Internal Capital Markets and Investment:

Do the Cash Flow Constraints Really Bind?

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Abstract

Lamont (1997) claims to find evidence of credit market imperfections that distort financing and investment decisions of a sample of oil-dependent firms, as investment by nonoil units fell when oil cash flow dropped. However, a simple test reveals that few of these firms behaved in a fashion consistent with binding cash flow constraints. In addition, most were cash rich. The data provide strong evidence against the hypothesis that investment decisions by nonoil units were significantly affected by oil cash flow, or that credit market imperfections are an important factor for this set of firms.

Internal Capital Markets and Investment: Do the Cash Flow Constraints Really Bind?

A lively debate has taken place in the literature on the relevance of cash flow constraints for business investment (see Fazzari, Hubbard and Petersen (1988); Hoshi, Kashyap and Scharfstein (1991)). The existence of such effects could have wide-ranging implications, from macroeconomic issues like the behavior of investment over the business cycle, to the efficiency of financial markets, to distortions in firm behavior due to agency problems. While some claim that such constraints are limited to smaller, less-well-known firms (see Gilchrist and Himmelberg (1995); Whited (1992)), others have argued that even large firms with access to public bond markets may face such constraints.

Taking the latter view is Lamont (1997), who finds a correlation between cash flow from oil subsidiaries and investment by nonoil units of 26 large diversified companies. When oil revenues fell following the collapse of oil prices in 1986, investment by subsidiaries in industries unrelated to the oil business also declined. This, he argues, is evidence of imperfections in credit markets that distort financing and investment decisions by these firms.

The critical assumption in this piece is that total cash flow of the firm fell sharply, prompting managers to cut investment by nonoil segments by more than they would have in the absence of the oil price decline, as the constraint imposed by total cash flow became binding. Thus, it would be well worth examining directly if total investment of oil and nonoil segments was restricted by total cash flow (Lamont does not); firms that do not meet this test cannot provide evidence in support of the main hypothesis. Interestingly, only a minority of the firms in his sample meet this basic--and necessary--condition.

Furthermore, many of the firms that do meet the cash flow condition acted in other ways that strongly suggest that, far from being constrained, they were actually flush with cash in 1986. Examples of such characteristics include balance sheets so cash-rich that many firms held more than twice the amount of cash and securities relative to total assets as did the median firm in similar industries, firms that repurchased hundreds of millions of dollars worth of common stock, and large increases in common dividends paid. These findings cast serious doubt on the validity of Lamont's results.

The next section reviews the "internal capital market" argument and examines the

condition that Lamont's hypothesis imposes on the relationship between total cash flow and investment by the entire firm. Then, I present data showing that a majority of the firms in his sample fail this basic condition. I proceed with other indicators demonstrating few firms in this sample could have been financially constrained, as well as some other weaknesses of the study, before concluding.

I. Cash flow and investment.

Lamont's argument is as follows: diversified firms subsidize the investment of nonoil units with cash flow generated by other segments through the "internal capital market". They do so because credit market imperfections drive a wedge between the cost of internal funds and external funds. As a result, the different corporate segments are financially interdependent, so that financial shocks to one segment impact the cost of funds in other segments.

According to this argument, when oil prices fell in 1986, the decline in cash flow generated from the oil segments of this group of firms was so sharp that they had to curtail capital spending. Faced with the need to balance their cash inflows and expenditures, companies stopped subsidizing nonoil units and cut capital expenditures across the board, including investment by nonoil segments.

Before turning to the investment behavior of nonoil units, it is worthwhile verifying if cash flow constraints did bind for the firm (as opposed to industry segments within the firm).[1] The overall firm is the appropriate unit of analysis, as internal capital markets operate by linking sources and uses of cash within the entire firm. Suppose there is a desired investment level I^*_t, determined by the net present value of the expected future cash flows of the firm's investment opportunities. The firm may face credit market imperfections like those described by Lamont. Actual investment, I_t, is given by

$$I_t = \min\{I^*_t, CF_t\} \qquad (1)$$

where CF_t is cash flow in period t. There are two periods (1985 and 1986); the constraint may

bind in either or both periods, or not at all. Next consider the change in investment, dI_t, between the two periods. There are four possible outcomes:

