Self-Dealing in Corporate Investment*

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Abstract

Using hand-collected data on CEOs' personal assets, we find that CEOs prioritize corporate investment projects that increase the value of CEOs' private assets. Such projects are implemented sooner, receive more capital, and are less likely to be dropped. This investment strategy delivers large personal gains to the CEO but selects lower NPV projects for the firm and erodes its investment efficiency. CEO self-dealing is driven by public firms and disappears at smaller private firms where the agent is the principal. Departures of self-dealing CEOs increase firm value by 5–7%. Overall, we uncover CEOs' private gains in capital budgeting.

JEL Codes: G30, G34, G41

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Academic theory and economics textbooks usually define the main task of a firm's CEO as selecting investment projects that maximize the NPV. Yet a central tenet in the agency theory is that some investment projects deliver private benefits to the CEO and allow for self-dealing at the shareholders' expense. While the CEO's private gains from investment projects are fundamental to the agency theory because they drive a wedge between the incentives of managers and shareholders, a systematic analysis of such projects in developed economies has been elusive. Such an analysis would require observing the opportunity set of investment projects, evaluating their value to the firm, and identifying their private benefits to the CEO.

This paper is one of the first to offer a granular analysis of CEOs' private monetary gains from corporate investment projects and to study how such incentives affect the selection, implementation, and sequencing of project-level investments. We study over 229,000 investment projects (with a combined investment near $1 trillion) overseen by 412 CEOs of public and private firms in the energy sector where we can observe the costs, cash flows, and execution schedules for each project. As a source of variation in the CEOs' private gains, we exploit their personal ownership of investment land, whose value is strongly influenced by the exploration of fossil fuels. The following example illustrates the economic mechanism.

In 2013, Tom Ward, the CEO of Sandridge Energy, a NYSE-listed energy firm with a $3.2 billion market capitalization, received criticism from the shareholders and media for directing corporate investment towards projects that benefitted him and his family. According to investigation reports, the CEO used the firm's capital to drill on his private land, increasing its value, whereupon he could lease it back to the firm or sell it for private gain.[1] Based on Sandridge proxy statements, the CEO and his family collected $5.9 million in royalties from the firm in 2008–2012, not including any gains on land sales to unrelated parties.

In January 2013, TPG-Axon Capital, a shareholder of Sandridge, launched a proxy contest to oust the CEO "whose credibility has been damaged due to extensive conflicts of interest and self-dealing." The campaign met with vehement resistance from the incumbent board, staggered and chaired by the CEO, who threatened to exercise a change of control clause and a proxy put to thwart the activist's effort. However, in March 2013, the Delaware Court ruled that the incumbent board may not refuse its approval to a slate of

[1] For example, the investigation report by Reuters is available at: https://stateimpact.npr.org/oklahoma/2013/02/06/reuters-ceos-deals-pose-potential-conflicts-of-interest-at-sandridge-energy/

new director nominees unless it can prove they would cause harm.[2] After the court decision, the Sandridge board settled the proxy fight and appointed four TPG directors. On June 19, 2013, the new board fired Tom Ward, and Sandridge stock rose 7%, indicating that the CEO's behavior had depressed the firm's value.

We use the institutional setting of the oil and gas industry, where the CEO's private gains are directly linked to select standalone projects, as a laboratory to analyze the effect of the CEO's private benefits on corporate investment and its outcomes. CEOs' private investments in oil fields are common and economically important. Over 22% of CEOs in our sample own investment land in oil fields, after excluding the CEOs' primary homes and residential investment properties. The average CEO with investments in oil fields owns 1.7 properties valued at about $1.9 million, and this investment value is higher for the CEOs of public firms ($2.3 million). The initiation of a drilling project within a 3-mile radius from a private land lot is associated with a 45% increase in land value and a higher royalty rate, amounting to about $1 million in a one-year gain for the average CEO of a public firm, an amount comparable to the annual salary. The medium-term effects are even larger. These private gains from the start of resource extraction act as a powerful monetary lever to explore the role of CEOs' private gains in corporate decisions.

