The Response of Industry Rivals to Control Threats

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Abstract

This paper studies how rival firms respond when a firm in the industry encounters a control threat because it suffers from agency problems. We find that rival firms increase leverage, cut capital expenditures, and reduce their cash balances and free cash flows. The competitors with the largest increases in debt *after* the control and the highest industry-adjusted level of investment *before* the control threat have the largest cuts in capital spending. Rival firms are also more likely to adopt takeover defenses than other firms in the economy. Rivals gain 0.55%, on average, when the control threat is announced. The stock price reaction is larger for rivals with high free cash flow, high capital expenditures, and low insider ownership. The stock price reaction is lower for firms that have insulated themselves from takeover pressures. These results are consistent with the argument that the control threat leads to a reduction in the agency costs of the rival firms in the industry.

1. Introduction

This paper studies how competitors react when there is a threat to the independence of one of the firms in an industry. This research is motivated by Jensen's (1986, 1993) observation that agency costs often manifest themselves at the industry level, in particular when future growth opportunities are sparse. Under these conditions, if the independence of one firm is threatened because of its agency problems, we expect both the firm and its competitors to respond. Responses can come in two forms. Firms can take actions to diminish the control threat or they can adopt antitakeover measures to insulate themselves. We investigate both types of responses in this paper.[1]

Our main sample consists of the rivals of 218 firms which receive hostile takeover bids from 1983 to 1998. We focus on hostile takeover attempts because such transactions are more likely to be of a disciplinary nature.[2] In support of the industry-wide agency cost arguments discussed by Jensen (1986, 1993), we find that the industry rival firms increase leverage after the control threat. The rivals also cut capital expenditures, and both cash levels and free cash flows decline. Consistent with the notion that increased debt leads to reduced investment, we find that the firms with the largest increases in debt experience the largest investment cuts. In addition, those firms with the largest industry-adjusted levels of investment experience the largest cuts. These results are consistent with the view that the acquisition leads to a decline in agency costs for all firms in the industry of the target firm. The firms cut capital spending, and reduce cash balances and commit to such a policy in the future by increasing leverage.

The stock price reaction of the rival firms is also consistent with the agency cost argument. Rivals gain 0.55%, on average, when the control threat is announced. Moreover, the stock price

[1] Of course, two other outcomes are also possible: (a) a number of rivals may not respond because they are already insulated from takeover pressures; or (b) some rivals do not take any action to reduce agency costs and they are subsequently taken over.

[2] See Morck, Shleifer, and Vishny (1988) for evidence indicating that hostile takeover are related to agency problems in the target firm, while friendly takeovers are more synergistic, and Schwert (2000) for

reaction is larger for firms with more capital expenditures, higher levels of free cash flow, and lower insider ownership. These are likely to be the firms that have the largest agency costs. Firms that have insulated themselves from takeover threats through takeover defenses also have a lower stock price response, consistent with the view that their independence cannot be threatened.

An alternative response to the increased threat of a takeover is to increase takeover defenses. We provide evidence in support of this conjecture as well: rival firms are also more likely to adopt takeover defenses than other firms in the economy.

An alternative interpretation of our findings is that the industry is simply evolving and that capital structure and all the other financial characteristics change because of other changes in industry structure. In other words, the relation between our findings and the control threat is spurious; all the changes would have taken place without the control threat. We provide four pieces of evidence against this interpretation.

First, we examine whether the increase in leverage and the changes in the other financial characteristics reflect the continuation of a trend. If the firms are responding to changes in industry conditions, we would expect industry indebtedness to increase slowly as more firms decide to lever up, since transactions costs prevent firms from adjusting their capital structures instantaneously. This is not the case.

Second, we examine *Value Line* forecasts for debt and capital expenditures for the firms in our sample. We find no evidence that analysts expected an increase in leverage or a decrease in capital expenditures. The firms in our sample have more debt and lower levels of capital spending than predicted by analysts. Moreover, firms are more profitable than expected, after taking into account the general level of analyst optimism.

Third, we examine whether the firms in our sample had the optimal level of debt before the control threat was announced. To do this, we estimate cross-sectional regression models of capital

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contradictory evidence suggesting that hostile transactions are not that different from friendly takeovers.

structure for all firms on Compustat, except for the firms in our sample. We then compute the residual of this model for the rival firms in our sample and find they have a mean ratio of total debt to total assets approximately six percentage points lower than predicted. These results imply that the firms in our sample had 'too little debt', on average, and they support Jensen's conjecture that many firms in an industry may suffer from agency problems. They are also consistent with the evidence provided by Berger, Ofek, and Yermack (1997) that many firms have insufficient debt and that firms lever up after entrenchment-reducing shocks.[3] Our evidence indicates that such shocks to one firm in an industry have repercussions for the other firms as well. Finally, the event study evidence discussed previously, which indicates a positive stock price reaction for rival firms, on average, and shows a higher stock price response for rival with more agency costs, is not consistent with a spurious relationship between the rival firms' changes in financial policies and the control threat.

