Takeovers and The Cross-Section of Returns

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August 15, 2006

*Cremers is from the International Center for Finance at the Yale School of Management; Nair is from the Wharton School at the University of Pennsylvania; and John is from the Stern School of Business at New York University. The authors thank Andy Abel, William T. Allen, John Core, John Campbell, Robert Daines, Joao Gomes, Paul Gompers, Annette Vissing-Jorgensen, Andrew Metrick, Stew Myers, Stavros Panageas, Michael Roberts, Antoinette Schoar, Jessica Wachter, and Moto Yogo; as well as participants at the Wharton workshop, MIT, NBER Asset Pricing Meetings, Stockholm School of Economics, INSEAD, University of Amsterdam and Said Business School at Oxford for comments and/or helpful discussions. Dasol Kim has provided excellent research assistance.

ABSTRACT

This paper considers the impact of takeover (or acquisition) likelihood on firm valuation. If firms are more likely to acquire when they have free cash or when the required rate of return is low, takeover targets become more sensitive to aggregate cash flow shocks or to the price of risk. Thus, ceteris paribus, firms that are exposed to takeovers will have a different rate of return from firms that are protected from takeovers. Using estimates of the likelihood that a firm will be acquired, we create a takeover-spread portfolio that buys firms with a high likelihood of being acquired and sells firms with low likelihood of being acquired. Relative to the Fama-French model, the takeover-spread portfolio generates annualized abnormal returns of up to 11.35% between 1980 and 2004. Further, the takeover-spread portfolio is shown to be important in explaining cross-sectional differences in equity returns. Additionally, using a two-beta model that distinguishes cash flow shocks from discount rate shocks, we show that firms more likely to be taken over have higher betas on the aggregate cash factor. Finally, we provide an explanation for the existence of abnormal returns associated with governance-spread portfolios (Gompers, Ishii and Metrick, 2003 and Cremers and Nair, 2005); relate the takeover-spread portfolio returns to takeover activity in the economy; and perform out-of-sample tests.

I. Introduction

This paper considers the impact of the takeover channel on valuation. While it is well known that target shareholders receive a large premium on a takeover, how expectations about takeover premiums affect firm valuation has not been investigated. One possible reason for this lack of interest may be the assumption that differences in takeover exposure are purely idiosyncratic and hence do not affect a firm's cost of capital. In that case, the issue of incorporating the takeover channel into valuation is solved by simply adding the expected takeover premium to the expected cash flows. However, takeover activity and hence a target's exposure might not be idiosyncratic.

In particular, Bruner (2004) and Rhodes-Kropf and Viswanathan (2005) show that takeover activity is time varying and related to the conditions in the equity market. Further, a systematic exposure to takeovers can have an important impact on firm valuations and returns, as the median bid premium - approximately 35% - as well as takeover activity - 3,467 completed deals between 1980 and 1998 - are both high (Mitchell and Stafford, 2003).[1]

In this paper, we first provide a simple theoretical framework that uses an asset pricing model to value firms that differ in their takeover exposure. A central feature of the asset pricing model is time variation in the price of risk, which is assumed to be imperfectly correlated to changes in aggregate fundamentals, i.e. similar to Campbell and Vuolteenaho (2004) and Lettau and Wachter (2005). In this framework, we consider two alternative motivations for acquisition activity. The first motivation for acquisitions is driven through agency problems on the acquirer's part. These agency problems lead to empire building, which is exacerbated during times of positive cash flow shocks (the 'agency' view). This would explain the relation between takeover activity and market conditions and would cause firms exposed to takeovers to become more sensitive to shocks in aggregate fundamentals (i.e. cash flow shocks).

[1]There were 1,427 completed deals between 1980 and 1989 and 2,040 completed deals between 1990 and 1998. The median bid premium received by targets was 37.7% in the eighties and 34.5% in the nineties. Further, acquisition activity increased in 1999 and 2000 before dropping in 2001.

The second motivation for acquisitions is the valuation of potential synergies (the 'synergy' view).[2] When the price of risk is low, the value of these synergies is high and firms tend to acquire, thereby increasing the sensitivity of potential targets to the changes in the price of risk (i.e. discount rate shocks).

Both motivations imply that differences in takeover likelihood lead to differences in exposure to state variables determining asset prices, and hence to differences in the expected rate of return. However, whether firms exposed to takeovers have a higher or a lower rate of return depends on the relative importance of the two acquisition motives. The 'agency' view would unambiguously suggest that firms exposed to takeovers should have a higher rate of return: takeover premiums arrive when aggregate fundamentals are high, thus when investors least need the cash. The implications from the 'synergy' view, i.e. of receiving the takeover premium when the price of risk is low or when future expected returns are low, depend on the importance of the investor's inter-temporal hedging demands (see Merton (1973)). If such demands are important, investors strongly value receiving the takeover premiums at a time when future returns are low. In this case, the 'synergy' view would suggest that firms exposed to takeovers should have a lower rate of return. [3]

Next, we document five sets of empirical results to shed light on these implications. First, we show that a portfolio that buys firms with a high takeover vulnerability, estimated using a logit regression, and sells firms with a low takeover vulnerability is associated with annualized abnormal returns of 11.35% relative to the four-factor Fama-French (1992) and Carhart (1997) model between 1980 and 2004. This suggests that higher exposure to takeovers leads to higher expected returns. Also, this would imply that the Fama-French model does not fully account for state variables that are associated with time-varying risk premia.

[2] This is similar in spirit to the Q-theory of investments (Abel (1983), see also Jovanovic and Rosseau (1999)). Recently, other theories have been proposed to explain the time variation in takeover activity relying on mis-valuation in capital markets (see Shleifer and Vishny (2003) and Viswanathan and Rhodes-Kropf (2004)). Under certain conditions, to be discussed in section 2, the use of such mis-valuation theories to explain time varying takeover activity does not affect the interpretation of our results.

[3] It also follows, perhaps counter-intuitively, that despite a potentially higher required rate of return, firms with greater takeover exposure are also valued higher. This is due to the expected takeover premium, which is absent for a firm that is protected from takeovers.

Second, the takeover-spread portfolio is denoted the 'Takeover' factor, which is expected to proxy for the risk due to stock price sensitivity to state variables affecting time variation in risk premia. We find that our proposed factor explains differences in the cross-section of equity returns. Our main results are for the cross-section of stocks sorted into size and book-to-market portfolios, for which it is indeed striking that the Takeover factor can significantly improve the asset pricing model beyond the size and book-to-market factors.[4] In particular, adding the Takeover factor to the four-factor model almost doubles the R-squared using the 100 size and book-to-market sorted portfolios and improves pricing performance as well. Further, this improvement is not limited to the extreme portfolios of high growth and/or small size stocks.

Third, we investigate the link between corporate governance and stock returns as documented in Gompers, Ishii and Metrick (2005, henceforth GIM) and Cremers and Nair (2005, henceforth CN). GIM employ a governance index (G) they develop to show that a portfolio that buys firms with the highest level of shareholder rights and sells firms with the lowest level of shareholder rights generates an annualized abnormal return of 8.5% from 1990 to 1999. CN investigate how different governance mechanisms interact and show that these abnormal returns exist (and are higher) only when the G index is complemented with the presence of a blockholder (or high public pension fund ownership).[5] In this paper, we check if these abnormal returns decrease when the asset pricing model incorporates the Takeover factor. To highlight the usefulness of this exercise, it is important to note that the Takeover factor has a very low correlation with the governance-spread portfolios. Specifically, we show that abnormal returns associated with governance-spread portfolios (as used in GIM and CN) decrease significantly once we add the Takeover factor to the asset pricing model including the Fama-French factors and the momentum factor. Thus, it appears that the asset pricing model employed in these earlier papers is incomplete.

[4] See Ferson, Sarkissian and Simin (1999) on how a factor based on an anomaly can be expected to price a cross-section of equity returns sorted on the same dimension that created the anomaly.

[5] Bebchuk, Cohen and Ferrell (2004) confirm the result in GIM using a narrower index using 6 critical elements (out of 24) in the original index compiled by GIM.

Fourth, we find that the returns to the takeover-spread portfolio seem to predict real takeover activity. Fifth and finally, using the two-beta model proposed by Campbell and Vuolteenaho (2004), we show that firms exposed to takeovers indeed have higher cash flow betas, suggesting that takeover activity is indeed more likely to be related to changes in aggregate fundamentals rather than the price of risk, which is consistent with a higher expected return.

The central idea in this paper - that firms differing in takeover exposure also differ in their exposure to state variables important for asset prices - contributes to another area of active research. In particular, this paper contributes to the empirical asset pricing literature that uses factors other than the market factor to capture time variation in risk premia. While an intertemporal capital asset pricing model was proposed as early as 1973 (Merton, 1973), empirical work to detect stochastic variation in investment opportunities, with the notable exception of Campbell (1993), has only been recent (see e.g. Brennan and Xia, 2004).[6] This paper proposes to use the takeover likelihood as a proxy for a firms exposure to these (unobservable) state variables. Thereby, we also investigate if the empirically successful Fama-French model correctly accounts for such time variation in investment opportunities.