Our first result is that a firm is nearly three times more likely to initiate an exploration project in an oil field where its CEOs owns investment land than in an observationally similar field in the same region. Firms also tend to enter such fields more quickly and invest in them more aggressively. For example, the average firm invests 6.1 percentage points more capital in an oil field where its CEOs owns private land than in other fields with similar characteristics in the same region. Firm investment in such fields becomes less responsive to signals of project quality revealed in the early years of its implementation. In particular, firms continue to invest in the fields with the CEO's personal assets even if the initial drilling outcomes are weak.

The tendency of firms to prioritize the fields with the CEO's private assets across both the extensive and intensive margins could have several interpretations. According to the information hypothesis, the CEO has superior information about the quality of fossil reserves near his personal investment properties. This hypothesis predicts that the wells drilled near the CEO's personal investments should have higher productivity and lower dispersion in financial outcomes, consistent with the CEO's superior information.

[2] See Kallick v. SandRidge Energy, March 2013. The full text of the Delaware Court ruling is available at: https://courts.delaware.gov/opinions/download.aspx?ID=186150

Alternatively, according to the agency hypothesis, the CEO engages in self-dealing by aiming to realize private gains from land appreciation from the initiation of drilling. If such a motive imposes a constraint on the location of drilling or results in overinvestment, the wells near the CEO's personal properties should, all else equal, be less productive and have lower NPVs than their unconstrained counterfactuals.

Our findings support the agency hypothesis. When a firm enters an oil field encompassing its CEO's private land, such investment projects underperform their counterfactuals. For example, wells drilled in the field near the CEO's investment properties have 13% lower output, 8 percentage points lower internal rate of return (IRR), and 34% lower estimated NPV. These investment projects are also 4 percentage points more likely to be value-destroying—that is, to deliver nominal cash inflows that do not recoup the cost of drilling, such as dry wells. The evidence suggests that the higher intensity of drilling in the CEO's oil field is associated with the stepping down in project quality and, hence, weaker performance.

These economic estimates are robust to absorbing time-invariant heterogeneity across firms, CEOs, and regions, as well as accounting for an array of granular control variables at the project level, such as project characteristics, technology, and geological composition of fossil fuels. These results also persist after controlling for unobservable factors affecting a given firm or region during the year, absorbed by firm $*$ year and state $*$ year or township $*$ year fixed effects. For example, the specifications with township$*$year and firm$*$year fixed effects capture changes in economic variables affecting a firm's activity in a given exploration region (township radius $\approx$ 3 miles), including changes in local investment opportunities, technological discoveries, regulation, and firm's investment policy, among many others. These results are also distinct from a home bias and remain robust after controlling for the CEO's home state and the distance between a project and the firm's headquarters.

We consider two non-mutually exclusive economic channels of investment self-dealing. The first, which we label front running, involves purchasing investment land in anticipation of the firm's entry into an oil field. The second, which we label diverting, involves directing the firm's investment funds to drilling projects in the oil fields with the CEO's pre-existing investment properties. To distinguish between these channels, we exploit variation in the timing of private land acquisitions, using administrative data on deed transfer records. To separate the diverting channel from the front-running channel, we rely on several settings where investment properties are acquired without private information about the firm's future investment strategy, so that the front running channel is shut down. First, we replicate our analysis by focusing on investment properties acquired prior to the discovery of the shale gas technology, where the choice of land investments is plausibly exogenous to the fossil deposits that are yet-to-become commercially viable. Second, we study investment properties acquired before the CEO's professional appointment at the firm. Third, we consider inherited properties. This experiment endows the CEO with properties in a particular region at an idiosyncratic time of a relative's death, effectively muting the CEO's input in property selection. Our findings suggest that both the front running and the diverting channels are operative, and the diverting channel is likely more economically important.

Next, we study personal land transactions after the firm's entry into the CEO's oil field to evaluate whether the CEO knowingly engages in self-dealing or naïvely suffers from overconfidence, while believing to act in the best interest of the shareholders. We find that after a firm initiates drilling in the CEO's oil field and drives up land values, the CEO is 136% more likely to sell his private land in the field, mostly to retail buyers. Correspondingly, after the CEO's land sale, his firm reduces investment intensity in the field. The CEO's disposition of investment properties upon their appreciation is consistent with the realization of private gains from corporate investment and speaks against the alternative interpretation of naïve overconfidence. If corporate investment in the CEO's oil field were driven by the CEO's persistent overconfidence rather than the self-serving interest to raise the land price and cash out, we would expect overconfident CEOs to retain their investments after the initiation of drilling, just as overconfident CEOs retain their in-the-money options after stock appreciation (Malmendier and Tate 2005; Kaplan et al. 2022).

