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September 2010, forthcoming American Economic Review 101 (1) (2011), pp. 1–19.

⁵ Transactions are in terms of acre feet (AF). An acre foot is 325,852 gallons, about enough to meet the needs of 4 people for a year.

⁶ As reported in G. D. Libecap, “Institutional Path Dependence in Climate Adaptation...”

⁷ Brewer et al, March 2007.

⁸ See G. D. Libecap, “Water Rights and Markets in the U.S. Semi-Arid West: Efficiency and Equity Issues, forthcoming in Evolution of Property Rights Related to Land and Natural Resources, D. H. Cole and E. Ostrom, eds., Cambridge: Lincoln Institute, 2010.

⁹ See Brewer et al 2007; G. D. Libecap, “Water Rights and Markets in the U.S. Semi-Arid West...”

¹⁰ G.D. Libecap and J.L. Smith, “The Self-Enforcing Provisions of Oil and Gas Unit Operating Agreements: Theory and Evidence,” NBER Working Paper No. 7142, May 1999, Journal of Law, Economics and Organization 15(2): pp. 526–48; G.D. Libecap, “The Assignment of Property Rights on the Western Frontier: Lessons for Contemporary Environmental and Resource Policy,” NBER Working Paper No. 12598,

October 2006, in Journal of Economic History 67(2): pp. 257–9; T. L. Anderson, R. Arnason, and G.D. Libecap, “Efficiency Advantages of Grandfathering in Rights-Based Fisheries Management,” NBER Working Paper No. 16519, November 2010, forthcoming in Annual Review of Environment and Resource Economics.

¹¹ M. T. Kanazawa, “Efficiency in Western Water Law: The Development of the California Doctrine, 1850–1911,” Journal of Legal Studies 27 (1) (1998), pp. 159–85; G. D. Libecap, “The Assignment of Property Rights...”

¹² See G. D. Libecap, “Institutional Path Dependence in Climate Adaptation...”

¹³ Z. K. Hansen, G. D. Libecap, and S. E. Lowe, “Climate Variability and Water Infrastructure: Historical Experience in the Western United States,” NBER Working Paper No. 15558, December 2009, forthcoming in The Economics of Climate Change: Adaptations Past and Present, G. D. Libecap and R. Steckel, eds., University of Chicago Press.

¹⁴ G.D. Libecap, “Institutional Path Dependence in Climate Adaptation...” and G. D. Libecap, “Water Rights and Markets in the U.S. Semi-Arid West...”

¹⁵ See G. D. Libecap, “Institutional Path

Dependence in Climate Adaptation...”

¹⁶ G. D. Libecap, “Water Rights and Markets in the U.S. Semi-Arid West...” and R. Hornbeck and P. Keskin, “Farming the Ogallala Aquifer: Short and Long-run Impacts of Groundwater Access, working paper, Economics Department, Harvard University, 2010.

¹⁷ G. D. Libecap, “Water Rights and Markets in the U.S. Semi-Arid West...”

¹⁸ G. D. Libecap, “Transaction Costs: Valuation Disputes, Bi-Lateral Monopoly Bargaining and Third-Party Effects in Water Rights Exchanges. The Owens Valley Transfer to Los Angeles,” NBER Working Paper No. 10801, September 2004, later published as, “Chinatown Revisited: Owens Valley and Los Angeles—Bargaining Costs and Fairness Perceptions of the First Major Water Rights Exchange,” Journal of Law, Economics and Organization 25 (2) (2008), pp. 311–38, and G. D. Libecap, Owens Valley Revisited: A Reassessment of the West’s First Great Water Transfer, Palo Alto: Stanford University Press, 2007.

¹⁹ G. D. Libecap, “Water Rights and Markets in the U.S. Semi-Arid West...”

²⁰ See G. D. Libecap, “Institutional Path Dependence in Climate Adaptation...”

