

Hubris, Learning, and M&A Decisions: Empirical Evidence

by

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ABSTRACT

Recent empirical results have found a declining trend in the cumulative abnormal return (CAR) of acquiring firms during an M&A program. Should one conclude that CEOs undertaking M&As are infected by hubris and unable to learn? We first confirm the existence of this declining trend. However, we find a positive CAR trend for CEOs most likely to be infected by hubris and a negative (and significantly different) trend for likely rational CEOs. This supports the learning hypothesis and conforms to the theoretical analysis of Aktas *et al.* (2005). Moreover, the empirical evidence is broadly consistent with theoretical predictions about the implications of learning for the time between successive M&A deals. We conclude that CEO behavior reveals substantial learning during acquisition programs.

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The psychology literature stresses many shortcomings of rationality as a representation of human behavior. This has been recognized and studied by many economists (see, e.g., Akerlof and Yellen (1985), Haltiwanger and Waldman (1985), Camerer (1987)). Financial economics is no exception. Keynes (1936) stresses the importance of investor sentiment as a determinant of investment decisions. The equity premium puzzle (Mehra and Prescott (1985)), noise trading (Shiller (1984)), market overreaction (DeBondt and Thaler (1985)), just to quote a few, represent challenges to rationality. Each anomaly has generated heated debates, and has led to important developments (see, e.g., Constantinides (2002) concerning the equity premium puzzle). More recently, the behavioral approach has reached corporate finance. While Baker *et al.* (2006), in their review about behavioral corporate finance, quote 209 references, only 39 date from before 1990, among which probably less than 10 would be typically classified in corporate finance.

Indeed, corporate finance would seem to be a fruitful area for behavioral investigations. It usually avoids the intricacies of irrationality aggregation (Fehr and Tyran (2005)). As emphasized as early as Roll (1986), mergers and acquisitions (M&A) are a type of natural experiment. They are large decisions, publicly observable, involving important financial resources (and therefore requiring a huge commitment from decisions makers), where CEOs are known to play a central role. To test whether CEOs adopt rational behavior in the M&A setting should shed light on the fundamental behavior of economic agents.

Recent empirical papers have reported a clear declining trend in cumulative abnormal returns (CARs) of bidder firms during M&A programs. Fuller *et al.* (2002), analyzing 3,135 successful M&As during the nineties in the US, report an average bidder CAR of 2.74% for the first bid, declining to 0.52% for the fifth and successive bids. Similar results, some even more dramatic, are reported in Croci (2005), Billett and Qian (2005), Ismail (2005) and Conn *et al.* (2005) (the latter for the UK M&As). The question is no longer whether this result is real or robust (the empirical foundations of the above-cited papers are sound and we replicate here similar results). But how should this pattern be explained? Is the declining trend of the CAR from deal to deal a clear sign of growing hubris with successive deals? Or could it be consistent with rational learning by CEOs?¹ The question is important. Irrational CEOs would not only raise doubts

¹ Some of the above cited papers bear enlightening titles. Just to mention a few: “Are overconfident managers born or made? Evidence of self-attribution bias from frequent acquirers” (Billet and Quian (2005)), “Why must all good things come to an end? The performance of multiple acquirers” (Conn *et al.* (2005)), “Will multiple acquirers ever learn? The US evidence from single versus multiple acquirers” (Ismail (2005)).

about traditional models used to explain corporate behavior but would also raise questions about the corporate governance mechanisms leading to value-destroying outcomes.

Aktas *et al.* (2005) – ADR hereafter - develop a rational expectations model aimed at capturing the most salient traits one should observe in M&A programs. In their model, CEOs, when choosing a bid price, balance the risk of losing the deal (due to low premium) against the risk of being fired (by angry shareholders, reacting to the value destruction from a premium that is too high). The introduction of learning (as a Bayesian inference process based on market reactions to past deal announcements) and hubris (as either over-confidence or over-optimism (Malmendier and Tate (2004)) delivers a set of rich and specific predictions about CAR patterns and about the time between successive deals (DURATION) during M&A programs. In particular, the authors show that (1) a declining trend in the CAR is not sufficient to imply the existence of hubris, (2) DURATION should, due to learning, be decreasing for rational CEOs and increasing for hubris-infected CEOs and (3) endogenous sample selection biases may obscure ex-post empirical analyses. It should be stressed that CEO learning is not a purely theoretical proposition. For example, Bill Miller, CEO of Valchery, Inc (Forbes, 2005) observes “Directors are also asking companies to create a systematic method that will both capture what they’ve learned from their own acquisitions and apply those methods to future deals”.

This paper undertakes an empirical exploration of the learning and hubris hypotheses. Our aim is to describe the dominant traits of the US CEOs and to test the main empirical predictions developed in ADR. We study a sample of 2,589 individual CEOs, spanning the 1992-2002 period. Among them, 1,235 have not done any M&A deals and 1,424 have done at least one deal. The average number of deals by CEOs having done at least one is 3.28, which totals 4,677 deals in all. Beyond testing a specific theory, our empirical contributions are as follows:

- we focus on CEOs and not on firms as in Croci (2005) because we believe that CEOs’ play a central role in M&A decisions. Bertrand and Schoar (2003) stress the importance of individual managers in corporate decisions. Especially when dealing with hubris and learning, it seems sensible to focus on specific individual decision makers;
- we adapt our econometric methods to the natural panel structure of the data (tracking successive deals done by a given CEO).
- we investigate the determinants of DURATION, which is, to our knowledge, the first empirical evidence about this attribute of M&A programs;
- using a two-step procedure similar to Leschinskii and Zollo (2004) and Gaspar *et al.* (2005), we explicitly control for potential endogenous sample selection biases.

We first confirm the existence of a declining CAR pattern from deal to deal. Then, using the ADR model insights, we provide a set of new results. Univariate analyses show that:

- during M&A programs, average CEOs, firms and deal profiles change. This is not necessarily a surprise but is interesting to note and it confirms that repetitive acquirers are not the same as one time acquirers;
- on average the CAR declines from deal to deal. But, when splitting the sample between rational and hubris-infected CEOs (Section II explains the measure of hubris), clear differences appear. For hubris-infected CEOs, the CAR trend is not significant;
- as predicted by the ADR model under the learning hypothesis, DURATIONS decrease from deal to deal. Some behavioral differences also appear between rational and hubris-infected CEOs, but they are less pronounced for DURATION than for the CAR.

Multivariate analyses deliver two principal results:

- controlling for panel data and endogenous sample selection, while CARs decline on average during M&A programs, for hubris-infected CEOs, they increase. The difference between these CAR trends is statistically significant. This result is robust to the inclusion of many control variables and to alternative hubris proxies;
- DURATION decreases from deal to deal. This is true on average and for hubris-infected CEOs and is robust to the inclusion of many control variables. For hubris-infected CEOs however, the pace of DURATION decrease is significantly slower than for rational CEOs. We also uncover some interesting relations between CEOs remuneration and the evolution of DURATION.

Most of these results are compatible with the ADR model, under the learning hypothesis, after noting that even hubris-infected CEOs learn. In particular, the combination of a declining average CAR, an increasing CAR for hubris-infected CEOs, and a declining average DURATION, are direct predictions of the model. We do not find a DURATION increase for hubris-infected CEOs, as predicted by the model, but the significant difference of slope between rational and hubris-infected CEOs points in the right direction (especially taking into account the inherently noisy nature of our hubris proxies). Note also that, while a declining CAR might also be explained by a shrinking investment opportunity set (see Klasa and Stegemoller (2005)), a DURATION decrease is predicted only by the learning hypothesis. Overall, the results suggest that average CEO behavior is characterized by learning and that traces of learning seem to be present even when a CEO is infected by hubris.

In the first section of this paper, we present a short review of the arguments potentially explaining the CAR pattern from deal to deal in M&A programs and then summarize the main

testable implications of the ADR model. Section II describes our sample, variables and empirical methods. Section III is devoted to a preliminary set of univariate analyses while Section IV provides multivariate analyses. The final section provides a summary and conclusion.

I. M&A Programs and Value Creation

A. CAR Patterns during M&A Programs

Schipper and Thompson (1983) are probably among the first to emphasize the repetitive nature of acquisitions. They show that acquisition program announcements are value creating. This suggests that market reactions to subsequent deal announcements do not fully represent the value creation involved, but are merely revisions of previous investor anticipations.

Other contributions focus on CEO hubris as a key psychological factor in acquisitions. Referencing Roll (1986), Rau and Vermaelen (1998), Malmendier and Tate (2004), Moeller *et al.* (2005), among others, interpret empirical evidence as indicative of hubris (long term post acquisition under-performance, CEO behavior, value-destroying deals). Fuller *et al.* (2002), Croci (2005), Billett and Qian (2005), Ismail (2005) and Conn *et al.* (2005) all find a declining trend in the CAR during M&A programs. Table 1 summarizes their main results. This clear empirical regularity is interpreted as a sign of hubris, except by Croci (2005). Using performance persistence measures borrowed from the performance attribution literature, Croci shows that neither performance persistence (good deals following good deals) nor performance reversals (bad deals following good deals) are statistically significant. He concludes that CEOs seem neither to possess superior target picking skills nor to be systematically overconfident.

Klasa and Stegemoller (2005) present a new argument. They study the relation between growth opportunities and M&A sequences made by individual bidders. The central idea is that M&A sequences involve a time-varying investment opportunity set. The authors posit that M&A sequences begin subsequent to an expansion of this opportunity set and end when it is finally exhausted. The CAR trend observed ex-post would therefore reflect this time variation in the investment opportunity set and not hubris-infected behavior of CEOs. While the authors provide an empirical analysis supporting their argument, the proxies used to measure the investment opportunity set are not without ambiguities.

B. The ADR Model

Aktas *et al.* (2005) introduce a model specifically designed to understand the empirical implications of learning and hubris on M&A programs. The M&A market is viewed as an auction

market in which CEOs bid to buy targets. The model focuses on a risk-averse and under-diversified CEO deciding on a bid price for a particular target. Financial markets are efficient, the investment opportunity set is constant, and both corporate governance mechanisms and competition from rivals are taken as exogenous.

When deciding on a bid price, the CEO faces a conundrum: if the price is too low, the proposed takeover might not be successful, but if the price is too high, the CEO risks dismissal by shareholders disgruntled by the value destruction. Learning enters the model as a Bayesian inference process. Market reactions to past deals announcement are signals received by the CEO, helping him to better assess the potential synergies of targets. Hubris also is taken into account. It distorts the CEO's cognitive processes, being either excess optimism (over-estimation of expected synergies) or over-confidence (under-estimation of the uncertainty about potential synergies). Conditional on all of the above-mentioned influences on the CEO's bidding decision, ADR derive an optimal bid premium, which takes the following form:

$$\pi^* = \frac{1}{2} \frac{\hat{\mu}_{B,t} - \frac{\gamma}{2} (\hat{\mu}_{B,t})^2 - \frac{\gamma}{2} \hat{\sigma}_{B,t}^2}{\left(\hat{\mu}_{B,t} - \frac{\gamma}{2} (\hat{\mu}_{B,t})^2 - \frac{\gamma}{2} \hat{\sigma}_{B,t}^2 \right) + \left(\mu_L + \frac{\gamma}{2} \mu_L^2 + \frac{\gamma}{2} \sigma_L^2 \right)} \quad (1)$$

where:

- π^* stands for the optimal bid premium (in excess of the prevailing market price);
- μ_B and σ_B are the CEO's expected bonus in case of deal completion and its variance, respectively;
- μ_L and σ_L are the CEO's expected loss in case of being fired after the deal completion, and its corresponding variance;
- γ is the CEO's risk aversion coefficient;
- the hat symbol stands for CEO's perception and t is the deal sequence order number.