Finally, we evaluate whether CEO self-dealing reflects a governance friction or serves as an optimal contract with the shareholders. Prior work shows analytically that a non-zero level of an agent's corruption is efficient in a variety of settings, and the optimal level of corruption trades off the cost of allowing resource misallocation against the cost of designing incentives to eliminate it (see Shleifer and Vishny 1998 for a review). For example, by allowing the CEO to realize private gains from corporate investment, the firm could attract better managerial talent or reduce spending on executive pay. We do not find support for this view. First, CEOs with private investments in oil fields are paid no less than their counterparts at the same firms without such investments. If anything, CEOs with private investments obtain higher pay and perquisites, albeit these differences are not statistically significant. Second, the departures of self-dealing

CEOs generate large positive announcement returns of 5.3–7.5%. In contrast, the departures of other CEOs in the sample generate slightly negative announcement returns, consistent with the traditionally muted market reactions to CEO departures (Warner, Watts, and Wruck 1988; Weisbach 1988). This pattern suggests that investors perceive a large increase in firm value from terminating a CEO with private interests, and our micro evidence likely signals a broader range of the CEO's self-dealing behaviors.

Overall, our findings line up closely with the predictions of the classical agency theory, which postulates that managerial self-dealing arises due to the separation of ownership and control (Coase 1937; Jensen and Meckling 1976; Fama and Jensen 1983; Grossman and Hart 1988). In support of this prediction, we find that self-dealing mostly disappears at small private firms where the agent is usually a principal. Our evidence also validates theoretically-motivated mediators of self-dealing. Jensen and Meckling (1976) and Jensen (1986, 1989, 1993) posit that managers overinvest in self-serving projects when they have more free cash flow, face looser monitoring, and possess stronger control rights. We find that CEOs are more likely to invest in self-serving projects during periods of high oil prices, which increase free cash flow and managerial slack. The underperformance of such projects is greater when the CEO has stronger control rights (board chairman) and faces weaker monitoring (less concentrated shareholder ownership).

The central contribution of this article is to provide the first evidence on how the CEO's personal investments are associated with the selection and implementation of corporate investment projects. We show that CEOs skew corporate investment towards projects that offer private monetary gains, and this practice dampens investment efficiency. Our findings add to three research strands: (1) self-dealing, (2) CEOs' private incentives in corporate investment, and (3) economic policies in the oil and gas industry.

Our paper is part of a broader literature in economics that examines self-dealing. So far, this literature has mostly focused on the expropriation of minority shareholders by the controlling shareholders overseas, such as asset transfers in Indian business groups (Bertrand, Mehta, and Mullainathan 2002), related lending in Mexico (La Porta, Lopez-de-Silanes, and Zamarripa 2003), intercorporate loans in China (Jiang, Lee, and Yue 2010), loan guarantees and asset transfers in Asia (Johnson, Boone, Breach, and Friedman 2000), and intergroup tunneling in Western Europe (Johnson, La Porta, Lopez-de-Silanes, and Shleifer 2000). Similarly, in an international context, prior work identifies economy-wide institutional features that affect the likelihood of self-dealing (Djankov, La Porta, Lopez-de-Silanes, and Shleifer 2008).

Our paper adds to this literature by offering project-level evidence in the U.S. and studying the behavior of agents rather than controlling shareholders.

In the U.S., managerial self-dealing and the resulting inefficient investment is hypothesized as one of the key channels through which governance affects firm value (e.g., Gompers, Ishii, and Metrick 2003, p. 131). Yet, direct evidence on self-dealing in investment projects has been scarce, and prior work offers diverging predictions about CEOs' private incentives. Early work emphasizes CEOs' incentives to overinvest in projects that require their specific human capital (Shleifer and Vishny 1989) and engage in empire building to increase personal status, gain power, and diversify risks. In contrast, later work adds that "empire building may not be the norm, and managers may instead prefer to enjoy a quiet life" (Bertrand and Mullainathan 2003, p. 1043), highlighting CEOs' preferences to underinvest and consume leisure. Yet another stream of work (e.g., Xuan 2009) illuminates CEOs' private motives to overinvest in projects that raise their internal clout with key firm insiders, a preference for bridge building rather than empire building. This lack of consensus highlights challenges in identifying CEOs' self-serving projects and measuring their private gains, since intangible benefits such as internal clout, entrenchment, or leisure are difficult to trace. This paper is one of the first to identify capital budgeting projects that yield unambiguous monetary benefits to the CEO and compare their investment intensity and performance against thousands of regular projects.

