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Shareholders' expectations, aspiration levels, and mergers

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Shareholders' expectations, aspiration levels, and mergers

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Abstract

This paper offers a new explanation of value-reducing mergers and stock market driven takeovers by introducing recent research on aspiration levels and individual decision making under risk. If market valuation constitutes an aspiration level for managers, we show that managers may be tempted to seek riskier mergers in order to meet shareholder optimism. Such merger seeking behavior increases in bidder overvaluation and can also favor acquisitions when the expected value of takeovers is lower than alternative investments. The paper provides support for several empirical findings and complements existing market-timing models as its predictions are decoupled from equity offers and are independent from the means of payment.

Keywords: aspiration level, mergers and acquisitions, market-driven takeovers, overvaluation

1 Introduction

In the last two decades, significant resources have been spent in corporate mergers. At the beginning of the 1980's, US-american mergers and acquisitions (M&A) amounted to an average of 3.6% of GDP (Weston et al., 2004). By 1995 M&A activity has reached 5% of GDP and equated to about 48% of non-residential gross investment (Andrade et al., 2001). Records peaked in 1999 at 15.4% of GDP (Weston et al., 2004) and even after the downturn that followed in the US, a total of $1.24 trillion (and globally of a total of $2.56 trillion) changed hands in 2006 alone.

Empirical results on bidder returns to mergers, however, indicates that potential merger synergies accrue almost entirely to target shareholders, while "acquiring firm shareholders appear to come dangerously close to actually subsidizing these transactions" (Andrade et al., 2001, p.111).[1] In fact, a number of studies find that mergers come at a significant loss to the acquirer, suggesting that they are not in their shareholders' interest (see e.g. Dodd, 1980; and Firth, 1980). In a recent analysis, Moeller et al. (2005) report that in the 1990s (1991-2001) acquiring firms' shareholders lost an aggregate of $216 billion at the announcement of merger bids.

Several empirical artefacts are not or only partially explained by existing models of value-reducing mergers. In particular, it appears puzzling that there is: (*i*) lower performance or even wealth destruction of bidders with high valuations (Rau and Vermaelen, 1998; Dong et al., 2006; Moeller, 2005), (*ii*) a higher likelihood of value-decreasing mergers at the end of a wave (Moeller, 2005; Harford, 2005), and (*iii*) stock market driven mergers are paid with debt as well as cash (Harford, 2005; Dong et al., 2006).

Recent theoretical papers provide an explanation where managers time a

[1] The results on the overall return to mergers are mixed, suggesting that they may not create value on average. For extensive surveys on the topic see Jensen and Ruback (1983), Jarrell et al. (1988) and Andrade et al. (2001).

soaring equity market by using their temporarily overvalued equity as cheap currency to acquire less overvalued assets (Shleifer and Vishny, 2003; Rhodes-Kropf and Viswanathan, 2004). An important element in these models is the prediction of Myers and Majluf's (1984) 'means of payment hypothesis' saying that managers pay with equity when it is overvalued. They predict that overvaluation leads to more stock mergers and that these stock mergers underperform, because shareholders correct their misperception. Although a number of studies provide empirical support for both models (Ang and Cheng, 2003; Dong et al., 2006; Rhodes-Kropf et al., 2005) the evidence is not unambiguous, particularly with regard to the distinction between cash and stock. Against intuition, the performance of cash-mergers turns out to be similar to that of stock mergers (Dong et al., 2006). Further, most findings show that the stock market drives acquisitions in general, not only stock-mergers. This is also reported by Harford (2005) for partial-firm cash merger activity. By distinguishing between changes in the business environment and misvaluation components he provides evidence that the primary driver of merger activity is the positive capital liquidity effect in times of financial market booms.

The contribution of this paper is to offer an alternative explanation of the above stylized facts. We deal with the puzzles by providing an explanation that considers aspiration levels as one of the driving forces of value-reducing mergers. In line with Roll (1986) we believe that individual decisions have predictive content for market behavior. Mergers reflect the decisions by individual managers, which are not always profit maximizing. In particular, there is a growing body of evidence suggesting that managers aim at achieving their aspiration level, often determined by a target rate of return (see, e.g., Lant, 1992; Mao, 1970; Mezias, 1988; Mezias et al 2002, Payne et al, 1980, 1981). Jensen (2005, p.7) observes that "(j)ust as managers' compensation suffers if they miss their internal targets, CEOs and CFOs know that the capital markets will punish the entire firm if they miss analysts' forecasts by as much as a penny."

Specifically, we argue that rather than maximizing expected value, man-

agers try to satisfy expectations by shareholders. Because riskier investments are sometimes more likely to meet expectations, we argue that managers can be expected to take on unnecessarily risky projects such as mergers. We show that a simple model can predict the above stylized facts. Intuitively, if managers feel that their firm is underperforming, they will be afraid not to meet shareholder expectations. An alternative is to merge, which may be risky and have a relatively low expected value but nevertheless increase the probability of meeting expectations. Managers may be especially prone to take on the risky projects when expectations are high, like when the firm is overvalued. This argument is independent of the form of payment and similar to Jensen's (2005, p.8-9) explanation of agency costs of overalued equity: "You realize the markets will hammer you unless your company's performance justifies the stock price. So after all value creating alternatives have been taken you start to take actions that destroy long run value that you hope will at least appear to generate the market's expected performance in the short run.".