The results in the paper indicate that the widely used Fama-French asset pricing model may not be specified completely. Our results also imply that the benefits of corporate governance should not be inferred from the abnormal returns (relative to the Fama-French model) that GIM and CN document. It might indeed be true that better governance is beneficial, as suggested by the association between better governance with higher valuations and better operating performance (see GIM and CN). However, the results in this paper point out that the abnormal returns accruing to stronger governance are consistent with those firms having higher systematic risk, which is not fully captured by the Fama-French asset pricing model. Therefore, using these abnormal returns to advocate the case of stronger corporate governance could be misleading.

[6] Brennan, Wang and Xia (2004) note that “However, despite this evidence of time variation in investment opportunities, and despite the lack of empirical success of the classic single period CAPM and its consumption variant, there has been little effort to test models based on Merton’s classic framework.”

In the next section, we present a simple theoretical framework to highlight the main idea in this paper. In section 3, we form portfolios based on different levels of takeover vulnerabilities and investigate their returns. In section 4, we propose a 'Takeover' factor to explain differences in the cross-section of equity returns. In section 5, we test the sensitivity of the abnormal returns associated with governance-spread portfolios to an asset pricing model that includes this Takeover factor. In section 6, we investigate whether the Takeover factor is associated with takeover activity in the economy. Section 7 concludes.

II. Takeovers and Asset Prices

We specify a parsimonious environment that allows us to focus on differences in valuation arising from differences in takeover vulnerability. We categorize firms into potential acquirers and potential targets. All potential targets have identical final cash flows of X_T that, for simplicity, are realized without any uncertainty. At time $t+k<T$ an acquirer can attempt an acquisition that pays the target a premium of Δ over the stock price. However, the targets differ in the level of managerial entrenchment that changes the likelihood with which a takeover bid succeeds or would occur in the first place.[7] The parameter τ reflects the likelihood with which a takeover bid succeeds. A lower value of τ hence reflects greater managerial entrenchment in the target firm.[8]

To value potential targets, we appeal to a well-known existence theorem (Harrison and Kreps, 1979). This theorem states that, in the absence of arbitrage, there exists a stochastic discount factor or pricing kernel, M_T, such that the price at time t for any traded asset paying X_T at time $T>t$ equals

$$P_t = P_t(X_T) = E_t[M_T X_T],$$

[7]Examples of managerial entrenchment devices include takeover defenses and leverage (Stulz (1988) and Harris and Raviv (1988)).

[8]The managers can differ in their private benefits, based on which they follow entrenchment strategies. That is, managers with higher private benefits are more likely to be entrenched.

where E_t denotes the expectation conditional on information available at time t. The price of the potential targets at time t is then

$$E_t[P_{t+k} + \tau\Delta]E_t[M_{t+k}] + cov_t(P_{t+k}, M_{t+k}) + \tau cov_t(\Delta, M_{t+k}), \tag{1}$$

where P_{t+k} is the present value at time t+k of receiving X_T at time T.

The covariance between the stochastic discount factor and the expected premium in the above expression leads to differences in expected returns between firms that have a different takeover exposure (τ). The rest of the framework presents two potential reasons as to why this last covariance term might be different from 0. To do so, we first present a reduced-form linear characterization of the stochastic discount factor that depends on two parameters. We then present the two motivations for takeover activity that generate a link between takeovers and these asset pricing parameters.

A. Asset pricing

The asset pricing model we employ has the important feature that the price of risk varies, implying that at some times investors require a greater return per unit of risk than at others. This assumption is substantiated by a large and growing body of empirical work on the predictability of expected excess returns on aggregate stock market index (see, e.g., Shiller (1984); Campbell and Shiller (1988); Fama and French (1988, 1989); Campbell (1991); Hodrick (1992); Lamont (1998); Lettau and Ludvigson (2001)). To capture this time-varying risk premium, we introduce a state variable, z_t, that follows the process

$$z_{t+1} = z_t + \sigma_z \varepsilon_{z,t+1},$$

where ε_z is a shock to the price of risk, distributed normally with zero mean and unit standard deviation. We do not take a stand on the source of this state variable and, consequently, do not take a stand on the relative merits between the various models that generate such time-varying risk premia.

We assume that the shocks to z are not perfectly linked to variation in aggregate fundamentals. This makes our model similar to, among others, the model used in Campbell and Vuolteenaho (2004) and Lettau and Wachter (2005). For simplicity, we assume that the shocks to z are independent of the variation in aggregate fundamentals. The aggregate fundamentals are modeled as follows. We denote the log of aggregate payout to stockholders in the economy at time t by d_t and use a simple model of payout growth that follows the process[9]

$$d_{t+1} = d_t + \sigma_d \varepsilon_{d,t+1}, \tag{2}$$

where ε_d is a shock to the payout growth and is distributed normally with zero mean and unit standard deviation.

The discount factor captures these two mentioned sources of variation through factors that are related to time varying risk and to aggregate fundamentals. Further, since a stochastic discount factor can be linearly approximated by a Taylor expansion, we can express the price of a security that pays X_T at time T as

$$P_t(X_T) = E_t(M)E_t(X_T) + b \times cov_t(-Z_T, X_T) + c \times cov_t(D_T, X_T),$$

where Z is a factor capturing shocks in the price of risk and D is a factor capturing dividend or cash flow shocks.[10]

Stocks whose payouts X are positively correlated with aggregate cash flow shocks D pay off when aggregate fundamentals are high. Because these stocks distribute cash when investors

[9]This can be viewed as a simplified version of the dividend growth model used for example by Campbell (1999), Bansal and Yaron (2004) and Lettau and Wachter (2005).

[10]For an illustration of the linearization of the stochastic discount factor, consider the Campbell-Cochrane (1999) model. Although variation in aggregate fundamentals and the price of risk are closely linked in Campbell and Cochrane (1999), the discount factor - given by $M_{t,t+k} = (\frac{S_{t+k}}{S_t}\frac{C_{t+k}}{C_t})^{-\gamma}$, where C denotes the consumption and S denotes the consumption surplus ratio - is approximately equal to $M_{t,t+k} = 1 - \gamma\frac{S_{t+k}-S_t}{S_t} - \gamma\frac{C_{t+k}-C_t}{C_t}$.

least need it, investors will demand to receive a higher return on these stocks. Therefore, the parameter ‘c’ should be negative. Whether parameter ‘b’ is positive or negative depends on the importance of intertemporal hedging demands. In the absence of any intertemporal hedging concerns, investors demand a higher return on stocks that pay off when current valuations are high. Thus, investors demand a higher return on stocks whose returns covary negatively with the price of risk, implying that ‘b’ should be negative as well. However, if intertemporal hedging concerns are important, such stocks also provide hedging benefits, by paying off when future expected returns will be low. This would lead to lower expected returns and a less negative (or positive) value of b (see also Campbell and Vuolteenaho, 2004).

B. Takeover Activity

We consider two alternative motivations driving acquisition activity and investigate their implications for expected returns.[11]

B.1. Agency Problems

How do returns to takeover targets vary if acquisitions are driven by agency problems that emanate from the separation of ownership and control? In the spirit of Jensen (1986) and, more recently, Dow, Gorton and Krishnamurthy (2005), we characterize the agency problem by the assumption that managers of acquiring firms do not pay out cash directly to shareholders but instead use it to invest in acquisitions and other projects. These managers thus have ‘empire building’ tendencies, which are easier to pursue when the financial constraints the firm faces

[11]To the extent that takeovers only occur if the premium is above a threshold level, aggregate merger activity will be related to stock market conditions. However, in our parsimonious model, we allow takeovers to occur regardless of the premium but instead focus on how the premium varies over time.

are lower, i.e. when the amount of cash in the firm increases.[12] As a result, the cost of acquiring is a decreasing function of the firm's free cash flow.

The managers of potential targets, on the other hand, pay out cash directly to shareholders. Thus, the channel through which shocks to a firm's cash flows are transferred as shocks to the aggregate payout (dividends versus takeover premia) depends on the fraction of acquirers in the economy. Having already characterized the payout growth process, the cash held by acquirers at time $t+1$ is then

$$c_{t+1} = a\sigma_d \varepsilon_{d,t+1} \tag{3}$$

where a denotes the fraction of firms in the economy that are acquirers.

Since acquisitions are easier when acquirers have more cash available, the premium the acquirer offers is a function of the cash on hand, and is denoted by $\Delta(c_{t+1})$. This directly relates the takeover premium to the aggregate cash flow shocks in the stochastic discount factor. Consequently, takeover vulnerability will affect the rate of equity return. Using the specification of the takeover premium in (1), we get the following proposition.