A. **Constraint binds in both periods.** $I_{t-1} = CF_{t-1} < I^*_{t-1}$, and $I_t = CF_t < I^*_t$. In this case, the change in investment equals the change in cash flow:

$$dI_t = CF_t - CF_{t-1} = dCF_t \tag{2}$$

B. **Constraint binds at t-1 only.** $I_{t-1} = CF_{t-1} < I^*_{t-1}$, and $CF_t > I_t = I^*_t$. Thus, the change in investment is less than the change in cash flow:

$$dI_t = I^*_t - CF_{t-1} < CF_t - CF_{t-1}$$
$$dI_t < dCF_t \tag{3}$$

C. **Constraint binds at t only.** $CF_{t-1} > I_{t-1} = I^*_{t-1}$, and $I_t = CF_t < I^*_t$. Investment falls by less than cash flow:

$$dI_t = CF_t - I^*_{t-1} > CF_t - CF_{t-1}$$
$$dI_t > dCF_t \tag{4}$$

D. **Constraint never binds.** $CF_{t-1} > I_{t-1} = I^*_{t-1}$, $CF_t > I_t = I^*_t$. In this instance the sign of the relationship between the change in investment and the change in cash flow is indeterminate.

$$dI_t = I^*_t - I^*_{t-1} \; ? \; CF_t - CF_{t-1} \tag{5}$$

Lamont's hypothesis corresponds to the third outcome, where the cash flow constraint was not binding in 1985 but became binding in 1986. Cash flow exceeded desired investment

in 1985, so actual investment equaled I^*. However, in 1986, cash flow falls short of desired investment. As a result, actual investment equals cash flow. For the constraint to have become binding, cash flow had to have fallen more sharply than did desired investment, so $dI_t > dCF_t$. Otherwise, the constraint (by definition) could not have become binding.

Table 1 shows the changes in investment and cash flow for the 26 firms in Lamont's study. Most of these firms failed this basic test of cash constraint, that cash flow fall more sharply than investment:

- Lamont states: "this study examines a ... group of firms that experience a cash shortfall." (p.85) However, **cash flow actually rose for six firms.** DuPont's cash flow rose by more than three-quarters of a billion dollars in 1986, yet total capital expenditures fell by $309 million. Mobil Oil's cash flow increased by more than half a billion dollars, yet it cut investment expenditures by $329 million. Four other firms had higher cash flow but cut investment. This group's decline in investment was not a response to falling cash flow.

- **One firm increased capital expenditures in 1986.** Litton spent $33 million more on total capital expenditures in 1986 than it did in 1985, in spite of lower cash flow.

- **Seven firms cut capital expenditures by far more than the drop in cash flow.** Unocal's capital expenditures fell by more than five times the drop in total cash flow, as did Kerr-McGee's; Tenneco's fell by nearly four times as much, and Amoco's by nearly twice as much. Such outsized decreases violate the condition implied by Lamont's cash flow constraint hypothesis, but are consistent with a drop in desired investment in response to less favorable investment opportunities.

- **Twelve firms cut investment by less than the fall in cash flow.** These decreases would be consistent with constrained behavior; however, given that more than half the sample evidently cut capital spending in response to a drop in *desired* investment, we cannot rule out the possibility that these other firms were merely reacting to less profitable investment projects as well.

This comparison assumes that other sources and uses of funds are constant. However, examining the impact of other activities we find that, far from causing any constraint, they on net provided additional funds for most firms in this sample. Table 2 lists the changes in

sources other than cash flow and uses other than capital expenditures.[2] DuPont had a large jump in other uses due to six acquisitions totaling $1.2 billion in 1986. Other uses fell by $2.6 billion at Atlantic Richfield Co., as the firm reduced its share repurchases. While other sources fell for all of the firms whose cash flow increased in 1986, the declines were smaller or roughly equal to the increases in cash flow, leaving total sources for most of this group higher or about unchanged from 1985. Two firms, Royal Dutch Shell Group and Atlantic Richfield Co., had large declines in total sources as they scaled back their borrowing in 1986. Similarly, Litton's and Unocal's drop in other sources is almost entirely attributable to slower debt issuance, and Tenneco's other uses of funds jumped in 1986 due to a reduction in long term debt outstanding. There is little evidence that other activities drained cash from investment for these firms.

For the firms in the final group, whose investment fell by less than the change in cash flow--that is, consistent with the hypothesis of binding cash constraints in 1986--most had *increases* in funds from other sources, some of them substantial. The largest category of other sources of funds is from increases in long-term debt. As will be discussed below, many of these firms had heavy bond issuance in 1986. Overall, data on other sources and uses of funds do not suggest that financial constraints tightened in 1986.