This research complements a number of recent papers examining the effect of takeover threats on industry rivals. Two papers, Fee and Thomas (2005) and Shahrur (2005) focus specifically on horizontal acquisitions. They find positive abnormal returns to rival firms similar in magnitude to the ones observed in this paper. Further analysis of the stock price response of suppliers and customers support the notion that horizontal takeovers enhance efficiency in an industry. The results of these papers are not inconsistent with our findings; however, our findings suggest that the improvement in efficiency is due to a reduction in non-value maximizing behavior on the part of industry rivals. These papers do not investigate capital spending and other financial policies in the years after the control threat.[4] Song and Walkling (2000) propose and test the 'acquisition probability hypothesis' to explain the stock price response to rival firms when an acquisition is announced. According to this hypothesis, the stock price of rivals responds because

[3] See also Safieddine and Titman (1999) for evidence that firms increase leverage after unsuccessful takeover attempts, and Denis and Denis (1993), who study leveraged recapitalizations, many of which are preceded by takeover threats.

[4] The literature examining the stock price reaction to rival firms dates back at least to the important papers by Eckbo (1983, 1985) and Stillman (1983).

the increased probability that they will also be taken over. Their evidence is generally consistent with the hypothesis; in particular, the stock price reaction of rival firms is more significant for those that end up being taken over. Our explanation is complimentary to theirs because we explicitly exclude the rivals that end up being taken over. In addition, they do not investigate what happens to the financial characteristics of the rival firms after the acquisition.

The remainder of this paper is organized as follows. Section 2 describes our data collection procedure. Section 3 describes the results. Section 4 discusses the evidence in light of alternative explanations for our findings and section 5 concludes.

2. Data collection

We gather data on all hostile takeover attempts for U.S. firms during the period 1984-1998 from the SDC database. Transactions are removed if the acquirer's goal is to purchase less than 50% of the shares of the target or already owns more than 50% of the shares before the announcement date. Bids for financial firms are also removed from the sample.

The list of rival firms is constructed from the Earnings Supplement of the Standard and Poor's Industry Surveys. This guide is published monthly and categorizes firms into industries using criteria similar to the ones used by Compustat.[5] We do not rely on CRSP or Compustat to construct a sample of industry rivals. As indicated by Guenther and Rosman (1994) and Kahle and Walkling (1996) the CRSP SIC codes are not very representative of the industries in which the firms actually operate, which leads to less precise inferences. Compustat SIC codes appear to be more reliable. Unfortunately, however, firms change industries during their lives and Compustat only keeps a record of the firm's historical SIC codes starting in 1987.

We search the Earnings Supplement in the month before the takeover is announced to

[5] Conversations with Standard and Poor's indicate that the industry rivals are the same as the ones listed on the Compustat database at the time, except that some smaller rivals are not included in the Earnings Supplement.

identify industry rivals. Because the Supplement only covers larger firms, we are obviously not able to identify rivals of bids for small firms in an industry. However, these smaller transactions are also less likely to have an impact on the behavior of other firms in the industry. We remove bidders if they are from the same industry as the target, because our focus is on the effect of the transaction on firms that are not involved in the bid. If the transaction is successful and the bidder changes the policies of the target firm, we do not want these improvements to show up in our sample through their effect on the bidding firm. Finally, we also remove rivals that receive a takeover attempt themselves over the subsequent three years.

Rivals are included in the sample if they are listed on Compustat and have data available for at least one year before the announcement of the takeover and one year after the completion of the transaction or its withdrawal.

We are able to identify 2437 rivals for 218 hostile takeover attempts. Note that while we have 2437 rivals listed on Compustat before and after the transaction, the actual number of observations in each test varies slightly because not all Compustat data are available for each company. Panel A of Table 1 lists the takeovers attempts by year, and Panel B contains summary statistics on the number of rivals. The number of hostile acquisitions in the sample ranges from zero in 1998 to 44 in 1988. While hostile takeovers were more frequent during the 1980s [see also, Holmstrom and Kaplan (2001)], approximately 23% of our observations occur during the 1990s. The strong decline the number of hostile takeovers in our sample in the early 1990s can be explained by the general decline in takeover activity. As takeover picked up again in the second half of the decade, so did hostile activity. The number of rivals ranges from 1 to 63. The average number of rivals is 11.10, with a median of 7.

3. Results

3.1. Changes in the financial ratios

In this section we examine the changes in the financial ratios of rival firms. Ratios are averaged for the two years prior to the control threat and the two years after the completion of the takeover or its withdrawal date. To reduce the influence of outliers observations, we winsorize ratios that involve debt, capital spending, and cash at the 99th percentile (the 1st percentile is zero), while profitability and free cash flow ratios are winsorized at the 1st and 99th percentiles. We present the level of the variable computed over the two-year period before the control threat. We then compute the same variable for the two-year period after the control threat and present the change.

Table 2 contains the results. In Panel A we treat each industry rival as an individual observation, such that industries with more rivals receive more weight. In addition, if the rivals respond to the same event, then their actions are not independent; the p-values, which are based on t-tests (for means) take this lack of independence into account. However, we are not aware of such a correction for sign-rank tests (for medians), and those results should therefore be interpreted cautiously. Note that the number of observations is not consistent for all ratios, because we lack information for some variables for some years.

We start by examining the levels of debt of the rivals. As argued by Grossman and Hart (1982) and Jensen (1986) debt may constrain the firm from engaging in non-value maximizing behavior. If the rival firms want to signal to the market that they are committed to cutting excess investment, we would expect them to increase leverage. On average, rival firms have a ratio of long term debt to total assets of 20.70% (median = 19.58%) in the two years prior to the control threat. In the two years after completion or withdrawal this ratio increases by 2.63 percentage points, on average (median = 0.0061 percentage points). Total debt also increases substantially, from 43.95%, on average, to 48.75%.