Proposition 1 *Firms with greater exposure to takeovers have a higher expected rate of return due to higher exposure to factors related to aggregate fundamentals. At the same time, firms with a higher exposure to takeovers, ceteris paribus, have a higher value.*

Proof: *The value of a potential target firm can be written as*

$$E_t[P_{t+k}M_{t+k}] + \tau E_t[\Delta M_{t+k}]$$

$$= E_t[P_{t+k}]E_t[M_{t+k}] + \tau E_t[\Delta]E[M_{t+k}] + cov_t(P_{t+k}, M_{t+k}) + \tau cov_t(\Delta, M_{t+k}),$$

[12] Viewed literally, this motivation would only explain cash deals. However, managers can also use a combination of stock and cash, where it can be easier for the manager to pursue his private benefits when the cash component is higher. One could also incorporate stock deals by an alternative view whereby stock issuance today for acquisition purposes leads to stronger financial constraints in the future. A manager with cash in hand would be less concerned about this cost.

whereas the value of a firm completely protected from takeovers equals

$$E_t[P_{t+k}M_{t+k}].$$

The takeover premium Δ is a function of the shock to the acquirer's cash only, such that the covariance between M_{t+k} and Δ is given by $cov_t(D_{t+k},\Delta)$. Since the premium increases as shocks to cash increase, using (2) and (3), this covariance term is positive. Thus, the firms expected return increases in takeover vulnerability. Further, the higher return is only due to a higher beta on the factor related to aggregate fundamentals. Finally, $\tau E_t[\Delta M_{t+k}] > 0$, so that, ceteris paribus, higher takeover exposure is associated with a higher value.

B.2. **Synergies**

This section considers the potential to generate synergies as an alternative motivation for acquisitions. These synergies are captured through an increase in the target's cash flow, from X_T to $X_T(1+\psi)$, after the acquisition. Thus ψX_T denotes the potential synergies that can be attained by the combination of the two firms and which is uncertain. The perceived synergy is shared between the target, who receives a takeover premium Δ, and the acquirer.[13] Since a large body of evidence on share price reactions around takeover announcements suggests that on an average targets receive a positive premium while acquirer returns are insignificantly different from zero, we attribute all synergies to the target, such that $\Delta = P_{t+k}\psi$.[14]

In this setting, the present value of the expected synergies increases as the future cost of capital decreases. These increases allow an acquirer to pay a higher takeover premium. More generally, the takeover premium is a function of the future price of risk and is denoted by $\Delta(z_{t+k})$. As a result, once again the takeover premium is related to the stochastic discount

[13] The acquirer management might also receive private benefits from the acquisition, such as those attributed with empire-building (Jensen, 1986).

[14] See Bruner (2004) for a comprehensive survey.

factor, this time through shocks to the price of risk. Applying this to (1), we get the following proposition.

Proposition 2 *Firms with greater exposure to takeovers have greater exposure to state-specific risk factors that affect time-varying risk premia than similar firms that are protected from takeovers. If intertemporal hedging demands are important, then firms exposed to takeovers would have a lower rate of return.*

Proof: *The value of the firm exposed to takeovers can be written as*

$$E_t[P_{t+k}M_{t+k}] + \tau E_t[\Delta]E_t[M_{t+k}] + \tau cov_t(\Delta, M_{t+k}),$$

whereas the value of the firm protected from takeovers equals

$$E_t[P_{t+k}M_{t+k}]$$

As the takeover premium is a function of shocks to the price of risk only, the covariance between M_{t+k} and Δ is given by $cov_t(-Z_{t+k}, \Delta)$. Because the takeover premium increases as the price of risk decreases, this covariance term is positive. Thus, for the firm exposed to takeovers, the exposure to Z is given by $b[cov_t(P_{t+k}, -Z_{t+k}) + \tau cov_t(-Z_{t+k}, \Delta)]$, which is increasing in τ. In the presence of intertemporal hedging demands, b can be positive and hence the rate of returns to firms exposed to takeovers can be lower than similar firms that are protected from takeovers.

C. Discussion

Both propositions 1 and 2 illustrate that takeover vulnerability can affect the expected rate of return. If firms are more likely to acquire when they have free cash or when the required rate of return is low, takeover targets become more sensitive to aggregate cash flow shocks or to the price of risk. In our model, this effect on expected returns arises because the takeover premium depends on the two state variables, the amount of cash available and the price of risk, which determine time variation in the risk premia. Takeover vulnerability can either increase or decrease the rate of return, depending on the motives that drive acquisition activity. First, if agency motives are more important, we would expect to find higher expected returns for firms with greater takeover vulnerability. This is because in this case, takeovers would be more likely if acquirers have more cash, and stocks whose payouts are positively correlated with aggregate cash flows have higher required rates of returns. Second, if synergy motives are more important and intertemporal hedging demands are sufficiently large, we could expect to find lower expected returns for firms that are more likely takeover targets. In this case, if the price of risk is lower or future expected returns are lower, synergies are more valuable and thus the takeover premium is higher. Large hedging demands imply that investors would be willing to accept lower rates of returns on stocks that pay out when future rates of returns are low. Next, we turn to the data and use the four-factor asset pricing model proposed by Fama-French (1992) and Carhart (1997) to empirically explore the association between takeover likelihood and rates of return. We also use this benchmark model simply for the sake of consistency with Gompers, Ishii and Metrick (2003) and Cremers and Nair (2005).

III. Takeover-Spread Portfolios

We first investigate if firm-specific differences in takeover exposure are related to differences in their equity returns. To this end, we form portfolios based on the takeover vulnerability of each firm, and estimate abnormal returns relative to the four factor model.

A. Takeover Vulnerability

The likelihood that a firm will be acquired is estimated by a logit regression. Acquisitions are identified from the Securities Data Corporation's (SDC) database. Focusing on targets where the premium received is likely to be significantly large, we consider takeovers where the acquisition bid was for 100% of the firm. Further, since takeovers can be friendly or hostile and since takeover vulnerability to a friendly deal can be different from vulnerability to a hostile bidder, we only keep friendly deals. Since the probability of completing a hostile takeover is low and since hostile takeovers are themselves very infrequent, the loss of data by not considering hostile takeovers is low.[15] Among these targets of completed friendly acquisitions, we were able to find, from Compustat, firm-level information for 2,406 friendly targets between 1980 and 2004.[16]

Our first set of tests concern the probability of a takeover occurring over the 1980 to 2004 period. In the logit model, the target dummy is the dependent variable, and takes the value 1 if a firm is acquired. The logit model incorporates a number of independent variables that have been used in prior literature seeking to explain the probability of takeovers (see, for example, Hasbrouck (1985), Palepu (1986), and Ambrose and Megginson (1992)): an industry dummy that measures whether a takeover attempt occurred in the same industry in the year prior to the acquisition, the return on assets of the firm, firm leverage (book debt to assets ratio), cash (the cash and short-term investments to assets ratio), firm size (market equity), Q (Market / Book ratio), and asset structure (measured by the property, plant and equipment to assets ratio). All of these independent variables are measured at the end of the previous fiscal year.

In addition, we also include a variable to indicate the presence of a large external shareholder, as it has been argued that takeovers are more likely to occur as shareholder control increases (Shleifer and Vishny (1986)). We proxy external blockholders by those institutional shareholders that have more than a 5% ownership stake in the firm's outstanding shares. To construct this measure, we use data on institutional share holdings from Thompson / CDA

[15] Mitchell and Stafford (2003) note that the probability of a hostile bid being successful was 7.1% in the eighties and 2.6% in the nineties. Further, only 14.3% of the acquisition transactions received a hostile bid at any point of time in the eighties and the corresponding number in the nineties was 4%.

[16] The number is a conservative estimate of the takeover activity since it considers only completed friendly takeovers where the percent acquired is 100%. To ensure that the results in this section are robust, we also estimated a logit regression with all - friendly and hostile - announced and completed takeovers, without the percent acquired constraint and found similar results. These results are omitted in the interests of space and are available from the authors.

Spectrum, which collects quarterly information from SEC 13f filings. We use a dummy variable, denoted by BLOCK, which takes the value 1 when an institutional blockholder exists at the end of the previous year and 0 otherwise. Finally, we also include industry dummies (not reported).

The probability of becoming a target in the next year is thus estimated by using values of the independent variables at the end of the previous year. Table I shows the results for the total sample in the time period 1981-2004. Consistent with prior literature, the statistically significant variables are BLOCK, the industry dummy variable intended to capture the clustering of takeover activity within industry and time, market to book (Q) and firm size. Consistent with the notion that higher leverage and lower cash are takeover deterrents, we find that higher leverage and lower cash reduce the likelihood of being acquired. These effects, however, are not statistically significant. In the next section, we use these estimated coefficients to sort firms into portfolios based on the likelihood of being a takeover target.

Before proceeding, we redo the above test with the sample used in earlier governance studies documenting a link between governance and abnormal returns (see e.g. Gompers, Ishii and Metrick (2003) and Cremers and Nair (2005)). This allows us to investigate the abnormal returns associated with the governance-spread portfolios in section 5. Data requirements limit this sample to firms in the S&P 500, mid-cap 400 and small-cap 600 indices between 1990 and 2003, reducing the number of realized targets to 367 firms. The results from this model can be different from the previous model not only because of differences in the time-period, but also because this sample consists of relatively larger firms.

For this smaller sample, we introduce two additional independent variables that are not available before 1990. The first captures the amount of takeover protection a firm has and is denoted by EXT. EXT is a linear transformation of the governance index (G) constructed by Gompers, Ishii and Metrick (2003), such that a higher value of EXT (=24-G) indicates greater takeover exposure or greater shareholder rights. We also use a variable capturing the complementary effect between takeover defenses and blockholdings identified in Cremers and Nair

(2005). As the results indicate, EXT is significant in predicting takeovers. The complementary effect, while suggesting greater takeover vulnerability, is not statistically significant.

