THE ALLOCATION OF FREE CASH FLOW:
EVIDENCE FROM THE PERSIAN GULF CRISIS

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Abstract:

The short-lived oil price shock at the beginning of the Persian Gulf Crisis created a natural experiment. Oil producers were left with an unexpected, one-time cash flow shock and unchanged investment opportunities. We examine how they spent this free cash flow. Most firms followed an expansionary path, but there is considerable variation in how the cash flow was allocated. Both costly external financing theories and agency conflict theories have power in explaining this variation and neither dominates the other. Managerial ownership is negatively related to allocations to expansionary activities. Firms identified as financially constrained prior to the shock used the cash to reduce debt, bolster their cash reserves and expand the firm. We conclude that both agency conflict and financing theories are necessary to explain how firms allocated this cash flow.

INTRODUCTION

On August 2, 1990 Iraq invaded Kuwait, causing the price of crude oil to soar. From the end of July 1990 to the end of October 1990, crude oil prices rose from less than $20 to over $40 per barrel, and remained at elevated levels for the rest of 1990. However, the oil price shock would be short-lived. In fact, by March of 1991 the spot price had reverted to its pre-shock levels. Thus, this event left oil producers with a large, unanticipated one-time inflow of cash but it had little effect on their investment opportunity set, as indicated by unchanged spot and future crude oil prices (see Figures 1 and 2) in the months following this event. In this study, we examine in detail how this free cash flow was allocated and the factors related to this allocation.

The allocation of cash flow to a firm's various potential uses is a central issue in corporate finance. Theories incorporating either costly external financing or agency conflicts have been put forth to partially explain the allocation decisions of corporate managers. One difficulty faced by empirical researchers investigating this question is how to control for the relation between the value of investment opportunities and cash flows. The simultaneous large cash inflow and absence of any long-term price effect associated with the Persian Gulf crisis provides a unique, controlled setting to examine the allocation of cash flow without confounding changes in investment opportunities.

We begin by summarizing how the oil producers responded to the cash flow shock on average. We compare their allocations in 1991 to their allocations in 1989. We also compare their allocations to those of a control group of firms that did not receive a cash flow shock. While there is a general increase in expansionary spending, there is also

considerable cross-sectional variation in how the cash was allocated. To understand the sources of this variation, we develop a detailed picture of the degree of financial constraints and agency conflicts for each firm. The study concludes with an exploration of the associations between these theory-driven constructs and the actual allocation decisions of the sample firms.

We find that the majority of sample firms increase expansionary spending, mainly in the form of internal capital expenditures. While some firms increase distributions to stakeholders, the amount of the increase is not large enough, on average, to outweigh the allocation to expansion. Further, this increase in expansionary spending is markedly greater than for other firms in the industry that did not realize a substantial increase in cash from the Persian Gulf Crisis. There are interesting patterns in the cross-section of allocation decisions. Firms in which management holds large stakes are least likely to increase expansionary spending and most likely to either reduce debt or reserve the cash. Firms that can be identified as financially constrained *ex ante* are least likely to use the cash to repurchase shares, choosing instead to reduce debt and bolster their cash reserves. Further, there is some indication that the cash shock allowed previously constrained firms to increase their capital expenditures.

In a similar paper, Blanchard, Lopez-de-Silanes and Shleifer (1994) examine 11 firms that received large litigation awards not impacting their investment opportunity sets. Briefly, their study concludes that companies wasted these windfalls. Our primary focus, and contribution, is an exploration of the ability of agency and financing theories to explain the cross-sectional distribution of the free cash flow allocation decision. Like Blanchard, et al., we find that, on average, companies increase capital expenditures

following a cash flow shock. We also conclude that agency conflicts can affect this allocation decision. However, unlike the Blanchard et al., we find substantial variation in the allocation of this increase in cash flow and we explore the relation between financial constraints and this decision. There is at least as strong evidence to support the costly external financing explanations of cash flow allocation decisions as there is to support the agency-based explanation. We conclude that both the degree of agency conflicts and financial conflicts can affect companies' allocation of this cash flow.

BACKGROUND AND SAMPLE CONSTRUCTION

Background

Iraq's invasion of Kuwait had a significant impact on the price of oil. Both Iraq and Kuwait were relatively large contributors to the world's oil supply. Moreover, Saudi Arabia, the world's leading oil producer, was believed to be in striking distance of an Iraqi attack. As uncertainty over the outcome of this crisis increased, oil prices surged. Figure 1 shows that, by October 1990, the price of oil climbed to over $40 per barrel, almost twice its price at the end of July 1990. While the price of oil in the spot market surged, the longer-term outlook for oil was relatively unaffected, as can be seen in Figure 2. For example, at the end of December 1990, while the spot price of crude was almost 50% greater than it was in July 1990, the futures contract on oil to be delivered February 1992 was $22.28 per barrel, only $0.30 more than it was trading in July 1990. The differences between prices in spot market and those in the futures market clearly indicated the market's conclusion that the run-up in oil prices would be a short-lived phenomenon. Further, the low futures prices limited oil producers' ability to lock in the elevated levels of spot prices for an extended period.

Oil industry executives appear to have come to a similar conclusion regarding the long-term effects of the Gulf crisis. In the months immediately following the Iraqi attack, there was more net selling of stock by insiders in the oil industry than any other sector. As Joel Tillinghast of Fidelity Investments put it at the time, "It looks like people in the oil patch just don't believe oil prices will stay up."[1] As the Gulf Crisis wound down, an Exxon vice president echoed this sentiment noting "the world has ample crude inventories now, and it is going to have more."[2]

The market's forecasts for long-term oil prices were consistent with realized prices. At the end of January 1991, much of the uncertainty regarding the Persian Gulf Crisis had been resolved and oil prices tumbled. By March 1991, oil prices had dropped below $20 per barrel. For years following their return to this level, oil prices remained in a range similar to that observed prior to the Gulf crisis. Collectively, there is little evidence that this event had a measurable impact on the investment opportunities of oil companies.