One could argue that it is not just cash flow that matters, but cash stocks as well. However, considering cash stocks for this set of firms in 1986 argues against the existence of financial constraints. For example, a firm that decreased its cash holdings would have had additional resources to spend on investment in 1986, further loosening any constraints. On the other hand, an increase in cash stocks would provide evidence that the firm was not short on cash, especially considering (as is discussed below) that most of these firms had relatively large cash holdings compared to firms of similar size and industry.

II. Other possible indicators of financially constrained firms.

Of course, one should not look at investment and cash flow in isolation. Do other characteristics of this group of firms suggest they were financially constrained in 1986? No. In fact, a number of other measures suggest that these firms were cash rich:

- **High cash holdings relative to industry norms.** Holdings of cash and liquid securities on these firms' balance sheets in 1986 rose by more than 25 percent, to $31.5 billion--a cash hoard for this group exceeded during the entire 1982-1994 period only once, by the $31.9 billion holdings in 1987 (Table 3). Over this span of time, in only two years did cash and securities holdings for the group exceed 80 percent of total capital expenditures: 1986, 124 percent, and 1987, 113 percent. Most firms' cash holdings were above the median for similar firms,[3] and 10 were in the top quartile of comparable firms; only three firms were in the bottom quartile (Table 4). Most of these firms had ample resources to maintain investment plans in smaller subsidiaries.

- **Increases in common dividends paid.** Firms with cash resources exceeding their investment opportunities may return some cash to shareholders through higher dividends. In 1985, before the sharp drop in oil revenues, the average common dividends paid by the firms in this group rose by $9 million (Table 5). If these firms became constrained in 1986 one might expect smaller increases in dividends. However, the 1986 increase was more than three times as large as in 1985, averaging $30 million. Moreover, firms continued to raise dividends in subsequent years. Total dividends paid by the group soared by 30 percent over the next few years, from $8.2 billion in 1985 to $10.7 billion in 1988. The oil shock of 1986 seems to have had little long-term impact on the financial resources of these firms.

- **Stock repurchases.** Firms that are short on cash might be expected to avoid any discretionary uses of funds like buying back shares of common stock. However, more than half the firms in this sample had sufficient funds to carry out share repurchases in 1986 (Table 6). Four firms that had not repurchased shares in 1985 did so in 1986, including a buyback of nearly $600 million by W R Grace. Another ten firms repurchased shares in both years. While repurchase amounts in 1986 were smaller for most firms (but not all--Schlumberger and Union Pacific stepped up their repurchases), four of these firms had repurchases in excess of a quarter of a billion dollars in 1986.

- **New debt issues in 1986.** Did low collateral value make it difficult for firms to borrow in 1986?[4] Evidently not--12 firms in this sample issued public debt in 1986, and many made more than one offering (Table 7).[5] Total proceeds of these issues exceeded $8 billion. Of course, not all of this money represents new debt, but rather refinancing of existing issues. However, firms with multi-billion dollar cash stockpiles might easily have scaled down the size of the bond offerings if agency costs of borrowing were a major impediment. Many, in fact, increased debt during 1986.

- **Early retirement of debt.** In yet another display of the complete lack of financial constraints faced by these firms, on September 9, 1986, Phillips Petroleum retired an entire issue of $200 million of guaranteed notes that were not due until 1989.

Table 8 summarizes the data from the previous sections. A "V" in columns 1-3 indicates that the firm violates tests of being financially constrained either due to the relationship between cash flow and investment, by increasing dividend payout or by repurchasing shares, respectively. Column 4 lists the quartile of the ratio of cash plus securities to total assets relative to a group of COMPUSTAT firms of comparable size, 3-digit SIC industry, and bond ratings (including 259 firms with publicly-rated debt and 1291 firms without rated debt). I do not redisplay data on bond issues here.

Most firms fail one or more tests; DuPont fails all three (and issued over half a billion dollars of bonds in 1986), and has a ratio of cash holdings to assets near that of the median firm. Only three firms meet all the restrictions: Chevron, Fina and Zapata. Chevron, however, held liquid assets equal to 9 percent of total assets, almost three times the median share for comparable firms, and raised nearly $1 billion in the bond market during 1986. One can safely rule out financial constraints as a factor for Chevron.