B. Returns to Portfolios based on Takeover Vulnerability

We sort firms into quintile portfolios based on their takeover vulnerability, which is estimated in the logit regression. From the preceding section we can see that firms with a blockholder, low Q and low market capitalization, and operating in an industry where a takeover occurred the previous year will tend to appear in the portfolio that has the highest exposure to takeovers. However, it is important to note that any one of the firm characteristics alone does not dictate the portfolio that a firm is assigned to.[17]

It is beyond the scope of this paper to develop the best possible model for estimating takeover likelihoods. As a result, we ignore the (lack of) statistical significance of the estimated logit model and do not engage in any further model selection or improvement such as any possible interactive effects.[18] Instead, we focus on the equal-weighted returns for the remainder of the paper in an attempt to reduce the noise inherent in predicting takeover targets.[19]

We investigate the returns of each of the five takeover vulnerability-sorted portfolios as well as the returns to a long-short portfolio that buys firms with the highest takeover vulnerability and shorts firms with the lowest takeover vulnerability. For additional robustness, we also investigate the returns to a takeover-spread portfolio that is formed based on decile, rather

[17] Let us, for the sake of illustration, focus on market capitalization. A low market capitalization firm might have a high ROA, high Q, lack a blockholder, low fixed assets and operate in an industry that hasn't recently witnessed an acquisition. Such a firm will not appear in the portfolio with the highest exposure to takeovers. Similarly, a firm with high market cap might appear in the portfolio with the highest takeover exposure if the firm has a blockholder, low ROA and low Q, high fixed assets and is in an industry that has recently witnessed an acquisition.

[18] For example, characteristics such as leverage, cash, asset structure and ROA could matter more for smaller firms than for larger firms. Further, the takeover-deterrent effects of size might not be linear, e.g. it might be unlikely to acquire a firm beyond a particular size, even if other characteristics favor a takeover.

[19] The value weighted results give similar, but weaker results, which in some cross-sectional regressions (see section 4) are not significant.

than quintile, classifications. The returns to these two sets of portfolios are adjusted for four factors capturing risk or style effects: the market factor, the size and book-to-market factors proposed by Fama and French (1993) as well as the Carhart (1997) momentum factor. Therefore, we investigate if the takeover-spread portfolio is associated with a significant abnormal return relative to the Fama-French four factor model.

The theoretical framework presented in section II suggests two possibilities. If the factors in the four factor Fama-French model correctly capture the risk associated with time variation in the aggregate fundamentals and discount rates, we would not expect to find a significant abnormal return to the takeover-spread portfolio. In that case, a portfolio of firms more likely to be taken over would only have different betas. If, however, the four factor Fama-French model does not account for all such factors, we should find a significant abnormal return to the takeover-spread portfolio.[20]

In Table II (Panel A), we report the annualized abnormal returns associated with the takeover-sorted portfolios. We find that both the mean returns and the abnormal returns are generally increasing with the likelihood of takeovers. Further, an equal-weighted portfolio that buys firms with high takeover vulnerability (quintile 5) and shorts firms with low takeover vulnerability (quintile 1) generates a highly significant annualized abnormal return of 11.43% between 1980 and 2004, with a t-statistic of 7.00. Using decile classifications, the abnormal returns to such a takeover-spread portfolio is even more striking and equals 17.66% with a t-statistic of 7.81.[21] The corresponding numbers for the value weighted portfolio are, as expected, lower and equal to 4.17% (t-stat of 2.33), for quintile classifications and 8.22% (t-stat of 2.95) for the decile classifications.

Panel B reports the results for the sample between 1991 and 2003 and uses the logit model that includes takeover defenses as an additional independent variable (EXT). Again, we find

[20] Since the market captures both the shocks to aggregate fundamentals and to discount rates (Campbell and Vuolteenaho, 2004), it is reasonable to expect abnormal returns relative to a market model even when higher shocks to aggregate fundamentals are the only relevant channel.

[21] These abnormal returns are not caused by the announcement returns to realized targets, as will be discussed in section 6.

that abnormal returns increase with takeover vulnerability. The takeover-spread portfolio generates an annualized abnormal return of 6.69% (t-statistic of 3.08) for the quintile classification and 7.30% (t-statistic of 2.41) for the decile classification.

The results in this section are consistent with the notion that takeover vulnerability strongly affects the rate of return. Further, this evidence also appears to support acquisition motives that make takeover targets more sensitive to aggregate fundamentals rather than to discount rate shocks. Finally, the four factor model does not seem to capture this risk completely.

IV. The 'Takeover' Factor

In this section we investigate whether takeover-spread portfolios, as suggested by our framework, are important in explaining the cross-section of equity returns. The takeover-spread portfolio mimics the state variables related to time varying risk premia and is termed the 'Takeover' factor. This proposed takeover factor is the long-short portfolio that buys firms in the highest quintile and sells firms in the lowest quintile of takeover vulnerability, utilizing differences in firm-specific characteristics affecting exposure to takeovers.

A. Methodology

In cross-sectional regressions between 1980 and 2004, we investigate if the Takeover factor is priced in addition to the market, size (SMB), book-to-market (HML) and momentum factors that together form the empirically successful four-factor model (Fama and French, 1992 and Carhart, 1997). To facilitate comparison with prior research, we subject the model to the test portfolios designed by Fama and French (1992) and subsequently analyzed by Jagannathan and Wang (1996) (henceforth, JW), Hodrick and Zhang (2002), Ang et al. (2004), among several others.

The main econometric approach we use is the two-stage cross-sectional regression (CSR). In the first stage, the multivariate betas are estimated using ordinary least squares (OLS). The second stage is a single CSR of average excess returns on betas, estimated with either OLS or generalized least squares (GLS). While the use of GLS for the second stage provides improved asymptotic efficiency (Shanken, 1992) and robustness to proxy misspecification (Kandel and Stambaugh, 1995), it requires the inverse of the unknown covariance matrix of returns, which may be imprecisely estimated. Following Shanken (1992), both the OLS and GLS second stage standard errors are corrected for the bias induced by OLS sampling errors in the first-stage betas. We use these two-stage cross-sectional regression to test whether the takeover factor can explain differences in the cross-section of returns, i.e., whether there exists a positive and significant coefficient on the takeover betas in the second stage regression.

In addition, we test our econometric specification using the Hansen and Jagannathan (1997) distance (HJ-dist) and the J-GMM tests (see e.g. Cochrane, 2002). Hansen and Jagannathan (1997), who develop a distance metric we call the HJ-distance, demonstrate how to measure the distance between a true stochastic discount factor that prices all assets, and the one implied by the asset pricing model. The distance between these two is calculated in the usual way as the square root of the expected value of the squared difference. If the model is correct, the HJ-distance should not be significantly different from zero. We test whether HJ-distance equals zero using the statistical test developed in Jagannathan and Wang (1996). The estimates of HJ-distance are labeled HJ-dist. The asymptotic and empirical p-values (see Hodrick and Zhang, 2002) of the test HJ-dist $= 0$, are reported below the HJ-distance.[22]

[22] The p-values of the J-statistics from optimal GMM estimates of the models are not reported here, but exhibit a pattern similar to the HJ statistics.

B. Results

Table III presents the correlation matrix of the factors used to explain the cross-section of equity returns (Panel A) as well as of the betas on these factors (Panel B).[23] A few observations can be made at this point. First, the correlations among the SMB, HML and Takeover factors are fairly high. Of particular interest is the positive correlation between HML and Takeover (52.11%, see Panel A). This may raise two concerns – that any detected importance of the Takeover factor might be spuriously due to this correlation, or that a cross-section based on book-to-market will handicap the takeover factor relative to the book-to-market factor. To alleviate such concerns, we will investigate the performance of the Takeover factor in the cross-sectional regressions when the HML factor is excluded. As an additional robustness test, we also form an alternative set of test portfolios based on takeover vulnerabilities. Finally, we note that the cross-sectional correlation of the HML and Takeover betas equals only 5.82

We first focus on the 100 portfolios based on decile sorts of book-to-market and size and report the importance of the Takeover factor in various specifications. Our main results, the annualized coefficients from the second stage cross-sectional regression, are presented in Table IV (GLS) and Table V (OLS). Panel A of each table uses the 100 portfolios based on book-to-market and size, for which we consider the importance of the Takeover factor in various specifications. Panel B of each table reports pricing tests using 100 portfolios based on estimated takeover vulnerabilities as alternative test portfolios.[24]

The first model is the benchmark four-factor Fama-French(1992)-Carhart(1997) model. As is well known, the Fama-French factors are priced and the model generates a R-square of 14.54% using GLS and 30.60% using OLS.[25] Model 2 adds the proposed Takeover factor.

[23]Since the betas are from a multivariate regression, these betas are specific to the asset pricing model employed. The beta correlation matrix reported here is for the model including all five factors and using the 100 book-to-market and size sorted portfolios.

[24]We also use 25 portfolios instead of 100 based on these characteristics. The results are statistically significant in 3 out the 4 models. For the 25 book-to-market/size portfolios, with the Fama-French 4 factor model, the takeover factor is not significant, perhaps due to lack of variability that is not explained by the HML factor.