Sample construction

To examine the activities of companies that realized a substantial increase in cash as a result of the Gulf crisis, we first identify all companies in the Compustat database that were primarily engaged in crude petroleum and natural gas extraction (SIC 1311) at the time of the Gulf Crisis and have quarterly data available on cash holdings for the two

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[1] See "Oil-Industry Insiders Buck Trend and Sell," *Wall Street Journal* October 3, 1990 Section C page 1.
[2] Richard Kruizienga as quoted from "Oil's Inconvenient Bonanza," *New York Times*, January 27, 1991 Section 3 page 1.

years preceding the crisis.[3] This group is comprised of approximately 200 companies. Next, since our objective is to investigate how firms allocate a *substantial* increase in cash flow, we require that firms meet three criteria regarding their cash holdings. First, the ratio of cash to operating assets, defined as total assets less cash, for the quarter ending in December 1990 must be 25% greater than the average of this ratio for the previous eight quarters. Cash refers to the sum of cash and cash equivalents (Compustat item 1). Second, to ensure that this increase in cash is not the result of a financing activity other than an increase in operating cash flow, for example the sale of an asset, we read news items from Dow Jones News Retrieval for 1990 on financing activities and we require the ratio of cash to operating assets in the quarter ending in December to be greater than it is for all other quarters in 1990. Finally, as a control for seasonal factors affecting cash flow, we require the ratio of cash to operating assets for the quarter ending December 1990 be greater than it was in the quarter ending in December in each of the previous two years.[4] Our final sample consists of 50 companies. Some of the original sample of 200 oil and gas producers may not have realized a significant increase in cash flow during this period because they primarily produce natural gas, a product that did not increase in price as drastically during the Gulf Crisis. Alternatively, companies may have locked in, or hedged, oil prices prior to the Gulf Crisis, reducing the fraction of oil production they could sell at the higher price levels.[5] Finally, other companies realized

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[3] We do not include petroleum refiners (SIC 2911) in our sample. While many petroleum refiners also benefited from the increase in oil prices around Gulf crisis, the investment opportunities refiners face are likely quite different from oil and gas producers and less sensitive to oil prices, and consequently more difficult to control for. Our sample of only oil producers contributes to a cleaner experiment by controlling for industry effects and investment opportunities.

[4] We considered an alternative criterion to the two discussed above: the value of the ratio of cash to operating assets in December, 1990 is greater than it is in any of the preceding eight quarters. The sample using this criterion is comparable to the one used here.

[5] See the 1991 annual report for Louisiana Land and Exploration for an example of this scenario.

an increase in cash, but the increase did not meet the criteria we have set for this to be considered a substantial increase in cash.

In the next section, we describe the cash holdings of the companies in the sample and how they used the cash flow shock from the Gulf Crisis.

DESCRIPTIVE STATISTICS AND ANALYSIS

Descriptive Statistics

Descriptive statistics on the cash positions of the companies included in the sample are presented in Table 1. These data reveal a substantial increase in 1990 in the level of cash held. From 1989 to 1990, the median amount of cash for the companies in the sample doubles from $1.08 million to slightly more than $2.3 million, a level which is more than two times the median amount of cash held by these firms in any of the previous three years. Likewise, the mean amount of cash in 1990 is almost $24 million—well more than twice the average amount of $9.2 million in 1989. As indicated by their operating assets, these are relatively small firms, so to put this cash flow shock in proper perspective, the amount of assets held by these firms should also be considered. In 1989, the median ratio of cash to operating assets was .035. In 1990 this ratio more than doubled to .084. Similarly, the mean ratio of cash to operating assets jumped by almost 60% from .077 in 1989 to .123 in 1990. We also measure the size of the cash shock relative to the companies' demand for cash, measured as the previous year's net capital expenditures. The median ratio of cash to net capital expenditures increases from 0.53 in 1989 to 1.46 in 1990.

Companies appear to have disposed of a large fraction of this cash flow shock over 1991 and 1992. At the end of 1991, the median level of cash had dropped to $1.2 million and the median ratio of cash to operating assets was .056. By the end of 1992, the median level of cash was $1.01 million and the ratio of cash to operating assets was .049, a level statistically not different from its level in 1989. This spending pattern appeared to level off in 1993. Overall, we draw two conclusions from these results. First, this event resulted in a substantial cash inflow to the firms in the sample. Second, most of the companies used this cash inflow within two years. We concentrate on the 1991 allocation of cash because the further we get from 1991, the less controlled our experiment becomes in terms of changes in investment opportunities and the sources of funds.

Uses of Cash

We begin by examining the change in the uses of cash for our sample companies by comparing 1991 to 1989. We do not consider 1990 because most of the increase in cash flow was in the last quarter of 1990, so it is not clear if the uses of funds in 1990 reflect this cash inflow shock. These uses come from the Statement of Cash Flows and include: net repurchase of stock, dividends, acquisitions, long-term debt reduction net of issuance, deposits to cash reserves, and capital expenditures net of sales of property, plant and equipment. We scale the uses by lagged operating assets (total assets - cash). Each change in the use of cash is calculated as the difference between this ratio in 1991 and the ratio in 1989.