The optimal premium, π^* , is a positive function of the perceived risk adjusted bonus in case of deal completion and a negative function of the perceived risk adjusted loss (sanction) in case of being fired due to over-payment. CEO's perceptions about synergies are formed thanks to a Bayesian updating process:

$$\hat{\mu}_{s,t} = \frac{\frac{1}{h_\sigma \hat{\sigma}_{s,0}^2} h_\mu \hat{\mu}_{s,0} + \frac{1}{\sigma_v^2} \sum_{i=1}^{t-1} v_i}{\frac{1}{h_\sigma \hat{\sigma}_{s,0}^2} + (t-1) \frac{1}{\sigma_v^2}} \quad (2)$$

$$\frac{1}{\hat{\sigma}_{s,t}^2} = \frac{1}{h_\sigma \hat{\sigma}_{s,0}^2} + (t-1) \frac{1}{\sigma_v^2} \quad (3)$$

where:

- μ_s and σ_s are the expected synergies with the target and its variance ($\hat{\mu}_{s,0}$, $\hat{\sigma}_{s,0}$ are the CEO's priors and $\hat{\mu}_{s,t}$, $\hat{\sigma}_{s,t}$ are the CEO's perceptions at deal t);
- h_σ is the over-confidence coefficient ($0 < h_\sigma < 1$) and h_μ is the over-optimism coefficient ($h_\mu > 1$);
- the summation from i equal to one up to t minus one is the summation on previous deal announcements;
- v_t stands for the signals sent to the CEO (market reaction to previous deal announcements).

Note that synergies, perceptions, and bonuses are connected through the CEO's remuneration scheme (characterized by the presence of fixed and variable components). The ADR model delivers a rich set of empirical predictions about CAR evolution and DURATION during M&A programs. These are summarized at Figure 1. Panel A presents the results for rational CEOs. As the learning process is going on, rational CEOs improve their ability to forecast potential synergies with targets. Consequently, they bid more aggressively with each successive deal, increasing the offered premium. This increases the probability of doing deals (DURATION decreases) and increases the fraction of the value creation conceded to target shareholders (the bidder's CAR also decreases). These predictions are the consequence of the classical risk-return trade-off: the lower the uncertainty about future synergies, the lower the expected return. For hubris-infected CEOs (see Figure 1, Panel B), initial bids should be value destroying: they over-bid (either because of over-anticipation of potential synergies or because of under-perception of the associated risk). From deal to deal however, if CEOs survive (if they are not fired by their own shareholders), market reactions to past deal announcements provide them a lesson; (even infected with hubris, they learn at least something.) They progressively reduce value destruction (the CAR trend is positive), by reducing their aggressiveness in the bidding process. This should also lead to an increase in DURATION from deal to deal.

In summary, the ADR model predictions are as follows: for rational CEOs, the CAR and DURATION trends should both be negative throughout the implementation of the M&A program; for hubris-infected CEOs, the CAR and DURATION trends should both be positive. The aim of this paper is to test these empirical predictions.

Before proceeding to the empirical analysis, two points are worth emphasis:

- learning and hubris are not mutually exclusive. Hubris-infected CEOs may learn and rational CEOs may become infected by hubris.
- ex-post empirical analyses of M&As are subject to potentially serious endogenous sample selection biases. The *winner curse* phenomenon (we only observe ex-post auction winners) is pointed out in Roll (1986). The ADR model complements it with the *survival* bias (bad CEOs will be fired by their shareholders). Which one dominates (if either) is an open empirical question.

II. Data and Empirical Methods

A. Sample Constitution

To understand CEO behavior during M&A programs, we need to follow their successive decisions over an extended time period. Our sample of CEOs is extracted from Compustat ExecuComp. This database provides information about CEO compensation essential for testing predictions of the ADR model. The ExecuComp database starts in 1992. In order to observe the full history of each CEO's successive decisions, we therefore study only CEOs hired in 1992 and later. This amounts to 2,589 CEOs making decisions between 1992 and 2002. These 2,589 persons have been CEOs of 1,740 different firms. Some of them (70) have been CEOs of more than one firm. Our analysis focuses on '*CEO-Firm*' couples (a given CEO in a given firm), referenced hereafter under the generic term of CEO. Table 2 – Panel A presents the sample evolution through time. The sample increases through time and is already sizeable by the mid-nineties.

To identify the M&A operations undertaken by these CEOs, we rely on the Thomson SDC database. Since we want to control for an acquisition program effect (more on this in Section II.B), we collect deals beginning in 1990. Our deal selection criteria are as follows:

- US listed acquirers;
- all targets (US and non US, listed and non listed);
- completed deals;
- percentage of shares held before the deal less than 50%.

To provide comparisons with previously published results, we identify two samples: the '*Full Sample*', where we select all deals superior to one million USD, and the '*Big Sample*', where we select only deals superior to one hundred million USD. The '*Full Sample*' essentially mimics that used by Moeller *et al.* (2005). It is composed of 28,662 deals. The '*Big Sample*' is composed of

6,108 deals and is closer to Fuller *et al.* (2002) or Billett and Qian (2005). Table 2 – Panel B and C present their evolutions through time. The end of the nineties merger wave is clearly apparent in both samples (in the number of deals and in their aggregated value).

To construct the CEO's M&A decision history, we match the CEO sample with either the M&A '*Full Sample*' or '*Big Sample*', taking into account the CEO's period of activity reported by Compustat ExecuComp. Table 3 – Panel A describes the matched samples. For the '*Full Sample*' of M&As, 4,677 deals are matched to 1,424 CEOs. The average number of deals per CEO is 3.28. For 1,235 CEOs, no deal has been identified. For the '*Big Sample*', 2,021 are matched, 872 CEOs have done at least one deal (with an average of 2.32 deals per CEO) and 1,787 CEOs are classified as having done no deal. Table 3 – Panel B presents the number of CEOs having done at least a given number of deals. The results confirm that repetitive acquisitions are frequent (see Schipper and Thompson (1983)). Note that our M&A decision history reconstruction procedure possibly misses some deals since the Thomson SDC coverage is extensive but perhaps not exhaustive.

We complement information provided by Compustat ExecuComp and Thomson SDC using the CRSP and Compustat databases. Data availability limits our final sample sizes, depending on the control variables used in various tests. We therefore systematically report the exact number of observations in each computation.

B. Variable Definitions

Our main dependent variables are the cumulative abnormal returns (CARs) observed around the announcement date and the time between successive deals (DURATION).² To compute the CAR, we construct daily abnormal returns as in Fuller *et al.* (2002) and Moeller *et al.* (2004, 2005) using the Beta-one model, which subtracts the daily market portfolio return from the daily return of each company. We use the daily equal weighted CRSP index as a proxy for the market portfolio. The standard market model (or any model for which coefficients must be estimated) could be problematic due to the repetitive nature of the acquisition decisions. The event-window goes from day minus five to day plus five relative to the announcement date (the Thomson SDC announcement dates are known to be somewhat imprecise, which suggests that the event window should not be too narrow). When averaged to form a cumulative average abnormal return, CAAR,

² For the first deal, DURATION is the time between the CEO hiring date and the first deal announcement date.

we use equal weights. We have been able to compute the CAR for 25,845 out of the 28,662 deals composing our 'Full Sample' M&A universe. The average CAR is 1.6% (t-stat of 18.6) and its median is 0.5%. These results are in-line with recent papers focusing on exhaustive M&A samples (see Moeller *et al.* (2004)).

For multivariate analyses, our main independent variable is the deal sequence order number (SEQ), whose coefficient measures the slope of the analyzed dependent variable during the M&A program. A review of the existing literature has led us to include three categories of control variables. They are described in detail at Appendix 1. We present here a brief summary of them:

- CEO specific: we need the hiring and departure dates in order to determine the activity period. Compustat ExecuComp also provides CEO remuneration variables (annual base salary, the variable component of the salary in proportion to the base salary, shares holdings). These are important as controls because CEO remuneration is known to influence their decisions (see Hubbard and Palia (1995), Datta *et al.* (2001), Grinstein and Hribar (2004)). We also include the age (could be related to CEO risk aversion) and gender (for sheer curiosity).
- Deal specific: the announcement date (from Thomson SDC), the deal size (see among many others Moeller *et al.* (2005)), the percentage acquired and the toehold (see Schwert (2000), Betton and Eckbo (2004)), the payment method (see, e.g., Travlos (1987), Huang and Walkling (1987), Hansen (1987), Martin (1996), Faccio and Masulis (2005)), the attitude (hostile versus friendly deals, as reported by Thomson SDC) and the number of bidders (see Jensen and Ruback (1983)), the strategic fit between the bidder and the target (see among others Servaes (1996)), the target's private/public status (see Fuller *et al.* (2002)) and a proxy for the target's size (based on the percentage acquired and the deal size).³
- Firm specific: we control for a set of bidder characteristics, using insights from previous research. Specifically, we take into account the bidder's past performance (see Rau and Vermaelen (1998)), market anticipation effects (see Palepu (1986)), the acquisition program effect (see Schipper and Thompson (1983)), several variables to control for industry determinants, including the sector concentration, the number and value of transactions in the industry (see Mitchell and Mulherin (1996), Andrade and Stafford (2004) or Harford (2005)), the degree of acquirer's diversification (using information provided by the Compustat Segment database), the acquirer's size (see Moeller *et al.* (2004)) and several acquirer financial ratios

³ Note however that, since this proxy is based on the deal transaction price, it includes the premium paid by the bidder. This control variable has therefore been excluded from the set of CAR determinants, being clearly endogenous with respect to the market reaction around the deal announcement.

(cash-flow/total assets, leverage, free cash-flow, growth of assets, growth of sales, liquidity, market to book, price-earning, return on equity and Tobin's q).

Since a majority of targets are not listed firms, target controls are rather limited and, for unlisted targets, we cannot test the ADR model's prediction about takeover premiums.⁴

C. Methods

We will describe the details of our econometric methods in Section III (univariate analyses) and Section IV (multivariate analyses). However, it may be useful at this point to explain some generic choices underlying our empirical work.

C.1. Timing

Determinants of CEO behavior (base salary, variable component of the salary,...) are updated to their value at the end of the year before each acquisition; (their evolution could be due (at least partially) to the succession of deals (see Datta *et al.* (2001) and Rosen (2004)). Firm specific financial ratios and industry determinants are all estimated at the end of the year before the acquisition announcement (to avoid any feedback effects from acquisitions to these ratios).