[25]The computed R-squares are GLS R-squares with a constant. The significance of the takeover factor is robust in models without a constant, which are available on request.

Consistent with our theory, we find that the Takeover factor is important in explaining cross-sectional differences in equity returns. The annual risk premium associated with this factor is rather high and equals 8.00% for GLS. However, it is useful to note that the average beta on this factor is only 0.05. Thus, the average annualized risk premium associated with this factor is much lower and is equal to 0.4%. It is also striking that the R-square of the regression significantly increases to 27.10% for the GLS and 53.87% for the OLS results.

Since the Fama-French model does not accurately price small and high growth stocks, it is interesting to check if the performance of the Takeover factor is driven by these extreme portfolios. Consequently, we remove from the cross section of 100 portfolios those 5 portfolios that correspond to the smallest size decile and highest growth (below the median book-to-market). Our results, available on request, are robust to this. Our results are also robust to removing all 10 portfolios of the smallest size decile. However, these findings may not be surprising since the correlation between the returns of a portfolio with stocks in the smallest size decile with high growth (below the median book-to-market) and the Takeover portfolio returns is only -26%. Similarly, the correlation between the returns of a portfolio with stocks in the smallest size decile plus low growth (above the median book-to-market) and the Takeover portfolio is only -0.26%.

Finally, to ensure that our results are indeed not driven by the correlations of the Takeover factor with the other factors, especially with the book-to-market (HML) factor, we test an additional model. Model 4 considers a two-factor model including only the market portfolio and the Takeover factor. As found earlier, the coefficient on the Takeover factor is positive and significant, and the associated annual risk premium remains similar. Notably, the simple two factor model with the market and the Takeover factor still generates an R-square of 10.06% for the GLS and 17.07% for the OLS estimations.

C. Alternative Test Portfolios

The earlier results show that the Takeover factor is important in explaining the cross-section of the returns even when the cross-section is formed based on book-to-market and the model includes the book-to-market factor. To ensure that the importance of the Takeover factor is robust, we investigate its performance in explaining the returns to 100 portfolios based on estimated takeover vulnerabilities. Since the cross-section is thus not based on book-to-market characteristics, this also addresses concerns that arise from the correlation between the book-to-market and the Takeover factors. The results from this exercise are reported in Panel B of Table IV (GLS) and Table V (OLS). We again report results for four models. The first uses only the four-factor model while the second adds the Takeover factors. The third model is a simple market model and the fourth appends the market model with the Takeover factor. In both cases (model 2 and 4), the Takeover factor is important in explaining cross-sectional differences in equity returns.

Finally, and importantly, for all models and both sets of test portfolios, the HJ-distance decreases after the Takeover factor is included. The addition of the Takeover factor improves the pricing performance particularly for the 100 takeover-sorted portfolios. Here, the HJ-distance has an asymptotic p-value (under the null of exact multifactor efficiency) of 0.20% for the four-factor model and 27.64% once the takeover factor is added. [26]

We have shown that an economically motivated portfolio constructed to capture differences in exposure to shocks in aggregate fundamentals and discount rates (proxied by takeover likelihood) is important in explaining the cross-section of equity returns. The increase in R-squares, relative to existing models that are empirically successful, is remarkably large and shows the importance of accounting for the state variables relating to a time-varying risk premium. These results show that it is important for asset pricing models to take into account

[26] We also computed the empirical p-values assuming normality as in Hodrick and Zhang (2000) using Monte Carlo simulations under each model holding exactly. Ahn and Gadarowski (1999) indicate that the small sample properties of the HJ-distance can be quite far from the asymptotic distribution and depend on the number of assets and the number of time periods. These p-values indicate a similar pattern as the asymptotic p-values.

the difference between variations in price of risk and variations in aggregate fundamentals, for example through the use of the takeover-spread portfolios presented here.

V. Impact on Abnormal Returns associated with Governance

In this section, we examine the findings in Gompers, Ishii and Metrick (2003) and Cremers and Nair (2005). These papers investigate the impact of corporate governance on firm value using valuation measures, accounting measures of profitability and equity returns. With regards to equity returns, Gompers, Ishii and Metrick (2003, henceforth GIM) compile a governance index (G) and document that firms with lower takeover defenses (low G) have higher abnormal returns relative to a Fama-French model. Cremers and Nair (2005, henceforth CN) show that the positive abnormal return accruing to firms with low levels of protection exists only, and is larger, if the lack of takeover defenses is combined with a large external shareholder.

Our theoretical framework suggests that if the asset pricing model does not correctly capture the state variables related to the price of risk and to the aggregate fundamentals, a portfolio of firms exposed to takeovers can be associated with positive and significant abnormal returns. The results in the previous sections show that the Takeover factor is has large abnormal returns and is important in explaining the cross section of returns. Therefore, we investigate how the abnormal returns documented in GIM and CN change on using an asset pricing model that includes this Takeover factor.

Specifically, we investigate whether these abnormal returns decrease once the asset pricing model includes the Takeover factor. We focus on the sample for which takeover defense information, as used in GIM and CN, is available and consequently estimate takeover vulnerabilities based on the corresponding logit (see Table 1). Since the variables used to form the governance portfolios in GIM and CN are also used in the logit model, it is important to first underline the merits of the logit model employed. First, the logit model has many other characteristics beyond the governance index and blockholding that are contributing to the logit estimation. Further and most crucially, the correlation between the returns of the 'democracy-minus-dictatorship' (low minus high managerial protection) portfolio used by GIM and the Takeover factor is not only low but even negative (-11%). Therefore, there is no a priori empirical reason to suspect a strong connection between these two portfolios.

Following GIM, we use the 'G index' they compile ($< 0 < G < 24$), and first form a portfolio that buys firms with the lowest level of takeover protection ($G < 6$) and shorts firms with the highest level of takeover protection ($G > 13$). To characterize the lowest and the highest level, we use the same cutoff levels as GIM and the same terminology to call this the 'democracy-minus-dictatorship' portfolio. First, we consider the same time period as Gompers, Ishii and Metrick (2003) and replicate their result of the abnormal returns to the democracy-minus-dictatorship portfolio between 1990 and 1999 (Table VI, Panel A). Consistent with the findings of GIM, we find that the democracy-minus-dictatorship portfolio is associated with an annualized abnormal return of 8.65% (t-statistic of 2.97) relative to an asset pricing model that uses market, size, book-to-market and momentum factors.[27]

Next, we append the four factor model with the takeover-spread portfolio. We find that the democracy-minus-dictatorship portfolio now generates a much lower abnormal return of 3.79% and is no longer significant (t-statistic of 1.13, see Table VI). The equal-weighted version of such a portfolio is associated with an abnormal return of 1.51% that is also insignificant at standard levels. This documented reduction in abnormal returns also follows when the time period considered is extended from 1999 to 2003 - decreasing from 4.40% (t-statistic of 1.65) to 2.65% (t-statistic of 0.92) for the value-weighted case and from 3.62% (t-statistic of 1.64) to -0.68% (t-statistic of -0.31) for the equal-weighted case. However, for the time period between 1991 and 2004, the abnormal returns of the democracy-minus-dictatorship portfolio, even without the Takeover factor, are low.

[27] The abnormal returns are not exactly identical (a difference of 0.20%) due to slight differences in the construction of the momentum factor.

One possible reason for a weakening of the GIM results on extending the time period from 1999 to 2003 is perhaps the reduction in takeover activity during this time period.[28] As suggested by the framework here, lower takeover activity would imply a smaller difference in the returns between firms exposed to and firms protected from takeovers. Another reason is provided by CN. They find that takeover defenses and shareholder monitoring are complements in being associated with equity abnormal returns and accounting performance. Further, they document the complementary effect to be stronger in smaller firms. Using only takeover defenses, through G, might be capturing only part of the true effect associated with governance.

Therefore, we ensure robustness of the pattern that abnormal returns associated with corporate governance decrease when the takeover-spread factor is included in the asset pricing model, by checking the changes in abnormal returns associated with the existence of both low takeover defenses and high shareholder monitoring (see CN) when the takeover-spread portfolio is added to the asset pricing model. We first compute the abnormal returns to a portfolio that buys firms with few takeover defenses and high shareholder monitoring and shorts firms with many takeover defenses and low shareholder monitoring. To proxy for shareholder monitoring, we follow Cremers and Nair (2005) and use two alternatives - the presence of an institutional blockholder (BLOCK) and public pension fund holdings (PP).[29] Without the Takeover factor, the abnormal return of this governance-spread portfolio from 1990 to 2004 is 6.72% (using BLOCK). Consistent with CN, these abnormal returns are higher than the corresponding abnormal return of the democracy-minus-dictatorship portfolio. On introducing the takeover-spread portfolio to the Fama-French model, however, the documented abnormal return to the complementary governance portfolio also decrease from 6.72% (t-statistic of 1.86) to 2.04% (t-statistic of 0.53).

This finding has an important implication. These results suggest that the documented abnormal returns associated with governance are partly due to the misspecification of the asset

[28]The reduction in these abnormal returns on extending the time period is also documented by Cremers and Nair (2005).