Next we study capital spending, computed as capital expenditure to assets. If rival firms

were overinvesting before the control threat we would expect them to cut capital spending subsequently. This is indeed the case. The mean ratio of capital expenditures to assets of industry rivals declines by 0.37 percentage points, from a pre-control threat level of 7.41%, while the median decline is 0.29 percentage points. The change does not appear dramatic, but it is large economically. A cut in capital expenditures by 0.37 percentage points reflects a 5% decline in capital spending compared to the pre-control threat level of 7.41%.

We find a strong decline in both cash holdings and the level of free cash flow. Cash holdings decline by 1.08 percentage points of assets, on average, while the level of free cash flow declines by 0.65 percentage points. Both of these results support the view that rival firms commit themselves to a policy of reducing funds available for investment.

In the final row of the Panel, we report a decline in operating profitability of 0.95 percentage points. Because we focus on operating profits, this decline cannot be caused by the increase in leverage. This result does not support the agency view. If the industry rivals were making poor investment decisions before the control threat, and if they are now curtailing this behavior, profitability should increase. Of course, this conclusion assumes that the appropriate benchmark is the level of profitability before the threat took place. In section 3.3, we compare actual profitability to analyst forecasts to investigate this issue in more depth.

In Panel B of Table 2, we first average the ratios by control threat, and then present statistics for each ratio. Thus, each control threat receives the same weight in this analysis. Moreover, this approach allows us to compute unbiased test-statistics for the medians as well as the means.

In general, these results are very similar those of Panel A. If anything, the changes in the ratios are larger than those in Panel A, and they continue to be highly significant, both statistically and economically. For example, the average increase in long-term debt by 3.55 percentage points from a level of 19.83% before the control threat represents a change of almost 18% in

indebtedness.[6]

In sum, the findings presented in Table 2 suggest that rival firms reduce capital spending and funds under managerial control, and commit to such a reduction in the future by increasing leverage. In the next section, we investigate whether the firms with the most severe agency problems make the most dramatic changes.

3.2. Relation between changes in financial ratios

In this section we examine the cross-sectional variability in the debt ratios, and both capital spending and free cash flow. If the firms in our sample issue debt to commit themselves to reductions in capital spending and free cash flow, we should find the strongest declines in these ratios for those firms that increase leverage the most. To examine this conjecture, we estimate cross-sectional regressions of changes in these ratios on changes in long-term debt.

These results are reported in Table 3. We adjust the standard errors in the regression to take into account that the observations related to the same control threat are not independent. Regression (i) illustrates the relationship between changes in capital spending and debt. The coefficient on the change in debt is negative and highly significant, consistent with the view that change in debt leads to a reduction in investment. The effect is also important economically: a one standard deviation increase in the change in the level of debt (11.9 percentage points), leads to a decline in capital spending of 0.32 percentage points, almost equal to the mean decline in capital spending in the sample (0.37 percentage points). The intercept of –0.29 illustrates that firms cut capital spending significantly, even without changing the level of debt financing. This is not inconsistent with the agency cost interpretation. We would expect firms to cut some capital spending without the pressures from debt financing. The benefit of debt financing is that it signals to

[6] As mentioned previously, rival firms that receive a control threat themselves within three years of the control threat in our sample are excluded from our analysis. Our findings are very similar if these firms are included in the computation of the industry statistics. Obviously, they cannot be included in the computation of

the market the commitment to continue such a policy.

Columns (ii) and (iii) of Table 3 illustrate the negative impact of debt financing on cash holdings and free cash flow. The coefficient on the change in long-term debt is –0.0881 in the cash regression and –0.0874 in the free cash flow regression. Again, the negative intercepts indicate that firms also make changes without the immediate pressure of debt financing.

We have also re-estimated the models in Table 3 using the level of total debt, with similar results. Our focus is on long-term debt, however, because this entails more of a commitment than short-term financing. To provide more insight into the direct effect of the change in debt, we have estimated the model in column (i) using the change in the ratio of interest expenses to assets as the explanatory variable. While this is not a commonly computed ratio, it gets to the heart of the matter by illustrating how much capital spending is cut for each dollar change in interest expenses. The coefficient (not reported in the table) is –0.46 (p-value = 0.00) suggesting that firms cut capital spending by 46 cents for each dollar increase in interest expenses.

We also investigate whether the firms that experience the largest reduction in capital spending surrounding the years of the control threats are the ones with the largest levels of prior excess investment. This model yields the following results (p-values are in parentheses):

$$\Delta\text{Capital Expenditures / Assets} = -0.0034\ (0.00) - 0.356\ (0.00)\ \text{Industry-adjusted capital expenditures pre-control threat}$$

$$N=2386 \qquad \text{Adj. } R^2=0.15$$

Thus, rival firms that invest the most before the control threat cut investment the most afterwards. Interestingly, this result is much stronger for firms that invest more than their industry before the control threat (regression not reported), which indicates that it is not simply caused by mean reversion of capital spending.

The results of this section further strengthen the evidence in support of industry wide agency

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the industry statistics after the control threat if they are acquired themselves.

costs. Not only do we find that firms reduce capital spending and free cash, but those with the largest increase in debt experience the largest reductions. Moreover, the reductions in capital spending come mostly from firms that were overinvesting to begin with.