C.2. Industry Classification

Instead of using the classical SIC industry codes, which is subject to considerable criticism (see Kahle and Walkling (1996)), we use the 48 Fama-French classifications, using the SIC to Industry Codes conversion table provided on the K. French Web site⁵ and the historical SIC codes provided in the CRSP Database. This brings some balance among the number of industries, the number of firms within each industry and the homogeneity of intra-industry economic activity. These are key concerns when controlling for industry related determinants of market reactions to M&A announcements.

C.3. Hubris Proxy

Finding a robust proxy for hubris is a real challenge. Because our empirical investigation is based on the ADR model, a good proxy should be close to the definition of hubris adopted in that

⁴ As shown in Officer (2005), trying to estimate premiums leads to a dramatic reduction in samples size.

⁵ http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

model. In Section I.B, when summarizing the salient features of the ADR model, hubris has been defined as a cognitive bias, leading either to over-optimism or over-confidence. The most direct consequence is an over-bidding behavior, leading to value destruction at the deal announcement for the bidder's shareholders. Our hubris proxy is built on this implication. We however know that a major determinant of acquirers' CAR is the target status (public versus private, see Fuller *et al.* (2002)). If we want to proxy for hubris, we have at least to control for this effect. So, our proxy, called the hubris index hereafter, is obtained using the following procedure:

- CEOs are split into two sub-samples, depending on the status of the target (public versus private) in their first acquisition (N_{pub} and N_{pr} are the number of CEOs in the public target sub-sample and the private target sub-sample, respectively);
- for each CEO, we compute the CAR observed at his first deal announcement;
- for each sub-sample, we rank the CEOs in decreasing order by the first deal CAR (r_i denotes the rank of the i th CEO);
- the hubris proxy, h_i , is then the CEO rank divided by the total number of CEOs in his sub-sample ($h_i = r_i / N_{pub}$ or $h_i = r_i / N_{priv}$);

The higher h_i , the lower the value of the CEO's first deal, hence the more likely the CEO is infected by hubris. While certainly indirect and noisy, this proxy has several advantages. As already mentioned, it is directly motivated by the ADR model. Built on rank statistics, it is robust to outliers and, being computed by sub-samples of target status, it controls for this important determinant of acquirers' CAR.

Let us finally note that:

- when we have to split our 'Full Sample' of observation between rational and hubris-infected CEOs (mainly for univariate analyses), we define a dummy variable taking value one if h_i is above 0.75. We refer to this dummy variable specification of h_i as the hubris index dummy variable;
- when we use the h_i variable (or its dummy version as a sub-sample splitting criteria), because this variable is constructed from the CEO's first deal CAR, we exclude that first deal from the set of observations. Observed trends of CAR and DURATION are then therefore between deal two and subsequent ones (see Section III).

C.4. Financial Ratios, Outliers and Statistical Tests

Financial ratios often have large outliers (especially when the book value of equities is the denominator). Moreover, for many of them, controlling for industry is essential (e.g., in the case

of debt and leverage ratios – see MacKay and Phillips (2005)). To mitigate these potential difficulties, we omit any ratio whose denominator is a negative book value of equities and any ratio more than two standard deviations from the mean. In the multivariate analyses, we use industry median adjusted values.

All reported p-values are from a bootstrap procedure. We use a percentile-t approach, based on case by case resampling (Efron and Tibshirani (1993)), which is known to converge faster than asymptotic counterparts (see Horowitz (2002)) and thus should perform better in small sub-samples.

C.5. The Acquisition Program Effect

Since Schipper and Thomson (1983), we have known that initial announcements of acquisition programs generate higher CARs than successive deal announcements; hence, we control for an acquisition program effect in the multivariate analyses. This is accomplished by including a dummy variable taking value one if no deal has been announced by the firm in the two previous years. As we are interested in evolution of CAR and DURATION throughout acquisition programs, controlling for this effect is of prime importance.

III. Univariate Analyses

Our univariate analyses are presented in three tables. Table 4 focuses on the evolution of bidder (CEO and firm) and deal characteristics through M&A programs. Table 5 is dedicated to the CAR's behavior and Table 6 to DURATION (time between deals). The univariate analyses extend through as many as seven acquisitions. This provides uniformity with the later multivariate analyses (Section IV). As showed in Table 3, sample sizes become quite small from that point and are insufficient for most multivariate tests.

When interpreting univariate results, keep in mind the mix of cross-section and the time series. For example, a negative trend in a given ratio from deal to deal could be due either to a general trend characterizing all CEOs or a difference between CEOs doing few and many deals (or both). The issue is resolved with a panel data analyses in Section IV. At this stage, just keep in mind the potential ambiguity.

To summarize the key results, we will focus on the slope coefficients of each variable. These are obtained by a pooled regression of each variable on the deal sequence order number (SEQ). Slope coefficients provide therefore an indication of the average trend through a succession of deals.

As a robustness check, we present also results where observations at each deal sequence order number are by CEOs having done exactly (instead of at least) this many deals. This attenuates any possible overlap between successive deals, which could conceivably represent a source of statistical biases.

A. Bidder and Deal Characteristics from Deal to Deal

Table 4 – Panel A shows that CEO base salary increases significantly from deal to deal (a result also reported by Datta *et al.* (2001) and Rosen (2004)). This is, perhaps, evidence of the usual relation between CEO salary and firm size. There is no significant increase in the variable components (Interest and Holding). As we are dealing with ratios scaled either by the total compensation or the size of the company, this may hide a significant increase in the variable components of the remuneration in dollar value. Industry concentration measures do not display a systematic behavior through successive deals. The industry number (and value) of deals increase. This is probably due to the end of nineties merger waves (the higher the deal sequence order number, the higher the probability that the deal did take place in the late nineties). The acquirer segments concentrations decrease and the number of segments increases, which clearly indicates that repetitive acquirers, on average, tend to diversify their activities. The increase in total assets (measured in logs) is intuitively plausible. The asset and sales based growth rates indicate the size increase happens at an increasing rate (the average size is a convex function of the deal sequence order number) from deal to deal, this result being marginally significant concerning the sales based measure. The acquirer liquidity decreases from deal to deal.

Table 4- Panel B describes the evolution of deal features. The percentage acquired increases significantly (from 89% to more than 95%) so does the deal size, almost doubling on average. This is consistent with learning: CEOs could begin with smaller deals to learn the basics and then, when feeling more knowledgeable, they might risk bigger acquisitions. The number of rivals significantly decreases: CEOs seems to be more and more able to deter competition (or else bigger deals attract fewer competitors); the effect is statistically significant but it's very small.

B. CAR from Deal to Deal

Table 5 explores the behavior of CAR from deal to deal. Panel A give results for the '*Full Sample*'. In the '*At Least*' sub-panel (i.e., at least this many deals), the CAR slope is negative and (marginally) significant. However, when controlling for the overlap between successive deals (in

the *'Exactly'* sub-panel), the negative slope is not at all significant. This may be due either to the material sample size reduction (from 160 observations at the 7th deal for the *'At Least'* procedure to 44 for the *'Exactly'* one) or a spurious correlation created by the overlap between successive deals. By adopting a panel data approach, we will be able to explore this more deeply in Section IV. The *'Big Sample'* results, presented in Panel B, show a similar pattern, though the negative slope appears to be more significant, particularly taking into account the very small number of observations at the 7th deal in the *'Exactly'* case. Note also the presence of a strong outlier in this particular case (as revealed by the huge difference between the median and the mean CAR).

Are the CAR slopes different between rational and hubris-infected CEOs? Panel C of Table 5 explores this issue. For rational CEOs, the slope is negative and clearly significant. For hubris-infected CEOs, the slope is positive and not significantly different from zero. Remembering that the ADR model predicts a negative slope for rational CEOs and positive one for hubris-infected CEOs and given the noisy nature of our hubris variable, this result is somewhat encouraging. Remember too that this result does not take into account the first deal in the sequence. Is the difference of slopes significant? Is it robust to the inclusion of control variables and potential sample selection biases? The multivariate analyses developed into Section IV will attempt to answer these questions.

C. DURATION from Deal to Deal

Table 6 presents univariate results about DURATION, which is clearly and strongly decreasing across deals. In Panel A, for the *'Full Sample'*, the mean DURATION between two deals goes from 358 days (between the first and second deal) to 179 (between the 6th and 7th deals). From the beginning to the end, CEOs do deals twice as fast. This negative slope is highly significant for the *'At Least'* and *'Exactly'* approaches. In Panel B, for the *'Big Sample'*, we see that the slope loses its significance for the *'Exactly'* approach but this is due to some outliers at the end of the deal sequence (the sample size is very small, with 6 observations, and the median DURATION jumps to 379 days). Panel C focuses on the rational CEOs and hubris-infected CEOs sub-samples. The slope coefficient seems to be marginally less negative (by a factor of 10%) for the latter sub-sample. The ADR model predicts a negative slope for rational CEOs and positive slope for hubris-infected CEOs. Taking into account the noisy nature of the hubris proxy, two conclusions seem justified:

- the DURATION decrease for rational CEOs supports directly the learning hypothesis;

- the difference of slopes between rational CEOs and hubris-infected CEOs may or may not provide some indirect support to the learning hypothesis, depending on its statistical significance. We test this further in Section IV.

From the results thus far, it appears that the *'Full Sample'* and the *'Big Sample'* are comparable. Consequently, for parsimony we present henceforth only results on the *'Full Sample'*, which has the advantage of larger sample sizes. Also, since that initially doing small deals may be a way to learn, we might be losing pertinent information by excluding them.

IV. Multivariate Analyses

This section analyses determinants of the CAR and the DURATION from deal to deal, focusing on the role of the deal sequence order number. All results are presented without and with control variables to lessen the possibility of spurious conclusions (for example, potentially driven by collinearity among control variables).

A. The CAR from Deal to Deal

A.1. Econometric Methodology

A multivariate explanation of the CAR raises several econometric challenges. CARs are quite noisy (the typical R^2 of CAR regressions range from less than 1% to 6 or 7% (see, e.g., Moeller *et al.* (2005))). We must also deal with the panel structure of the data and with the potential endogenous sample selection biases pointed out in Section I.B. Panels A, B, and C of Table 7 progressively tackle these problems. Panel A of Table 7 presents a first cut using a simple regression of the CAR on the deal sequence order number, without and with control variables; Panel B, after having conducted a Hausman specification test (the results of which are reported at the end of the Panel), presents corresponding results using a fixed panel data estimator; Panel C controls for both the panel data nature of the sample and for the potential sample selection biases using the two-step instrumental variable approach suggested in Wooldridge (2001)⁶, also used in Leschinskii and Zollo (2004) and Gaspar *et al.* (2005). The first step constructs an instrument using a Probit model proxying for the probability of being included in the sample. This Probit model is re-estimated from deal to deal; (later, Table 8 will present the first Probit estimation forecasting the probability of doing exactly one deal). The probability of inclusion is then used in

⁶ We use the approach described at Section 17.7.3, which deals with endogenous attrition.

the CAR regression; (this is known as the Heckman lambda). The CAR regression is calculated after first differencing in order to obtain the fixed effect estimator.