[29]Only results using BLOCK are reported.

pricing model. As discussed in the introduction, this sheds light on the interpretation of the findings in GIM and CN. While this interpretation cautions against the use of these takeover-related abnormal returns to advocate for stronger governance, it is also important to note that the other positive aspects of governance shown in these two papers, specifically with regards to improved fundamental accounting performance, is unaffected by this.

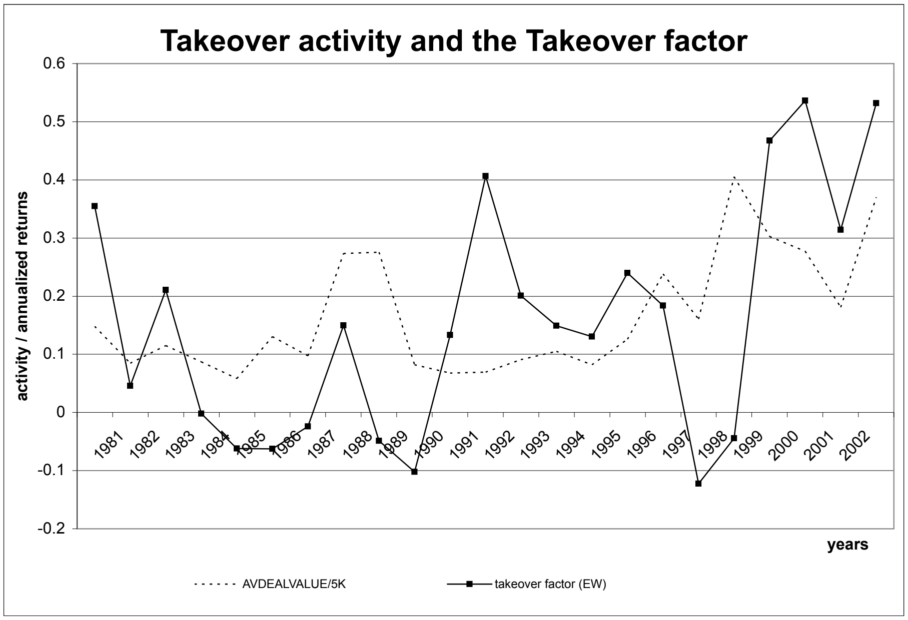
To summarize, consistent with proposition 1, we find that greater takeover vulnerability is associated with a higher rates of return. The proposition also states that takeover vulnerability increases firm values as well. Consistent evidence is provided in GIM and CN linking better takeover governance with higher Q ratios.[30]

VI. Extensions

As implied by the theoretical framework, we have seen that takeover-spread portfolios are important in explaining the cross-section of returns. To further support this argument, we plot the returns to the takeover-spread portfolio together with takeover activity (Figure 1). Takeover activity is measured each year as the (normalized) average deal value, taking into account all announced and completed takeovers. We plot returns of the takeover-spread portfolio lagged by one year to check whether the returns to this takeover-spread portfolio predict takeover activity.

[30]The coefficient on Q in the takeover logit regressions is negative, which is apparently incompatible with takeover targets having higher firm values, suggesting that firms with lower Q are more likely to be taken over. However, our proposition 1 states that ceteris paribus takeover targets should have a higher valuation. Firm Q is affected by several factors, some of which are potentially unrelated to takeovers and consequently to check whether our result is true, one needs to control for other factors and then check if takeover defenses hurt firm value. This is exactly what GIM and CN do.

FIGURE 1



As the above figure indicates, the takeover factor indeed appears to predict takeover activity and thus seems related to real takeover activity in the economy. More formally, the correlation between lagged returns of the takeover factor and takeover activity is either 28% or 31%, depending on whether we use total or average deal value to summarize takeover activity. As a final robustness check, we now address two concerns in the construction of the takeover-spread portfolio.

A. Takeover Factor and Out-of-Sample Takeover Likelihood

In the logit regressions used earlier to explain takeover activity, we use information on all realized takeovers between 1981 and 2004. As a result, the estimated coefficients rely on information until 2004. Consequently, the different takeover spread portfolios formed rely on future information, through the use of estimated logit coefficients to form categories of takeover likelihood. While there is no reason to expect such a bias will generate abnormal returns, we now conduct an alternative investigation to ensure that the results are not sensitive to such a bias.

Instead of estimating one logit regression, we now estimate the same model over rolling 10 year time periods. We first use the 1981-1990 time period to estimate the logit coefficients, which are used to form the takeover-spread portfolio at the beginning of 1991. We then estimate the logit regression for 1982-1991 and use the estimated coefficients to form the takeover spread portfolios for 1992. Proceeding similarly, we construct a takeover-spread portfolio between 1990 and 2004 that uses only past information. [31]

We redo the analysis in section III to investigate if a takeover-spread portfolio based on rolling estimation windows still generates abnormal returns relative to the four factor Fama-French model. As seen in Table VII (Panel A), the abnormal returns associated with the takeover-spread portfolio remain high and statistically significant. Using quintile sorts, the takeover-spread portfolio generates an annualized abnormal return of 12.32% between 1991 and 2004. The corresponding number when decile sorts are used is a striking 16.64%. While the takeover-spread portfolio results are consistent with the results in section III, it should be noted that the patterns among the five quintile portfolios are now more ambiguous. A possible reason might be that the out-of-sample logit regression is much noisier and detects extremes well but fails to correctly detect smaller changes of takeover vulnerability among firms.

Next, we consider the ability of the takeover-spread portfolio generated above to explain the cross section of returns. Following the methodology in Section 4, we report the coefficients

[31] The use of the rolling logit specification with 10 year windows merits discussion. If the takeover environment changes, perhaps estimates based on the distant past are not relevant for takeovers in the next year. This motivates the use of the rolling estimation window. The number of years to be considered in each period is chosen to balance two effects. Utilizing only recent information and hence using short windows reduces the number of realized targets. This lack of observations makes it difficult to arrive at any robust estimations. On the other hand, increasing the estimation window leaves us with fewer years to conduct our analysis. For example, if we consider a 20 year rolling logit regression, we are left with only 4 years (2001-2004) for which we can compute abnormal returns and perform cross-sectional tests. To balance these counteracting concerns, we choose 10 years as the time period in each logit. This allows us to focus our analysis on the post-1990 period.

in the second stage cross sectional regressions (Table VII, Panel B). For the period 1991-2004, the takeover spread portfolio using the rolling logit regression is important in explaining the returns of the 100 book-to-market and size sorted portfolios. Interestingly, in these regressions the size, book-to-market and the momentum factors are not statistically significant. This could be due to the now smaller number of observations (only 14 X 12 monthly returns) used to estimate the betas in the first stage of the cross-sectional returns or due to the lower importance of these factors post 1990.

In sum, the results reported in earlier sections are generally robust to the use of a methodology that utilizes only past information to form takeover-spread portfolios. One final issue is whether the documented abnormal returns are due to abnormal announcement returns to targets of realized takeovers. If true, this would shed light on the source of these abnormal returns. However, this would not explain the importance of the takeover spread portfolio in explaining the cross section of equity returns. To investigate the merit of this alternative view, we remove from our initial sample all firms that were targets between 1980 and 2004 and compute abnormal returns accruing to the different portfolios discussed in section II. Our results remain consistent and of (an arguably surprisingly) similar magnitude.[32]

VII. Aggregate Fundamentals versus Discount Rates

The evidence presented in this paper supports the view that firms exposed to takeovers have a higher rate of return. Our interpretation of this evidence, viewed through the theoretical framework presented, would be that takeover targets are more sensitive to aggregate fundamental shocks than to discount rate shocks. In this section, we shed direct light on this interpretation.

To separate the sensitivity to aggregate fundamental shocks from the sensitivity to discount rate shocks, we use the two-beta framework proposed by Campbell and Vuolteenaho (2004, henceforth CV). They propose a two-beta model that captures a stock's risk by the loadings

[32] Results are not reported in the interests of space.

on the cash-flow beta and the discount-rate beta. They split the return on the market portfolio into two components, one component reflecting news about the market's future cash flows and the other reflecting news about the market's discount rates. A stock's cash-flow beta measures the stock's return covariance with the former component and its discount-rate beta its return covariance with the latter component.

We investigate if firms with higher takeover exposure exhibit a pattern of higher cash-flow betas. As before (in section III.B.), we sort firms into portfolios based on their takeover vulnerability using the coefficients estimated in the logit regression. We form five portfolios with an equal number of firms in each portfolio and estimate each portfolio's cash-flow and discount-rate betas. As seen in Table VIII, the cash-flow betas exhibit the expected trend - higher takeover vulnerability is associated with higher cash-flow betas. On the other hand, discount rate betas exhibit a decreasing trend with greater takeover exposure. This evidence thus supports the view that takeover activity is high when aggregate cash flows are high. In fact, this view appears to shed light on the trend in discount rate betas as well if takeovers decrease the horizon of the equity holding (Lettau and Wachter, 2005). In any case, there is little evidence for the view that discount rate fluctuations, in isolation, motivate acquisition activity.[33]

It is natural to ask what fraction of the observed abnormal returns to the takeover spread portfolio can be explained by these changes in betas. The difference between the cash-flow betas of firm exposed to takeovers and firms protected from takeovers equals 0.10 (significant at the 5% level). Similarly, the difference between the discount-rate betas of firms exposed to takeovers and of firms protected from takeovers is -0.19 (again, significant at the 5% level). Using the annualized risk premium estimates provided by CV, this would imply an expected return difference of approximately 6.1%. While providing support to the view presented in this paper, such a model thus does not completely explain the abnormal returns documented in

[33]If discount rate shocks and cash flow shocks are negatively, but not perfectly, correlated, it is important to consider the sensitivity of takeovers to each shock in isolation.

this paper either. Thus, there appear to be additional factors missing from the simple two-beta model. Further investigation is left for future work.