The setup of our model is as follows. We make the simplifying assumption that managers only pay attention to the probability of meeting a specific target return as their aspiration level. The target return is determined by the expectations of the shareholders, manifested in the firm's current share price. The task of the manager is to choose among two options: an internal project or a merger. Shareholders form expectations about both projects, but the manager is better informed.

We show that the manager is possibly 'merger seeking': he chooses the merger project despite the lower expected value compared to the internal project. Intuitively, when shareholders have high expectations about the internal project, but the manager has private information that the internal project is unlikely to succeed, the merger project may be the only way to satisfy those expectations despite its inherent risk. We also analyze how the degree of merger seeking depends on the expectations and the risks involved. We show that managers

may become *more* merger seeking as the shareholders have *higher* expectations about the internal project, or as the merger project becomes more risky.

The appeal of our model is that it offers a quite different underlying explanation for the phenomenon of market-driven mergers. We do not assume that managers exploit short term shareholders (Shleifer and Vishny, 2003,) or that they make mistakes in Bayesian updating of synergies (Rhodes-Kropf and Viswanathan, 2004), but reason that stock momentum sets aspiration levels that drive managers into mergers. This allows us to decouple our predictions from the means of payment. In contrast to earlier market-timing models, which focus on payment with equity, our model predicts market-driven mergers that can be financed with any combination of stock, cash or debt.

The paper proceeds as follows. In the next section we discuss the theoretical background of the model. The following section explains the model and develops testable predictions. After that the paper concludes.

2 Theoretical Background

In this section we first position the model in the body of merger theories before discussing the literature on aspiration levels and their importance in individual decision making.

In seminal contributions, Jensen and Meckling (1976) and Jensen (1986, 1988) focus on information asymmetry and agency theory to explain mergers. On a similar basis, Shleifer and Vishny's (2003) market-timing model assumes self-serving agents that exploit market misvaluation to the detriment of short-term shareholders. Others have focussed on merging to exploit potential synergies. Jovanovic and Rousseau (2002), Lang et al (1989) and Servaes (1991) propose a Q-theory of mergers where growth prospects (as measured by Tobin's Q) redeploy target assets to the most efficient firm. There still exists the

possibility, however, that mergers underperform or even destroy value because of exogenous factors that cannot be controlled (and are also not exploited) by management, like asymmetric information, transaction costs, or taxes (e.g., Myers and Majluf, 1984). Rhodes-Kropf and Viswanathan's (2004) market-timing model hinges on constraints in risk assessment. Their target managers mistakenly, but rationally accept overvalued all-equity offers due to the fact that uncertainty about synergies is correlated with overall market uncertainty.

While the main focus of these papers is on market and firm characteristics (and constraints), a more recent body of literature is centered on managerial characteristics and explains market behavior based on individual differences between managers. Although these explanations are closer to agency theory, suboptimal investment decisions in these models are *not* driven by self-serving management, but by behavioral constraints like overoptimism (e.g., Roll, 1986). Malmendier and Tate (2008) also propose that managers overestimate their ability to generate value and future cash flows. Consistent with the conclusions of Rau and Vermaelen (1998), they find that this leads to overpayment for targets and value-reducing mergers.

In this paper we also analyze the merger decision making behavior of a better informed manager. Although we recognize that asymmetric information by itself generates similar behavior (Jensen and Meckling, 1976), the main novelty and driver of our results is the inclusion of an aspiration level. While most of the agency models are concerned with effort levels and focus on one project only, our approach enriches the literature with the explicit analysis of project selection and of the impact of riskiness on project selection, as in Lambert (1986). In his model, agents can become better informed about different projects by investing efforts. In our model, the question is not about collecting information. It thus avoids the confounding effects from the collection of information and on moral hazard in terms of effort.

Our idea for including an aspiration level has a basis in the literature on decision making. Expected utility constitutes a key model of individual decision

making under risk: its assumptions are normatively appealing for a wide range of choice problems and applications (von Neumann and Morgenstern, 1944). Its use in finance is widely spread (Ingersoll, 1987). Descriptively, however, expected utility proved to have its limitations (Allais, 1953; Ellsberg, 1961). A large body of evidence has challenged the normative model of expected utility. In the last decades several models have been proposed that explain the descriptive violations. All these models have been generally labeled as *nonexpected utility* (for surveys, see Camerer and Weber, 1992; Schmidt, 2004; Starmer, 2000) and received attention in finance (Barberis et al., 2001; Barberis et al., 2006; Benartzi and Thaler, 1995).