Zapata Corp, on the other hand, was clearly financially constrained in 1986. Having just defaulted on two of its subordinated debt issues, it was operating under an agreement negotiated with its bank lenders while it pursued steps to restructure its debt. The direct influence these lenders had on investment decisions likely contributed to the 10.3 percent decrease in investment relative to sales by its nonoil segment, the second largest percentage drop in this sample. Moreover, Zapata was able to obtain a new loan to finance the completion of the company's Wisdom gas field, subject to liens placed on the project by the bank. That is, even firms in default may be able to finance desirable projects.

Fina also was experiencing difficulties in 1986. Its cash flow and liquid assets both plummeted in that year. Furthermore, while Fina paid $25 million in common dividends in 1985, it eliminated its dividend in 1986. Curiously, the change in investment relative to sales by its chemical segment was -0.95 percent–the median for the segments listed in Lamont's Table III, and less than the average cut of -1.46 percent. That is, in spite of severe constraints on Fina, the investment behavior of its nonoil unit was fairly typical compared to the firms that were not constrained.

Of the firms in Lamont's sample that were not in default, only Fina appears to have been constrained in 1986. However, Fina and Zapata were likely constrained in 1985 as well, in violation of Lamont's assumption of being "awash in cash" in that year. Both cut total investment by far more in 1985 than they did in 1986. In addition, Zapata's cash flow began deteriorating in 1983, and decreased by $166 million from 1983 to 1985, a larger total drop than the 1986 decline of $81 million.

It is important to underscore that the data do not point to pervasive distortions in financing and investment decisions of major corporations, as Lamont asserts. Rather, these firms were easily able to cushion any deterioration of oil cash flow with other resources.

III. Other pitfalls of the paper.

A. Misinterpretation of coefficients. The crux of Lamont's argument is that high cash flow from oil operations subsidized investment by inefficient non-oil industry segments of diversified oil companies in 1985. In 1986, when oil prices fell and oil cash flow withered, investment by non-oil segments of the firm also declined. To demonstrate this relationship, in Table XI he reports the results of regressing investment by the non-oil segment on the segment's own cash flow, as well as oil cash flow of the firm (all variables are scaled by total firm sales). In support of the paper's central thesis, using data for 1985 only, the coefficient on oil cash flow is positive and statistically different from zero: firms with a greater share of total cash flow from oil had higher investment in nonoil segments, perhaps indicating that "internal capital markets" are subsidizing investment by the non-oil segment.

In 1986 this result disappears: the coefficient on oil cash flow is 0.00. Lamont interprets this as

> "In 1985, oil companies were awash in cash, and subsidized underperforming nonoil businesses. In 1986, the parent companies stopped subsidizing their nonoil segments; these segments therefore relied only on their own cash flow to finance investment." (p.103)

This is akin to asserting that the wealth effect on consumption holds when the stock market rises, but disappears when the stock market falls. In fact, Lamont's hypothesis about

subsidization of nonoil investment with oil cash flow implies we should also observe a positive coefficient on oil cash flow in 1986. Firms whose oil share of cash flow was lowest in 1986 should also have less investment. A coefficient of zero indicates the opposite occurred: a lower share of oil cash flow was *not* associated with below-average investment in 1986.

B. Nonoil segments as high investment in 1985. Lamont characterizes the nonoil segments as "overinvesting" because 5 of 39 units (13 percent) had investment exceeding pretax income. However, for firms with profitable investment opportunities it is quite common for this to occur. For example, of the 877 firms on the COMPUSTAT tape in 1985 in the same 3-digit SIC industries as the nonoil segments in Lamont's sample, 601 firms, or 69 percent, had investment greater than pretax income. This suggests that, if income or cash flow is the correct metric by which to judge if investment is excessive,[6] then the 13 percent "high investors" in 1985 for Lamont's sample was actually quite *low* by industry standards. Most of these firms were *underinvesting* in their nonoil segment by Lamont's argument. The other 34 units were, presumably, subsidizing oil operations with the cash flow from nonoil segments in 1985.