A.2. Results

The results in Panel A, without control variables, confirm the CAR univariate results (see Table 5): the CAR trend is negative from deal to deal. As apparent in Panel B, using a fixed effect estimator, which focuses on the time series dimension, reinforces this result. However, inclusion of control variable strongly impacts this result: the deal sequence order number coefficient becomes insignificantly different from zero (and either slightly positive or negative, depending on the Panel). Unreported results shows that the inclusion of any one of the following control variables is sufficient to remove the statistical significance of the CAR trend: Acquirer Market Value, Acquirer Industry Adjusted Tobin's q, Acquirer Industry Adjusted Free Cash-Flow, Acquirer Industry Adjusted Leverage, Acquirer Industry Adjusted Price Earning, Acquirer Industry Adjusted ROE, Acquirer Long Term Past CAR, Acquirer Segment Concentration and the Acquisition Program Dummy. This last variable is particularly worthy of noting: taking account of an acquisition program is sufficient to remove a negative CAR trend. The clear message sent by Panels A and B is that the CAR's negative trend from deal to deal, when estimated with all CEOs jointly, is a by product of the changing sample of CEOs, firms and deals characteristics in successive deals.

Some comments on the control variables:

- only one control variable is statistically significant with a stable coefficient between Panel A and Panel B: the runup (the anticipation effect observed in the 30 days preceding the event window, which has a negative effect, as expected);
- one control variable is significant in both panels but changes sign: the Acquirer Long Term Past CAR. For the pooled analysis, it has a positive sign, which switches to negative with the fixed effect estimation; (the same sign is obtained in Panel C, which controls for both endogenous selection bias and fixed effects). The fixed effect estimator is essentially determined by the time series pattern. A negative sign means that high past performing acquirers create less value in successive deals (and vice-versa). This is reminiscent of a mean reversion. When taking into account the cross-sectional dimension (with pooled estimation), the coefficient becomes positive. Despite the mean reversion, high past performers, on average, undertake better acquisitions than low past performing acquirers. This is reminiscent of momentum. Overall,

these results illustrate the importance of accounting for the panel data nature of the sample of repetitive acquisitions;

- the fixed effect estimator (Panel B) confirms other results (obtained in the cross-section): past good performers create less value (see Rau and Vermaelen (1998)), deals realized by bidders from active industries (Industry Number of Deals) are more value creating, cash deals create more value (see Travlos (1987)) and a higher anticipations (runup) reduces the observed CAR around the announcement date.

Before turning to Panel C's implications about sample selection bias, please take a look at Table 8. It reports results from a Probit model where the dependent variable takes value one if the CEO has done exactly one deal. Explanatory variables include characteristics of CEOs, bidder firms and industry.⁷ The model itself is highly significant. Thus, it makes sense to use the fitted probability of doing a deal to control for sample selection bias;

- the coefficient of Interest is negative and significant. This is at first sight somewhat surprising. Because Interest represents a variable component of the CEO's salary, so one might have predicted that more financially motivated CEOs would have been more willing to participate to the M&A market. Remembering, however, that all control variables are estimated prior to the deal attempt, the result could indicate risk aversion; i.e., CEOs with a lot to lose are less willing to make a risky (to them) takeover attempt;
- the larger the CEO's firm, the higher the probability of the deal, an expected result;
- CEO's hired by firms having already done deals in the past are more prone to do deal;
- higher M&A activity in the acquirer's industry during the preceding year is associated with a lower probability of doing the deal. This could signify the end of an M&A wave, or perhaps exhaustion of investment opportunities (Klasa and Stegemoller (2005));
- high industry average total assets reduces the deal probability. Competitors are bigger and horizontal M&A activity is less likely;
- high industry average cash flow increases the deal probability. Either this variable is correlated with the acquirer's cash-flow or buying targets with a high cash-flow stimulates the temptation to acquire;

⁷Industry characteristics are difficult to interpret because they can proxy either for average target profiles within industries (knowing that a large proportion of M&A deals are horizontal combinations) or they correlate with bidder features.

- CEOs active in growing industries, as measured by the industry sales based growth rate, are also more tempted to enter into the M&A market. It might be due to the fact they are heading healthier firm or to the fact that they are operating in industries with more attractive targets;
- high average industry leverage reduces the deal probability. This result makes sense if industry leverages proxy for the typical bidder's characteristics: highly leveraged firms meet difficulties to finance acquisitions;
- high industry Tobin's q reduces also the deal probability. A high Tobin's q signal both high growth prospects and high market valorization. As we already control for the bidder Tobin's q, this result probably signify that bidders operating in highly valued industries are less likely to do deal.

Turning back now to Table 7 – Panel C, the deal sequence order number coefficient is again negative (without and with control variables) but no longer significant (in contrast with the fixed effect results presented in Panel B, in the absence of control variables). Concerning the control variables, most are similar to those in Panel B: the Acquirer Long Term Past CAR coefficient is negative and highly significant, the Acquirer Segment Concentration is positive (and marginally significant), the Acquirer Industry Number of Deals in Year minus one is positive and significant, the runup is negative and significant, cash deals create significantly more value, as do the acquisition of private targets (in this last case, the result becomes significant in Panel C). Notice also that the Heckman Lambda variable, which controls for the potential sample attrition bias, is not significant. Endogenous sample selection seems not to be a major concern here (except for the deal sequence order number's significance). One possibility is that the *winner curse* and *survival* biases cancel each other out.

Table 7 – Panel D explores the effects of hubris on the CAR behavior from deal to deal. The first two columns use the hubris index dummy variable and the two last ones use the hubris index rank based variable (see Section III.C). Without and with control variables, in both case the coefficient of the interaction variable between the deal sequence order number and the hubris index is clearly positive and significant. Note also that, in each case, the value of the coefficient is higher than the absolute value of the deal sequence order number variable. This means that, while on average CARs are negatively trending from deal to deal for rational CEOs, for hubris-infected CEOs, they are positively trending; and this difference is statistically significant. These results strongly support the ADR model's predictions. Note finally that, in both specifications, most of the control variables identified as significant in Panel C (Acquirer's Long Term Past CAR, Segment Concentration, and Industry Number of Deals in Year minus one, plus Public Target, Cash Deal and Runup) retain their signs and statistical significance.

B. DURATION from Deal to Deal

B.1. Econometric Methods

The DURATION variable is a discrete variable, taking only positive values. This is typically called a count data variable in the econometric literature. We therefore employ count data models to explore its behavior in a multivariate setting, selecting a classical Poisson specification (see Wooldridge (2001), Section 19.2). Note that DURATION is measured as the months elapsed between successive acquisitions

To accommodate the panel data structure of the sample, we extend the basic Poisson specification to the fixed effect Poisson estimator introduced by Hausman *et al.* (1984) (see Wooldridge (2001), Section 19.6.4). Estimation is by conditional maximum likelihood. Concerning inference, unreported results (using, among others, a negative binomial model) indicates that we are faced with an over-dispersion problem, so reported p-values are bootstrapped (they give the same qualitative inferences as the robust p-values suggested in Wooldridge (2001), equation 19.24). Note finally that we do not control here for an endogenous sample selection biases. While the previous results for the CAR involve an auction process, potentially leading to endogenous sample attrition, DURATION is more closely related to CEOs decisions. Consequently, there is less reason to suspect endogeneity with the determinants or the sample selection process.

B.2. Results

Table 9 – Panel A presents the results using the pooled estimator and the fixed effects estimator, without and with control variables. In each case, the deal sequence order number coefficient is negative and strongly significant. This confirms the univariate results (Section III.C): the average delay between successive acquisitions is strongly decreasing. Seven control variables are significant with both estimators:

- bidders with high industry adjusted return on equity tend to do deals at a slower rate, suggesting that profitable companies take more time before entering into an M&A process;
- the higher the acquirer's industry concentration (measured using Industry Assets Based HHI), the lower the delay between acquisitions, as if repetitive acquirers in concentrated industries are in a hurry to buy remaining targets;
- the higher the CEO's base salary, the longer the time between successive acquisitions, which is understandable for risk averse CEOs;

- the higher the CEO's variable component of the compensation (Interest), the lower the delay between acquisitions, suggesting that bidders with high incentives are doing deals at a faster rate;
- the positive coefficient of the Hostility variable shows that CEOs take more time to prepare and announce hostile deals (note that this variable is marginally significant with the pooled estimator approach);
- the significant positive coefficient of Acquisition Program (Dummy variable: 1 for Bidder having not realized any operation in the past previous 24 months, 0 otherwise) shows, in particular, that a CEO hired by a firm having done deals in the two last year will do deals more quickly compared to CEOs hired by companies that have not done M&A deal in the previous 2-year period (keeping in mind that for the first deal, DURATION is the time between the CEO hiring date and the first deal announcement date);
- the higher the runup, the higher the delay between acquisitions, which is compatible with rumor and market anticipation effects for long negotiated deals.

We note also that the variable Long Term Past CAR is significant in both panel but changes of sign. In Panel A, which takes into account the cross-sectional dimension of the data, the coefficient is positive: past good performers tend to take more time to do deal. This is in accordance with the result obtained for the industry adjusted return on equity. However, when focusing on the time series dimension of the acquirer behavior, the sign reverses. One possible explanation is the impact of past deals on the long term past CAR, as we know since Table 5 that there is clear declining trend in the CAR from deal to deal.

Differences between rational CEOs and hubris-infected CEOs are explored in Panels B and C. Since the pooled and the fixed effect Poisson estimators lead to the same inferences in Panel A, for parsimony in B and C, we present only results using the pooled estimator. For rational CEOs (Panel B) the coefficient of deal sequence order number is negative and significant, with or without control variables. For hubris-infected CEOs, this coefficient is also negative for both specifications. Control variables themselves have similar patterns in the two sub-samples (except for Interest and Hostility).

To test for the difference between rational and hubris-infected CEOs, Panel C introduces a cross-product between the deal sequence order number and hubris. Results are reported without and with control variables and with two definition of hubris (hubris index dummy and hubris index rank, as described in Section II.C). The coefficient of this interaction variable is always positive and, in three cases out of four, significant. CEO's base salary and interest are highly

significant in Panel C. The negative sign of Interest shows that financially motivated CEO's, after controlling for their potential hubris, do acquisitions at a faster rate. This suggests an interaction between CEO remuneration and CEO behavior and confirms some results of Rosen (2004). Removing the CEO remuneration variables restores a highly significant positive coefficient for the hubris interaction variable (see columns 3 and 6 of Panel C). The cross-product variable coefficient is lower than the absolute value of the deal sequence order number in five of the six estimations: the delay between acquisitions decreases on average for rational CEOs and for hubris-infected CEOs but the pace is slower for the latter. The hubris index variable is always negative but is significant in only three cases (see columns 3,4 and 6). If negative sign is meaningful, it implies that while hubris-infected CEOs do not accelerate acquisitions as much as rational CEOs, they acquire at a faster rate on average.

These results do not support the ADR model as much as the CAR results in Section IV.A. Specifically, DURATION for hubris-infected CEOs does not increase. Still the interactions between hubris, learning and DURATION and the difference in slope between rational and hubris-infected CEOs all point towards learning.