There is considerable variation in the uses of cash within our sample. Forty percent of the companies increased the amount of funds they used to reduce debt, 36% increased the funds used to repurchase stock, 22% increased dividends, and slightly more than 5% increased funds used on acquisitions. Capital expenditures were increased most often—62% increased capital expenditures. We also include a variable we label as Net Expansion, which equals net capital expenditures + acquisitions + deposits to cash reserves – net repurchases – dividends – net debt reduction. The uses of cash that expand or potentially expand the firm enter positively into this variable and the uses of cash that shrink the firm enter negatively. In 1991, 58% of the firms in the sample increased their net expansionary allocations from 1989 levels.

We further examine the uses of this cash flow by comparing the firms in our sample to other companies in the industry that did not realize a substantial change in cash as a result of the Gulf Crisis, which we refer to as the control firms. Table 2 shows that more than half of the sample firms (56%) increase total expansionary spending, compared to a significantly lower 38% of control firms. This difference is particularly apparent for capital expenditures. Almost two thirds of the sample firms (62%) increase capital expenditures while only 39% of the control firms do so. For the other uses the differences between the samples are not statistically significant.

To examine the magnitude of the changes in the use of cash, for each use we examine the median for the sample firms adjusted by subtracting the median for the control firms. The results from these industry-adjusted allocations are presented in panel B of Table 2. These results show that the change in allocation of cash toward repurchases and debt reduction was smaller for firms in the sample than for other firms in

the industry. However, the firms in the sample made significantly larger increases in their allocations to dividends, acquisitions and capital expenditures. Overall, the shift in allocations away from repurchases and debt reduction and toward capital expenditures resulted in a net increase in expansionary spending, significantly higher than for other industry firms.[6]

Understanding the Allocations of Free Cash Flow

Overall, the evidence in Tables 1 and 2 demonstrates that well over half of the sample firms used this cash shock to increase expansionary spending within one year. Further, compared to other firms in the industry, their changes in allocations are significantly skewed toward expansionary spending and away from distributions to shareholders or lenders. There is also, however, considerable variation in these allocation decisions. In this section we explore the variation in how companies allocate these funds by examining the correlation between various firm characteristics and their allocation decisions.

We focus on two theoretically motivated explanations for the use of cash: financial constraints and agency conflicts. The experiment constructed around the cash shock from the Persian Gulf Crisis should provide an interesting proving ground for these two theories. We are examining cross-sectional variation in the allocation decisions of firms *relative to their own pre-shock levels.* Thus, while these oil producers certainly

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[6] To get a sense of the types of expenditures made after the cash flow shock, we searched the *Dow Jones News Retrieval* database for any news items pertaining to the sample firms between August 1990 and January 1991. There are 4 announcements of increases in general capital expenditure budgets, 9 acquisition announcements, 17 announcements of increased or newly acquired minority stakes in other companies and 20 acquisitions of assets or interests in oil properties. Turning to the distribution side, there are 7 dividend increases announced, 6 repurchases, and 3 reductions or planned reductions in debt.

could have cross-sectionally differing investment opportunities, we are controlling for that aspect and looking at the pre- to post-shock change within the firm. The event should not have affected the value of the investment opportunities of any firm, and therefore it should not affect the cross-sectional distribution of the value of these opportunities.

Financial Constraint

Myers (1984) and Myers and Majluf (1985) stress that information asymmetry between managers and capital providers creates a preference for internal financing. Lack of sufficient internal funding can force managers to forgo valuable projects because capital market imperfections make the cost of raising external funds prohibitive. A line of literature starting with Fazzari, Hubbard and Peterson (1988) empirically documents the sensitivity of investment to cash flows for firms identified *ex ante* as financially constrained, suggesting that imperfections in financial markets can impede investment. However, this literature has always struggled with the question of whether changes in cash flows are simply proxies for changes in the value of investment opportunities. If so, then a finding that cash flow and investment are correlated is really a finding that investment increases when the value of doing so increases. One advantage of the event examined in this study is that while it left many producers with a large inflow of cash, it appears to have left their investment opportunities unchanged.

An important caveat that emerges from the empirical literature on the effects of financing constraints on corporate investment is that it is very difficult to classify the degree of financing constraint a firm faces.[7] To address this issue, we construct two

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[7] For a review of this literature, see Hubbard, 1998.

measures of the degree of a firm's financial constraint. Our intent is to provide some insights into the relation between the degree of financing constraints and the use of cash that are not solely dependent on the measure for financing constraint.

The first measure of financing constraint is the ratio of interest expense to operating net income for 1989. For firms with negative operating income the value of this ratio is set equal to the 99th percentile value. In using this measure, we assume that firms facing greater difficulties financing current debt obligations (i.e., companies for which the value of this ratio is greater) likely have greater difficulties financing projects internally and also are likely to face greater difficulty in obtaining additional financing from the capital markets. According to theories of financial constraint, the extent to which firms retain this cash flow shock or use it to reduce debt—instead of paying them out to equityholders—will be greater, the greater the value of this ratio.

Our second measure of financing constraints is an ordinal variable, referred to as Constraint (Mgmt), that ranges from 0 for companies classified as unconstrained to 3 for those classified as constrained. Companies' degrees of financial constraint are based on in-depth analysis of management's discussion from their financial statements. This approach is similar to that used by Kaplan and Zingales (1997). Details on the construction of this variable are provided in the appendix. Like the interest to income ratio, theory suggests the extent to which firms retain this cash flow shock or use it to reduce debt–instead of paying it out to equityholders–will be greater, the greater the value of this variable.

Agency Conflicts

Managers may prefer to retain and spend cash flow rather than distribute it to investors for reasons other than binding financial constraints. Jensen and Meckling (1976) highlight the agency conflict that arises as management and ownership of an enterprise are separated. Jensen (1986) posits that this conflict will manifest itself over the disposition of free cash flows, or cash flows in excess of those required to finance all of the firm's positive NPV projects. The primary point of contention between managers and shareholders is whether the cash should be invested in the firm or elsewhere.