A “New” Paradigm in Corporate Finance: The Role of Managers and Managerial Biases

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When Corporate Finance emerged as a field of academic research and instruction in the first half of the last century, it revolved to a large extent around the role of managers and their individual preferences and

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beliefs. For example, in addressing the puzzling observation that corporations are very sensitive to the availability of internal funding and tend to shy away from debt, Gordon Donaldson devoted much of his classic work on corporate debt policies to “management attitudes.” In his story of Depression Babies, he claimed that managers who had experienced the Great Depression seemed to be particularly unwilling to use debt financing.¹

Modigliani and Miller’s famous irrel-

evance theorem, and the development of corporate finance theory, fundamentally changed the field. Myers and Majluf suggested that managers’ reluctance to raise external funds does not reflect irrational debt aversion, but rather is the rational response to asymmetric information. Soon, the field turned its focus away from management attitudes. Their perceived role was discussed only if it was of historical interest.²

The shift away from emphasis on man-

agers left an unresolved set of puzzles. Why do firms expend so much effort to select individual managers? Why do they spend so much money to keep them? Why are managers fired if the firm is not doing well? Over the last few years, researchers have returned to the premise that individual managers do matter. Recent research has examined the role of managerial traits, talent, and styles, as well as the role of managerial biases, such as CEO overconfidence. What triggered this change? And what have we learned so far? I use this summary of my own research, much of it joint with Geoffrey Tate, to explore these recent developments.

The Unintended Consequences of Compensation Data

Identifying the role of individual managerial traits is difficult, because it is hard to disentangle them from other determinants of corporate outcomes. A first step—and a necessary condition for the identification of managerial effects—is greater availability of manager-level panel data. A sufficient panel allows us, at least, to separate out time effects and time-invariant firm effects from managerial effects.

Starting in the 1990s, the systematic construction of datasets on executive compensation, such as ExecuComp, turned out to be crucial in providing precisely this information. Thanks to its panel structure and the identification of managers' names, age, gender, and career path, ExecuComp became the starting point for a broad body of research on managerial effects, not simply on compensation.

Superstar CEOs

One example of compensation data enabling much broader research is my research on “Superstar CEOs” with Tate.³ The title refers to the fact that, in terms of compensation, but also in terms of status and press coverage, managers in the United States follow a highly skewed distribution: a small number of superstars enjoy the bulk of the rewards. We explore the ramifications of a “CEO superstar culture” for managers and shareholders. Specifically, we ask whether the popular notion of prominent achiev-

ers subsequently underperforming, which is widely-held in many contexts (from “Sports Illustrated Jinx” to “Nobel Prize Disease”), applies to top executives. The empirical basis for this study is a unique, hand-collected dataset on CEOs who won high-profile awards from the business press or other prominent organizations between 1975 and 2002, merged with ExecuComp data. Our challenge is to identify the correct counterfactual—how would a superstar CEO have performed had he not won the award and attracted all the media attention? How do we avoid measuring mere mean reversion?

Using a two-stage matching procedure and nearest-neighbor matching estimators, we identify CEOs who, based on observables, were likely to win the award at a specific point in time but did not. We find that actual award winners significantly underperform the matched sample of not-award-winning CEOs, by 12–20 percent over three years. At the same time, the average compensation of award winners increases from about \$13m to over \$18m, far more than that of “hypothetical” winners. Moreover, winners spend significantly more time on outside activities (public speeches, writing memoirs, board meetings of other companies, on the golf course). The silver lining is that these findings are concentrated in badly governed firms, for example, firms with weak shareholder rights. Good governance can prevent the extractions and distractions of superstars, without lowering the firm's performance, as far as we can infer from the awards data.

The Rise of Behavioral Economics

Undoubtedly, the rise of behavioral economics was another important determinant of the changes in thinking about the role of individual managers. If individuals have “non-standard” preferences, if they form non-standard beliefs or make mistakes in their optimization process, then individual differences have the potential to help us to predict differences in investment and financing among fundamentally similar firms. Of course, even differences in “standard” preferences or beliefs could give rise to firm-level differences. But the mounting evidence on persistent biases and mistakes has helped us to clarify the need for proper identification

of individual traits and to distinguish clearly between managers who do and who do not display biased behavior.