Among the most recent contributions in the field, there are theories based on aspiration levels (Lopes and Oden, 1999; Payne, 2005; Diecidue and van de Ven, 2007). Diecidue and van de Ven (2007) interpret an aspiration level as an outcome that takes a special role in (financial) decision making. Subjects code outcomes above the aspiration level, for example returns above the mean of the market, as successes and outcomes below the aspiration level as failures. They place value on the overall probability of success and the overall probability of failure. This allows a richer set of predictions, while minimally modifying the normative benchmark of expected utility with the inclusion of an aspiration level. The main intuition is that the decision maker, when facing a financial decision, not only pays attention to the risky project but also to the probability of success and failure.

We believe that the idea of aspiration level and probability of success or failure plays an important role in the decision making of mergers. In psychology this phenomena has been empirically founded (Lopes, 1987, 1996) and motivated by the willingness of "winning at least something" or avoid "falling below the target." Empirical studies in business and finance report that managers pay attention to the probability that a target rate of return, i.e. a certain valuation level, will be met (Mao, 1970; Payne et al., 1981; Laughhunn et al., 1980). Petty and Scott (1980) found this idea of a target return, or aspiration level, among

most managers in a more extensive study. Furthermore March and Shapira (1987) conclude that "... the primary focus is on avoiding actions that might place one below [the target level]". Roy (1952, p. 432) argues that agents, when holding financial assets, will seek to reduce the overall probability of being below a level, i.e., that the gross return is not less than some predetermined quantity. The behavior of paying particular attention to accomplishing the aspiration level is observed, especially among decision makers in investments (Arzac and Bawa, 1977; Browne, 1995; Fishburn, 1977; Markowitz, 1959; Stutzer, 2003).

In our model, the key idea is that shareholder expectations, as expressed in firm valuation, constitute an aspiration level for management. For simplicity, but without loss of generality, aspiration levels are induced by the threat of being fired. Variable compensation may improve the alignment of incentives, but the optimal contract would still need to incorporate the threat of termination, because low returns could also signal a less capable manager. Lehn and Zhao (2006) report corresponding evidence for underperforming bidders. If managers pay attention to their aspiration level, this creates a conflict of interest between risk-neutral shareholders and risk-averse managers, provided the latter have superior information about the real value of the firm.

We focus on the conflict of interest that arises over the selection of a merger vs. an internal project. In this way we are able to operationalize the aspiration level for decisions about mergers and explain the empirical findings mentioned in the introduction. The advantage of our explanation is that, while keeping the model simple and accessible, we offer a behaviorally appealing characterization of merger activity. Our model advances a complementary explanation, which is independent from the means of payment, and thus provides theoretical support for the similarity of empirical findings on stock and cash mergers.

3 The model

3.1 Basic setup

There is a firm that is faced with a choice between two projects. One of these projects is an internal project, and it is denoted by x. The other project is the external, or 'merger', project, and is denoted by y. We model the profitability of each project as a lottery with two outcomes: a high outcome V_i^H and a low outcome V_i^L, $i = x, y$. The *ex ante* probability of the two outcomes are respectively given by p_i^H and p_i^L.

We assume that the shareholders are risk neutral and aim at maximizing profits. Rather than making the project choice themselves, they delegate this choice to the manager who is better informed about the internal project. The manager receives a private signal, r, that is informative about the profitability of project x but unobservable to the shareholders. Concretely, the manager receives a private signal $r \in [0, 1]$, drawn from a uniform distribution $F(r) \sim U[0, 1]$ with density $f(r)$. A signal with value r means that the actual probability for a high profitability of x is given by r, as in Lambert (1986).

To make things interesting in the current context of 'underperforming' mergers, we assume that *ex ante* the internal project has a higher expected value than the merger project. Hence, with the information that shareholders have, they would prefer the internal project to the merger project. Secondly, we assume that the merger project has a higher expected value than the worst outcome of the internal project. Otherwise the shareholders would do better by making the project decision themselves and always choose the internal project. Thus, if $E(\cdot)$ denotes the expected value, we have:

Assumption 1 $E(x) > E(y) > V_x^L$.

Naturally, since a high private signal r reveals good prospects for project x, project x is to be selected for sufficiently high values of r. However, the choices

for which managers and shareholders switch from a preference for y to x do not coincide. We now show this in this simple setup, and consider some extensions after that.

3.2 The manager

We first analyze the choice of the manager. Our analysis is based on the model presented in Diecidue and van de Ven (2007). In line with ample evidence, we assume that managers have an aspiration level and that they try to maximize the probability of reaching at least their aspiration level. In the current context, the expectations of the shareholders about the profitability of the firm's internal project, which constitute the basis for the firm's market valuation, represent a natural aspiration level. Consequently, managers are concerned with meeting the expectations by the shareholders. For simplicity, this will be their only concern. Thus, if $P(\,z|\,i,r)$ is the cumulative probability of obtaining outcome z given the project choice i and private signal r, the manager choose i to maximize:

$$1 - P(\,E(x)|\,i,r).$$

If the manager chooses project x, then the expectations are met only with the high outcome, and the manager's estimate of the probability of this happening is given by r. Assumption 1 implies also that the low outcome of project y cannot exceed expectations. If the high outcome of project y exceeds expectations, the probability of meeting expectations with project y is $1 - P(\,E(x)|\,y,r) = p_y^H$. The manager chooses x if and only if $r \geq p_y^H$. On the other hand, If even the high outcome of project y falls short of expectations, the probability of meeting expectations with project y is 0. In that case, the manager chooses x for every value of r. The knife-edge case in which the high outcome of project y equals expectations, i.e. $V_y^H = E(x)$, occurs for $p_x^H = (V_y^H - V_x^L)/(V_x^H - V_x^L) \equiv \phi_1$.The value of r that makes the manager indifferent between the project, $\widehat{r}_m$, is given by:

$$\widehat{r}_m = \begin{cases} p_y^H \text{ if } p_x^H < \phi_1 \\ 0 \text{ if } p_x^H \geq \phi_1 \end{cases}, \tag{1}$$

and the manager chooses x whenever the private signal he receives is sufficiently high, that is, if $r \geq \widehat{r}_m$.

3.3 The shareholder

We are interested in the optimality of the manager's choices from the perspective of the shareholders. The actual threshold signal for which the manager chooses project x is given by $\widehat{r}_m$, but this generally does not coincide with the shareholders' interests. To see this, suppose that the shareholders could choose the threshold signal that the manager uses. Let this be given by $\widehat{r}_s$. Hence, the manager is asked to select project x whenever he receives a signal $r \geq \widehat{r}_s$. If the manager follows the request, the *ex ante* probability that project x will be selected *and* that a high outcome $V_x^H$is realized is given by $\int_{\widehat{r}}^1 rf(r)dr = .5(1-\widehat{r}_s^2)$, given the assumption of a uniform distribution f. Similarly, the probability that project x will be selected and that a low outcome $V_x^L$is realized equals $\int_{\widehat{r}_s}^1 (1-r)f(r)dr = .5(1-\widehat{r}_s)^2$. The probability that y is selected is given by $F(\widehat{r}_s) = \widehat{r}_s$, and hence the probability of either V_y^H or V_y^L respectively by $p_y^H\widehat{r}_s$ and $p_y^L\widehat{r}_s$. Hence, the shareholders' payoff for any given $\widehat{r}_s$ is:

$$.5(1-\widehat{r}_s^2)V_x^H + .5(1-\widehat{r}_s)^2V_x^L + p_y^H\widehat{r}_sV_y^H + p_y^L\widehat{r}_sV_y^L. \tag{2}$$

The optimal $\widehat{r}_s$ from the shareholders' viewpoint is $\widehat{r}_s^*$ with:

$$\widehat{r}_s^* = \frac{E(y) - V_x^L}{(V_x^H - V_x^L)}. \tag{3}$$

3.4 Basic comparison

Since the shareholders and the manager have different objectives, their preferred threshold levels $\widehat{r}_m$ and $\widehat{r}_s^*$ generally do not coincide. For some values of p_x^H (or other parameter values), the manager is more prone to the merger project than shareholders would be if they had the same information. For other values of p_x^H, it will be the opposite. We define a manager with a threshold $\widehat{r}_m$ that is higher

(lower) than $\widehat{r}_s$ as merger seeking (averse). Thus, a merger seeking (averse) manager opts for the merger for a larger (smaller) set of values of r than the shareholder would. Formally, let $\Omega(r,\, j)$ be the set of $r's$ for which agent j will merge, where $j \in S, M$ (shareholder, manager). Hence, let $\Omega(r, M) = \{r \mid r < \hat{r}, M\}$, and $\Omega(r, S) = \{r \mid r < \widehat{r}_s, S\}$.Then,

Definition 2 *A manager is merger seeking if* $\Omega(r, S) \subseteq \Omega(r, M)$ *and merger averse if* $\Omega(r, M) \subset \Omega(r, S)$.

With this definition, we obtain the following result. Let $p^* \equiv \frac{V_x^L - V_y^L}{V_y^H - V_y^L + V_x^L - V_x^H}$.

Proposition 3 *If (i)* $p_y^H \leq p^*$, *the manager is merger seeking if* $p_x^H \leq \phi_1$ *and merger averse if* $p_x^H > \phi_1$, *and (ii)* $p_y^H > p^*$, *the manager is always merger averse.*

Proof. For $p_x^H < \phi_1$,it is trivial to see that $\widehat{r}_s^* > \widehat{r}_m = 0$. For $p_x^H < \phi_1, \widehat{r}_s^* \leq \widehat{r}_m$ if $p_y^H \left[V_y^H - V_y^L + V_x^L - V_x^H\right] \leq V_x^L - V_y^L$. Since $E(x) > E(y) > V_y^L$, it follows that $V_y^H - V_x^H > p_x^H(V_x^H - V_x^L) > p_x^H(V_x^H - V_x^L) - E(x) + V_y^L = V_y^L - V_x^L$. We have thus established that the term in brackets must be positive, so the result in the proposition follows. ■

Intuitively, for low (high) shareholder expectations concerning project x, a merger is relatively likely to meet (fall short of) these expectations. Figure 1 illustrates the result. The solid line represents the manager's threshold level $\widehat{r}_m$, and the dotted lines the shareholders' preferred threshold level $\widehat{r}_s^*$ for different values of p_y^H. If p_y^H is high enough (such as $\widehat{r}_s^*(1)$), the shareholders' threshold is always higher than the manager's. Hence, for values of r between $\widehat{r}_m$ and $\widehat{r}_s^*$ the shareholders would prefer to merge but the manager doesn't. For sufficiently low p_y^H (such as $\widehat{r}_s^*(2)$), there is a region where the shareholders' threshold is below that of the manager's.