VIII. Conclusion

This paper considers the impact of the takeover likelihood on firm valuation. While takeovers provide profitable exit opportunities for the target shareholders, takeover activity is affected by equity market conditions.

Using a theoretical framework where the price of risk varies over time and is not perfectly related to changes in aggregate fundamentals, we show that takeover exposure is associated with expected returns. We consider two alternative motivations for acquisition activity. The first motivation for acquisitions is driven through agency problems, which are exacerbated during times of positive cash flow shocks (the 'agency' view). This causes firms exposed to takeovers to become more sensitive to shocks in aggregate fundamentals. The second motivation for acquisitions is the valuation of potential synergies (the 'synergy' view). When the price of risk is low, the value of these synergies is high and firms tend to acquire, thereby increasing the sensitivity of potential targets to the changes in the price of risk. We show that firms exposed to takeovers could have a higher or lower rate of return, depending on the relative importance of two acquisition motives. While the 'agency' view would unambiguously suggest that firms exposed to takeovers should have a higher rate of return, the implications from the 'synergy' view depend on the importance of the investor's inter-temporal hedging demands. If such demands are important, then the 'synergy' view would suggest that firms exposed to takeovers should have a lower rate of return.

We document several supporting results. First, we show that a portfolio that buys firms with a high takeover vulnerability and sells firms with a low takeover vulnerability is associated with annualized abnormal returns of 11.35% relative to the four-factor Fama-French (1992) model augmented with the momentum factor (Carhart (1997)) model between 1980 and 2004. Second, we use the returns to the takeover-spread portfolio to propose a 'Takeover' factor and show that the Takeover factor explains differences in cross-sectional equity returns, and improves substantially on the four factor model. Third, we show that abnormal returns associated with governance-spread portfolios (Gompers, Ishii, and Metrick (2003) and Cremers and Nair (2005)) decrease significantly once the asset pricing model includes the 'Takeover' factor in addition to the Fama-French factors and the momentum factor. Fourth, the returns to the takeover-spread portfolio predict real takeover activity. Fifth, we document support for the theoretical framework by using a two-beta model and show that takeover targets have a higher beta on shocks to aggregate fundamentals (cash flow shocks).

This paper contributes to two different areas of research. First, the paper contributes to the development of an empirical asset pricing model that captures state variable(s) related to a time-varying risk premium and aggregate discount rate and cash flow shocks. The second contribution deals with the importance of corporate governance. Many advocates of governance have cited the positive abnormal returns associated with better governance to promote governance reform. While the conclusion that governance is associated with better firm performance might still be correct, the paper warns against the use of these abnormal returns as supporting evidence.

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Table I
Takeover Vulnerability: The Likelihood Of Being Acquired

This table presents results of the maximum likelihood estimates of the logit model for the Compustat based sample for the sample period 1980-2004 and for the sample covered by the Investor Responsibility Research Center (IRRC) for 1991-2004. The dependent variable is a dummy (Target) equal to one if the company is target of a friendly acquisition. 'Q' is the ratio of market to book value of assets, where market assets are defined as total assets plus market value of common stock minus book common equity and differed taxes. 'PPE' is property, plant and equipment to assets ratio. 'Industry' is equal one if, based on the Fama-French 48 industry classifications, there was a takeover in a firms industry in the year prior to the year of observation. 'ROA' is the return on assets. 'Leverage' is book debt to asset ratio. 'Cash' is cash and short-term investments to assets ratio. Firm size is proxied by 'Ln(MKTCAP)', the natural logarithm of the market equity. All independent variables are measure at the end of the fiscal year previous to the takeover event. Institutional Blockholder is a dummy variable assigned the value one if at least one institutional investor holds more than 5% of the companies stock and zero otherwise. 'EXT' is (24-G), where G is governance index as defined by Gompers, Ishii and Metrick (2001) and is available only after 1990. The point estimates and Wald chi-square statistics for the industry effects are not reported through they are included in the regression.

	Takeover Likelihood, 1980-2004			Takeover Likelihood, 1991-2004		
Variable	Coefficient	Std. Error	Significance	Coefficient	Std. Error	Significance
Panel A: Using announced and completed takeovers						
Q	-0.037	0.008	***	-0.059	0.023	***
PPE	0.015	0.030		0.123	0.129	
Ln(CASH)	0.003	0.010		0.030	0.031	
BLOCK	0.261	0.032	***	-0.687	0.390	*
Ln(MKTCAP)	-0.037	0.012	***	-0.107	0.039	***
Industry	0.072	0.053		0.081	0.142	
Leverage	0.095	0.025	***	0.806	0.177	***
ROA	-0.019	0.008	**	-0.432	0.123	***
EXT				0.052	0.018	***
EXT*BLOCK				0.032	0.019	*
Observations		83752			15332	
Targets		4979			734	
Panel B: Using 100% completed takeovers						
Q	-0.050	0.010	***	-0.25	0.052	***
PPE	0.004	0.046		0.324	0.175	*
Ln(CASH)	0.0168	0.0153		0.053	0.045	
BLOCK	0.586	0.046	***	-0.442	0.666	
Ln(MKTCAP)	-0.051	0.018	***	-0.015	0.055	
Industry	0.232	0.083	***	0.162	0.238	
Leverage	-0.0428	0.101		0.156	0.290	
ROA	-0.004	0.041		-0.122	0.239	
EXT				0.098	0.031	***
EXT*BLOCK				0.045	0.033	
Observations		83752			15332	
Targets		2406			367	

Table II
Importance of Takeover Vulnerability

We report the annualized mean, the annualized abnormal return (alpha), and the corresponding t-statistic of five equal-weighted portfolios that differ in their takeover vulnerabilities. To sort firms into these portfolios based on their takeover vulnerability, we use the coefficients estimated in Table 1. Panel A reports the results for the entire COMPUSTAT sample for the years 1980-2004, while panel B reports the results for the Investor Research Responsibility Center (IRRC) sample between years 1991 and 2004. We also report the annualized mean, the annualized abnormal return (alpha), and the corresponding t-statistic of a portfolio that buys firms in the highest category and shorts firms in the lowest category of takeover vulnerability based on five ('5-1') and ten ('10-1') categories of takeover vulnerabilities. The alphas are relative to the four-factor Fama-French (1992)-Carhart (1997) model.

Panel A: Portfolios based on different levels of takeover likelihood, 1980-2004			
Mean	Alpha	t-stat	Takeover-Likelihood
1.81%	-3.91%	-3.40	1
7.00%	3.01%	1.84	2
12.15%	6.80%	4.25	3
12.77%	4.05%	3.24	4
13.23%	7.43%	4.85	5
11.43%	11.35%	7.00	5-1
16.38%	17.66%	7.81	10-1

Panel B: Portfolios based on different levels of takeover likelihood, 1991-2004			
Mean	Alpha	t-stat	Takeover-Likelihood
11.22%	-0.78%	-0.53	1
13.83%	0.98%	0.57	2
16.33%	2.36%	1.19	3
20.26%	6.57%	3.39	4
27.08%	11.53%	4.77	5
15.86%	12.30%	4.55	5-1
19.26%	13.61%	3.51	10-1

Table III
Time-series correlation matrix of factors

The table provides the correlation among the factors used to explain cross-sectional equity returns (Panel A) and the correlation between the multi-variate betas on these factors for the 100 size and book-to-market sorted portfolios (Panel B). The factors considered are the four factors in the Carhart (1997) model that includes the market, size (SMB), book-to-market (HML) and momentum (UMD). The new factor introduced here is a takeover-spread portfolio (Takeover). The takeover-spread portfolio buys firms with low likelihood of being taken over and shorts firms with low likelihood of being taken over between 1981 and 2004 (See Table II).

Panel A: Time series correlation of the factors

	Market	SMB	HML	UMD
Market	100.00%			
SMB	18.06%	100.00%		
HML	-53.04%	-42.10%	100.00%	
UMD	-14.44%	-8.54%	6.26%	100.00%
Takeover	-38.42%	-3.58%	52.11%	-36.94%

Panel B: Correlation Matrix of the multivariate betas

	Market	SMB	HML	UMD
Market	100.00%			
SMB	-21.38%	100.00%		
HML	44.09%	-22.35%	100.00%	
UMD	-4.35%	9.17%	-3.55%	100.00%
Takeover	12.95%	31.76%	5.82%	62.67%

Table IV
Cross sectional pricing using the 'Takeover' Factor - GLS

We report the results for various cross-sectional GLS regressions of mean excess returns of the 100 BM/size-sorted test portfolios (Panel A) and of the 100 takeover-likelihood sorted portfolios (Panel B) regressed on their factor-betas. The multivariate factor-betas are estimated in a time series regression of each test portfolio on a constant and the particular factor, in the time period of 1981:4 - 2004:12. For the cross-sectional regressions, we report the coefficients and their t-statistics in parentheses - where standard errors are adjusted for the estimation risk in the betas (see Shapiro (2002)) - as well as the R2. The included factors are the market (VW CRSP index), SMB (small-minus-big market capitalization long-short portfolio), HML (high-minus-low BM), Mom (one year momentum Carhart portfolio) and two takeover-factors. Each takeover-spread portfolio buys firms in the highest quintile of takeover vulnerability and shorts firms in the lowest quintile (see Table II) of takeover vulnerability.