Following Jensen and Meckling (1976) and numerous other empirical studies of agency conflicts between firms' management and its shareholders (see, for example, Long and Walkling, 1984, and Mikkelson and Partch, 1989), we examine these conflicts by looking at the ownership structure of the firm. Our first proxy for the degree of agency conflict is management blockholder ownership, defined as the total fractional ownership by all managers who individually own at least 5% of the firm's shares.[8] Blockholders are identified from the appropriate proxy statements as shareholders beneficially controlling 5 or more percent of the stock of the firm. Managers who are blockholders likely have a large portion of their wealth invested in the firm. With their incentives aligned with shareholders', blockholder managers would be expected to allocate funds to maximize shareholder wealth.

A second proxy for the degree of agency conflict is ownership by outside blockholders. Some blockholders are also boardmembers, so, following Byrd and

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[8] We define an individual as a manager if he or she is, or is related to, an employee or former employee of the company.

Hickman (1992), we characterize a board member who is also a blockholder as an outsider if he or she neither fits the definition of a manager nor is a banker, lawyer or consultant.[9] Shleifer and Vishny (1986) present a model in which outside blockholders have the incentives to monitor management. If their monitoring is effective, firms with greater degrees of outside block ownership would be expected to use funds in a manner consistent with shareholder wealth maximization.

In addition to these proxies we also include the percent ownership by all managers, regardless of whether they are a blockholder, and we include the percent ownership by all outside members of the board and outside blockholders. For all of these proxies, we assume the degree of agency conflicts are decreasing in the fraction of ownership. Since blockholder ownership is more concentrated we assume that blockholdings should be particularly effective at reducing agency conflicts and use the extent of management and outside blockholdings for most of our analysis.

Finally, the corporate governance literature has identified the division of board membership between managers and outsiders as an indication of how well the agency conflict in the firm is controlled. (Weisbach, 1988, Byrd and Hickman, 1992, Cotter, Shivdasani and Zenner, 1997) Therefore, we include the fraction of the board membership held by managers.

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[9] Bankers, lawyers and consultants are usually termed to be "gray" board members because of their actual or potential for business relationships with the firm. We do not have predictions for their ownership and do not include it in the analysis.

Descriptive Characteristics of the Sample Firms

Descriptive statistics for our proxies for agency conflicts and financial constraints are provided in Table 3. There is substantial variation in the ownership structure within the sample. The median fraction of shares owned by managers is slightly more than 10% and ranges from 1.6% at the 25th percentile of the firms to 20.9% at the 75th percentile. Outside directors and outside blockholders account for a median 7% of the shares outstanding. However for the top quartile, this fraction is over 28%. Twenty-two of the firms, or approximately 58% of those with ownership data, have at least one management blockholder. For these firms, the fraction of shares owned by management blockholders is 14% for the median firm and varies from 8.5% at the 25th percentile to over 25% for the 75th percentile. On average, managers make up 43% of the board with so-called gray and outside directors filling out the remaining seats.

The median value for our first proxy for financial constraint, the interest expense ratio, is 0.314, indicating that the median firm in our sample used 30% of its operating cash flow to make interest payments. The financial constraint variable that is based on management discussions yields a different way of judging these firms' financial condition. The median value of the variable is 2, indicating that more than half of the sample firms fit the criteria for either likely constrained or constrained. Although not reported in the tables, the correlation between the two proxies we use for the degree of financial constraints (interest expense ratio and management discussion) is 0.44 suggesting that, though similar, these measures are picking up some different information.

Correlations Between Allocations and Agency and Financial Constraint Variables

Table 4 presents the correlations between the allocation of cash and the ownership structure and degree of financial constraint of the firm using the proxies discussed above. For each firm, we also determine which use of cash saw the greatest increase and relate the firm's characteristics to this choice.

These results show a positive correlation between management ownership and the use of cash to reduce long term debt. In particular, both the fraction of shares owned by all managers and the fraction owned just by management blockholders are positively correlated with the change in funds allocated to debt reduction. For firms with greater managerial ownership, the allocation most likely to receive the greatest increase in funding is debt reduction. For firms with lesser managerial ownership, the allocation with the greatest increase in funding is capital expenditures. The results further indicate that firms with greater managerial ownership are also more likely to retain a large fraction of the cash shock into 1992.

These results are consistent with two interpretations. Managers who also have a larger stake invested in the firm have greater undiversified exposure to firm risk. Thus, these results may be a reflection of managerial risk aversion: managers use this cash flow to reduce the likelihood that the firm will encounter financial distress. Alternatively, managers with larger stakes have interests that are more aligned with shareholders. Consequently, these results may reflect efforts by managers to maximize shareholder wealth: managers use this cashflow to position the firm to take advantage of future

investment opportunities that are more attractive than those available in 1991. These actions are rational in the presence of costly external financing.

The results for the variables pertaining to the ownership by outsiders tend to be opposite that for the ownership by insiders. Outside ownership, defined as the fraction of shares owned by outside blockholders and outside directors, is significantly negatively correlated with only the change in net repurchase allocation. The fraction of shares owned by outside blockowners is also positively correlated with the change in the allocation to net capital expenditures. These results partially reflect the fact that higher blockholdings by outsiders generally mean lower blockholdings by managers (the correlation between these variables is –0.31).