Overconfident CEOs

One such bias, long suspected as an explanation of misguided investment and mergers, is managerial overconfidence. If managers are overconfident about their ability to create value, then they are likely to perceive too many investment projects and mergers as being worth undertaking. Tate and I analyze the existence and importance of CEO overconfidence in a series of papers. The first⁴ begins by pointing out that the implications of overconfidence are more subtle than simply “more and worse investment.” Once we account for financial market interaction, we realize that rational financiers curb overconfident managers' desire to over-invest: they refuse to provide the necessary financing, at least not at the price the overconfident CEO expects. Hence, the investment decisions of overconfident CEOs become sensitive to internal cash flow, in particular in firms with few internal resources.

The empirical challenge here is to provide a plausible measure of overconfidence. Since biased beliefs naturally defy direct and precise measurement, we use “revealed beliefs”—again exploiting executive compensation data. We identify CEOs who personally over-invest in their companies by buying excessive amounts of company stock, or holding executive options until they expire, even if these options are highly in the money and a calibrated model of option exercise suggests that the owners should diversify. In our data, such CEOs do not outperform the market by holding on to their options, ruling out insider trading or rational empire building as explanations. Holding on to options is also hard to explain with signaling, given that the stock of overconfident CEOs' firms performs worse than the market and the industry. After addressing a number of additional interpretations (taxes, risk tolerance, board pressure, procrastination), we conclude that excessive stock purchases and option holding likely indicate overestimation of future returns.

We then show that there is a robust

relationship between the CEOs' personal overinvestment in their firms and their corporate investment: overconfident CEOs are excessively sensitive to the availability of internal funds. As predicted by the theory, the relationship between overconfidence and investment-cash flow sensitivity is strongest in financially constrained firms. Overconfidence emerges as a novel explanation for the long-standing investment-cash flow puzzle.

The Market Interaction of Overconfident CEOs

Our findings implicitly rely on the market interaction of rational investors and biased managers: investors who do not share the CEO's optimistic view demand higher interest rates or lower stock issuance prices than the CEOs deem appropriate. Another paper, with Tate and Jun Yan⁵ tests this channel directly. Here, we ask whether overconfident CEOs are more reluctant to tap external capital markets. Combining our overconfidence data on managers' personal portfolios with data on security issuances, we find a significant relationship between overconfidence and two long-standing capital-structure puzzles: the "pecking order of financing" (preference for cash over debt and debt over equity) and firms' reluctance to access external capital markets, including the "debt conservatism puzzle."

In the same paper, we also consider managerial traits other than overconfidence that are likely to generate differences in managers' financial decision-making. Specifically, we exploit variation in managers' personal histories. Existing evidence in the psychology literature suggests that seismic events early in life can have long lasting effects on individuals' personalities. We identify two such formative experiences that affect a significant portion of our sample CEOs: growing up during the Great Depression and serving in the military. Depression CEOs are considered to have less faith in external capital markets and, therefore, to lean excessively on internal financing. Military service during early adulthood, and particularly combat exposure, induces aggressiveness and risk-taking, possibly including more aggressive capital-structure choices.

Both sets of predictions are confirmed in the data. Depression CEOs are more prone to under-utilize debt relative to its tax benefits than the average CEO. And, they do not substitute equity issuance for debt, confirming that they have an aversion to risky capital markets. CEOs with prior military service, particularly in World War II, choose more aggressive capital structures. Under their leadership, market leverage ratios are significantly higher than under their predecessors' or successors' leadership. The results on World War II veterans are particularly important, because the draft alleviates concerns about self-selection into service.