IV. Conclusion

A majority of the firms in Lamont's sample fail the most basic test of whether a drop of investment by nonoil segments in 1986 could have been caused by newly-binding cash flow constraints related to sinking oil prices: cash flow did not fall more sharply than did investment or, in many cases, actually rose. Moreover, most of the rest of the firms appear to have been flush with cash–a condition inconsistent with financial constraints being important for these firms. The data on firm-level cash holdings and cash flow provide strong evidence against the hypothesis that investment decisions by nonoil units were significantly affected by oil cash flow, or that credit market imperfections are an important factor for this set of firms. On the contrary, these large public corporations have ready access to credit, and changes in cash flow do not impose binding constraints on their investment.

These results are in accord with other studies that call into question the importance of liquidity constraints and the causal link between cash flow and investment (Kaplan and

Zingales (1997)), suggesting that one must exercise great caution in interpreting investment-cash flow sensitivities as evidence of liquidity constraints.

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Notes

1. This analysis assumes, as did Lamont, that cash flow is the appropriate measure of financial constraint. However, broader measures of sources and uses of funds also support the argument made in this paper, that financial constraints did not pinch for most firms in this sample in 1986. Furthermore, most of these firms had ample stocks of cash and securities to maintain investment expenditures and weather a shortfall in cash flow, and many actually added to their stock of liquid financial assets in 1986.

2. Total sources of funds exceeded total uses of funds for 14 of the 26 firms in the sample, up from 10 firms in 1985, prior to the sharp drop in oil prices.

3. Relative to a control group comprised of COMPUSTAT firms of comparable size, 3-digit SIC industry, and bond ratings (including 259 firms with publicly-rated debt and 1291 firms without rated debt).

4. Lamont states: "the value of the petroleum-related collateral owned by the company also fell, so external finance may have been more difficult to obtain" (p. 86).

5. At least one other firm issued private placements in 1986.

6. Note that this is not the measure that would be suggested by economic theory; rather, the expected NPV of cash flows (or Tobin's q) drives investment. However, cash flow or pretax income is the measure that Lamont has chosen, so I have presented this as an industry comparison.

Table I

Change in investment and cash flow from 1985 to 1986.

Lamont's hypothesis that firms' investment was constrained by cash flow implies that cash flow fell by more than investment, or (dI/dCF) < 1.

Company	dI ($ million)	dCF ($million)	dI/dCF
Cash flow rose:			
Du pont de Nemours	-309	818	*
Mobil Corp	-329	520	*
Royal Dutch/Shell Group	-2269	406	*
Atlantic Richfield Co	-1773	133	*
Placer Dome Inc	-20	31	*
Southdown Inc	-25	16	*
Investment rose:			
Litton Industries Inc	33	-228	*
Investment fell by more than cash flow:			
Homestake Mining	-38	-3	12.01
Unocal Corp	-665	-128	5.20
Kerr-McGee Corp	-225	-45	5.00
Tenneco Inc	-1756	-474	3.70
Imperial Oil Ltd	-381	-148	2.57
Amoco Corp	-1625	-850	1.91
Nova Corporation[1]	-40	-32	1.25
Investment fell by less than cash flow:			
Canadian Pacific Ltd	-57	-58	1.00
Burlington Northern RR Co.	-299	-330	.91
Chevron Corp	-845	-960	.88
Fina Inc	-48	-60	.79
Zapata Corp	-57	-81	.70
Phillips Petroleum Co	-269	-430	.63
Dekalb Energy Co	-42	-73	.59
Grace (W R) & Co	-321	-567	.57
Occidental Petroleum Corp	-128	-267	.48
Union Pacific Corp	-291	-917	.32
Schlumberger Ltd	-340	-2120	.16
USX Corp-Consolidated	-222	-1641	.14

* Violates assumption of dCF < 0 or dI < 0.

[1] COMPUSTAT does not report depreciation in 1985; however, income fell by $18 million.

Table II

Change in sources of funds other than cash flow
and uses of funds other than investment, from 1985 to 1986.

These sources and uses represent additional resources that firms had available to ease financial constraints.