V. Conclusion

At the end of the nineties M&A wave, the aggregate deal value of year 2000 transactions initiated by US bidders reached 1.1 Trillion USD. With a NYSE, AMEX, and NASDAQ total market capitalization around 15.5 Trillion USD at the end of the same year, acquisitions aggregated to roughly 7% of total market capitalization. Might such a huge economic restructuring process be led by hubris-infected CEOs as suggested by recent empirical evidence? Fuller *et al.* (2002), Croci (2005), Billett and Qian (2005), Ismail (2005) and Conn *et al.* (2005) find a clear declining trend of in bidders' CARs from deal to deal. For the most part, they offer hubris as an explanation.

Are typical US CEOs infected by hubris? The question is important, not only because of their potential to reduce resource allocation efficiency through acquisitions. How could the corporate governance mechanisms in-place offer little protection against such a deviance? And, almost as important, why would important economic decision makers be so prone to irrationality?

But the facts are there: bidders' CAR do decline from deal to deal (we confirm this result and there is no reason to suspect any weaknesses in the above-cited papers).

The empirical evidence is unambiguous, but how should it be interpreted? Aktas *et al.* (2005) (ADR) model the CEO M&A decision making process, trying to understand what one should empirically observe ex-post. Combining rationality, hubris, and learning, they reach three main conclusions. First, if rational CEOs are learning, which seems plausible, they become more aggressive with experience in bidding. Consequently, in successive acquisitions, they concede an ever larger fraction of synergies to target shareholders; this implies that bidder CARs should decline from deal to deal. Hubris-infected CEOs, however, receiving negative feedback from investors about their excessive previous bids, should become more cautious. This suggests an increasing trend in the CAR from deal to deal.

As rational CEOs become more aggressive in the bidding process, the probability of winning the takeover auction increases and the time between successive deals durations should decrease. The reverse is expected for hubris-infected CEOs.

Using information provided by Compustat ExecuComp, we study the behavior of 2,589 individual CEOs during the 1992-2002 period. The Thomson SDC database identifies 4,677 acquisitions made by 1,424 of them. A proxy for hubris is developed. It is, based on the CAR observed around the very first deal done by a particular CEO.

Key results are the following:

- on average, observed CARs indeed decline from deal to deal. But the cross-sectional characteristics of bidders, CEOs and deal change within the sample of all acquisitions. So the CARs observed for, say the fourth acquisition done by all CEOs who do four is not from the same population as the CARs from the third acquisition;
- for rational CEOs, CARs decrease in successive acquisitions and the trend is statistically significant. For hubris-infected CEOs, CARs increase and the difference in trend between rational and hubris-infected is statistically significant. This result is consistent with the predictions of the ADR model;
- endogenous sample selection biases can be controlled with a two-step Heckman procedure but they do not appear to represent a material problem as the results are similar to those obtained with simpler methods.
- on average, the interval between successive acquisitions declines over time, as predicted by the ADR model for rational CEOs who learn. This pattern is more pronounced for rational CEOs than for hubris-infected CEOs and the difference is statistically significant. Taking into account the noisy nature of the hubris proxy, hubris-infected CEOs also learn, but at a slower pace.

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Appendix

Variable	Description
Panel A. Key variables	
CAR	Bidder's announcement 11-day cumulative abnormal return. The abnormal return is calculated using the Beta-One model, which subtracts the daily market portfolio return (equal weighted CRSP index) from the daily return of the bidder.
DURATION	For the first deal, DURATION is the time (either in days or months) between the CEO hiring date and the first deal announcement date. For subsequent deals, it is the time between successive deals.
SEQ	The deal sequence order number in a M&A program for a given <i>CEO-firm</i> couple. SEQ is zero for firms having done no deal.
Hubris Score - Rank	It corresponds to the hubris proxy (h_i) computed using the rank method described in Section II.C.3. The higher h_i , the lower the bidder's CAR in the CEO's first deal, hence the more likely the CEO is hubris-infected.
Hubris Score - 25%	It corresponds to the dummy version of the hubris proxy; one if the hubris proxy h_i is above 0.75, and zero otherwise.
Lambda	It corresponds to the Heckman lambda, obtained from a Probit model of the probability of being included in the <i>CEO-firm</i> sample (see Table VIII). The Probit model is re-estimated from deal to deal.
Panel B. CEO characteristics (Source: ExecuComp)	
Salary	The dollar value of the base salary earned by the CEO during the fiscal year.
Interest	The variable component of CEO compensation. It corresponds to the sum of the aggregate value of stock options (BLK_VALUE) and the value of restricted stock (RSTKGRNT) granted to the CEO, divided by total compensation (TDC2).
Holding	The aggregate number of shares held by the CEO as a % of the total shares outstanding.
Age	The age of the CEO at the hiring date.
Gender	Dummy variable: 1 for male CEOs, and 0 for female CEOs.
Panel C. Firm characteristics (Source: CRSP, Compustat, Compustat Segment Database and ExecuComp)	
Long Term Past CAR	24-month cumulative abnormal return (from month -27 to month -4, relative to the announcement date).
Segment Concentration	Concentration of activities computed using a <u>Herfindahl-Hirschman Index</u> on sales repartition by activity segments.
Number of Segments	The number of activity segments reported in the Compustat Segment database.
Total Assets	Log of book value of total assets (item 6).
Cash Flow	Income before extraordinary items (item 18)+depreciation and amortization (item 14), scaled by the book value of total assets (item 6).
Free Cash Flow	Operating income before depreciation (item 13)-interest expense (item 15)-income taxes (item 16)-capital expenditures (item 128), scaled by the book value of total assets (item 6).
Asset Based Growth Rate	Total Assets at the end of year $t-1$ minus Total Assets at the end of year $t-2$, scaled by the Total Assets at the end of year $t-2$.
Sales Based Growth Rate	Sales at the end of year $t-1$ minus Sales at the end of year $t-2$, scaled by the Sales at the end of year $t-2$.
Leverage	Book value of debt (item 34+item 9) over market value of total assets (item 6-item 60+(item 25*Item 199)).
Liquidity	Current assets (item 4)-current liabilities (item 5), scaled by the book value of total assets (item6).
Market to Book	Market value of equity (item 24*item 25) divided by the book value of total common equity (item 60).
Price Earning	Closing stock price at the end of the fiscal year (item 199) over earnings per share (item

	58).
ROE	Return on equity, which corresponds to the adjusted income before extraordinary items (item 20) over book value of total common equity (item 60).
Tobin's q	Market value of assets over book value of assets: (item 6-item 60+item 25*item 199)/item 6.
Market Value	Number of shares outstanding multiplied by the stock price one month prior to the announcement date.
Acquisition Program	Dummy variable: 1 for a Bidder having made no acquisitions in the past previous 24 months, 0 otherwise.
Runup	Bidder's 30-day cumulative abnormal return during the period (-35,-6), relative to the announcement date.
Number of deals already done by the firm	The number of M&A deals done by the firm in the 2-year period preceding the CEO hiring date.

Panel D. Bidder's industry characteristics using the 48 Fama-French industry classifications

Industry Assets Based HHI	Industry Herfindahl-Hirschman concentration Index using total assets (item 6). The HHI is computed using all COMPUSTAT firms in the industry with valid data on total assets (item 6).
Industry Market Value Based HHI	Industry Herfindhal Index using market value of equities.
Industry Sales Based HHI	Industry Herfindhal Index using total sales.
Industry Number of Deals (year -1)	The number of deals in the bidder's industry the year before the deal announcement.
Industry Value of Deals (year - 1)	Aggregated value of deals in the bidder's industry the year before the deal announcement.
Industry Total Assets	Median total assets (log of book value) in the industry.
Industry Cash Flow	Median cash flow in the industry.
Industry Debt Ratio	Median debt ratio in the industry.
Industry Sales Based Growth Rate	Median sales based growth rate in the industry.
Industry Leverage	Median leverage in the industry.
Industry Market to Book	Median market to book ratio in the industry.
Industry Tobin's q	Median Tobin's q ratio in the industry.

Panel E. Deal characteristics

Toehold	Percentage held by the bidder before the transaction.
Percentage Acquired	Percentage acquired by the bidder.
Deal Size	Size of the deal (in million USD).
Target Size	Estimate of the target size using 'Deal Size' and 'Percentage Acquired': ((Deal Size*100%)/Percentage Acquired).
Number of Rival bidders	Number of rival bidders reported by SDC.
Hostility	Dummy variable: 1 for hostile deals, 0 otherwise.
Cash	Dummy variable: 1 for purely cash-financed deals, 0 otherwise.
Strategic Fit	Dummy variable: 1 when the bidder and the target are from the same Fama-French industry, 0 otherwise.
Private Target	Dummy variable: 1 for private targets, 0 otherwise.

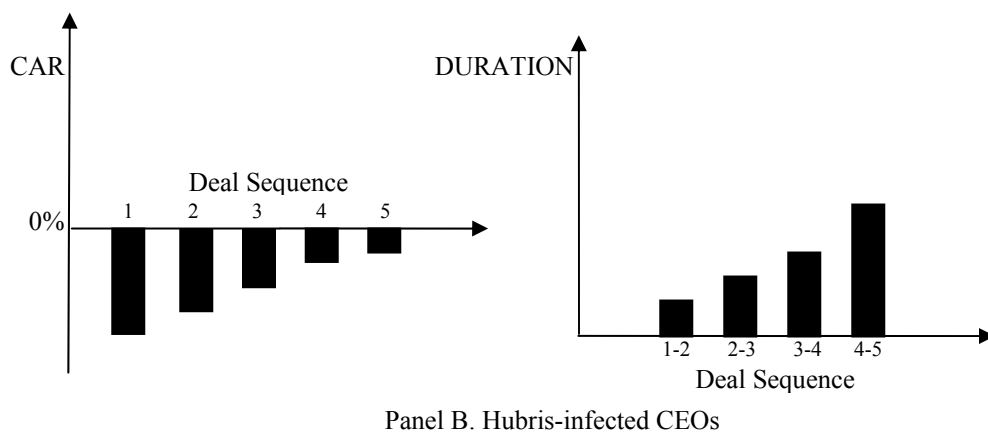
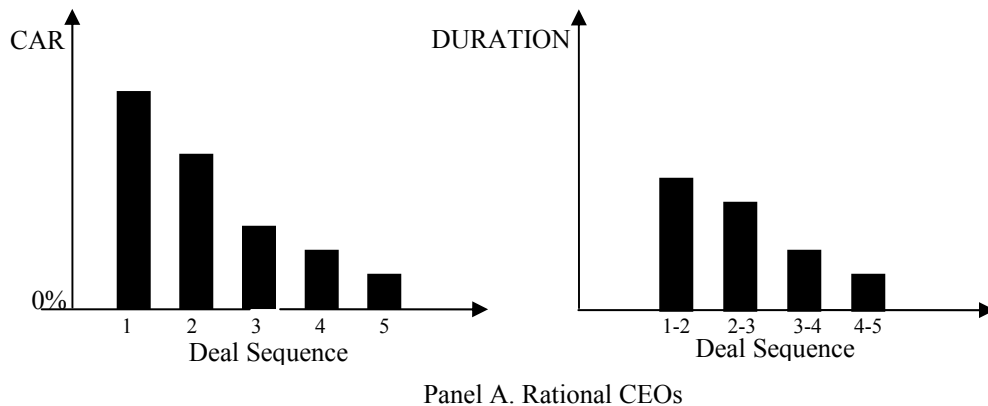


Figure 1. The Bidder's CAR and DURATION between successive deals. This figure summarizes the main predictions that can be drawn from the theoretical model developed by Aktas *et al.* (2005). The X-axis represents the deal sequence order number in an acquisition program undertaken by the same CEO. The Y-axis is either the ex-post observable CAR or the time duration between two successive acquisitions. Rational CEOs should have declining CARs and shorter intervals between successive deals during the program. Hubris-infected CEOs should have the opposite pattern.