The composition of the board of directors appears to have little effect on the allocation decision. This finding is in contrast to the recent evidence that the composition of the board of directors is important for major strategic events such as an acquisition or executive turnover attempt, as shown in Byrd and Hickman (1992) and Cotter, Shivdasani and Zenner (1997). Apparently, the influence of the board and of outside blockholders is limited for less strategic cash flow allocation decisions. This is consistent with managers' specific knowledge being given more weight in operational decisions than in strategic matters.

The measures designed to identify financially constrained firms have some interesting correlations. Firms classified as financially constrained according to manager comments prior to receiving the cash shock increase the funds allocated to reducing debt. However, the reduction in debt is not matched by an increase in payments to equityholders. In fact, the correlations for both measures of financial constraint indicate

that in the year following the crisis, financially constrained companies repurchase less stock than other companies. On the other hand, this relation suggests that financially unconstrained firms significantly increased stock repurchases in the year following the crisis.

There is some evidence of a correlation between financial constraint status and the change in capital expenditures or acquisitions. Interest expense ratio is positively correlated with increases in capital expenditures. However, acquisitions or capital expenditures are not likely to be financially constrained firms' primary use of this cash flow. In general, the cash flow shock provided constrained firms the opportunity to either invest immediately or reduce the constraints on their future investment by reducing future contractual payments.

Overall, these correlations suggest that both a firm's financial condition and its degree of agency conflicts effect how managers allocate this cash flow. In the next section, we include these proxies as independent variables and regress them on the uses of cash from the gulf crisis.

Multivariate regressions

To further investigate the relation between the use of funds and firms' characteristics, we estimate cross-sectional regressions in which proxies for the degree of financial constraint and the degree of agency conflict are regressed on various measures for the allocation of cash. Operating assets is also included in these regressions to control

for any variation in the proxies because of firms' size. The results from these regressions are presented in Panels A and B of Table 5.

With perfect financial markets and control of the agency conflict, this cash flow shock would be distributed to investors, so this event should have no effect on net expansionary spending. However, theories discussed above suggest that financial constraints or agency conflicts can lead managers to retain or spend these funds, rather than distributing them to investors. According to the financial constraint hypothesis, net expansionary spending is predicted to be positively correlated with both the degree of financial constraints and the degree of agency conflicts.

Specifications 1 and 2 in panel A of Table 5 present results for Expand, which is a proxy for net expansionary spending that is defined above. These regressions show that net expansionary spending is related to both the degree of financial constraint and the degree of agency conflicts, supporting both the agency conflict theory and financial constraint theory. The Expand variable is significantly positively related to the ratio of interest expense to operating income, indicating that companies that were more financially constrained when they received this cash windfall retained the cash or used it to expand operations, while companies facing lesser constraints distributed the funds to shareholders and bondholders. The significantly negative relation between expand and the fraction of shares held by managerial blockholders suggests that companies in which managers hold a larger fraction of shares distribute the cash to shareholders and bondholders, rather than retain the funds or increase capital expenditures and acquisitions.

In regressions 3 and 4 in Panel A of Table 5 we examine a second dependent variable that we label ConstraintSpend. This variable is calculated in a similar manner to the net expansionary spending variable. However, it is designed to pick-up the types of spending that are expected from constrained firms, so net debt reduction enters positively rather than negatively into this variable. ConstraintSpend should capture all actions predicted by the financial constraint hypothesis, which suggests financial constraints would likely lead manages to retain this cashflow or use it to increase capital expenditures and acquisitions or to reduce debt.

Like the results for Expand, ConstraintSpend is positively related to the interest expense ratio. This result offers further support for the financial constraint hypothesis: Companies facing greater financial constraints used the funds to expand operations, by retaining the cash flow or increasing capital expenditures, or to reduce contractual obligations, by reducing the amount of debt outstanding. Unlike the results for Expand, ConstraintSpend is not significantly related to the fraction of shares owned by managerial blockholders. Because the only difference in these two regressions in that reduction of debt is included as part of ConstraintSpend, the difference in results between these two specifications suggests that companies with greater ownership by managerial blockholders show a strong preference for using this windfall to reduce debt. In the next regressions we examine the uses individually.

To examine the use of cash in greater detail we regress the proxies for financial constraint status and agency conflicts, along with a control for firm's size, on the individual uses of cash. The results from these regressions are presented in Panel B of Table 5. For brevity, we only present the results using the ratio of interest expense to

operating income and the fraction of shares owned by managerial blockholders. The results for regressions using management's characterization of constraint and all management ownership yield similar inferences. However, management's characterization of constraint has less explanatory power than our financial measure.

The interest income variable is positively associated with changes in net capital expenditures and proportion of the shock retained and negatively associated with changes in net repurchases of stock. These results are similar to those from the correlation table and have similar interpretations; they suggest that financially constrained firms used the cash flow to increase capital expenditures or retain cash. Both of these relations are consistent with the financial constraint hypothesis. The negative relation between the interest expense ratio and repurchases suggests financially constrained companies were unlikely to allocate this cash flow to shareholders. On the other hand, as was noted in the discussion of the correlations, this relation also suggests that companies that did not face financial constraints used this windfall to repurchase stock.

The manager block ownership variable is positively correlated with net debt reduction and negatively correlated with acquisitions. This relation with the net debt reduction has several possible interpretations. One is consistent with Berger, Ofek, and Yermack (1998) (entrenched managers prefer lower debt) another is consistent with maximizing shareholders' wealth. The negative relation between manager blockownership and acquisitions suggests that this event did not increase the attractiveness of acquiring other companies' stock, except to managers who held little stock in their firm.

Overall, these regression results confirm the conclusion from the correlation analysis that both agency conflicts and financial constraints are important determinants of firms' use of free cash flow. Further, the regressions show that neither dominates the other in explanatory power when both are included together.