Panel A: Using 100 book-to-market and size sorted portfolios

	Constant	Market	SMB	HML	Mom	Takeover	R2	H-J statistic
1. FF4	0.18	-0.10	0.02	0.05	0.11		14.54%	0.69
	8.36	-2.84	0.69	2.07	2.32			0.20%
2. FF4 + Takeover	0.17	-0.09	0.02	0.05	0.12	0.08	27.10%	0.59
	7.06	-2.35	0.68	2.05	2.40	3.02		27.64%
3. CAPM	0.19	-0.12					5.20%	0.76
	9.84	-3.23						0.00%
4. CAPM + Takeover	0.18	-0.11				0.07	10.06%	0.68
2-factor model	8.94	-2.96				2.89		0.94%

Panel B: Using 100 takeover likelihood sorted portfolios

	Constant	Market	SMB	HML	Mom	Takeover	R2	H-J statistic
1. FF4	0.27	-0.22	0.00	0.18	-0.02		41.05%	0.64
	6.81	-4.52	0.03	6.19	-0.44			5.14%
2. FF4 + Takeover	0.28	-0.22	0.00	0.19	-0.03	0.11	41.40%	0.61
	6.60	-4.41	0.07	5.88	-0.49	5.34		20.53%
3. CAPM	0.33	-0.25					26.19%	0.75
	8.99	-5.45						0.01%
4. CAPM + Takeover	0.29	-0.21				0.11	36.11%	0.66
2-factor model	7.53	-4.52				5.34		2.91%

Table V

Cross sectional pricing using the 'Takeover' Factor - OLS

We report the results for various cross-sectional OLS regressions of mean excess returns of the 100 BM/size-sorted test portfolios (Panel A) and of the 100 takeover-likelihood sorted portfolios (Panel B) regressed on their factor-betas. The multivariate factor-betas are estimated in a time series regression of each test portfolio on a constant and the particular factor, in the time period of 1981:4 - 2004:12. For the cross-sectional regressions, we report the coefficients and their t-statistics in parentheses - where standard errors are adjusted for the estimation risk in the betas (see Shapiro (2002)) - as well as the R2. The included factors are the market (VW CRSP index), SMB (small-minus-big market capitalization long-short portfolio), HML (high-minus-low BM), Mom (one year momentum Carhart portfolio) and two takeover-factors. Each takeover-spread portfolio buys firms in the highest quintile of takeover vulnerability and shorts firms in the lowest quintile (see Table II) of takeover vulnerability.

Panel A: Using 100 book-to-market and size sorted portfolios								
	Constant	Market	SMB	HML	Mom	Takeover	R2	H-J statistic
1. FF4	0.20	-0.17	0.09	0.09	0.50		30.60%	0.69
	3.46	-2.81	2.85	3.23	4.66			0.20%
2. FF4 + Takeover	0.09	-0.03	0.04	0.03	0.42	0.17	53.87%	0.59
	1.16	-0.48	1.57	1.20	4.19	2.95		27.64%
3. CAPM	0.26	-0.18					5.96%	0.76
	4.76	-2.88						0.00%
4. CAPM + Takeover	0.04	0.01				0.19	17.07%	0.68
	0.45	0.10				3.37		0.94%

Panel B: Using 100 takeover likelihood sorted portfolios								
1. FF4	0.25	-0.20	-0.01	0.17	-0.07		41.83%	0.64
	4.09	-3.20	-0.06	4.98	-1.25			5.14%
2. FF4 + Takeover	0.28	-0.25	0.02	0.20	-0.09	0.11	43.15%	0.61
	4.19	-3.56	0.54	5.06	-1.63	5.24		20.53%
3. CAPM	0.55	-0.41					32.44%	0.75
	6.68	-5.86						0.01%
4. CAPM + Takeover	0.36	-0.27				0.12	36.65%	0.66
	5.40	-3.88				5.62		2.91%

Table VI
Abnormal Returns associated with Governance Spread Portfolios

We report the annualized mean, the annualized abnormal return (alpha), and the corresponding t-statistic of a (value-weighted, VW, and equal-weighted, EW) portfolio that buys firms in the highest category of governance and shorts firms in the lowest category of governance. Governance is measured using G, the index compiled by Gompers, Ishii and Metrick, and by a combination of G and blockholding (BLOCK) (see Cremers and Nair, 2005). The alphas are first computed relative to the four-factor Carhart (1997) model and then relative to a five-factor model that appends the Carhart Model with a takeover-spread portfolio. The takeover-spread portfolio buys firms in the highest category and shorts firms in the lowest cateogry of takeover vulnerability (see table II).

Panel A:Democracy-Dictatorship Long-Short Portfolios, 1990:9 - 1999:12, VW		
	FF4	FF4+Takeover
VW Alpha	8.65%	3.79%
t-stat	2.97	1.13
EW-Alpha	4.70%	1.51%
t-stat	2.00	0.55

Panel B:Democracy-Dictatorship Long-Short Portfolios, 1990:9 - 2004:12, VW		
	FF4	FF4+Takeover
VW-Alpha	4.40%	2.65%
t-stat	1.65	0.92
EW-Alpha	3.62%	-0.68%
t-stat	1.64	-0.31

Panel C: Democracy-Dictatorship conditional on BLOCK Long-Short Portfolios, 1990:9 - 2004:12, EW		
	FF4	FF4+Takeover
VW-Alpha, BLOCK=4	6.72%	2.04%
t-stat	1.86	0.53
EW-Alpha, BLOCK=4	4.68%	0.79%
t-stat	1.83	0.29

Table VII
Robustness: Using Rolling Logits to construct a 'Takeover' Factor

As in Table II and Table IV, we report the abnormal returns associated with takeover spread portfolios and the importance of the Takeover factor in explaining the cross-section of returns, but now using takeover-spread portfolios that are based on a rolling logit regression. Estimates of a logit regression that fits takeover activity in the previous 10 years are used to form takeover-spread portfolios the following year. For a description of the independent variables used, see Table I. In Panel A, we report the annualized mean, the annualized abnormal return (alpha), and the corresponding t-statistic of five equal-weighted portfolios that differ in their takeover vulnerabilities, for the entire COMPUSTAT sample between 1991 and 2004. We also report, in panel A, the annualized mean, the annualized abnormal return (alpha), and the corresponding t-statistic of a portfolio that buys firms in the highest category and shorts firms in the lowest category of takeover vulnerability based on five ('5-1') and ten ('10-1') categories of takeover vulnerabilities. The alphas are relative to the four-factor Fama-French (1992)-Carhart (1997) model. In Panel B, we report the results for various cross-sectional GLS regressions of mean excess returns of the 100 BM/size-sorted test portfolios regressed on their factor-betas (see Table IV for details on the cross-sectional regressions).

Panel A: Takeover-Spread Portfolios, 1991-2004

Mean	Alpha	t-stat	Takeover-Likelihood
10.61%	12.32%	3.25	5-1
13.71%	16.64%	3.50	10-1
9.84%	-1.30%	-0.55	1
14.32%	2.42%	1.25	2
16.94%	6.26%	4.04	3
17.76%	7.04%	3.70	4
20.45%	11.02%	3.82	5

Panel B: Using 100 book-to-market and size sorted portfolios

Takeover-Factor	Constant	Market	SMB	HML	Mom	Takeover	R2	H-J statistic
1. N/A	0.16	-0.07	0.04	0.04	-0.00		11.06%	0.79
	8.29	-1.70	1.02	1.17	-0.04			25.40%
2. Takeover	0.15	-0.07	0.04	0.04	-0.00	0.08	13.81%	0.72
	7.83	-1.59	1.02	1.18	-0.01	1.70		48.00%
3. N/A (CAPM)	0.16	-0.07					4.03%	0.84
	9.01	-1.74						6.00%
4. Takeover	0.16	-0.07				0.08	8.73%	0.81
2-factor model	8.72	-1.67				1.76		16.20%

Table VIII
Cash-Flow Betas and Takeover Vulnerability

The table shows the estimated discount-rate (DR) and cash flow (CF) betas for the takeover-likelihood sorted portfolios (see the text for a description of the betas, or see Campbell and Vuolteenaho (2004) for details). The time series used is 1981:1 - 2001:12. All estimated betas are significant at the 1% level and all differences are significant at the 5% level.

DR beta	CF beta	Takeover-Likelihood
1.35	-0.02	1
1.34	0.05	2
1.19	0.08	3
1.17	0.07	4
1.16	0.08	5
-0.19	0.10	5-1
-0.23	0.14	10-1