Overall, this paper provides three strong cases for measurable managerial characteristics having significant explanatory power beyond traditional capital-structure determinants. As such, our results help us to answer a crucial question in capital-structure research: why do firms with seemingly similar fundamentals have significantly different capital structures? Modern dynamic theories of optimal capital structure allow room for similar firms to operate away from a common target capital structure, but the factors which predict the direction of such deviations remain unclear. Our results show that managerial traits help to explain the remaining variation.

In a third paper, Tate and I⁶ provide the strongest and clearest evidence on the empirical importance of managerial overconfidence. We relate overconfidence to mergers and acquisitions. As pointed out earlier, overconfidence does not necessarily predict excessive mergers when embedded into a market setting with rational financiers. It does so only when the (overestimated) benefits of a merger exceed the (also overestimated) costs of raising external financing. Hence, overconfidence induces more mergers only in cash-rich firms. However, if we do observe that overconfident CEOs undertake more mergers on net, then we can derive the additional prediction that those mergers, on average, have lower returns than mergers undertaken by non-overconfident CEOs.

In our empirical analysis, we find that overconfident CEOs do, in fact, undertake significantly more and significantly worse mergers than other CEOs, in particular in cash-rich firm years. The average announce-

ment effect is significantly more negative for mergers of overconfident CEOs (-90 basis points) than for those of their non-overconfident peers (-12 basis points). We also introduce a second, media-based proxy for overconfidence, which captures how the business press characterizes a CEO—either as "confident" and "optimistic" or as "reliable," "cautious," "conservative," "practical," "frugal," and "steady." All of our main results are replicated using this press-based measure of overconfidence.

Overall, managerial overconfidence appears to provide a unifying framework for some of the major empirical puzzles in Corporate Finance. Our findings do not imply that traditional explanations, such as misaligned incentives or asymmetric information, are not valid. Overconfidence is an additional explanation, applicable to the subset of overconfident CEOs. But its broad explanatory power and its large estimated effects on investment, financing, and mergers indicate that it has significant empirical relevance. Moreover, the overconfidence explanation has important governance implications: overconfidence cannot be curbed by providing incentives in the form of stock and option grants.

Individual Characteristics of Other Corporate Actors

The importance of individual characteristics and biases for corporate outcomes is likely to extend beyond the CEO and to shape the way organizations function, as Colin Camerer and I discuss in our survey on Behavioral Economics of Organizations.⁷ In a related paper,⁸ Burak Güner, Tate, and I focus on a different set of corporate actors, board members. We illustrate the individual impact of corporate directors, especially the role of one individual trait: their financial expertise. Following the recent wave of accounting scandals, regulators have urged placing more "financial experts" on boards to ensure more accurate disclosure and better audit committee performance. However, we neither know whether individual board members make a difference nor whether they affect outcomes in the way the regulator intends, preventing financial missteps. In particular, "financial experts" typically are

bankers, who may pursue the interests of their financial institutions rather than maximizing shareholder value.

How can we identify individual effects when board composition is endogenous and, hence, the influence of board members is hard to disentangle from firm-specific effects? We construct a novel panel data set on the board composition of 282 companies over 14 years. The data provide sufficient variation to identify commercial banker effects, after controlling for company fixed effects. Thus, the results do not reflect time-invariant firm characteristics. Moreover, we are able to instrument for the presence on the board of commercial bankers, using pre-sample shocks to the supply of banker directors attributable to the banking crisis in the late 1970s and early 1980s.

We find that financial experts significantly affect corporate decisions, although not necessarily in the interest of shareholders. When commercial bankers join boards, firm lending increases, but mostly for firms with good credit and poor investment opportunities—that is, firms that are able to repay loans but do not have value-creating investment projects. Also, investment bankers on the board are associated with larger security issuance but also worse acquisitions. Both activities generate fees for the investment banks but appear to decrease (or at least not to increase) shareholder value. Third, whenever the interests of the financial institutions are unrelated to a corporate decision (for example, in the case of compensation decisions), or the financial expert is unaffiliated (for example, finance professors), we find little evidence of any influence at all. This research illustrates that the ongoing debate on optimal corporate governance is likely to benefit from accounting for individuals in our prediction of corporate outcomes.