A related strand of work studies CEOs' private benefits in the context of investments in perquisites, such as corporate jets, and finds mixed evidence. While some studies suggest that such perquisites reflect managerial excess (Yermack 2006; Edgerton 2012), others argue that the CEO's use of the corporate jet yields shareholder benefits (Rajan and Wulf 2006; Giroud 2013) and persists in the presence of strong principals (Cronqvist and Fahlenbrach 2013). This debate highlights the importance of a systematic analysis of self-dealing projects in capital budgeting and clean micro-level evidence on their outcomes.

Finally, we add to research that uses the oil industry to study fundamental economic questions, such as optimal risk sharing (Leland 1978), investment-to-cash flow sensitivity (Lamont 1997), CEO pay for luck (Bertrand and Mullainathan 2001), inter-firm learning (Kellogg 2011), the effect of uncertainty on investment (Kellogg 2014), market power and production efficiency (Asker et al. 2019), bankruptcy protection and productivity (Boomhower 2019), and debt overhang (Wittry 2021). We extend this work by providing evidence on a foundational principal-agent conflict underlying the theory of the modern firm.

1. Empirical Setting

1.1. The Oil and Gas Industry

The oil and gas (O&G) industry represents an important sector in the economy. The dotted line in Figure 1 plots the annual capital expenditures in the O&G industry as a fraction of total capital expenditures in the U.S. economy in 2000–2020, using the U.S. census data on national capital investment. During the mean (median) year in this period, the industry contributes 9.2% (11.1%) of nationwide capital investment and consistently ranks among the top investment drivers in the economy. The solid line in Figure 1 shows that the energy sector also accounts for a significant share of the U.S. stock market capitalization. During the median (mean) year in 2000–2020, the energy sector constitutes 8.4% (12.0%) of the S&P 500 index. In addition to the impactful financial metrics, the O&G industry supports 10.3 million jobs. These contributions suggest that investment decisions in the O&G sector have a significant influence on the economy in supporting economic growth, regional development, and job creation.

Several institutional features make the O&G sector well-suited for studying CEOs' investment decisions. First, this is a capital-intensive industry where investment decisions play a first-order role in value creation. Second, investment decisions in this sector are centralized, and the CEO holds the main decision authority in establishing each firm's investment strategy (Graham, Harvey, and Puri 2015). Third, investment projects are standardized. The typical investment project involves drilling a well, and the project's location, investment, and cash flows are observable and easy to compare. Drilling projects account for the dominant majority (83.5%) of the industry's capital investment (Gilje and Taillard 2016).

Investment sites in oil and gas fields are located in 19 states across the country, extending from the East Coast to the West and scattered across many large and economically important states, such as Texas, Ohio, Pennsylvania, and New York.[3] In 2020, the states with oil and gas investment projects in our sample account for 33.6% of the U.S. population and 33.2% of the GDP. Figure 2 plots the locations of new oil and gas wells drilled in the United States from 2000 to 2020. To illustrate temporal dynamics, light-shaded and dark-shaded dots indicate wells drilled earlier and later in the 2000–2020 sample period, respectively.

[3] The 19 states with oil and gas exploration in our sample include AK, KY, LA, MS, MT, NE, NV, NM, NY, ND, OH, OK, PA, SD, TN, TX, UT, WV, and WY.

In summary, the O&G industry accounts for one tenth of capital investment in the U.S. The investment decisions are centralized in the firm's executive suite, and the projects are well-defined, homogenous, and economically important. Thus, the O&G sector offers a convenient setting for studying CEOs' investment decisions and plays a significant role in regional and national economic development.

1.2. Project Lifecycle, Cash Flows, and Technology

A typical O&G firm has hundreds of proven reserves, and the firm's management plays a key role in determining which reserves to develop and in what sequence. The significant subjectivity inherent in this managerial decision offers a useful setting for studying the role of CEOs' private interests in the selection, implementation, and sequencing of investment projects.

