

Derivative Strategies for Share Repurchases

Wojciech Grabowski, Assistant Professor,
Department of Economics, University of Warsaw

1. Introduction

The scale of share repurchases in the last decade generated a significant body of research looking for its causes. Several hypotheses have been advanced to explain the surge in the volume of repurchase transactions. The free cash-flow hypothesis claims that managers return excess cash to mitigate agency problems. The dividend substitution hypothesis seeks to elucidate the relations between the two forms of corporate cash payouts to the shareholders, including the examination of the impact of their tax treatments. The signaling hypothesis postulates that shares are bought back by managers who want to signal their undervaluation to investors. More recently, option-funding theory emphasizes the role played by employee stock option (ESO) grants in repurchase behavior. Another common explanation posits that managers are buying back shares to manage the EPS figures.

Companies frequently explain their repurchase programs with the need to manage ESO dilution. Links between ESO grants and repurchase activity have been also established empirically in recent academic studies.¹ Still, at present, the ESO valuation, the rate of return on ESO activity and its impact on corporate efficiency remain an area of investigation and debate. It is not clear if the repurchase operations should be incorporated into such analysis or treated separately. The answer to this problem is interesting from both the practical and theoretical point of view.

While large-scale studies of repurchase activity exist, the frequently complex management of repurchases by individual corporations is still largely unexplored. Such clinical analysis, as in other areas of corporate finance, may provide additional insight.²

¹ Fenn and Liang (2001), Kahle (2002).

² Tufano (2001).

Below I examine a specific aspect of repurchase operations: their enhancement by the derivative transactions on the company's own stock. I analyze the cases of two major technology companies: Microsoft and Dell. The data has been hand-collected from their quarterly and annual reports. I then look at the derivative programs from the financial management point of view. In conclusion I extend the option funding perspective for share repurchases and their enhancements and propose to view some of these operations as a part of the risk management of ESO plans.

2. Derivative enhancements of repurchase programs: the cases of Microsoft and Dell

A. Microsoft

Until 2001 Microsoft enhanced its repurchase program by writing put warrants on its own stock (Table 1). The idea of the put strategy was straightforward. Microsoft sold puts and collected premium hoping that its share price would stay above the exercise price of the puts and that they would expire out of the money. Writing puts is a basic strategy to profit from the rise in the share price. The strategy must be therefore timed appropriately and is least risky if there is little chance of the share price downturn. The downside, however, may be substantial. In contrast to another simple strategy profiting from share price rise, buying calls, it may result in a large potential loss. However, it provides cash at the outset, while buying calls is costly. If the puts went into the money Microsoft would have to either buy back its shares at above market prices, or to issue its own shares to settle the puts. So Microsoft took on two potential risks: executing repurchases at unfavorable prices or diluting profits by the net-share settlement of the puts. Such unfavorable outcomes would negate the original idea of both the repurchase program and its derivative management. They would result in the dilution and not in the accretion of the EPS, and in repurchasing at above market instead of at or below market prices.

Table 1.

Microsoft: put warrant program 1997–2001

Fiscal year/quarter	Put warrant proceeds (\$m)	Put warrants outstanding (m)	Strike price	Expiry time	Market high	Market low
1998	538	120	36–38.5	11/98–06/00	54.28	29.5
1Q99	225	150	38–44	03/99–09/01	59.81	47.25
2Q99	130	163	43.5–49.5	06/99–12/01	72	48.13
3Q99	402	163	59–65	09/99–03/02	94.63	68
4Q99	9	163	59–65	09/99–03/02	95.63	75.5

Komentarze i komunikaty

Fiscal year/ quarter	Put warrant proceeds (\$m)	Put warrants outstanding (m)	Strike price	Expiry time	Market high	Market low
1999	766	163	59-65	09/99-03/02	95.63	47.3
1Q00	290	163	64-73	03/00-09/02	100.75	81.63
2Q00	182	163	69-78	06/00-12/02	119.94	84.38
3Q00	0	163	69-78	06/00-12/02	118.63	88.13
4Q00	0	157	70-78	09/00-12/02	96.5	60.38
2000	472	157	70-78	09/00-12/02	119.9	60.38
1Q01	81	157	70-78	12/00-03/03	82	60.31
2Q01	-486	113	70-78	03/01-03/03	70.88	41.5
3Q01	2.8m shares issued	94	70-78	06/01-03/03	64.69	43.38
4Q01	-962	0			73.68	51.94
2001	-1367	0			82	43.38

Source: Microsoft Form 10-K Annual Reports and Form 10-Q Quarterly Reports.