This first result establishes the possibility of a value-reducing merger by overvalued acquirers, as managers may opt for mergers with lower expected values than internal projects. This result fits Jensen's (2005) idea of agency

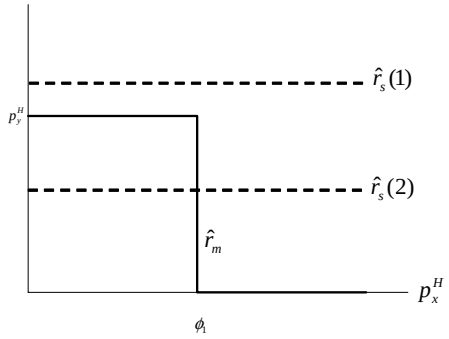

Figure 1: Expectations and the degree of merger seeking

costs of overvalued equity. We next consider two small extensions to the basic model.

3.5 Merger and expectations

It sometimes advanced that firms are more likely to merge if expectations by shareholders are high. Our simple framework of the previous section cannot account for this, and in fact predicts the opposite: managers become more risk averse for higher values of p_x^H. This, however, is only an artefact of project x having only two outcomes. With two outcomes, the probability of meeting expectations with project x is always given by r, independent of $E(x)$. Thus, higher expectations about the internal project do not make it more difficult to meet expectations. On the other hand, the probability of meeting expectations with project y is more difficult for high $E(x)$. Hence, project x is always favoured if expectations are high enough.

Things are different if we introduce a third outcome V_x^M to project x. For simplicity, y still has two outcomes. The manager again receives a private signal r, meaning that project x gives a high return V_x^H with probability r, a medium return with probability p_x^M, and a low return with probability $1 - r - p_x^M$. If

shareholders' expectations are above below V_x^M then the probability of meeting them is given by $r+p_x^M$. On the other hand, if expectations are above V_x^M, then the probability of meeting them is reduced to r. This is intuitive: if expectations about x are higher, project x is less likely to satisfy expectations.

There are two possible cases. Suppose first that $V_y^H < V_x^M$. This case is very similar to that of the previous section. Proposition 1 has a direct counterpart, with $\phi_1, \widehat{r}_m$ and p^* appropriately redefined. Specifically, ϕ_1 is now determined by $\phi_1' \equiv \frac{V_y^H - p_x^M(V_x^H - V_x^L) - V_x^L}{V_x^H - V_x^L}$, and the threshold signal is given by $\widehat{r}_m' = p_y^H - p_x^m$ if $p_x^H < \phi_1'$. As can be seen, $\phi_1^{'}$ and $\widehat{r}_m'$ reduce to ϕ_1 and $\widehat{r}_m$ for $p_x^M = 0$.

Now consider the more interesting case, where $V_y^H > V_x^M$. If $E(x) < V_y^H$, the probability of meeting expectations by choosing y is p_y^H. However, for x the probability is given by r or $r+p_x^M$, depending on whether $E(x)$ is above or below V_x^M, respectively. Higher expectations reduce the probability of meeting them if they cross the threshold level V_x^M, making merging more attractive. Define ϕ_1' as above and $\phi_2 \equiv \frac{V_y^H - p_x^M(V_x^H - V_x^L) - V_x^L}{V_x^H - V_x^L}$. The threshold values of r are:

$$\widehat{r}_m = \begin{cases} p_y^H - p_x^M & \text{if } p_x^H < \phi_2 \\ p_y^H & \text{if } \phi_2 < p_x^H < \phi_1' \\ 0 & \text{if } \phi_1' < p_x^H \end{cases} \tag{4}$$

We can also derive the optimal threshold level from the shareholders perspective, along the lines in the previous section. It is straightforward to derive that this is given by $\widehat{r}_s^{*\prime}$ with:

$$\widehat{r}_s^{*\prime} = \frac{E(y) - p_x^M V_x^M - (1 - p_x^M)V_x^L}{(V_x^H - V_x^L)}. \tag{5}$$

Figure 2 illustrates the result. Again several cases are possible, depending on the value of p_y^H. The figure illustrates the case where p_y^H is relatively small. The threshold of the shareholder is in that case below that of the manager, up to ϕ_1'. Moreover, the distance between the two thresholds is smaller between 0 and ϕ_2 than between ϕ_2 and ϕ_1'. Hence, between ϕ_2 and ϕ_1' there are more possible signals for which the manager opts for the merger whereas the shareholders

prefer not to. Define therefore the degree of merger seeking as the difference between the thresholds: $\widehat{r}_m - \widehat{r}_s$ (and merger aversion if this is negative).