3.3. Are the firms in the industry responding to changes in industry conditions?

In this section we examine whether the control threat for one of the rival firms leads to the changes reported in Table 2 or whether the industry is simply moving toward a new equilibrium, where leverage is higher, capital spending is lower and free cash flow is reduced. In other words, we investigate whether the relationships we report are spurious. Zingales (1998) discusses this endogeneity criticism in more detail. We perform three sets of tests to investigate this possibility.[7]

First, we examine whether the findings presented in Table 2 simply reflect a trend in the ratios of the companies that operate in these industries. If the industry is moving toward a new equilibrium, we should find that some of the financial ratios change gradually. This is because firms incur transaction costs when they issue new debt and not every firm will adjust at the same time. If the changes simply reflect a pattern, there should also be a change in the ratios over the two-year period prior to the control threat. Generally, the changes in the ratios are not statistically significant and they are small economically. These findings suggest that the results reported in Table 3 are not the reflection of a time trend.

Second, we examine whether the changes we observe are predicted by financial analysts. It is possible that expectations change, possibly because of an industry shock, such that the relation between the events surrounding the control threat and the rival changes post-threat is spurious. A simple analysis of the time trend would not reveal this. We gather projected levels of debt and capital expenditures and projected operating margins from the *Projections and Estimations File* of

[7] In section 3.6, we provide event study evidence which also suggests that the rival firms in our sample respond to the control threat, and that the response depends on some of their characteristics.

the *Value Line DataFile* prior to the control threat announcement. This database contains estimates made by Value Line analysts for a large number of financial statement variables. Estimates are available starting in 1987 and only cover a subset of the firms in our sample. In addition, there are more estimates for some data items than for others. It is important to bear these limitations in mind when reviewing our findings.

A further concern with the Value Line *DataFile* is that estimates for total assets are not available. We therefore have to resort to alternative deflators. To deflate capital expenditures, we employ sales; this deflator has been employed frequently in the literature [see, for example, Lamont (1997)]. To deflate long-term debt forecasts, we employ the estimates book value of equity. We do not need to use a deflator for operating profits because the operating margin is a separate forecast item.

Value Line generally provides estimates for the current fiscal year and for the next fiscal year, as well as for the next three to five years. We are interested in the long-term projections because we want to determine what analyst expectations were of the rival's characteristics after the control threat in the period before the actual threat occurred. Because the projections are for three to five years, we interpolate when necessary. It is, of course, possible that Value Line forecasts are biased in general. We therefore first gather data on all forecast errors for all firms on the *Value Line* database to determine this bias. In addition, the forecast accuracy and bias may depend on the forecast horizon, the length of time between the period for which the forecast is made and the date of the forecast. Moreover, forecast accuracy may change over time as economic conditions change. To control for these factors, we employ the following regression framework, estimated for all firms that have long-term forecasts available on the *Value Line DataFile*:

$$\text{Forecast Error} = b_0 + b_1\,(\text{Rival Firm}) + b_2\,(\text{Forecast Horizon}) + \text{Year Dummies} + e$$

Rival Firm is a dummy variable set equal to one if the firm is a rival firm and the forecast is made before the control threat for the fiscal years ending one or two years after the control threat. The

forecast horizon is the number of months between the period for which the forecast is made and the date of the forecast. The intercept (b_0) captures the average bias for all companies, and the rival firm dummy (b_1) captures the bias-adjusted forecast error for rivals.

Table 4 contains the results. For sake of brevity, we only report the coefficient on the rival firm dummy. The results indicate that the changes in the characteristics documented in Table 2 were not fully expected by Value Line analysts. Long-term debt to book equity is 6.71 percentage points higher than expected and capital spending is 0.19 percentage points below expectations. Because the deflator for these two variables is different from the one employed in Table 2, a direct comparison of the magnitude of the change and the bias-adjusted forecast error is not possible. It is also interesting to find that operating profits are better than expected. Thus, while Table 2 reports a decline in operating profitability, the decline is not as dramatic as was initially anticipated by the analyst community. The fact that profits are better than expected after the control threat provides further evidence in support of the industry-wide agency cost argument.

In the third and final set of tests, we consider the debt level of the firms in our sample before the control threat. If the increase in leverage after the control threat announcement simply reflects firm adjustments to new industry conditions, then we would not expect the capital structure of the firms in our sample to be out of line before the control threat. On the other hand, if all firms in the industry suffer from free cash flow agency problems, we expect the firms in our sample to have less debt than predicted.

To examine this conjecture, we estimate cross-sectional regression models of leverage for each year during the 1983-1998 period using all firms on Compustat, except the firms in our sample. The estimates start and stop one year before the sample period because we want to examine optimal leverage before the control threat. Two sets of regressions are estimated, one using the ratio of long term debt to total assets as the dependent variable, and one using the ratio of total debt to total assets as the dependent variable. The independent variables we employ are based on

Titman and Wessels (1988), Opler and Titman (1996), and Berger, Ofek, and Yermack (1997): (i) return on assets, measured as operating income divided by total assets; (ii) non-interest tax shields, measured as investment tax credits divided by total assets; (iii) asset collateral value, measured as net property, plant and equipment divided by total assets; (iv) company size, measured as the natural logarithm of total assets; and (v) asset uniqueness, measured as R&D divided by total assets, and also as selling, general and administrative expenses divided by total assets. The ratio of R&D to total assets also captures growth opportunities. We winsorize all variables at the 1st and 99th percentiles to avoid problems with outliers. We then use the estimated regression models to predict the optimal level of debt for each firm, and compare the optimal to the actual level for the firms in our sample in the period prior to the control threat.

