported earnings per share. This is particularly true for companies that have executive compensation programs tied to EPS targets.

However, faithful readers of the Frontiers of Finance series will not be surprised when we claim that managers should focus instead on the economic consequences of such a decision. We corroborate this assertion by elaborating on the example we laid out in the body of this report (see page 6).

In this example, a company is comprised of two divisions. The first, the Cash Cow division, earns a return on invested capital of 40%. Using a cost of capital of 10%, a growth rate of 8%, and an assumption of zero net investment, we can use the standard perpetuity present value formula to value the business. This formula—cash earnings divided by cost of capital less growth—yields a value of \$1,000. The second business, the Dog division, earns a meager 5% return. Holding constant all assumptions except that for growth, we can calculate that the Dog division's market value is \$50.

Accordingly, the combined divisions have a combined market capitalization of \$1,050. With 100 shares outstanding, this translates to a price of \$10.50 per share (see Table 8).

Table 8
Tale of Two Divisions

	"Cash Cow" Division	"Dog" Division
Cash earnings	\$ 20	\$ 5
Invested capital	50	100
Earnings per share contribution	0.20	0.05
Return on invested capital	40%	5%
Growth in cash earnings	8%	0%
Value	\$ 1,000	\$ 50

Market value of total firm	\$ 1,050
Shares outstanding	100
Price per share	\$ 10.50
Total earnings	\$ 25.00
Earnings per share	\$ 0.25
Price-to-earnings ratio	42 x

Note: Assumes 10% cost of capital and annual net investment over depreciation of \$0.
Source: CSFBC analysis.

In our example, another firm approaches our company and offers to buy the assets of Dog for book value of \$100. This amount is double the intrinsic value to our company of \$50. As management has no investment needs, they would return this money to shareholders via share repurchase. Should management accept this offer?

The accounting and economic analyses will give different answers. An economic analysis indicates that the company is now worth \$50 more, as it now has \$100 in cash versus owning a business worth \$50. Thus, firm value jumps from \$1,050 to \$1,100. Accordingly, before the company repurchases its shares, the share price would jump to \$11 to reflect this improvement. After the company returns the \$100 in cash to shareholders by repurchasing 9.1 shares, the company's value will fall back to \$1,000. However, as there will now be only 90.9 shares outstanding, the per-share value of our company would remain at \$11, a 4.8% increase from \$10.50. Clearly, the economic analysis gives a green light to selling the Dog division (see Table 9).

Table 9
Economic and Accounting Analysis of an Asset Sale-Financed Share Repurchase

	Cash Cow Alone
Market value of total firm	\$ 1,000
Old shares outstanding	100.0
Shares repurchased	9.1
New shares outstanding	90.9
New price per share	\$ 11.00
New net income	\$ 20
New earnings per share	\$ 0.22
New price-to-earnings ratio	50 x

Source: CSFBC analysis

The accounting analysis points the other way. Selling Dog will result in losing \$5 in earnings power. Even with fewer shares outstanding, this translates into earnings of \$0.22 per share or 12% dilution versus the prior total. Given the reported earnings per share drop, many managers would choose to pass on this opportunity to create value.

¹“Share Buybacks: A Popular Option,” *The Economist*, April 25, 1998.

²“Matsushita’s Management gets U.S.-Style Changes,” *The New York Times*, March 25, 1998.

³“Buy Back and Enjoy the Returns,” Francois Langlade-DeMoyen and Matthew Norris, *Credit Suisse First Boston Equity Research*, March 24, 1998.

⁴*Creating Shareholder Value*, Alfred Rappaport (Free Press, New York, 1997), p. 96.

⁵Another excellent, but dated, example is Teledyne Inc. In the five years ended 1976, Teledyne repurchased almost two-thirds of its originally outstanding shares. Shareholders who retained their stake through the period enjoyed a compound annual rate of return of 26.3% versus a 4.5% return on the S&P 500.

⁶“Who Wins in Large Stock Buybacks—Those Who Sell or Those Who Hold?” William McNally, *Journal of Applied Corporate Finance*, Spring 1998. McNally shows that nontendering shareholders, who “pay” for the premium to tendering shareholders through a wealth transfer, are more than compensated by the market’s positive reaction to the signal sent by management.

⁷“Common Stock Repurchases and Market Signalling,” Theo Vermaelen, *Journal of Financial Economics*, 1981.

⁸*Principles of Corporate Finance*, Richard A. Brealey and Stewart C. Myers (McGraw Hill, New York, 1996), p. 479-484.

⁹“Corporate Control and the Politics of Finance,” Michael C. Jensen, *Journal of Applied Corporate Finance*, Summer 1991.

¹⁰“Using APV: A Better Tool for Valuing Operations,” Timothy A. Luehrman, *Harvard Business Review*, May-June 1997.

¹¹“Debt and Taxes,” Merton H. Miller, *The Journal of Finance* 32, 1977.

¹²“Share Buybacks That Pay Back in Spades,” Jeffrey M. Laderman, *Business Week*, February 23, 1998.

¹³“Stock Options Are Not a Free Lunch,” Gretchen Morgenson, *Forbes*, May 18, 1998.

¹⁴This issue will be further explored in an upcoming report.

¹⁵“Stock Repurchases and Incentive Compensation,” Christine Jolls, NBER Working Paper No. 6467, March 1, 1998.

¹⁶To be specific, CAP is defined as “the number of years during which a company can invest incremental capital at returns above the cost of capital.”

¹⁷To save space, we have adopted the following notation: PV_0 stands for Present Value in Year One, k_e is the cost of equity, and FCF_t is Free Cash Flow in Year t .

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