Proposition 4 *Suppose $V_y^H > V_x^M$. (i) The manager is merger seeking if $p_x^H < \phi_2$ and merger averse if $p_x^H > \phi_2$. (ii) The degree of merger seeking is nonmonotonic with respect to p_x^H. As p_x^H increases, the degree of merger seeking first increases and then decreases.*

This is the main insight of the first extension. As expectations about the value of x increase, managers (shareholders) favour mergers more (less). Result (ii) of the proposition follows for the set of $r's$ for which they would make different choices (i.e. $|\widehat{r}_m - \widehat{r}_s|$).

This result enables the model to explain market-timing and merger waves, as the increase in shareholder expectations (overvaluation) drives merger activity. The model thus provides a complementary explanation to existing market-timing merger models (Shleifer and Vishny, 2003; Rhodes-Kropf and Viswanathan, 2004). However, in contrast to these models, our result is independent of the means of payment and can thus explain why overvaluation can also lead to an increase in cash mergers, as reported by Harford (2005).

3.6 Merger and risk

We return to the basic setting with two outcomes for project x. However, for project y, the outcome is now drawn from a continuous distribution F with density f. In order to focus on the risk of merging, rather than risk-return trade-offs, we compare distributions F_i that have the same mean but a different riskiness. Riskiness is measured according to the intuitive notion of elementary increase in risk, which implies second-order stochastic domination (see Mas-Colell et al, 1995).

Definition 5 *F_B constitutes an elementary increase in risk from F_A if (i) F_B and F_A have the same mean and (ii) there is an interval $[z_1, z_2]$ such that $f_B(z) \leq f_A(z)$ for all $z \in [z_1, z_2]$ and $f_B(z) \geq f_A(z)$ for all $z \notin [z_1, z_2]$.*

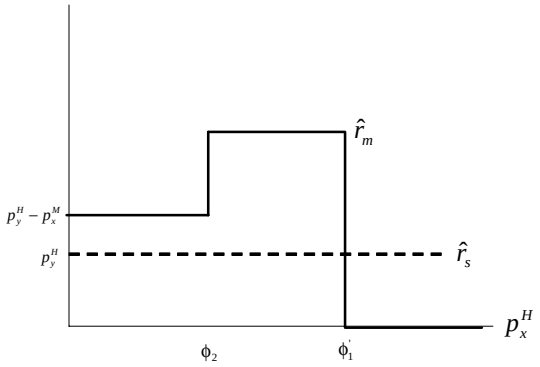

Figure 2: Nonmonotonicity in degree of merger seeking

Proposition 6 *Let F_B constitute an elementary increase in risk from F_A. Then there exists a $\tilde{z}$ such that if $E(X) > \tilde{z}$ the degree of merger seeking is higher under F_B than under F_A, and if $E(X) < \tilde{z}$ the degree of merger seeking is lower under F_B than under F_A.*

Proof. Let $z \in [a, b]$. Since F_A second order stochastically dominates F_B, it must be that for any z^*, $\int_a^{z^*} [F_B(z) - F_A(z)]\, dz \geq 0$. By the definition of elementary increase, it is easy to see that F_B and F_A can cross at most once on (a, b). Define $F_B(\tilde{z}) = F_A(\tilde{z})$. Clearly, $F_B > F_A \ \forall z < \tilde{z}$ and $F_B < F_A \ \forall z > \tilde{z}$. Suppose therefore that $E(X) > \tilde{z}$ then $1 - F_B(E(X)) > 1 - F_A(E(X))$. But this says that the probability of meeting the aspiration level is higher under F_B than under F_A, so faced with F_B, the manager will merge for a larger set of $r's$ than under F_A. Similarly for $E(X) < \tilde{z}$. ■

Thus, the manager is more likely to merge under F_B than under the less risky distribution F_A if shareholder expectations are sufficiently high. Riskier mergers may simply be the only chance left to fulfil shareholders' high expectations or optimism. This is consistent with the findings of Moeller (2005), who find that the majority of losses at the end of a merger wave was caused by very large

deals by acquirers with extremely high valuations.

4 Conclusion

Several explanations have been put forward in the literature to explain market-driven mergers. We propose a model that complements earlier market-timing theories by introducing the behaviorally appealing aspiration level to capture merger activity.

Our results show that shareholder expectations, captured as aspiration levels in stock prices, can motivate managers to favour mergers, even when the expected value of takeovers is lower than alternative investments. This merger seeking behavior increases in stock momentum, particularly in overvaluation. Also, managers opt for riskier mergers in order to meet shareholder optimism. In contrast to earlier predictions by market-timing models of Shleifer and Vishny (2003) or Rhodes-Kropf and Viswanathan (2004), the propositions in this paper are decoupled from equity as consideration and apply to all means of payment.

The model advances a coherent theoretical explanation of several empirical artefacts, like the lower performance of bidders with high valuations (Rau and Vermaelen, 1998; Dong et al., 2006; Moeller, 2005), stronger underperformance of mergers at the end of a wave (Moeller, 2005), and stock market driven mergers that are financed with cash or any other means of payment (Harford, 2005).