Table I
Evidence From the Literature on Bidders' CAR Pattern Across Deal Sequence

This table displays average bidders' cumulative abnormal returns (CAR) reported in the M&A literature during acquisition programs. *N* is the total number of acquisitions in the sample.

Sample features		Deal sequence					
Fuller et al. (2002) <i>5-day Market-Adjusted CAR</i>	Period: 1990-2000; <i>N</i> =3,135 U.S. bidders	1st				5th and >5	
		2.74%				0.52%	
Croci (2005) <i>5-day Market Model CAR</i>	Period: 1990-2002; <i>N</i> =4,285 U.S. bidders	1st	2nd	3rd	4th	5th	>5
		1.60%	1.62%	1.13%	1.00%	1.12%	-0.41%
Billett and Qian (2005) <i>5-day Market Model CAR</i>	Period: 1985-2002; <i>N</i> =3,702 U.S. bidders and listed U.S. targets	1st	2nd	3rd	4th	5th	6th
		-0.10%	-1.54%	-1.37%	-1.66%	-1.21%	-1.74%
Ismail (2005) <i>5-day Market Model CAR</i>	Period: 1985-2004; <i>N</i> =16,221 U.S. bidders	1st	2nd	3rd	4th	5th	6th
		1.41%	1.52%	1.44%	0.81%	0.22%	0.32%
Conn et al. (2005) <i>3-day Market-Adjusted CAR</i>	Period: 1984-1998; <i>N</i> =3,842 U.K. bidders	1st	2nd – 3rd		>3		
		0.88%	0.46%		-0.16%		

Table II
CEO and M&A Sample for this Study

Panel A reports active individual 'CEO-firm' couples by year. A 'CEO-firm' couple is a given individual CEO combined with a particular firm; (some CEOs have been with more than one firm). Since the ExecuComp database starts in 1992, a full history of successive CEO decisions must be restricted to CEO hired in 1992 or later. Panel B and C report the number of acquisitions and the aggregated deal value (US\$ millions). Selection criteria are: US listed acquirers, completed deals, and percentage of shares held before the deal inferior to 50%. For ease of comparison with previous results, two samples are identified. The 'Full Sample' corresponds to all deals over one million US\$, and the 'Big Sample' to deals over one hundred million US\$. The total number of deals is 28,602 and 6,108 for the 'Full Sample' and the 'Big Sample', respectively.

Panel A - Active CEOs by Year

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Count	159	377	605	837	1038	1223	1377	1565	1727	1803	1835
%	1.3%	3.0%	4.8%	6.7%	8.3%	9.7%	11.0%	12.5%	13.8%	14.4%	14.6%

Panel B - M&A Universe - Full Sample

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Count	956	1,001	1,340	1,753	2,254	2,358	2,902	3,687	3,723	2,932	2,564	1,686	1,506
Value	77,209	71,611	88,903	163,021	204,955	318,233	437,631	659,575	1,197,734	1,029,969	1,112,749	535,033	263,412
%	3.3%	3.5%	4.7%	6.1%	7.9%	8.2%	10.1%	12.9%	13.0%	10.2%	8.9%	5.9%	5.3%

Panel C - M&A Universe - Big Sample

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Count	130	137	194	250	348	419	559	828	854	830	754	445	360
Value	61,246	56,629	67,774	134,467	168,885	280,015	386,590	596,742	1,129,159	978,896	1,068,082	505,629	235,771
%	2.1%	2.2%	3.2%	4.1%	5.7%	6.9%	9.2%	13.6%	14.0%	13.6%	12.3%	7.3%	5.9%

Table III
Sample Characteristics

Panel A displays summary statistics on M&A deals by CEO. The *'Full sample'* corresponds to all deals over one million US\$, and the *'Big Sample'* to deals over one hundred million US\$. Our CEO sample encompasses 2,589 CEOs active in 1,740 unique companies. The number of *'CEO-Firm'* couples is 2,659. They were involved in 4,677 and 2,021 M&A deals, for the *'Full sample'* and for the *'Big Sample'*, respectively. The average number of deals by *'CEO-Firm'* is 3.28 and 2.32 for the *'Full sample'* and for the *'Big Sample'*, respectively. Panel B reports the number of CEOs having done at least a given number of deals.

Panel A – Sample summary statistics

	<i>Full sample</i>	<i>Big Sample</i>
Number of CEOs		2,589
Number of Firms		1,740
Number of <i>CEO-Firm</i> Couples		2,659
<i>CEO-Firm</i> with no deal	1,235	1,787
<i>CEO-Firm</i> with at least one deal	1,424	872
Total number of deals	4,677	2,021
Average number of deal by <i>CEO-Firm</i>	3.28	2.32

Panel B – Deals sequence statistics

	<i>Full sample</i>	<i>Big Sample</i>
1 deal	1,424	872
2 deals	515	455
3 deals	323	179
4 deals	193	99
5 deals	106	54
6 deals	78	30
7 deals	47	21
8 deals	45	6
9 deals	25	9
10 or more deals	91	18

Table IV
Bidder and Deal Profiles Across the Deal Sequence

This table describes bidder (Panel A) and deal profiles (Panel B) across the deal sequence for the 'Full Sample'. Each cell contains the simple average. The deal sequence (SEQ) goes from 0 to 7, which means that the acquirers have done exactly 0 to 7 deals. CEO and firm specific variables are from the year the CEO was hired, then updated to values at the end of the year before each acquisition. 'Slope' corresponds to the slope coefficient of a regression between the variable and the deal sequence order. All 'p-values' are obtained using a bootstrap procedure. HHI stands for Herfindahl-Hirschman concentration Index. Variable definitions are in the Appendix.

Panel A - Bidder characteristics - Full Sample

	SEQ	0	1	2	3	4	5	6	7	Slope	p-value
CEO Specific											
Salary		372	469	550	584	593	617	660	755	45.84074	0.00
Interest		0.590	0.686	0.679	0.682	0.568	0.686	0.586	0.669	-0.00048	0.34
Holding		1.26%	1.75%	0.92%	1.40%	1.61%	1.83%	0.71%	2.26%	0.00057	0.35
Age		53.23	53.96	54.25	55.06	55.57	55.75	58.65	54.70	0.46131	0.26
Gender		97.8%	97.7%	99.1%	99.0%	98.1%	98.7%	100.0%	100.0%	0.00298	0.01
Firm Specific											
Long Term Past CAR			13.03%	24.73%	23.44%	35.42%	28.41%	22.18%	14.30%	8.27011	0.80
Industry Assets Based HHI		0.104	0.104	0.109	0.098	0.094	0.077	0.104	0.103	-0.00136	0.17
Industry Market Value Based HHI		0.120	0.126	0.130	0.131	0.121	0.120	0.122	0.129	0.00003	0.48
Industry Sales Based HHI		0.087	0.092	0.095	0.089	0.090	0.074	0.090	0.090	-0.00064	0.15
Industry Number of Deals (year -1)		104.6	117.3	129.9	148.6	126.1	161.8	161.5	147.0	7.03710	0.10
Industry Value of Deals (year - 1)		22741.7	30702.6	27698.2	31360.7	32777.2	39080.9	46994.7	33886.2	2321.865	0.10
Segment Concentration		0.794	0.796	0.771	0.796	0.787	0.736	0.731	0.663	-0.01612	0.00
Number of Segments		2.201	2.213	2.310	2.272	2.453	2.514	2.564	2.923	0.09055	0.00
Total Assets		6.818	6.979	7.224	7.301	7.337	7.436	7.741	8.264	0.17386	0.00
Cash Flow		203.9	278.4	313.0	421.6	255.7	330.7	473.9	773.6	57.76525	0.20
Free Cash Flow		0.015	0.031	0.035	0.044	0.040	0.031	0.023	0.057	0.00290	0.48
Asset Based Growth Rate		0.173	0.182	0.192	0.256	0.188	0.287	0.248	0.373	0.02313	0.04
Sales Based Growth Rate		0.171	0.169	0.185	0.245	0.199	0.302	0.195	0.312	0.01691	0.12
Leverage		0.166	0.152	0.142	0.125	0.137	0.152	0.134	0.161	-0.00100	0.76
Liquidity		0.227	0.243	0.215	0.216	0.235	0.189	0.180	0.179	-0.00852	0.00
Market to Book		3.321	3.793	3.958	5.431	4.980	4.600	4.451	3.309	0.05572	0.86
Price Earning		35.297	33.955	37.019	36.018	40.121	32.687	53.749	30.138	0.64240	0.32
ROE		3.9%	9.5%	8.8%	15.7%	4.3%	1.5%	7.6%	13.1%	0.00256	0.75
Tobin's q		1.971	2.128	2.177	2.591	2.448	2.319	2.292	2.060	0.02049	0.86

Table IV– Continued

Panel B - Deal characteristics - Full Sample

	SEQ	0	1	2	3	4	5	6	7	Slope	p-value
Toehold			0.54	0.70	0.54	1.47	0.13	0.00	0.53	-0.0428	0.21
Percentage Acquired			89.11	90.87	89.86	92.50	91.71	98.39	95.66	1.1586	0.00
Deal Size			68.44	67.72	82.78	98.96	73.82	92.11	112.18	5.4644	0.00
Number of Rival bidders			1.02	1.03	1.02	1.00	1.00	1.00	1.00	-0.0043	0.02
Hostility			0.6%	0.6%	0.5%	0.9%	1.3%	2.1%	2.2%	0.0026	0.22
Cash			56.1%	56.7%	56.0%	56.6%	43.6%	55.3%	57.8%	-0.0037	0.31
Strategic Fit			63.9%	58.2%	63.2%	65.1%	65.4%	72.3%	60.0%	0.0046	0.24
Private Target			33.2%	34.4%	30.6%	36.8%	41.0%	29.8%	22.2%	-0.0081	0.18

Table V
CAR by Deal Sequence - Univariate Analyses

This table describes, for the *'Full Sample'* (Panel A) and the *'Big Sample'* (Panel B), bidders' cumulative abnormal return (CAR) by deal sequence (SEQ). Deal sequence goes from 1 to 7, which means that the corresponding acquirers have realized *'exactly'* or *'at least'* 1 to 7 deals, according to the considered sub-sample. The *'Full Sample'* corresponds to all deals over one million US\$, and the *'Big Sample'* to deals over one hundred million US\$. Panel C analyses whether the slope of the CAR with respect to deal sequence is different between rational and hubris infected CEOs. Since the first deal CAR is used to build the hubris proxy, it is excluded. The hubris proxy is the dummy variable version of the hubris rank index variable defined in Section 2.C. Each panel provides the *'mean'* and the *'median'* of the 11-day CAR, the number of *CEO-Firm* couples in the sample (*'N'*) and the *'p-value'* to test whether the *'median'* is statistically different from zero. Abnormal returns are computed as in Fuller *et al.* (2002) using a Beta-one model, which consists in subtracting the daily market portfolio return from the daily return of each company. The equal weighted CRSP index proxies for the market portfolio. *'Slope'* denotes the slope coefficient of the pooled regression between median CAR and the deal sequence order number. All *'p-values'* are obtained using a bootstrap procedure.