In 1998–2001³ the company had outstanding put positions at the level of 2–3% of its total shares outstanding. In 1998 it collected over half a billion dollars of premium and had 120m puts outstanding at year end. In the same year it repurchased 78m of shares for \$2.5bn. In the next year, 1999, the company expanded its put strategy, and the amount of outstanding options increased to 163 million. The maximum expiry time of the warrants was 2.5 years. Microsoft's market price was rising, the puts written earlier at lower strikes were expiring out of the money and the strategy was proceeding successfully. The company wrote more options at increasingly higher strike prices. At the end of 1998 the strike price range was \$36–38.5, while at the end of 1999 it increased to \$59–65. Still, as the company wrote most probably slightly OTM puts in the first three quarters of 1999, the options were OTM by a fair margin at the end of 1999. The company received \$766m of premium that year. Microsoft continued to write options in the first half of 2000, replacing the expiring options. The options were written at the maximum strike price of \$78 and brought in the proceeds of almost half a billion dollars. The option position may have seemed relatively safe as the share price moved in the \$80–119 range in the first half of 2000. The situation began to change in the second half of that year. The antitrust proceedings against Microsoft pushed its price much lower in a short period of time, and suddenly some of the options went into the money. At the end of 2000 the company had still 157 million puts outstanding with exercise prices ranging from \$70 to \$78, and 2.5 years of maxi-

³ All references are to fiscal years and quarters.

mum expiry time. In the first quarter of 2001 the company wrote more options in the same strike range, to replace expiring warrants. In the next quarter the Microsoft's share price went down significantly reaching a low of \$41.5 and the company started buying back its puts. It spent almost half a billion dollars that quarter and the number of outstanding puts was reduced to 113m. In the second half of 2001, with all the options in the money and both the market and the economic situation deteriorating, the company decided to buy back all outstanding warrants. It issued 2.8m shares and paid \$962 in cash to close its warrant positions. In the same year it spent over \$6bn on share repurchases.

The put warrant issues of Microsoft were accompanying an active share repurchase program. It coincided with high exercise rate of employee options of about 200 million annually as well as with large option tax benefits and a high level of cash flow from operations. The combined put warrant operations did not result in the cash outflow from the company. But the program designed to enhance share buybacks ended up in buying back the enhancing instruments themselves. The strategy became very risky in 2001, when, it seems, some puts were written near the money just before a period of substantial market volatility. It is interesting why Microsoft did not elect to settle all the outstanding puts in shares but used cash instead. This may have forced it to issue some 20 million shares at the time when it repurchased 89m at a very high cost.

Microsoft repurchased 542 million shares for \$25.5bn in 1997–2002, issuing 1125 million shares in the same period, mainly to cover 951 million ESO exercised. It granted 1005 million options in that period, the highest amount in 1997 and 2000, 4.6% and 6% of its shares outstanding. In 1998–2001, Microsoft issued 833 million shares and repurchased 266 million for \$16.3bn. 672 million ESO were exercised. There were 4816 million shares outstanding at the beginning of 1998 and 5383 million at the end of 2001. Microsoft used also minor forward positions for share repurchases.

B. Dell

Dell initiated its repurchase program in 1997. At the same time it started a derivative-based strategy to enhance it (Table 2). The derivative strategy was based on the opening of option spread positions, composed of long calls and short puts. The derivative program was terminated in 2003, when all outstanding options were exercised. Such spread strategy is successful when the share price rises, similarly to the put-only strategy. The options are sold and bought so that there is no or little exchange of cash. The short put position is used to finance long call positions. This strategy allows the spread holder to profit more from the rise of the share price and is quite aggressive: there is no or little cash received at the outset and if the share price falls the downside is the same as for the put-only strategy. In 2000 Dell opened a small number of short straddle positions, composed of short puts and calls, with calls for OTM. Such positions are profitable if the underlying price closes near or

between put and call strikes and lose money if the share price moves further below or above the exercise prices.

Table 2.