It is important to point out some limitations to our model. First, because we believe that individual decisions have predictive content for market behavior, we have focused on the decisions by managers. We modeled the manager's behavior as a decision problem, abstracting entirely away from all strategic interactions with other players. In reality, other market players such as the target firm, will react taking into account the motives behind the manager's decision. Secondly, in our model the manager is uniquely motivated by the aspiration level. In practice, managers will not be so insensitive to other factors, in part because

owners of firms will give other incentives than firing the manager in case of disappointing results. These simplifications are meant to convey the key ideas in the most transparent way possible. Nevertheless, we do believe that our results go through in a more general model. We leave that for future research.

5 Bibliography

Allais, M., (1953). "Fondements d'une Théorie Positive des Choix Comportant un Risque et Critique des Postulats et Axiomes de l'Ecole Américaine," Colloques Internationaux du Centre National de la Recherche Scientifique 40. Translated into English, with additions, as "The Foundations of a Positive Theory of Choice Involving Risk and a Criticism of the Postulates and Axioms of the American School," in M. Allais and O. Hagen, eds., Expected Utility Hypotheses and the Allais Paradox (Dordrecht: Reidel, 1979), 27-145.

Andrade, G., M. L. Mitchell, and E. Stafford (2001). "New Evidence and Perspectives on Mergers." Journal of Economic Perspectives 15(2), 103-120.

Ang, J. S. and Y. Cheng (2003). "Direct evidence on the market-driven acquisitions theory." The Journal of Financial Research XXIX(2): 199–216.

Arzac, E.R., V.S. Bawa (1977). "Portfolio choice and equilibrium in capital markets with safety-first investors," Journal of Financial Economics 4: 277-288.

Barberis, N., M. Huang, T. Santos (2001). "Prospect Theory and Asset Prices," Quarterly Journal of Economics 116:,1-53.

Barberis, N., M. Huang, R.H. Thaler (2006). "Individual Preferences, Monetary Gambles, and Stock Market Participation: a Case for Narrow Framing," American Economic Review 96 (4): 1069-1090.

Benartzi, S., R. H. Thaler (1995). "Myopic Loss Aversion and the Equity Premium Puzzle," Quarterly Journal of Economics 110: 73-92.

Camerer, C., M. Weber (1992). "Recent Developments in Modelling Preferences: Uncertainty and Ambiguity," Journal of Risk and Uncertainty 5: 325–370.

Diecidue, E., and J. van de Ven (2007). "Aspiration level, Probability of Suc-

cess and Failure, and Expected Utility." *Forthcoming*, International Economic Review.

Dodd, P. (1980) "Merger proposals, managerial discretion and stockholder wealth." Journal of Financial Economics (8), 105-138.

Dong, M., D. Hirshleifer, S. Richardson, S. H. Teoh (2006). "Does Investor Misvaluation Drive the Takeover Market?" The Journal of Finance LXI(2): 725-762.

Ellsberg, D. (1961). "Risk, Ambiguity and the Savage Axioms," Quarterly Journal of Economics75: 643–669.

Firth, M. (1980) "Takeovers, Shareholder Returns and the Theory of the Firm." Journal of Economics, 235-260.

Fishburn, P.C., (1977). "Mean-Risk Analysis with Risk Associated with Below-Target Returns," American Economic Review 67: 116-126.

Harford, J. (2005). "What drives merger waves?" Journal of Financial Economics 77: 529-560.

Ingersoll Jr., J.E., (1987). Theory of Financial Decision Making, Studies in Financial Economics. Rowman and Littlefield.

Jarrell, G. A., J. A. Brickley, and J. M. Netter (1988) "The market for corporate control: the empirical evidence since 1980." Journal of Economic Perspectives 2, 49-68.

Jensen, M.C. (1986) "Agency costs of free cash flow, corporate finance, and takeovers." American Economic Review 76(2), 323-329.

Jensen, M.C. (1988) "Takeovers: Their Causes and Consequences." Journal of Economic Perspectives 2, 21-48.

Jensen, M. C. (2005) "Agency Costs of Overvalued Equity." Financial Management 34(1).

Jensen, M. C. and R. S. Ruback (1983) "The market for corporate control: The scientific evidence." Journal of Financial Economics 11, 5-50.

Jensen, M. C. and W. H. Meckling (1976). "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure." Journal of Financial Economics 3(4), 305-360.

Jovanovic, B., and P. Rousseau (2002) "The Q-Theory Of Mergers." American Economic Review 92 (2), 198–204.

Laughhunn, D. J., J. W. Payne, R. Crum (1980). "Managerial risk preferences for below-target returns."Management Science 26(12): 1238-1249.

Lambert, R. (1986). "Executive Effort and Selection of Risky Projects" Rand Journal of Economics 17 (1): 77-88.

Lang, L., R. Stulz, and R. Walkling (1989). "Managerial Performance, Tobin's Q, and the Gains from Successful Tender Offers." Journal of Financial Economics 24 (1), 137-154.