Robustness checks

As we stated briefly above, we conducted the regression tests using all of the measures of agency conflict and financial constraint examined in Table 3. We find the results in the specifications presented to be easiest to interpret. Results from other specifications yield inferences for each measure that are similar to those drawn from the correlation analysis in Table 4.

CONCLUSIONS

This natural experiment has provided insights into how both financial constraints and the agency costs of free cash flow impact the cash flow allocation decision within the firm. We find evidence that both theories are important to any attempt to explain this decision, and that neither factor dominates the other in multivariate tests.

In particular, our results indicate that block ownership by management plays an important role in aligning the incentives of managers with outside investors. Large outside blockholders appear to be less effective in impacting the allocation of free cash flow shocks. Similarly, outsider dominated boards did not factor into the decision. This is not meant to discount the importance of both outside blockholders and board members

in special situations such as takeovers and executive turnover. However, for more operational matters such as the allocation of cash flow, their influence appears to be limited.

Further, the actions of firms identified *ex ante* as financially constrained indicate that capital market imperfections significantly impact the investment decisions of firms. This supports contentions in recent research and by managers that internal sources of liquidity are important to firms' investment programs.

APPENDIX

For constraint (mgmt) variable, we classify a firm's degree of financing constraints based on the comments made by managers in its 10K or Annual Report before the Gulf Crisis, generally that from 1989. This discussion usually appears in the letter to shareholders and the section focusing on liquidity and capital resources. In an attempt to limit the subjectivity of our classification we use the following criteria. A company is classified as unconstrained if managers indicate that they have ample cash flows to make future investments and have identified a source of capital, generally a line of credit with a bank, to which they have easy access. A company is classified as likely unconstrained if it indicates current cash flows are insufficient to cover investments but they have aligned other sources of capital. A company is classified as possibly constrained if managers indicate that they are encountering difficulty obtaining financing from the capital markets but current cash flows should be sufficient for immediate needs. A company is classified as constrained if managers imply that they have been forced to pass up investments due to difficulty obtaining financing or that they anticipate that future cash flows will be

insufficient for future investment needs and they are having difficulty obtaining funding

from external sources. We include this measure in the analysis

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SUMMARY STATISTICS

This table presents the mean and median of several characteristics of the sample of 50 oil and gas producing firms [SIC 1311] classified as those receiving a substantial cash flow shock from the Persian Gulf Crisis in the 4th quarter of 1990. Cash is cash and cash equivalents. Operating assets are total assets minus cash. Net Capital Expenditures are capital expenditures minus sale of property, plant and equipment and are intended to capture a firm's demand for funds. Fiscal year figures are presented here. Most companies in the sample had December fiscal year ends.

		1987	1988	1989	1990	1991	1992	1993
Cash	Mean	13.06	10.20	9.22	23.88	28.04	11.43	11.96
	Median	0.58	0.52	1.08	2.33	1.20	1.01	1.19
Operating Assets	Mean	245.42	248.36	255.36	248.75	270.39	274.83	306.40
	Median	13.97	14.29	16.53	12.04	13.55	14.17	15.88
$\dfrac{Cash_t}{Operating\ Assets_{t-1}}$	Mean	0.101	0.072	0.077	0.123	0.109	0.091	0.111
	Median	0.048	0.038	0.035	0.084	0.056	0.049	0.061
$\dfrac{Cash_t}{Net\ Capital\ Expenditures_{t-1}}$	Mean		2.263	2.213	3.370	2.648	2.017	3.289
	Median		0.305	0.528	1.455	1.107	0.629	0.730

TABLE 2

Each allocation of cash listed in this table is scaled by the beginning of year operating assets (total assets minus cash). The allocations of cash are computed in 1989 and 1991. The values in this table are the fraction of firms from the sample and from the rest of the oil and gas industry [SIC 1311] that report a higher allocation to each use in 1991 than in 1989. The net values are defined as use of cash – source of cash. For example, in 1991, 40% of the firms in the sample increased the amount of cash they allocated to net debt reduction (debt repurchases minus debt issuance) from the amount they allocated to net debt reduction in 1989. Expand captures expansionary actions and is defined as cash retained plus the net amount spent on capital expenditures and acquisitions net of the increase in net distributions (stock repurchases, debt repurchases and dividends) over these periods. The firms in the sample consist of 50 oil and gas producers classified as those receiving a substantial cash flow shock from the Persian Gulf Crisis. Other 1311 firms are oil and gas producers that did not realize a substantial cash as a result of this crisis.

PANEL A
CHANGES IN USE OF CASH FROM 1989 TO 1991

Fraction of firms Increasing	Net LT Debt Reduction	Total Payouts to Equity	Net Repurchases	Dividends	Acquisitions + Net Capital Expenditures	Acquisitions	Net Capital Expenditures	Expand (Net Expansionary Spending)
Sample Firms	.400	.420	.360	.220	.560	.053	.620	.580
Other 1311 firms	.340	.420	.426	.113	.380	.100	.393	.347
p-value for difference	(.445)	(1.000)	(.409)	(.103)	(.030)	(.321)	(.006)	(.003)

PANEL B
INDUSTRY-ADJUSTED CHANGES IN ALLOCATIONS FROM 1989 TO 1991.

Industry-adjusted changes in cash are calculated as the median change for the firms in the sample minus the median for oil and gas producers that did not realize a substantial increase in cash from this crisis. p-values are for the hypothesis that the median is equal to zero.