Dell: equity derivative operations, 1997–2003

Fiscal Year/Quarter	Puts Outstanding (m)	Average Strike Price (\$)	Calls Outstanding (m)	Average Strike Price (\$)	Maturity Fiscal Year/Quarter	Option Proceeds (\$m)	Shares Repurchased (m)	Average Repurchase Price (\$)	Market High (\$)	Market Low (\$)
1997	134,4	1,88	142,4a	2,19	03/97–09/97		320	1,55	4,52	0,83
1Q98			148,8	4,25		4	106	1,88	5,75	3,74
2Q98			216	6,25	3Q99	24	45,6	4,78	10,84	5,53
3Q98			216	9,25	3Q99	10	72,8	4,02	12,98	9,13
4Q98			200	11		0	52	6,02	12,63	8,75
1998	220	9,75	200	11	1Q99–3Q00	38	276	3,71	12,63	3,74
1Q99			160	12	3Q00		40	8,35	21,06	12,61
2Q99			116	13	3Q00		44	9,07	29,56	19,31
3Q99			80	14	3Q00		36	10,97	34,63	20,38
4Q99			49	14			29	13,45	50,19	29,78
1999	33	11	49	14	1–4Q00		149	10,19	50,19	12,61
1Q00			45b	24	2Q01	39	18	13,83	55,00	35,38
2Q00			53b	36	2Q02	14	17	14,35	45,06	31,38
3Q00			52b	45	3Q02	3	15	16,67	49,94	37,38
4Q00			118	41		7	16	19,88	53,97	37,06
2000	69	39	118	41	1Q01–3Q02	63	56	18,95	55,00	31,38
1Q01	111	45	95c	50	4Q03	4	11	45,45	59,69	35,00
2Q01	107	46	90c	51	1Q04		11,9	43,78	54,67	42,00
3Q01	127	44	100c	49	1Q04		21	39,24	44,25	22,75
4Q01	111	44					21,1	40,52	33,06	16,25
2001	111	44	88	50	1Q04		65	41,54	59,69	16,25
1Q02	96	44	80	50	1Q04		16	46,94	30,49	20,63
2Q02	81	44	56	51	1Q04		17	43,47	28,74	23,41
3Q02	66	44	40	53	1Q04		18	42,72	27,84	16,63
4Q02	51	45	25	58			17	43,59	29,67	25,30
2002	51	45	25	58			68	44,12	30,49	16,63

Fiscal Year/ Quarter	Puts Out- stand- ing (m)	Avera- ge Stri- ke Pri- ce (\$)	Calls Out- stand- ing (m)	Avera- ge Stri- ke Pri- ce (\$)	Maturi- ty Fiscal Year/ Quarter	Option Proce- eds (\$m)	Shares Repur- chased (m)	Avera- ge Re- purcha- se Pri- ce (\$)	Market High (\$)	Market Low (\$)
1Q03	36,5	46	19	d			14	43,71	28,91	23,76
2Q03	22	47,8	12,3	d			14	44,14	27,95	22,33
3Q03	9,3	50,4	6	d			13	45,77	29,06	23,11
4Q03	0		0				9	51,67	30,94	23,86
2003	0		0				50	45,80	30,94	22,33

a. call&put arrangements to purchase, b. equity options to buy, c. equity options&forwards to buy, d. significantly OTM.

Source: Dell Form 10-K Annual Reports and Form 10-Q Quarterly Reports. Share prices and quantities adjusted for splits.

At the end of 1997 Dell had 134.4 million puts opened at \$1.88⁴ and 142.2 million “put and call option arrangements to purchase shares” at the exercise price of \$2.188. The Dell’s share price range that year was \$0.82–4.52. The options were short-term, European, maturing between March and September of 1997. The company actively repurchased shares in 1997, buying back 320 million shares, or more than 10%, of 2992 million shares outstanding at the beginning of 1997. In 1998 Dell continued its strategy of spread-enhanced share repurchases. It issued more put and call options and at the end of 1998 there were 220m puts and 200m calls outstanding, at \$9.75 and \$11. The opening of these positions brought Dell \$38m in cash. The positions were opened at increasingly higher prices as the market price of Dell stock was rising rapidly that year. The options were now longer-term European ones, with the most distant expiry in 1.75 years. In 1998 the company bought back 276 million shares, again close to 10% of the shares outstanding at the beginning of the year. The option spreads were used to buy back shares actively. Since the market price rose quickly, calls went into the money and this resulted in the average repurchase price of \$3.7, below the market price range that year of \$3.74–12.63. In 1999 the company was active using calls it held to repurchase shares. The number of repurchased shares was 149 million that year, similar to the change in the call position, which stood at 49m at the year-end, while the puts numbered 33m. The market price quadrupled again that year with maximum price reaching \$50 from the low of \$12.61. The average share repurchase price of \$10.18 was below that range. With the market price up and fewer spread positions Dell started to open new positions actively again. In 2000 the market price range was \$31.38-\$55. Dell opened more European option positions increasing maximum expiry time to two years. It sold 79m puts, almost half of them in the second quarter, with strike price ranges of \$25–47,