Panel A - Full Sample

SEQ	At least				Exactly			
	Mean	Median	N	p-value	Mean	Median	N	p-value
1	1.25%	0.63%	1,388	0.00	1.06%	0.65%	465	0.01
2	0.61%	0.19%	900	0.06	-0.70%	-0.97%	300	-0.01
3	0.67%	0.47%	579	0.07	0.16%	-0.65%	191	0.01
4	0.76%	0.59%	390	0.08	1.01%	1.57%	105	0.01
5	0.51%	-0.16%	285	0.22	0.41%	-0.53%	77	0.03
6	0.01%	0.63%	207	0.49	-1.04%	0.58%	46	0.01
7	-1.01%	-0.99%	160	0.12	-1.28%	-0.58%	44	0.02
Slope		-0.0016		0.11		-0.0002		0.45

Panel B - Big Sample

SEQ	At least				Exactly			
	Mean	Median	N	p-value	Mean	Median	N	p-value
1	1.20%	0.67%	855	0.00	0.72%	0.40%	418	0.00
2	-0.37%	-0.72%	413	0.23	-0.80%	-0.70%	172	0.01
3	0.01%	0.27%	236	0.49	-0.04%	0.48%	99	0.01
4	-0.98%	-0.97%	137	0.09	-1.42%	-1.52%	52	0.01
5	-1.37%	-1.38%	84	0.11	-4.92%	-2.20%	30	0.02
6	0.10%	-0.01%	54	0.45	-0.92%	-1.34%	20	0.02
7	-1.16%	-1.61%	33	0.23	2.16%	-0.17%	6	-0.02
Slope		-0.0025		0.07		-0.0020		0.26

Panel C - Full Sample - At least

SEQ	Rational				Hubris			
	Mean	Median	N	p-value	Mean	Median	N	p-value
1	/	/	/	/	/	/	/	/
2	0.96%	0.29%	694	0.01	-0.54%	-0.67%	206	0.31
3	0.60%	0.44%	466	0.10	0.96%	1.30%	113	0.19
4	0.69%	0.70%	318	0.13	1.07%	-1.24%	72	0.21
5	0.69%	-0.26%	231	0.20	-0.28%	0.22%	54	0.43
6	-0.31%	-0.36%	165	0.31	1.29%	1.41%	42	0.13
7	-0.97%	-1.51%	130	0.14	-1.19%	-0.58%	30	0.18
Slope		-0.0035		0.03		0.0006		0.42

Table VI
DURATION by Deal Sequence - Univariate Analyses

This table describes, for the 'Full Sample' (Panel A) and the 'Big Sample' (Panel B), the DURATION (in number of days) between two successive deals. Deal sequence goes from 1 to 7, which means that the corresponding acquirers have done 'exactly' or 'at least' 1 to 7 deals, depending on the sub-sample. The 'Full Sample' corresponds to all deals over one million US\$, and the 'Big Sample' to deals over one hundred million US\$. Panel C analyses whether the slope of the DURATION across the deal sequence is different between rational and hubris infected CEOs. Since the first deal CAR is used to build the hubris proxy, it is excluded. The hubris proxy is the dummy version of the hubris rank index variable defined in Section 2.C. Each panel reports the 'mean' and the 'median' of the DURATION, and the number of CEO-firm couples in the sample ('N'). 'Slope' denotes the slope coefficient of the pooled regression between median DURATION and the deal sequence number. All 'p-values' are obtained using a bootstrap procedure.

Panel A - Full Sample

SEQ	At least				Exactly			
	Mean	Median	N	p-value	Mean	Median	N	p-value
1	604	426	1424		707	502	515	
2	358	224	909		410	273	323	
3	329	204	586		453	316	193	
4	245	153	393		367	247	106	
5	195	119	287		319	204	78	
6	205	104	209		308	216	47	
7	179	78	162		246	143	45	
Slope		-30.40		0.00		-28.38		0.00

Panel B - Big Sample

SEQ	At least				Exactly			
	Mean	Median	# Firms	p-value	Mean	Median	# Firms	p-value
1	759	579	872		859	662	455	
2	447	308	417		543	439	179	
3	355	238	238		504	379	99	
4	266	150	139		323	219	54	
5	207	140	85		263	199	30	
6	229	121	55		363	140	21	
7	194	100	34		406	379	6	
Slope		-40.10		0.00		-29.7		0.23

Panel C - Full Sample - At least

SEQ	Rational				Hubris			
	Mean	Median	# Firms	p-value	Mean	Median	# Firms	p-value
1	/	/	/		/	/	/	
2	351	225	703		381	224	206	
3	328	200	473		334	227	113	
4	236	146	321		282	170	72	
5	188	111	233		224	170	54	
6	191	98	167		261	143	42	
7	174	77	131		197	79	31	
Slope		-30.88		0.00		-27.9		0.00

Table VII
CAR by Deal Sequence - Multivariate Analyses

Panel A presents ordinary regressions of the CAR on the deal sequence order number, without and with control variables. Panel B estimates CAR determinants with a fixed panel data regression. Panels C and D compare rational and hubris-infected CEOs. The hubris proxy is either the dummy version or the hubris rank index variable defined in Section 2.C. Besides the panel data nature of the sample, Panel C and Panel D control also for potential sample selection bias with a Heckman 2 step procedure. 'Coef' corresponds to the estimated coefficient of the corresponding variable. 'N' denotes the number of 'CEO-firm' couples in the sample. 'R²' is the coefficient of determination. The 'Fisher' statistic and its corresponding 'p-value' are also provided for each regression. All 'p-values' are obtained using a bootstrap procedure. 'Industry adjusted' indicates that the variable is used after being adjusted for the industry median (e.g, 'Leverage – Industry Adjusted' is the difference between the bidder leverage and the median leverage of all firms active in the same Fama/French industry. HHI stands for Herfindahl-Hirschman concentration Index. Variable definitions are in the Appendix.

Independent Variable	Panel A - Full Sample - Pooled Estimator				Panel B - Full Sample - Fixed Estimator			
	Coef	p-value	Coef	p-value	Coef	p-value	Coef	p-value
Constant	0.0078	0.11	0.0567	0.13				
Deal Sequence Order Number	-0.0004	0.10	0.0001	0.90	-0.0015	0.00	-0.0006	0.43
Market Value			-0.0036	0.10			-0.0061	0.13
Tobin's q – Industry Adjusted			0.0021	0.46			0.0008	0.86
Free Cash Flow – Industry Adjusted			-0.0120	0.78			-0.0092	0.94
Leverage – Industry Adjusted			-0.0043	0.82			0.0527	0.14
Price Earning – Industry Adjusted [x10 ²]			-0.0063	0.11			0.0006	0.94
ROE – Industry Adjusted			-0.0114	0.02			-0.0073	0.35
Long Term Past CAR			0.0070	0.03			-0.0107	0.02
Segment Concentration			0.0016	0.89			0.0274	0.12
Industry Assets Based HHI			0.0292	0.23			0.0302	0.60
Industry Number of Deals (year-1) [x10 ²]			0.0009	0.63			0.0015	0.04
Salary [x10 ²]			-0.0002	0.91			-0.0008	0.70
Interest			0.0054	0.04			0.0005	0.91
Private Target			0.0064	0.32			0.0055	0.42
Cash			0.0074	0.24			0.0160	0.01
Acquisition Program			0.0100	0.25			0.0057	0.66
Number of rival bidders			-0.0183	0.02			-0.0034	0.85
Hostility			0.0144	0.54			0.0080	0.74
Runup			-0.0400	0.01			-0.0527	0.00
Strategic Fit			0.0012	0.78			-0.0015	0.77
N	4,605		2,872		4,605		2,872	
R²	0.10%		1.90%		30.30%		41.40%	
Fisher	3.1	0.07	2.8	0.00	1.3	0.00	1.6	0.00
					Hausman Test (Random vs Fixed Effect)			
					Chi2		33.48 0.03	

Table VII – Continued

Panel C - Heckman 2 step Panel Data Estimator (first difference)

Independent Variable	Full Sample			
	Coef	p-value	Coef	p-value
Deal Sequence Order Number	-0.0095	0.42	-0.0075	0.54
Market Value			0.0000	0.97
Tobin's q – <i>Industry Adjusted</i>			0.0017	0.80
Free Cash Flow – <i>Industry Adjusted</i>			-0.1073	0.31
Leverage – <i>Industry Adjusted</i>			-0.0042	0.94
Price Earning – <i>Industry Adjusted</i> [x10 ²]			0.0031	0.76
ROE – <i>Industry Adjusted</i>			0.0300	0.31
Long Term Past CAR			-0.0254	0.00
Segment Concentration			0.0371	0.13
Industry Assets Based HHI			0.0027	0.97
Industry Number of Deals (year-1) [x10 ²]			0.0258	0.00
Salary [x10 ²]			-0.0020	0.50
Interest			0.0006	0.92
Private Target			0.0132	0.00
Cash			0.0117	0.07
Acquisition Program			0.0007	0.94
Number of rival bidders			-0.0067	0.43
Hostility			0.0275	0.39
Runup			-0.0649	0.00
Strategic Fit			-0.0048	0.42
Lambda	0.0080	0.59	0.0004	0.99
N	2,337		1,336	
R²	0.00%		4.30%	
Fisher	0.31	0.58	2.93	0.00

Table VII – Continued

Panel D - Heckman 2 step Panel Data Estimator (first difference)