Table 5 contains the results of this analysis. The means figures are reported first, followed by median. The results are striking. The firms in our sample have much less debt than predicted. For example, the predict average level of long-term debt over the two years before the control threat is 22.62%, but the sample firms' actual debt ratio is only 17.69%. The difference between the two is highly significant. The results are similar when we study medians or focus on total debt levels.[8] A direct comparison between the actual change in debt documented in Table 3 and the deficit reported in Table 5 indicates that while the firms are moving the level of debt in the right direction, the magnitude of the change is not sufficient to overcome the entire deficit. It is also important to exercise some caution in making this comparison, because we have fewer observations in Table 5 due to lack of Compustat data on some of the explanatory variables required in the predictive regressions.

These findings indicate that the majority of the firms in these industries have too little debt and provide further support for the agency cost hypothesis. They are also consistent with the

[8] The results in the table are only for firms that survive until after the control threat is completed, but they are very similar if we do not impose that restriction.

findings of Berger, Ofek, and Yermack (1997) and Safieddine and Titman (1999). Berger et al. (1997) provide evidence that entrenched managers have lower leverage. They also find that leverage increases after entrenchment-reducing shocks to managerial security, such as unsuccessful tender offers or CEO replacements. Safieddine and Titman (1999) find that target firms who terminate takeover attempts substantially increase leverage and cut capital spending in subsequent years. Our evidence suggests that entrenchment-reducing shocks also affect the other firms in the industry.

3.4. Adoption of takeover defenses

Up to this point, we have examined one possible response from the rival firms, which is to reduce investment and to commit to such policy by increasing leverage. Alternatively, some managers who value control may decide to adopt takeover defenses instead. Of course, the response of some firms may consist of a combination of both options. In this subsection, we examine the adoption rate of takeover defenses by the firms in our sample. During the time period we study many firms throughout the economy increased the adoption of takeover defenses, however, and it is therefore important to control for this secular increase.

To determine the extent to which firms insulate themselves from takeover attempts, we employ the governance index developed by Gompers, Ishii, and Metrick (2003). Gompers, et al. (2003) construct this index from the database maintained by the *Investor Responsibility Research Center* (IRRC). The database contains details on 24 corporate governance provisions for approximately 1500 U.S. firms, and the governance index is constructed by adding one for every provision that reduces shareholder rights. While not every provision is directly related to an increase in takeover defenses, many of them are, and the index is a therefore a good measure for the extent to which managers are making it more difficult to be taken over. Data on the index are available every two or three years starting in 1990. We are therefore only able study this issue for a

subset of our sample.

We gather data on the governance index for our sample firms in the last available year before the takeover threat and in the first available year after its completion. To make sure that we are not picking up economy-wide trends in this index, we compute the change in the raw index as well as the economy-wide index. Table 6 contains the results. The unadjusted index increases by 0.34, on average, over the period of the control threat from 9.14 to 9.48, while the median change is 1.00, with the index going from 9 to 10. The results are similar when we focus on the adjusted index, albeit that the mean change is larger and the median change is smaller. These changes are by no means dramatic, but they nevertheless suggest that companies attempt to make it more difficult to be taken over. This evidence, combined with the changes in financial policies documented earlier provides further support the agency cost explanation.

3.5. Event-study evidence

As discussed previously, the agency cost hypothesis also has implications for the stock price reaction of the rival firms at the announcement of the control threat, as well as for the cross-sectional variation in the stock price reaction. To examine these implications, we study the abnormal returns of the industry rivals around the announcement of the control threat. We focus on the abnormal returns computed over the five-day window starting on the announcement date. It is important to use a short window for the industry rivals to maximize the signal-to-noise ratio. The disadvantage is that not all relevant information with respect to the transaction may be released over this period. To compute abnormal returns, we subtract the return on the value-weighted CRSP index from the rival return. To avoid problems with outliers, we winsorize abnormal returns at the 1^{st} and 99^{th} percentile.

Panel A of Table 7 contains the results. Summary statistics are displayed in Panel A. Returns for rival firms are 0.50%, on average, with a median of 0.17%. These figures are somewhat larger than the ones reported by Song and Walkling (2000). However, Song and Walkling focus on

a two-day event window while our event windows spans five days. In addition, they also include firms that subsequently become targets, while future targets are removed from our sample. When we compute abnormal returns over a two-day window and compare it to their subsample of firms that do not become targets, we find average abnormal returns of 0.28% compared to 0.32% in their sample. In the second row of Panel A, we aggregate abnormal returns by control threat and report that rival returns increase to 1.30%, on average, with a median of 0.89%. This suggests that abnormal returns are larger in industries with fewer rivals.

In Panel B of Table 7 we estimate several models to explain the cross-sectional variability in the rival returns. Because we focus on individual rival characteristics, we estimate models at the firm-level, not at the transaction level, but we include a dummy variable for each transaction to capture any transaction-specific return effects, and a dummy for each year. In addition, we correct the standard errors in the regressions to take into account the lack of independence of observations for rivals of the same control threat.

In the first three models, we regress rival abnormal returns on the firms' financial characteristics measures before the control threat. We would expect rivals with more investment and more free cash flow to have higher abnormal returns because these firms display the most severe evidence of agency problems. This is indeed the case. Abnormal returns are positively related to capital spending and free cash flow and negatively related to long-term debt, and the effects are significant for capital expenditures and free cash flows. These effects are also large economically. For example, moving capital expenditures to assets from its 25^{th} percentile (4.49%) to its 75^{th} percentile (9.28%) increases abnormal returns by 19 basis points. In the fourth regression, we include both capital spending and free cash flow. The effect of free cash flow remains significant, but the effect of capital spending is no longer significant in this specification. This is mainly due to the correlation between the two variables: firms with high free cash flow also have high capital expenditures. We have not included the ratio of debt to assets in this specification because it

is also correlated with capital spending and free cash flow.