	Net LT Debt Reduction	Net Payouts to Equity	Net Repurchases	Dividends	Net Expansionary Spending	Acquisitions	Net Capital Expenditures	Expand
Median	-0.053	-0.047	-0.025	0.006	0.102	0.024	0.081	0.171
p-value	0.001	0.001	0.093	0.001	0.001	0.001	0.001	0.0001

TABLE 3
PROXIES FOR AGENCY CONFLICTS AND FINANCIAL CONSTRAINT

The table presents descriptive statistics for a sample of 50 oil and gas producers [SIC 1311] classified as those receiving a substantial cash flow shock from the Persian Gulf Crisis. Management% ownership includes the fraction of shares owned by all officers and directors. Outsider% ownership is the fraction of shares owned by outside blockholders and outside directors. Management% blockholder ownership is fraction of shares owned by the managers who own at least 5% of the outstanding shares. Outside% blockholders is the fraction of shares owned solely by outsiders who own at least 5% of the outstanding shares. The data for ownership and board composition are from the 1990 and 1991 proxy statements. Interest Expense / Operating Income is the ratio of interest expense to operating income in 1989. If operating income is negative in 1989, the ratio is set to the 99th percentile value. Constraint (Mgmt) is based on comments from management regarding liquidity and capital resources. The four levels of this variable include Unconstrained (0), Not likely constrained (1), Probably constrained (2), and Constrained (3). The data on financial constraints is based on financial statements for the period preceding the crisis.

		Number	Mean	Median	25%	75%
Management% Ownership	Entire Sample	38	.139	.103	.016	.209
Outsider% Ownership	Entire Sample	38	.172	.070	.006	.286
Mgmt% ownership by blockholders	Entire Sample	38	.114	.061	0	.159
	Those with Blockholders	22	.197	.141	.085	.252
Outside% ownership by blockholders	Entire Sample	38	.148	0	0	.286
	Those with Blockholders	16	.351	.373	.188	.471
Fraction of Board Seats held by Mgrs	Entire Sample	43	.434	.400	.200	.667
Interest Expense / Operating Income	Entire Sample	50	.723	.314	.160	.897
Constraint (Mgmt)	Entire Sample	42	1.51	2	1	2

TABLE 4
CORRELATIONS AMONG ALLOCATION CHANGES, BLOCK OWNERSHIP, FINANCIAL CONSTRAINTS AND BOARD COMPOSITION

All allocations are scaled by beginning of year operating assets (total assets minus cash). For each firm, the baseline for each allocation category is calculated as the mean from 1987 to 1989. The difference between the 1991 calculation and the baseline is the change in allocation. The highest change in allocation is set equal 1 for the allocation of cash with the largest increase between 1991 and the average for the pre-shock period, the other allocations are set equal to 0. The allocation variables are described in table 2. Cash retained in 1992 is the fraction of the cash flow shock from the Gulf Crisis the retained at the end of 1991. Ownership and financial constraint variables are described in Table 3. The correlation coefficients are presented with their p-values in parentheses. Correlations significant at the 10% or better level are in bold.

	Change in Allocation							Highest Change in Allocation			
	Expand	Net Debt Reduction	Net Repurchases	Dividends	Acquisitions	Net Capital Expenditures	Fraction of Shock retained into 1992	Net Debt Reduction	Net Repurchases	Net Capital Expenditures	Cash Reserves
Management% Ownership	-0.070 (0.722)	**0.304** **(0.085)**	-0.180 (0.316)	-0.028 (0.878)	-0.236 (0.186)	0.003 (0.985)	**0.340** **(0.045)**	**0.283** **(0.095)**	-0.035 (0.839)	**-0.347** **(0.038)**	0.147 (0.394)
Outside% Ownership	**0.394** **(0.038)**	-0.121 (0.508)	**-0.327** **(0.078)**	-0.080 (0.662)	-0.127 (0.490)	0.273 (0.144)	0.153 (0.381)	-0.184 (0.269)	0.147 (0.377)	-0.252 (0.126)	-0.030 (0.858)
Mgmt Block Ownership	-0.019 (0.924)	**0.314** **(0.075)**	-0.233 (0.191)	-0.024 (0.896)	-0.273 (0.125)	-0.005 (0.975)	**0.353** **(0.041)**	0.265 (0.119)	-0.070 (0.687)	**-0.372** **(0.025)**	0.199 (0.244)
Outside Block Ownership	**0.371** **(0.052)**	-0.091 (0.621)	**-0.368** **(0.046)**	-0.081 (0.661)	-0.148 (0.419)	**0.321** **(0.084)**	0.173 (0.322)	-0.203 (0.222)	0.121 (0.468)	-0.253 (0.125)	-0.009 (0.956)
Fraction of Board Seats Held by Management	-0.128 (0.478)	0.162 (0.338)	-0.006 (0.974)	0.152 (0.369)	-0.116 (0.496)	-0.011 (0.949)	0.132 (0.418)	0.056 (0.720)	-0.013 (0.934)	-0.103 (0.510)	-0.022 (0.889)
Interest Expense / Operating Income	**0.446** **(0.006)**	-0.038 (0.811)	**-0.589** **(0.001)**	-0.133 (0.405)	-0.134 (0.227)	**0.293** **(0.075)**	-0.088 (0.570)	0.062 (0.684)	-0.142 (0.346)	**-0.243** **(0.100)**	0.163 (0.278)
Constraint as characterized by Management	-0.092 (0.616)	**0.394** **(0.018)**	**-0.300** **(0.085)**	0.093 (0.590)	-0.063 (0.715)	0.174 (0.325)	0.090 (0.585)	**0.303** **(0.048)**	-0.143 (0.361)	**-0.312** **(0.041)**	0.060 (0.703)