⁴ References are to the average strike prices. Share prices are adjusted for splits.

most probably at or near the money, and 3.25m probably mostly OTM calls, thus opening a small number of straddle positions. The call sales indicated that the transaction counterparty bet that the Dell price would rise significantly. There were 69 million and 118 million calls outstanding at the year-end, with strike prices of \$39 and \$41. The opened positions provided \$63m in cash. The difference between average put and call exercise price became very narrow, closely resembling futures position. The strikes were now also very high, in the elevated market price range. The company repurchased 56m shares in 2000, at the average cost of \$18.94, below market range again due to the exercise of earlier calls. In the three quarters of 2001 Dell sold 94.3m ATM puts bringing the average strikes up to \$46–51 range, and extending their expiry time to over 2.5 years. The risk of derivative positions was increased significantly. The price of Dell shares declined in 2001 along with the market and reached their minimum of \$16.25 in the last quarter from the maximum of \$59.69 in the first. In 2001 the company repurchased 65 million shares at \$41.53 on average. The puts were in the money and the company stopped opening new equity derivative positions in October 2000. At the start of 2002 Dell had 111 million puts and 88 million calls outstanding with strikes of \$44 and \$50. The market price range in 2002 was \$16.63–30.49, and the puts were exercised successively against the company. The company repurchased 68 million, or 2.6% of its shares, at \$44.11 on average, and at the year-end the put and call positions stood at 51 and 25 million. In 2003 more puts were exercised, and Dell repurchased 50 million shares at the average price of \$45.8, while the market price range was \$22.33–30.94. The average strike of puts rose steadily until \$51 and the calls finished significantly OTM. All derivative positions were closed or cancelled in 2003.

In 1997–2003 Dell repurchased 984 million of its shares and issued 552 million, predominantly in ESO exercises. The number of shares outstanding was 2992 million at the beginning of that period and 2681 million at its end. Dell paid over \$12 billion for the repurchased shares. In 2000–2003 Dell bought back 239 million shares and paid \$9bn, so 75% of the repurchase cost was used to repurchase 25% of all repurchased shares. 275 million shares were issued in 2000–03. There were 733 million ESO granted in 1997–2003, and 414 million in 2000–03. ESO issues were highest in 1997 and 2001 at almost 6% of shares, and they were around 2% in 1999 and 2000. With no share repurchases, the EPS would grow somewhat slower in 1998–9, when it was growing extremely rapidly anyway, and its growth rate would be little changed from 2000 on.

C. Equity derivative strategies: the financial management viewpoint

Microsoft and Dell implemented derivative instruments and strategies to enhance their share repurchase programs. Microsoft wrote put warrants on its own stock, while Dell applied mainly option spreads, and, on a minor scale, wrote straddles. Both companies implemented their strategies aggres-

sively during the late 1990s, and seem to have correctly believed that their share prices would rise rapidly. Dell was quick to open a significant number of positions early on, and could exercise its ITM calls until 2000. This enabled Dell to repurchase its shares at very low prices until 2000. Both companies appear to have thought that the rise in their share prices will continue, and opened more positions, this time at elevated strike prices, after their share prices climbed significantly. When the stock market downturn came, they had to settle the short put positions. Microsoft was fairly quick to reverse its strategy and settled the puts early on. The scale of Microsoft operations was lower than Dell's and it managed to avoid the cash outflow on its combined put transactions. Dell had to buy back shares in put exercises until 2003, paying significantly above market prices for its own shares. Still, due to the very successful early buyback period, the average price it paid for its shares over 1997–2003 was below its share price range in 1999–2003.