An additional implication of our arguments is that the stock price response for rivals should be smaller if they have insulated themselves from takeover attempts, either through specific provisions such as poison pills or because insiders own a lot of stock. These implications are also borne out in the data. Model (iv) illustrates that abnormal returns are significantly lower for firms that score higher on the Gompers et al. (2003) governance index. The economic impact of this result is also very strong. The abnormal return for a firm with a governance index at its 25th percentile (7) is 36 basis points higher than for a firm with a governance index at its 75th percentile (11). It is important to keep in mind, however, that this model can only be estimated for a subset of the rivals in our simple because of limited data availability on the governance index. Model (v) shows a negative relation between abnormal returns and insider ownership. It is more difficult to acquire firms with high insider ownership; moreover, agency costs are less of an issue for these firms. Model (vi) indicates that the governance and insider ownership effects are both significant, but we only have 334 observations in this specification. Finally, we combine most of the explanatory variables in model (vii). Only the ratio of long-term debt to total assets is excluded because of multicollinearity. The explanatory variables all have the right sign, but only the effect of the governance index is significant. This is not surprising given that we only have 313 observations in this regression and that the model includes dummies for each transaction.

In sum, the event study evidence is generally consistent with the agency cost hypothesis. Rival firms gain when the takeover is announced and the extent of the gain depends on the financial policies of the rival and the extent to which the market for corporate control can force the rivals to make changes.

4. Alternative explanations and relationship with previous literature

This section discusses a number of alternative interpretations for our findings and brings to

bear some evidence to assess their validity. It also relates the findings of this paper to some previous work. As we mentioned briefly in the introduction, until recently, the evidence of the impact of takeovers on industry rivals was limited to the influential papers by Eckbo (1983, 1985) and Stillman (1983). These authors study rival returns around takeover announcements and challenges by antitrust authorities and generally conclude against collusion, and in favour of improved productive efficiency.

There has been renewed interest in studying the stock price reaction of rival firms recently. Fee and Thomas (2005) and Shahrur (2005) report positive abnormal returns for rival firms in horizontal acquisitions. They also study the stock price response of suppliers and customers. Shahrur (2005) finds that suppliers and customers have positive abnormal returns when targets and they rivals also experience stock price increases, while Fee and Thomas (2005) find no abnormal returns for customers and positive returns for suppliers that are retained after the merger. Both papers conclude that this evidence does not support increased collusion or improved buying power, but supports the view that the acquisition improves the firms' productive efficiency. These authors do not investigate changes in the financial policies of industry rivals. Our results suggest that efficiency gains come from a reduction in the agency problems of the target firm. This explanation does not rely on the completion of the acquisition. The mere fact that a firm in the industry receives a control threat is sufficient for other firms to take action. In addition, the agency cost explanation applies to horizontal acquisitions as well as unrelated acquisitions. We investigate whether our results depend the success of the acquisition attempt or industry relatedness of the acquirer, but find not evidence that this is the case.

Song and Walkling (2000) argue convincingly argue that the stock price reaction for industry rivals can be partly explained by the increased probability that the targets themselves will become taken over. They find that returns for those rivals that end up being taken over within one year is much higher than those that get taken over subsequently or those that remain independent. Our

paper complements this explanation. It shows that even those firms that do not get taken over earn abnormal returns, and that this return is related to previous agency problems. Song and Walkling (2000) focus on the first acquisition in an industry after a 'dormant period', a period during which no acquisitions are made. We do not make such a distinction, but their argument also partially applies to our analyses. The control threat should only have an impact on rivals to the extent that it comes as a surprise and it is likely that the threat becomes less of a surprise as more acquisitions take place. There is a countervailing argument, however. It may take several takeover attempts in an industry before rival firms realize that the gains are partly related to an industry-wide agency cost problem. We investigate this issue for our sample and do not find that the changes in financial policies are systematically related to the order of the takeover attempts.[9]

Other alternative explanations cannot fully explain our findings. One argument is that the industry becomes less competitive after a horizontal acquisition, leading to reduced output and reduced capital spending. Firms with lower levels of investment can support more debt, and increased debt leads to decreased levels of free cash flow, and possibly lower cash holdings. The reduction in competition could also explain why operating profits are higher than expected. However, as we mentioned previously, our results do not depend on whether the acquisition is horizontal or not. In addition, this interpretation would not explain the cross-sectional variability in rival returns documented in Panel B of Table 7.

Another argument is that the rival firms are not responding to the acquisition, but to the actions taken by the target firm in defense. In particular, a number of targets engage in share repurchases, often financed by increased leverage, as a defense against the takeover attempt. It is therefore possible that the response of rival firms is to the increase in leverage and not to the takeover threat per se. We do not believe that this possibility has a lot of merit, however. First, we

[9] Note that this analysis does not apply to the abnormal return analysis because these regression models contain dummies for each transaction. The explanatory variables are thus only designed to explain the

do not find that any of our results depend on whether the acquisition is successful or whether the target uses (leveraged) share repurchases as a defense mechanism. Second, all the theories about the response of competitors to increases in leverage suggest increases in capital spending.[10]

The facts presented in this paper provide strong support for Jensen's view (1986, 1993) that agency costs manifest themselves at the industry level and that takeover threats affect other firms as well. Kaplan and Holmstrom (2001) also discuss the agency cost view in their recent review piece, arguing that it was a prominent feature of the takeover scene during the 1980s. Mitchell and Mulherin (1996), on the other hand, argue that most takeover waves are caused by shocks, which alter the structure of the industry. We do not believe that these explanations are mutually exclusive. The agency cost view suggests that many firms in an industry refuse to disgorge free cash flow and use it for unprofitable investment instead. This may well be the consequence of an industry shock. It is exactly the refusal of firms to respond to this shock, which necessitates the hostile acquisition. It is certainly the case that many of the takeover threats in our sample occur in industries which changed structure according to Mitchell and Mulherin (1996).