Company	Change in Other Sources	Change in Other Uses	Net change in other funds
Cash flow rose:			
Du pont de Nemours	-236	1372	-1608
Mobil Corp	-438	-204	-234
Royal Dutch/Shell Group	-2353	-850	-1503
Atlantic Richfield Co	-1558	-2596	1038
Placer Dome Inc	-89	-152	63
Southdown Inc	-28	-6	-23
Investment rose:			
Litton Industries Inc	-1423	-1439	16
Investment fell by more than cash flow:			
Homestake Mining	-1	60	-61
Unocal Corp	-3894	-3287	-607
Kerr-McGee Corp	49	-5	54
Tenneco Inc	777	2324	-1547
Imperial Oil Ltd	-51	224	-275
Amoco Corp	-619	-1250	631
Nova Corporation	61	64	-3
Investment fell by less than cash flow:			
Canadian Pacific Ltd	-387	-922	535
Burlington Northern RR Co.	218	370	-153
Chevron Corp	-3527	-5734	2207
Fina Inc	226	176	49
Zapata Corp	8	-20	28
Phillips Petroleum Co	-6581	-6500	-81
Dekalb Energy Co	-18	-34	16
Grace (W R) & Co	1137	972	165
Occidental Petroleum Corp	10514	9914	600
Union Pacific Corp	1873	1575	298
Schlumberger Ltd	1044	835	209
USX Corp-Consolidated	5401	659	4742

Table III

Cash and liquid securities holdings.

Total holdings of cash and securities for firms in the sample, and cash and securities holdings as a percent of capital expenditures.

Year	Total Cash Holdings ($ billions)	Cash/Investment (%)
1982	21.2	42
1983	26.7	79
1984	25.3	56
1985	25.0	66
1986	**31.5**	**124**
1987	31.9	113
1988	23.5	58
1989	21.5	53
1990	24.2	57
1991	22.1	51
1992	21.6	61
1993	24.8	73
1994	25.8	74

Table IV

Holdings of cash and securities, by firm.

Stocks of cash and liquid securities at end of year, and percent change from 1985 to 1986. Cash ratio is holdings of cash and securities divided by total assets in 1986, expressed as a percentage; H indicates high cash ratio: in top quartile of firms in similar industries, size groups and bond ratings in 1986; L indicates low cash ratio, in bottom quartile.

Company	Cash and Securities			Cash ratio	
	1985	1986	change		
	($ millions)		(%)	(%)	
Amoco Corp	991	441	-56	1.9	
Atlantic Richfield Co	1083	2397	121	11.1	H
Burlington Northern RR Co	563	652	16	9.7	H
Canadian Pacific Ltd	234	126	-46	1.0	L
Chevron Corp	3168	3131	-1	9.1	H
Dekalb Energy Co	198	102	-48	15.1	
Du pont de Nemours	583	584	0	2.2	
Fina Inc	30	9	-69	0.5	L
Grace (W R) & Co	152	93	-39	2.3	
Homestake Mining	90	104	16	14.9	H
Imperial Oil Ltd	371	532	43	8.5	
Kerr-McGee Corp	212	165	-22	5.3	
Litton Industries Inc	1564	1515	-3	33.2	H
Mobil Corp	1546	1582	2	4.0	
Nova Corporation	145	135	-6	3.9	
Occidental Petroleum Corp	726	655	-10	3.7	
Phillips Petroleum Co	676	1141	69	9.2	H
Placer Dome Inc	30	155	415	17.8	H
Royal Dutch/Shell Group	6949	9400	35	12.3	H
Schlumberger Ltd	4590	3810	-17	47.6	H
Southdown Inc	7	15	122	2.7	
Tenneco Inc	81	111	37	0.6	L
USX Corp-Consolidated	289	3915	1255	17.9	H
Union Pacific Corp	453	300	-34	2.8	
Unocal Corp	242	370	53	3.7	
Zapata Corp	41	29	-29	3.4	

Table V

Change in common dividends paid.

Average change in common dividends paid by firms in the sample, in millions of dollars and percent.

Year	Average change common dividends ($ millions)	Percent change in common dividends (%)
1982	14.4	6.3
1983	5.4	1.9
1984	21.8	7.7
1985	9.3	3.0
1986	**29.7**	**9.4**
1987	30.5	8.8
1988	37.0	9.8
1989	28.0	6.8
1990	44.0	10.0
1991	-17.4	-3.6
1992	-0.2	-0.0
1993	-5.8	-1.3
1994	36.1	7.2

Table VI

Stock repurchases

Firms' expenditures to repurchase common stock in 1985 and 1986.