Marketwide Implications

Given the evidence on influences—both rational and biased—that individual managers have on corporate outcomes, the next obvious question is: What are the broader, market-level implications? How do biases affect prices and market interaction outside the firm? For example, returning to the old story of Depression Babies in a non-corporate setting, Stefan Nagel and I⁹ show that individual investors who lived through

times of macroeconomic downturn, such as the Great Depression of the 1930s, tend to shy away from the stock market and other risky financial investments, as measured by stock-market investment and reported willingness to take financial risk. These results have market-wide implications: time variation in the earlier experiences of the current set of investors will influence risk taking in the aggregate.

This insight, in turn, helps to explain the puzzling phenomenon that periods of high risky asset prices—as measured by the price/earning ratio—often are followed by low subsequent returns. Indeed, we are able to show that periods of high average experienced returns of the current set of investors (and hence high risk taking) coincide with periods of high price/earnings ratios. For example, the 1960s and 1990s, periods of high equity-market valuations and low subsequent returns, coincide with periods when then-present investors had high experienced stock-market returns. And the 1940s and early 1980s, which were periods of low valuation and high subsequent returns, coincide with investors having low experienced stock-market returns. While this does not prove that variations in P/E ratios and expected returns are driven by experience effects, a theory of experience-induced variation in risk taking is a plausible explanation.

In another set of papers with Devin Shanthikumar,¹⁰ I explore the market response to a different bias affecting financial decisions: naiveté about misaligned incentives. In the context of investment advice, we document that individual investors fail to account for upward distortions in analyst recommendations. In response, analysts profitably can offer investment advice even when standard rational frameworks predict that they should not be able to do so in the presence of asymmetric information.

How does the discussion of a “market response” to investor biases relate back to the corporate setting and to managerial biases? Since investors cannot (short-)sell specific pieces of a firm—or short-sell the CEO, for that matter—the stock market is unlikely to allow identifying a “market reaction” to managerial biases, with the exception of the rare occasion when we can study announcement effects (as in the case of mergers by overconfident CEOs discussed above). A more

promising route to identifying a response to managerial biases is internal firm data. Firms appear to install “corporate repairs”—that is, procedures and institutional design intended to counteract managerial biases. Obtaining and exploring such data seems the natural next step in the development of the new paradigm in Corporate Finance research.

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² F. Modigliani and M. Miller, “The Cost of Capital, Corporation Finance, and the Theory of Investment,” *American Economic Review*, vol. 48, (1958), pp. 261–97; S. Myers and N. Majluf, “Corporate Financing and Investment Decisions when Firms Have Information that Investors Do Not Have,” *Journal of Financial Economics*, vol. 13, (1984), pp. 187–222; S. Myers, “The Capital Structure Puzzle,” *Journal of Finance*, vol. 39(3), *Papers & Proceedings*, (1984), pp. 575–92.

³ U. Malmendier and G. Tate, “Superstar CEOs,” NBER Working Paper No. 14140, June 2008, and *Quarterly Journal of Economics*, vol. 124(4), pp. 1593–638.

⁴ U. Malmendier and G. Tate, “CEO Overconfidence and Corporate Investment,” NBER Working Paper No. 10807, October 2004, and *Journal of Finance*, vol. 60(6), pp. 2661–700.

⁵ U. Malmendier, G. Tate, and J. Yan, “Overconfidence and Early-life Experiences: The Impact of Managerial Traits on Corporate Financial Policies,” NBER Working Paper No. 15659, January 2010.

⁶ U. Malmendier and G. Tate, “Who Makes Acquisitions? CEO Overconfidence and the Market’s Reaction,” NBER Working Paper No. 10813, October 2004, and *Journal of Financial Economics*, vol. 89 (1), pp. 20–43.

⁷ U. Malmendier and C. Camerer, “Behavioral Economics of Organizations,” in P. Diamond and H. Vartiainen (eds.), *Behavioral Economics and Its Applications*, Princeton University Press, (2009).