A typical investment project includes the preparation of the reserve for extraction, followed by drilling, extraction, and site cleanup. The pattern of cash flows includes a large initial investment in site development, followed by positive cash inflows from resource extraction (greater in the first years of a project's life), and a small close-up investment at the end to conserve a depleted well. The typical well remains in production for 20–25 years, a period we label the useful life of an investment project.

The output for each drilling project is a combination of oil and natural gas, as their deposits are often extracted simultaneously. The initial output of a well in the first year is highly informative about its future productivity. The production output in the first full year of extraction (i.e., the baseline production level) is typically the highest output level achievable during a project's lifetime. With each additional year, the well is gradually depleted, and the output level declines. Several models in petroleum engineering provide robust estimates of a well's future productivity and longevity based on its observed productivity in the initial year and other geological factors (Fetkovich et al. 1996; Li and Horne 2003). These forecasts of a project's cash flows allow us to test how CEOs' capital investment decisions respond to the revelation of value-relevant information after the project's initiation. Internet Appendix Figure IA.1 depicts a typical pattern of a well's production over time, using the forecasting model of Fetkovich at al. (1996).

The technological scope and development costs of investment projects in the O&G industry are highly standardized. Virtually all investment projects in our sample period of 2000–2020 are executed via one of the two drilling technologies: (1) vertical drilling or (2) horizontal drilling.

Vertical drilling is the traditional drilling technology for accessing an underground reserve of fossil fuels located directly underneath the well site by drilling vertically into the ground. The vertical drilling method was the primary way of extraction until innovative developments in hydraulic fracturing in the early 2000s made horizontal drilling economically viable. Horizontal drilling involves drilling non-vertical wells, which access the ground at an angle other than 90 degrees. This technology permits extracting subsurface deposits that are inaccessible from directly above because of various obstacles, such as wetlands or abnormal reservoir shapes. By the end of 2011, new horizontal wells surpassed new vertical wells in total drilling footage, and by 2013, horizontal wells accounted for the majority of new O&G wells in the U.S.

In summary, given the large number of proven reserves available to the typical firm, the management holds significant flexibility in selecting and sequencing investment projects. Projects are well-standardized in their technology, cash flow pattern, and production output. A project's initial productivity is informative about its future cash flows due to the predictability of reservoir depletion patterns.

1.3. The Effect of Resource Extraction on Local Landowners

The development of an O&G reservoir increases the value of land encompassing the reservoir. The increase in land value is driven by the fact that a firm must acquire a permit to extract fossil fuels by entering into a contract with the landowners (mostly private individuals). In exchange for the permit to drill, firms provide monetary compensation to the mineral right owners in the form of an upfront cash bonus and a royalty stream (15%–25% of the well's production output), which drives up the local land prices.

Figure 3 shows that the initiation of oil and gas drilling serves as a powerful catalyst of local land values. Market value of land rises by 45.1% during the year of the initiation of drilling, denoted as year zero. The increase in land values is persistent in time, and most of the effect materializes shortly after the start of drilling. The graph also captures some anticipatory upward pressure on land prices in the year immediately preceding the start of drilling, but not in earlier years. Land values (in dollars per acre) capture the average market value of vacant land in a township within 20 kilometers (12 miles) of an oil and gas formation. Property-level data on market land values come from the Zillow Transaction and Assessment Dataset (ZTRAX), a comprehensive national database with detailed information (property characteristics, address and geolocation, assessor data, and purchase and sale transactions, etc.) on over 200 million parcels in 3,100 counties during our sample period. The value of land is based on market transactions for vacant land—that is, parcels for which land value exceeds 50% of the assessed lot value.