Firm	Repurchase amount ($ million) 1985	1986
Repurchases in 1986 but not 1985:		
Du Pont	0	162
W R Grace	0	598
Homestead Mining	0	28
Mobil Corp	0	20
Repurchases in both years:		
Amoco	806	202
Atlantic Richfield	3525	260
Dekalb Energy	23	1
Kerr-McGee	97	39
Litton Industries	1320	15
Nova Corporation	12	12
Occidental Petroleum	1389	381
Phillips Petroleum	4972	15
Schlumberger	184	474
Union Pacific Corp	153	273
Repurchases in 1985 but not 1986:		
Canadian Pacific	8	0
Tenneco	51	0
USX Corp	335	0
Unocal	4178	0
Repurchases in neither year:		
Burlington Northern	0	0
Chevron	0	0
Fina	0	0
Imperial Oil	0	0
Placer Dome	0	0
Royal Dutch Shell	0	0
Southdown	0	0
Zapata	0	0

Table VII
Firms with new bond issues in 1986

Company	Number of issues	S&P Rating 1985	S&P Rating 1986	Total Amount ($ million)
Amoco Corp	4	AAA	AAA	1,050
Atlantic Richfield Co	4[1]	AA-	A	1,252
Burlington Northern RR Co.	2	AA	AA	500
Canadian Pacific Ltd	1	AA	AA	10 billion yen
Chevron Corp	3	AA	AA-	900
Dekalb Energy Co	0		BB+	
Du pont de Nemours	2	AA	AA	550
Fina Inc	0			
Grace (W R) & Co	1	BBB+	BBB-[2]	250
Homestake Mining	0			
Imperial Oil Ltd	0	AA+	AA+	
Kerr-McGee Corp	1	A	A-	100
Litton Industries Inc	0	A-	A-	
Mobil Corp	3	AA-	AA-	295
Nova Corporation	0			
Occidental Petroleum Corp	4	BBB+	BBB	2,500
Phillips Petroleum Co	0	BBB	BB-	
Placer Dome Inc	0			
Royal Dutch/Shell Group	0	.[3]	.[3]	
Schlumberger Ltd	0			
Southdown Inc	0	BBB	BBB	
Tenneco Inc	0	A-	BBB+	
USX Corp-Consolidated	1	BBB-	BBB-	400
Union Pacific Corp	0	AA	A+	
Unocal Corp	3[4]	BBB	BBB-	420
Zapata Corp	0		D[5]	
Total	29			$8,217 + 10 B yen

[1] Atlantic Richfield includes $200 million of eurobonds, $102 million of euroyen bonds and a $200 million MTN program. Actual amount outstanding under the MTN program is not available.

[2] W R Grace was downgraded to Ba2 by Moody's.

[3] The operating subsidiaries of Royal Dutch Shell Group had investment-grade debt ratings.

[4] Unocal includes $200 million of eurodollar notes, $110 million of Swiss Franc bonds and $110 of Deutsche Mark bonds.

[5] D = In default.

Table VIII

Summary of tests of financial constraint in 1986.

"V" indicates that a firm violates one of the following tests of the existence of financial constraint: Column 1, cash flow falls by more than investment in 1986; column 2, no increase in dividends in 1986; column 3, firm did not repurchase shares. Column 4 lists the quartile of the ratio of cash plus securities to total assets, relative to a group of COMPUSTAT firms of comparable size, 3-digit SIC industry, and bond ratings (including 259 firms with publicly-rated debt and 1291 firms without rated debt), with 1 being lowest cash holdings,4 highest.

Firm	dCF < dI	d(div)	Stock Repurchase	Cash quartile
Amoco Corp	V		V	2
Atlantic Richfield Co	V		V	4
Burlington Northern Rr Co		V		4
Canadian Pacific Ltd		V		1
Chevron Corp				4
Dekalb Energy Co -Cl B			V	3
Du Pont (E I) De Nemours	V	V	V	2
Fina Inc -Cl a				1
Grace (W R) & Co			V	2
Homestake Mining	V		V	4
Imperial Oil Ltd	V			3
Kerr-Mcgee Corp	V		V	3
Litton Industries Inc	V		V	4
Mobil Corp	V		V	3
Nova Corporation	V		V	3
Occidental Petroleum Corp		V	V	3
Phillips Petroleum Co			V	4
Placer Dome Inc	V	V		4
Royal Dutch/Shell Grp Comb	V	V		4
Schlumberger Ltd			V	4
Southdown Inc	V			2
Tenneco Inc	V	V		1
Usx Corp-Consolidated		V		4
Union Pacific Corp			V	2
Unocal Corp	V			3
Zapata Corp				2