Both companies would do well if they scaled down the risk profile of their strategies in the period after the rapid stock market appreciation, for example by using barrier options or altering the terms of the vanilla contracts. This might have lowered cash provided by put sales, but would have decreased the costs of closing the positions. It seems that the risk-tolerance of both companies increased in the boom period, as they adopted more risky strategies.

3. Repurchases: EPS or ESO management?

Microsoft and Dell, large technology companies, may be characterized as major issuers of employee stock options. They both provide an option funding explanation for their repurchase programs in the financial reports. Both established large-scale derivative programs to complement their share repurchase activity. These programs were initially successful, but it seems that in the bull market of 2000 their managers adopted an overconfident view of the future stock market developments. This resulted in the opening of large and risky derivative positions on their own stock.

The application of derivative transactions to the management of repurchase programs was certainly innovative. It also introduced a new element into the ESO-share repurchases combination. Derivatives were employed to manage the issues of other derivatives with the same underlying instrument. More broadly, the derivative enhancements to repurchase programs indicated an increased range of application of derivative instruments in corporate financial management.

In general, derivatives may be used for two major purposes, speculation and risk-management. Complementing repurchases with derivatives suggests that similar motivation may lie behind some of the buyback transactions. The classification of some of the repurchase transactions and their derivative enhancements as EPS-managing or as risk-managing might have consequences for the evaluation of their efficiency and their accounting treat-

ment. In practice firms seem to confuse the EPS management role of repurchases with their contribution to the risk-hedging of ESO plans. This may be due to the difficulty of the measurement of cost and benefits of ESO.

The risk-management purpose of repurchases may be linked to ESO plans. If a company issues options it may elect to hedge them. Hedging ESO grants, i.e. short call positions, may be done by buying the underlying instrument (repurchasing shares) and/or by taking the reverse position i.e. buying calls (as in the case of Dell). The more aggressive variants employed by Dell and Microsoft involved also writing puts to reduce, at least initially, the hedging costs. There are possibly many potential ESO-managing strategies, differing in the choice and maturity selection of derivative instruments as well as their risk profile, but the problems of their exact design and quantitative formulation may be quite significant due to the complex economic nature of ESO.

The EPS management role of share repurchases involves more directly the issues of market timing and investor reaction. Repurchases should be undertaken only if the EPS accretion from the after-tax return on cash is lower than the accretion from repurchases using the same amount of cash. In practice the return on repurchases is frequently comparable to that on cash, but there is also a positive announcement return⁵. The total return on repurchases including their market impact may be more attractive to managers, as is the case with other financial management choices perceived as accretive⁶. Companies also admit that repurchases are meant to prevent ESO dilution. This helps confuse the EPS management motivated by the ESO dilution due to the accounting rules of the EPS calculation and the actual ESO exercise with the ESO-managing transactions, whose objective should be the highest return on ESO plan, taking into account the return on labor and human capital purchased with ESO grants.

Classification of repurchases as EPS or ESO management may have implications for the analysis of the return on both ESO plans and the stand-alone repurchase operations. If we treat buybacks and their derivative complements as linked to ESO grants, we should include their cost together with option tax benefits in ESO cost/benefit calculations. If they are treated as stand-alone EPS management transactions they should be assessed separately. The quantification of these two effects of repurchases requires further study of both individual companies and their larger samples. It may contribute to the deeper understanding of the economics and profitability of ESO plans as well as to the more efficient financial design of both ESO and repurchase operations.

⁵ Ikenberry et al. (1995), Kahle (2002), Stoneham (2002).

⁶ Andrade (1999).

References

- Andrade G., 1999. *Do appearances matter? The impact of EPS accretion and dilution on stock prices*, working paper, Harvard Business School.
- Fenn G.W., Liang N., 2001. "Corporate payout policy and managerial stock incentives". *Journal of Financial Economics* 60, 45–72.
- Ikenberry D., Lakonishok J., Vermaelen T., 1995. "Market underreaction to open market share repurchases". *Journal of Financial Economics* 39, 181–208.
- Kahle K.M., 2002. "When a buyback isn't a buyback: open market repurchases and employee options". *Journal of Financial Economics* 63, 235–261.
- Stoneham P., 2002. "A game plan for share repurchases". *European Management Journal* 20/1, 37–44.
- Tufano P., 2001. "Introduction. HBS-JFE conference volume: complementary research methods". *Journal of Financial Economics* 60, 179–185.