⁸ B. Güner, U. Malmendier, and G. Tate, “Financial Expertise of Directors,” *Journal of Financial Economics*, vol. 88(2), pp. 323–54, (2008).

⁹ U. Malmendier and S. Nagel, "Depression Babies: Do Macroeconomic Experiences Affect Risk-Taking?" NBER Working Paper No. 14813, March 2009, forthcoming in Quarterly Journal of Economics.

¹⁰ U. Malmendier and D. Shanthikumar, "Are Small Investors Naïve about Incentives?" NBER Working Paper No. 10812, October 2004, and Journal of Financial Economics, vol. 85(2), pp. 457-89, (2007), and "Do

Security Analysts Speak in Two Tongues?" NBER Working Paper No. 13124, May 2007.

Empirical Analysis of Corruption

Benjamin A. Olken*

Although corruption is considered a significant problem in much of the developing world, for many years there was virtually no hard economic data on it. Instead, economic studies for the most part relied on cross-country datasets consisting of businessmen's general perceptions of the relative corruption levels of different countries.¹ The lack of data meant that it was difficult to estimate the true costs of corruption, to test which theories of corruption were borne out in the data, and to understand what approaches might be most effective in reducing corruption.

In recent years, a variety of approaches have been taken to ferret out more accurate indicators of corrupt activity. My recent empirical work on corruption examines how this improved data can be used to answer three questions: what are the costs of corruption; how can corruption be ameliorated; and, what theories of corruption best match the data?

The Costs of Corruption

Corruption may matter for economic efficiency if theft of government resources increases the cost of government activity. Then, otherwise worthwhile government projects — such as redistribution schemes or public works projects — will no longer

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be cost effective. I examine this possibility² in my study of a large Indonesian anti-poverty program that distributed subsidized rice to poor households. I estimate the extent of corruption in the program by comparing administrative data on the amount of subsidized rice distributed in a given region with survey data on the amount of the subsidized rice actually received by households in that region. The central estimates suggest that, on average, at least 18 percent of the rice appears to have disappeared. I show statistically that the "missing rice" was much more concentrated in particular regions than would be predicted by random chance. Therefore, it looks as though in some regions much of the rice was not distributed at all, rather than there simply being misreporting in the survey data.

In the same paper, I construct a welfare calculation of the benefits of the program, both as it was implemented and using a counterfactual with the same targeting of beneficiaries but without corruption. I estimate that the welfare losses from this "missing rice" may have been large enough to offset the potential welfare gains from the program's redistribution. In other words, the program without corruption might have been cost-effective but, in the presence of corruption, it likely was not. These estimates suggest that corruption can be costly enough to substantially impede redistribution.

Corruption also may lead to inefficiency if it undoes the government's ability to correct an externality. For example, if someone can bribe a police officer or

judge instead of paying an official fine, then the marginal cost of breaking the law is reduced from the official fine to the amount of the bribe. Even worse, if the police officer extracts the same bribe regardless of whether the person has broken the law, then the marginal cost of breaking the law falls to zero and the law ceases to have a disincentive effect altogether.

Patrick Barron and I examine this possibility in a paper on trucking in Indonesia.³ We had surveyors travel with truck drivers on 304 trips to and from the Indonesian province of Aceh, recording data on more than 6,000 illegal payments made at police and military checkpoints and at weigh stations. We believe that this represents the first large-scale survey that has ever directly observed actual bribes in the field.

Using these data, we examine what happens when these trucks stop at weigh stations. Driving an overweight truck is a classic example of an activity that generates an externality. While there can be benefits to a trucker from loading on additional weight, the damage the truck does to the road rises very rapidly with the truck's weight. For this reason, governments around the world weigh trucks and impose fines on trucks that are overweight.

In our data, we find that virtually all of the trucks in our sample were substantially over the weight limits — and, in fact, 42 percent of trucks were more than 50 percent over the legal weight limit. The data also suggest that corrup-