4. Conclusion

This paper studies the effects of control threats to one firm in an industry on rival firms. This research is motivated by Jensen's (1986, 1993) argument that entire industries may suffer from agency problems. If one firm's independence is threatened because of agency problems, then the managers of other firms who want to remain in control realize that they need to reduce agency problems as well or be faced with similar control threats.

Our results are consistent with Jensen's explanation: after the control threat, the rival firms

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variation in returns around the mean rival return for each transaction.

[10] In particular, the 'deep pockets' argument proposed by Telser (1963) and further developed by Brander and Lewis (1988) and Bolton and Scharfstein (1990) suggests that industry rivals will increase output to drive the highly leveraged firm out of the market, while the limited liability hypothesis, proposed by Brander and Lewis (1986) and Maksimovic (1988), implies that all firms in an industry have an incentive to increase output

increase debt, cut capital expenditures, and reduce their cash balances and free cash flows. The rivals with the largest increases in debt after the control threat and the highest level of industry-adjusted investment before the control threat have the largest cuts in capital expenditures. In addition, we find that the rival firms have less debt than predicted by an empirical capital structure model. We also find that industry rivals adopt more takeover defenses than other firms in the industry.

Event study results provide further evidence in support of agency costs. The industry rivals gain 0.55%, on average, when a control threat is announced, with larger returns accruing to firms with high free cash flow, high capital expenditures, and low insider ownership. Moreover, firms with more takeover defenses in place at the time of the announcement of the acquisition have lower abnormal returns.

Overall, our results suggest that the benefits of control threats are larger than previously documented, since they also affect the behavior of industry rivals.

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when one firm increases leverage in order to take advantage of the firm's limited liability.

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Table 1
Summary statistics

Panel A: Number of hostile acquisition by year

Year	Number of acquisitions
1983	5
1984	14
1985	23
1986	37
1987	28
1988	44
1989	16
1990	3
1991	1
1992	1
1993	2
1994	5
1995	12
1996	15
1997	12
1998	0

Panel B: Number of rival firms

Mean	11.21
Median	7
Mode	3
Minimum	1
Maximum	63
25^{th} Percentile	4
75^{th} Percentile	15

Table 2
Change in financial characteristics of competitors of firms receiving a hostile takeover bid

The rival firms are obtained from the Earnings Supplement to the Standard and Poor's Industry Surveys. Means are listed in the first line. Medians are listed in the second line. A t-test is performed to compare means, taking into account the lack of independence of the observations. A sign rank test is performed to compare medians. The P-values of these tests are in parentheses. Free cash flow is computed as: operating income - dividend payments - interest payments - tax payments. The tax payments take into account deferred taxes.

Panel A: Individual firm observations

	Level year -2 & -1	Change between years -2 & -1 and years 1 & 2	N
Long term debt over total assets	0.2070 0.1958	0.0263 (0.00) 0.0061 (0.00)	2428
Total debt over total assets	0.4395 0.4332	0.0362 (0.00) 0.0196 (0.00)	2381
Capital expenditures over total assets	0.0741 0.0646	-0.0037 (0.00) -0.0029 (0.00)	2388
Cash over total assets	0.0854 0.0483	-0.0108 (0.00) -0.0045 (0.00)	2441
Free cash flow over total assets	0.0753 0.0772	-0.0065 (0.00) -0.0037 (0.00)	2353
Operating return on assets	0.1540 0.1477	-0.0095 (0.00) -0.0064 (0.00)	2437

Table 2 (continued)

Panel B: Data aggregated by control threat

	Level year -2 & -1	Change between years -2 & -1 and years 1 & 2	N
Long term debt over total assets	0.1983 0.1842	0.0355 (0.00) 0.0247 (0.00)	218
Total debt over total assets	0.4534 0.4433	0.0432 (0.00) 0.0318 (0.00)	218
Capital expenditures over total assets	0.0819 0.0736	-0.0059 (0.00) -0.0047 (0.00)	218
Cash over total assets	0.0923 0.0866	-0.0122 (0.00) -0.0069 (0.00)	218
Free cash flow over total assets	0.0757 0.0770	-0.0067 (0.00) -0.0052 (0.00)	218
Operating return on assets	0.1553 0.1593	-0.0117 (0.00) -0.0108 (0.00)	218

Table 3
Relationship between changes in debt and changes in capital spending and free cash

The change in long-term debt is computed as the change in the ratio of long-term debt to total assets computed over the two years subsequent to the completion or withdrawal of the control threat and the same ratio computed over the two years before the announcement of the control threat. The changes in the other ratios are computed in a similar fashion. The capital expenditures ratio is computed as capital expenditures divided by total assets. The cash ratio is computed as the ratio of cash and cash equivalents to total assets. The free cash flow ratio is computed as (operating income - dividend payments - interest payments - tax payments) / assets. The p-value in parenthesis refers to a t-test of significance of the coefficient. To compute this t-statistic, the standard errors have been adjusted to reflect the lack of independence of observations associated with the same control threat.