Lant, T.K. (1992). "Aspiration Level Adaptation: An Empirical Exploration," Management Science, 38 (5): 623-644.

Lehn, K. M. and M. Zhao (2006). "CEO Turnover after Acquisitions: Are Bad Bidders Fired?" The Journal of Finance LXI(4): 1759-1811

Lopes, L.L., (1987). "Between Hope and Fear: The Psychology of Risk," Advances in Experimental Social Psychology 20: 255-295.

Lopes, L.L., (1996). "When Time is of the Essence: Averaging, Aspiration, and the Short Run," Organizational Behavior and Human Decision Processes 65: 179-189.

Lopes, L.L., G.C. Oden, (1999). "The Role of Aspiration Level in Risky Choice: A Comparison of Cumulative Prospect Theory and SP/A Theory," Journal of Mathematical Psychology 43:286-313.

Malmendier, U. and G. Tate (2008). "Who makes acquisitions? CEO overconfidence and the market's reaction" Forthcoming, Journal of Financial Economics

Mao, J. C. T. (1970). "Survey of Capital Budgeting: Theory and Practice." The Journal of Finance VII(1): 77-91

March, J.G. and Z. Shapira, (1987). "Managerial Perspectives on Risk and Risk Taking," Management Science 33: 1404-1418.

Mas-Colell, A., M. Whinston, and R. Green (1995), Microeconomic Theory, Oxford UP.

Markowitz, H.M., Portfolio Selection: the Efficient Diversification of Investments (New Haven: Yale UP, 1959).

Mezias, S.J. (1988). "Aspiration Level Effects: An Empirical Study," Journal of Economic Behavior and Organization, 10: 389-400.

Mezias, S.J., Chen Y.R. and P.R. Murphy, (2002). "Aspiration-Level Adaptation in an American Financial Services Organization: a Field Study," Management Science 48: 1285-1300.

Moeller, S. B., F. P. Schlingemann, R. M. Stulz (2005). "Wealth Destruction on a Massive Scale? A Study of Acquiring-Firm Returns in the Recent Merger Wave." The Journal of Finance LX(2): 757-782.

Myers, S. C. and N. S. Majluf (1984). "Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have." Journal of Financial Economics 13: 187-221.

Payne, J.W., (2005). "It is whether you win or lose: The importance of the overall probabilities of winning or losing in risky choice," Journal of Risk and Uncertainty 30: 5-19.

Payne J.W., D.J. Laughhunn and R. Crum, (1980). "Translation of Gambles and Aspiration Level Effects in Risky Choice Behavior," Management Science 26: 1039-1060.

Payne, J. W., Laughhunn, D. J., Crum, R. (1981). "Further tests of aspiration level effects in risky behavior." Management Science 27(8): 953-958.

Petty, J. and D. Scott, (1980): "Capital Budgeting Practicing in Large American Firms: A retrospective analysis and update," in: F. Derkinderen and R. Crum, eds., Financing Issues in Corporate Project Selection (Boston, Mass: Martinus Nyhoff, 1980).

Rau, P. R. and T. Vermaelen (1998). "Glamour, value and the post-acquisition performance of acquiring firms." Journal of Financial Economics 49: 223-253.

Rhodes-Kropf, M., D. Robinson, S. Viswanathan (2005). "Valuation Waves and Merger Activity: The Empirical Evidence." Journal of Financial Economics 77(3): 561-603.

Rhodes-Kropf, M. and S. Viswanathan (2004). "Market Valuation and

Merger Waves." Journal of Finance LIX: 2685-2718.

Roll, R. (1986). "The Hubris Hypothesis of Corporate Takeovers." Journal of Business 59, 197-216.

Roy, A., (1952). "Safety First and the Holding of Assets," Econometrica 20: 431-449.

Schlingemann, F. P. (2004). "Financing decisions and bidder gains." Journal of Corporate Finance 10: 683-701.

Schmidt, U., (2004): "Alternatives to Expected Utility: Some Formal Theories," in S. Barberà, P.J. Hammond and C. Seidl, Handbook of Utility Theory, Vol. 2, (Dordrecht: Kluwer Academic Publishers), 757-838.

Servaes, H. (1991). "Tobin's Q and the Gains from Takeovers." Journal of Finance 46 (1), 409-419.

Shleifer, A. and R. W. Vishny (2003). "Stock Market Driven Acquisitions." Journal of Financial Economics 70: 295-311.

Starmer, C., (2000). "Developments in Non-Expected Utility Theory: The Hunt for a Descriptive Theory of Choice under Risk," Journal of Economic Literature 38: 332–382.

Stutzer, M., (2003). "Portfolio choice with endogenous utility: a large deviations approach," Journal of Econometrics 116: 365-386.

von Neumann, J. and O. Morgenstern, Theory of Games and Economic Behavior (Princeton: Princeton University Press 1944, 1947, 1953).

Weston, Fred J., Mitchell, Mark L., Mulherin J. Harold, 2003. Takeovers, Restructuring, and Corporate Governance. Prentice Hall, 4th edition