TABLE 5, PANEL A
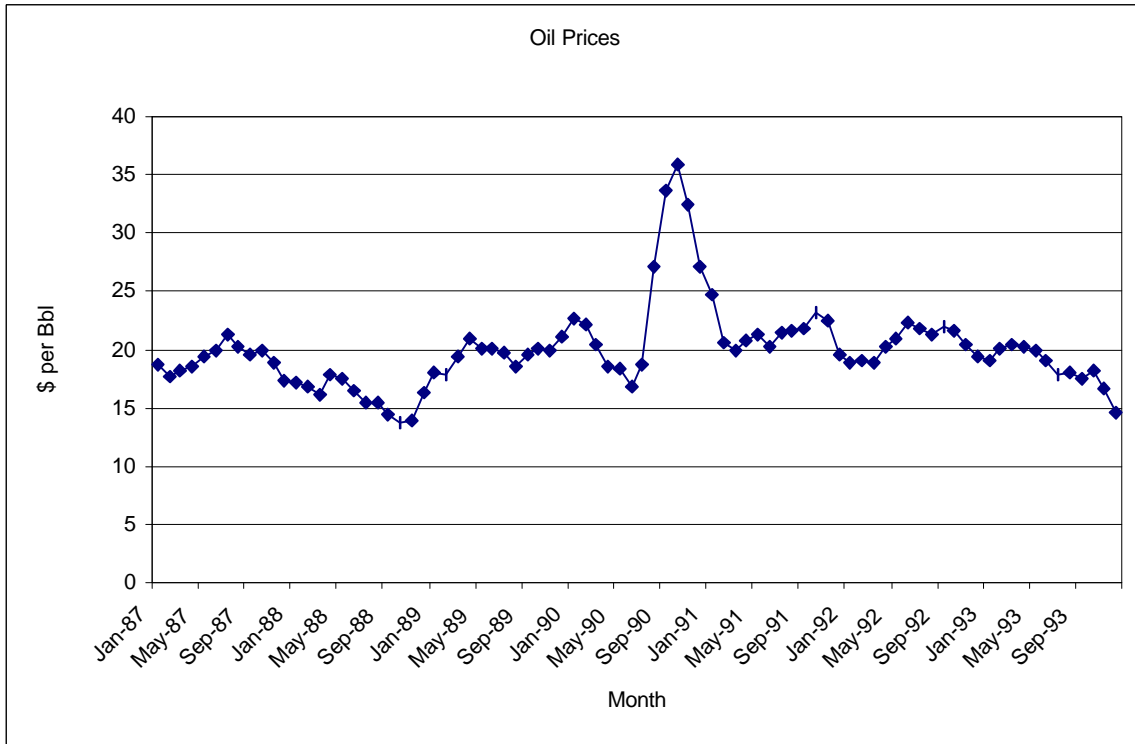REGRESSION RESULTS FOR THE ALLOCATION OF CASH
This table presents OLS regressions on summary allocations of cash termed Expand and Constraint. Expand captures expansionary actions and is defined as cash retained plus the net amount spent on capital expenditures and acquisitions net of the increase in net distributions (stock repurchases, debt repurchases and dividends). Constraint captures any actions expected of a firm that was financially constrained prior to the cash shock. It is defined as cash retained plus the net amount spent on capital expenditures, acquisitions, and debt repurchases minus the increase in net distributions to equity holders (stock repurchases and dividends). The dependent variables used in Panel B and the independent variables in both Panels A and B are also defined in Table 3. The sample consists of 50 oil and gas producers [SIC 1311] classified as those receiving a substantial cash flow shock from the Persian Gulf Crisis.

	Expand	Expand	Constraint	Constraint
Intercept	-0.149	-0.060	-0.242	-0.116
	(0.377)	(0.714)	(0.169)	(0.540)
Interest Expense / Operating Income	**0.604** **(0.001)**		**0.626** **(0.001)**	
Constraint (Mgmt)		0.116 (0.180)		**0.188** **(0.062)**
Manager% Blockholdings	**-1.857** **(0.059)**		-0.931 (0.344)	
Outside% Blockholdings		-0.483 (0.246)		-0.519 (0.271)
Operating Assets	0.001 (0.641)	0.001 (0.278)	0.001 (0.575)	0.001 (0.490)
Adjusted R^2	0.342	0.011	0.362	0.073

Panel B

	Net Capital Expenditures	Acquisitions	Proportion of Shock Retained	Net Debt Reduction	Net Repurchases	Dividends
Intercept	0.026	0.005	-0.041	-0.042	0.079	0.001
	(0.636)	(0.302)	(0.590)	(0.174)	(0.325)	(0.848)
Interest Expense / Operating Income	**0.080** **(0.090)**	-0.005 (0.703)	**0.132** **(0.032)**	-0.001 (0.959)	**-0.246** **(0.001)**	-0.001 (0.686)
Manager% Blockholdings	-0.150 (0.626)	**-0.192** **(0.061)**	-0.072 (0.859)	**0.317** **(0.051)**	0.468 (0.266)	0.001 (0.956)
Operating Assets	0.001 (0.788)	-0.001 (0.595)	0.000 (0.422)	0.001 (0.996)	-0.001 (0.846)	0.001 (0.840)
Adjusted R^2	0.004	0.052	0.069	0.054	0.303	-0.096

FIGURE 1: SPOT PRICES FOR WEST TEXAS INTERMEDIATE CRUDE OIL, JANUARY, 1987 TO DECEMBER, 1993

FIGURE 2: FUTURES PRICES FOR CRUDE OIL, JULY, 1990 AND DECEMBER, 1990

Futures prices for Crude Oil, New York Mercantile Exchange

$ per Barrel

Delivery Date

Future prices, July 1990
Future prices, December 1990