	Dependent variable		
	Change in capital expenditures (i)	Change in cash holdings (ii)	Change in free cash flow (iii)
Intercept	-0.0029 (0.01)	-0.0088 (0.00)	-0.0044 (0.01)
Change in long-term debt	-0.0269 (0.02)	-0.0881 (0.00)	-0.0874 (0.00)
N	2374	2428	2344
Adjusted r-squared	0.02	0.02	0.04

Table 4
Value Line forecasts for leverage and operating profitability for rival firms

This table contains results for the following regression model, estimated for all firms on the *Estimations and Projections File* of the *Value Line DataFile* with long-term forecasts available.

$$\text{Forecast Error} = b_0 + b_1 (\text{Rival Firm}) + b_2 (\text{Forecast Horizon}) + \text{Year Dummies} + e$$

The forecast error for long-term debt / book equity is computed as (actual long-term debt / actual book equity – predicted long-term debt / predicted book equity). The forecast error for capital expenditures is computed as (actual capital expenditures / sales – predicted capital expenditures / sales). The forecast error for operating margin is computed as actual operating margin – predicted operating margin. Rival Firm is a dummy variable set equal to one if the firm is a rival firm and the forecast is made before the control threat for the fiscal years ending one or two years after the control threat. Forecast horizon is the number of months between the period for which the forecast is made and the date of the forecast. Only the coefficient on the rival firm dummy is reported.

Forecasted item	Rival firm dummy (p-value)	Number of forecasts in regression	Number of rival firm forecasts
Long-term Debt / Book Equity	0.0671 (0.00)	109,331	472
Operating margin	0.0039 (0.00)	196,215	990
Capital Expenditures / Sales	-0.0019 (0.08)	138,668	775

Table 5
Actual versus predicted debt levels for the rival firms

Two regression models are estimated for all firms on Compustat, except for the firms in our sample. The first model employs long term debt over total assets as the dependent variable. The second model employs total debt over total assets as the dependent variable. Independent variables are: (i) operating income / assets, (ii) investment tax credits / assets, (iii) property, plant and equipment / assets, (iv) log assets, (v) R&D / assets, and (vi) selling, general and administrative expenses / assets. A separate model is estimated each year. This model is employed to predict the debt levels for the firms in our sample. Predicted and actual debt levels are averaged for the two year period before the control threat. Means are listed in the first line, medians are listed in the second line. A t-test is performed to compare means. The standard error on the t-test is adjusted to reflect lack of independence of observations associated with the same control threat. A sign rank test is performed to compare medians. The p-values of these tests are in parentheses.

	Predicted level years -2 & -1	Actual level years -2 & -1	Difference (p-value)	N
Long term debt	0.2262 0.2243	0.1769 0.1632	0.0493 (0.00) 0.0673 (0.00)	1937
Total debt	0.4910 0.4798	0.4326 0.4266	0.0584 (0.00) 0.0692 (0.00)	1927

Table 6
Adoption of takeover defenses by rival firms.

The corporate governance index is based on Gompers et al. (2003) who gather data from IRRC on 24 specific corporate governance provisions. The higher the governance index, the more insulated management is from takeover pressures. The adjusted governance index is the index adjusted by the average for the economy. The first number is the mean, followed by the median. The p-value refers to a t-test of significance for changes in means and a signed rank test for significance for changes in medians. The p-value for the t-test is adjusted to reflect the lack of independence of observations associated with the same takeover threat.

	Last available year before the control threat (i)	First available year after the control threat (ii)	Change (p-value) (iii)	N
Governance index	9.14 9.00	9.48 10.00	0.34 (0.00) 1.00 (0.00)	899
Adjusted governance index	0.10 0.23	0.53 0.81	0.42 (0.00) 0.52 (0.00)	899

Table 7
Rival abnormal returns around the control threat

Abnormal returns are computed as market-adjusted returns over the 5-day period starting 2 days before the announcement of the takeover attempts. In Panel A, The p-value after the mean refers to a t-test of equality of this abnormal return to zero. The t-test is based on standard errors that adjust for lack of independence of observations when we consider individual rival returns. The p-value after the median refers a signed rank test of equality of the median to zero. All the regression models in panel B contain year dummies and transactions dummies. P-values in the regression models have been adjusted to reflect the lack of independence of observations associated with the same control threat

Panel A Summary statistics

	Mean (p-value)	Median (p-value)	N
Individual observations	0.50% (0.00)	0.17% (0.00)	2443
Aggregated by control threat	1.30% (0.00)	0.89% (0.00)	207

Panel B Regression Analysis

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)
Capital expenditures / Assets	0.040			0.011				0.063
	(0.10)			(0.66)				(0.34)
Free cash flow / Assets		0.072		0.072				0.036
		(0.00)		(0.00)				(0.61)
Long term debt / Assets			-0.003					
			(0.76)					
Governance index					-0.0009		-0.0015	-0.0009
					(0.08)		(0.09)	(0.26)
Insider ownership						-0.033	-0.0438	-0.054
						(0.04)	(0.10)	(0.01)
Adjusted R-squared	0.20	0.22	0.20	0.21	0.14	0.17	0.08	0.15
N	2338	2324	2369	2283	598	827	334	313