Independent Variable	Full Sample - Hubris Score - 25%				Full Sample - Hubris Score - Rank			
	Coef	p-value	Coef	p-value	Coef	p-value	Coef	p-value
Deal Sequence Order Number	-0.0282	0.01	-0.0164	0.17	-0.0782	0.00	-0.0530	0.00
Deal Seq. x Hubris Score	0.0625	0.00	0.0414	0.00	0.1337	0.00	0.0914	0.00
Market Value			0.0000	0.94			0.0000	0.73
Tobin's q – <i>Industry Adjusted</i>			0.0024	0.70			0.0031	0.62
Free Cash Flow – <i>Industry Adjusted</i>			-0.1046	0.31			-0.1121	0.29
Leverage – <i>Industry Adjusted</i>			-0.0127	0.86			-0.0244	0.71
Price Earning – <i>Industry Adjusted</i> [x10 ²]			0.0030	0.76			0.0002	0.99
ROE – <i>Industry Adjusted</i>			0.0253	0.38			0.0216	0.45
Long Term Past CAR			-0.0240	0.00			-0.0235	0.00
Segment Concentration			0.0372	0.12			0.0328	0.16
Acquirer Industry Assets Based HHI			0.0017	0.98			0.0121	0.88
Industry Number of Deals (year-1) [x10 ²]			0.0283	0.00			0.0269	0.00
Salary [x10 ²]			-0.0024	0.44			-0.0023	0.46
Interest			-0.0010	0.88			-0.0034	0.62
Private Target			0.0126	0.00			0.0125	0.00
Cash			0.0104	0.10			0.0108	0.08
Acquisition Program			0.0010	0.91			0.0016	0.86
Number of rival bidders			-0.0062	0.45			-0.0060	0.46
Hostility			0.0292	0.37			0.0282	0.38
Runup			-0.0611	0.00			-0.0597	0.00
Strategic Fit			-0.0064	0.28			-0.0055	0.35
Lambda	0.0175	0.22	0.0023	0.89	0.0155	0.26	0.0022	0.89
N	2,285		1,323		2,285		1,323	
R²	3.00%		5.90%		6.10%		7.80%	
Fisher	34.92	0.00	3.85	0.00	74.22	0.00	5.24	0.00

Table VIII
The Probability of Doing Exactly One Deal

The dependent variable is a dummy variable equal to one if the CEO has done exactly one deal, 0 otherwise. Reported are estimated coefficients (*Coef*) and corresponding *p-values* obtained using a bootstrap procedure. *N* is the number of *CEO-Firm* couples in the sample. *LR* is a likelihood ratio statistic for the probit, which has its own p-value. HHI stands for Herfindahl-Hirschman concentration Index. Variable definitions are in the Appendix.

Independent Variable	Coef	p-value
Gender	0.3492	0.43
Salary	-0.1441	0.19
Interest	-0.6665	0.00
Market Value	0.3216	0.00
Number of deals already done by the firm	0.0506	0.07
Number of Segments	-0.0722	0.34
Industry Sales Based HHI	-0.9358	0.13
Industry Value of Deals (year-1)	-0.1389	0.00
Leverage	0.1318	0.75
Tobin's q	-0.0582	0.24
Industry Total Assets	-0.4184	0.00
Industry Cash Flow	0.0047	0.08
Industry Sales Based Growth Rate	2.2977	0.05
Industry Leverage	-1.9015	0.10
Industry Market to Book	0.2837	0.28
Industry Tobin's q	-0.6628	0.05
LR Test	176.38	0.00
N	953	

Table IX
Duration by Deal Sequence - Multivariate Analyses

This table provides multivariate analyses of DURATION (the time in month between successive acquisitions) for the 'Full Sample'. Panel A shows the estimation of the pooled regression and the fixed effect panel regression, without and with control variables. Panels B and C investigate, within the pooled estimator framework, potential differences in DURATION between rational CEOs and hubris infected CEOs. The hubris proxy is either the dummy version or the hubris rank index variable defined in Section 2.C. 'Coef' denotes the estimated coefficient of the corresponding variable. 'N' is the number of CEO-firm couples in the sample. A likelihood ratio ('LR') statistic is given for each model. All 'p-values' are obtained using a bootstrap procedure. 'Industry adjusted' indicates that the corresponding variable is used after being adjusted for the industry median (e.g, 'Leverage – Industry Adjusted' corresponds to the difference between the bidder leverage and the median leverage of all firms active in the same Fama/French industry. HHI stands for Herfindahl-Hirschman concentration Index. Variable definitions are in the Appendix.

Panel A. DURATION Determinants – Pooled and Panel data estimators

Independent Variable	Pooled Estimator				Poisson Fixed Effect Estimator			
	Coef	p-value	Coef	p-value	Coef	p-value	Coef	p-value
Constant	3.2101	0.00	3.8174	0.00				
Deal Sequence Order Number	-0.2328	0.00	-0.0673	0.00	-0.1350	0.00	-0.1309	0.00
Target Size			0.0063	0.35			-0.0153	0.32
Market Value			-0.1205	0.00			-0.0499	0.21
Tobin's q – Industry Adjusted			0.0229	0.10			-0.0991	0.00
Free Cash Flow – Industry Adjusted			-0.3884	0.06			0.0175	0.47
Leverage – Industry Adjusted			-0.0091	0.90			0.0929	0.00
Price Earning – Industry Adjusted			0.0004	0.15			0.0222	0.22
ROE – Industry Adjusted			0.1750	0.00			0.0472	0.05
Long Term Past CAR			0.0744	0.02			-0.0307	0.09
Segment Concentration			0.1698	0.01			0.0048	0.76
Industry Assets Based HHI			-0.8416	0.00			-0.1467	0.00
Industry Number of Deals (year-1)			-0.0003	0.01			0.0161	0.68
Salary			0.0007	0.00			0.5723	0.00
Interest			-0.0546	0.02			-0.0291	0.08
Private Target			0.0057	0.80			0.0469	0.00
Cash			-0.0408	0.12			-0.0094	0.44
Acquisition Program			1.0196	0.00			0.3875	0.00
Number of rival bidders			0.0590	0.13			0.0035	0.58
Hostility			0.1706	0.11			0.0272	0.07
Runup			0.2558	0.01			0.0221	0.09
Strategic Fit			-0.0202	0.35			0.0026	0.90
N	3,970		2,241		3,970		2,241	
LR	7,087	0.00	12,851	0.00		0.00		0.00

Table IX – Continued

Panel B. DURATION Determinants – Pooled estimation for rational and hubris sub-samples

Independent Variable	Rational CEOs				Hubris infected CEOs			
	Coef	p-value	Coef	p-value	Coef	p-value	Coef	p-value
Constant	3.2294	0.00	3.8009	0.00	3.1455	0.00	3.7974	0.00
Deal Sequence Order Number	-0.2436	0.00	-0.0760	0.00	-0.1927	0.00	-0.0390	0.04
Target Size			0.0047	0.50			0.0089	0.48
Market Value			-0.1234	0.00			-0.1065	0.00
Tobin's q – <i>Industry Adjusted</i>			0.0367	0.03			-0.0294	0.24
Free Cash Flow – <i>Industry Adjusted</i>			-0.5250	0.04			-0.2614	0.38
Leverage – <i>Industry Adjusted</i>			-0.1003	0.28			0.1965	0.26
Price Earning – <i>Industry Adjusted</i>			0.0004	0.21			0.0005	0.20
ROE – <i>Industry Adjusted</i>			0.1741	0.00			0.2047	0.14
Long Term Past CAR			0.0478	0.10			0.1671	0.00
Segment Concentration			0.1951	0.01			0.0924	0.22
Industry Assets Based HHI			-0.7531	0.00			-1.4275	0.00
Industry Number of Deals (year-1)			-0.0001	0.16			-0.0008	0.00
Salary			0.0007	0.00			0.0006	0.00
Interest			-0.0669	0.02			-0.0007	0.99
Private Target			0.0049	0.85			0.0098	0.82
Cash			-0.0458	0.14			-0.0258	0.50
Acquisition Program			1.0142	0.00			1.0204	0.00
Number of rival bidders			0.1027	0.06			-0.0087	0.84
Hostility			0.2126	0.08			-0.0787	0.72
Runup			0.1729	0.10			0.4238	0.02
Strategic Fit			-0.0197	0.41			0.0073	0.83
N	3,104		1,769		866		472	
LR	6,020	0.00	9,935	0.00	1,082	0.00	3,006	0.00

Table IX – Continued

Panel C - DURATION Determinants - Pooled Estimation - Rational versus Hubris Tests

Independent Variable	Full Sample - Hubris Score - 25%						Full Sample - Hubris Score - Rank					
	Coef	p-value	Coef	p-value	Coef	p-value	Coef	p-value	Coef	p-value	Coef	p-value
Constant	3.2217	0.00	3.8314	0.00	2.7508	0.00	3.3601	0.00	3.8669	0.00	2.7929	0.00
Deal Sequence Order Number	-0.2394	0.00	-0.0734	0.00	-0.0469	0.00	-0.2834	0.00	-0.0792	0.00	-0.0644	0.00
Hubris Score	-0.0761	0.15	-0.0503	0.27	-0.1155	0.03	-0.3179	0.01	-0.0835	0.25	-0.1698	0.05
Deal Seq. x Hubris Score	0.0467	0.04	0.0362	0.09	0.0590	0.00	0.1115	0.00	0.0255	0.29	0.0615	0.04
Target Size			0.0058	0.39	0.0116	0.18			0.0052	0.42	0.0110	0.18
Market Value			-0.1199	0.00	-0.0241	0.04			-0.1206	0.00	-0.0227	0.05
Tobin's q – <i>Industry Adjusted</i>			0.0242	0.11	-0.0048	0.59			0.0248	0.10	-0.0051	0.55
Free Cash Flow – <i>Industry Adjusted</i>			-0.4114	0.05	-0.2414	0.19			-0.3959	0.05	-0.2278	0.21
Leverage – <i>Industry Adjusted</i>			-0.0270	0.71	0.0217	0.78			-0.0232	0.75	0.0190	0.81
Price Earning – <i>Industry Adjusted</i>			0.0004	0.15	0.0004	0.15			0.0004	0.15	0.0004	0.16
ROE – <i>Industry Adjusted</i>			0.1774	0.00	0.0669	0.14			0.1756	0.00	0.0651	0.15
Long Term Past CAR			0.0763	0.00	0.0446	0.08			0.0759	0.00	0.0441	0.08
Segment Concentration			0.1735	0.00	0.0692	0.15			0.1703	0.00	0.0626	0.17
Industry Assets Based HHI			-0.8308	0.00	-0.8197	0.00			-0.8326	0.00	-0.8175	0.00
Industry Number of Deals (year-1)			-0.0003	0.00	-0.0003	0.00			-0.0003	0.00	-0.0003	0.00
Salary			0.0007	0.00					0.0007	0.00		
Interest			-0.0730	0.00					-0.0719	0.00		
Private Target			0.0075	0.73	-0.0116	0.63			0.0087	0.70	-0.0116	0.63
Cash			-0.0450	0.09	-0.0284	0.24			-0.0449	0.10	-0.0272	0.25
Acquisition Program			1.0200	0.00	1.0778	0.00			1.0204	0.00	1.0780	0.00
Number of rival bidders			0.0594	0.14	0.0373	0.27			0.0621	0.12	0.0402	0.25
Hostility			0.1731	0.11	0.1936	0.07			0.1647	0.12	0.1869	0.07
Runup			0.2598	0.01	0.2310	0.02			0.2640	0.01	0.2361	0.02
Strategic Fit			-0.0211	0.31	-0.0159	0.44			-0.0212	0.31	-0.0152	0.45
N	3,829		2,213		2,445		3,829		2,213		2,445	
LR	6,630	0.00	12,826	0.00	12,112	0.00	6,726	0.00	12,812	0.00	12,090	0.00