Internet Appendix Table IA.1 confirms the strong monetary benefits to local landowners from oil and gas exploration on the extensive margin (Panel A) and the intensive margin (Panel B). Panel A shows that the commencement of drilling confers monetary benefits to the landowners in the township of drilling, as measured by their land values (columns 1–2) and collected royalties (columns 3–4). The main variable of interest is the binary indicator *Drilling initiation*, which equals 1 after the first well is drilled in a township and 0 otherwise. The data on transaction-level land prices and royalties are from ZTRAX and DrillingInfo, respectively. According to column 2, the initiation of drilling is associated with a $5,384 increase in the value of land per acre, equivalent to a 48.9% appreciation relative to the year before the start of drilling ($11,014 per acre). This estimate, significant at 1%, is similar in magnitude to that depicted in Figure 1 and controls for township heterogeneity and time trends (vintage year) via the respective fixed effects. Columns 3–4 show that the initiation of drilling also increases the royalty rate paid to the landowners, and this effect is also reliably significant at 1% with the full set of fixed effects (t-statistic = 4.24 in column 4).

Panel B focuses on the intensity of drilling. The main independent variable of interest, *Drilling intensity*, captures the cumulative number of wells drilled in the property's township. The results show that, after the initiation of drilling, a higher intensity of drilling is associated with a further increase in local land prices (columns 1–2) and a higher royalty rate paid to the local landowners (columns 3–4).

Overall, the results in Table IA.1 confirm that the commencement of drilling and the intensification of drilling generate large monetary benefits for the landowners in the township of the drilling site, consistent with prior research. The positive wealth shocks from oil exploration to the local landowners are large enough to drive up local bank deposits by 39% (Plosser 2014) and induce the landowners to quit their jobs (Bellon, Cookson, Gilje, and Heimer 2021). Fedaseyeu, Gilje, and Strahan (2019) conclude that "Landowners in shale-boom areas receive big inflows of wealth, tantamount to 'winning the lottery'" (p. 6).

In summary, the commencement of drilling and the addition of new projects in the area produce large positive shocks for the landowners in the townships adjacent to the drilling sites. Thus, a CEO with a personal investment in an oil field faces private monetary gains from the field's exploration and has an incentive for its accelerated development and higher investment intensity.

2. Data, Summary Statistics, and Institutional Details

2.1. Firms and Investment Projects

We begin our sample construction by identifying public and private firms engaged in oil and gas exploration in the United States in 2000–2020. To identify such firms, we obtain the universe of U.S.-based oil and gas drilling projects from DrillingInfo. This is the most comprehensive project-level data repository for the oil and gas industry, and it is widely used by the U.S. federal agencies, such as the Environmental Protection Agency (EPA) and the U.S. Energy Information Administration (EIA) of the U.S. Department of Energy. These data serve as the foundation for government reports on Petroleum Supply Monthly (PSM) by the EIA and the Inventory of U.S. Greenhouse Gas Emissions and Sinks by the EPA. The dataset includes over 30 project-level characteristics for each oil and gas well, such as its location coordinates, rock formation features, exploration technology (vertical or horizontal drilling), the drilling firm, the date of drilling and closure, drilling depth, monthly production volume, and royalty payments to the landowner.

We augment these project-level data with two additional datasets. First, we collect per-project capital expenditures, including per-foot drilling costs, from regulatory pooling documents. Second, we obtain prices of oil and natural gas from the EIA.

We restrict the sample to firms that have available data on the identity of their CEO. From this initial set of 318 firms, we exclude 20 foreign firms because their CEOs reside outside the United States. We also exclude project-level observations with missing data. After imposing this filter, we arrive at our main sample of 298 firms, 412 CEOs, and 229,001 investment projects. Table IA.2 shows the sequence of sample selection criteria and the number of observations retained after each filter.

Panel A in Table 1 reports summary statistics for our sample firms. Among the 298 sample firms, 170 are publicly traded, and 128 are privately held. The average (median) firm invests about \$243 (\$78) million per year in drilling projects, operates 592 (158) wells, and initiates 72 (23) new investment projects per year. The additional breakdown of these statistics between public and private firms shows that public firms have a greater number of active wells, initiate more drilling projects per year, and operate in more states. The average (median) public firm owns assets with a book value of \$16.6 (\$3.2) billion, has an annual investment rate of 28% (24%) of book assets, maintains a market-to-book ratio of 2.02 (1.57), and generates an annual return on assets of 12% (14%).

Panel B in Table 1 reports summary statistics for investment projects. The 229,001 investment projects in our sample account for a combined capital expenditure of $938 billion (expressed in year 2020 dollars). The average (median) drilling project is located 777 (557) kilometers from the headquarters, requires an investment of $3.4 ($3.7) million, and generates an annual cash inflow of $3.3 ($1.4) million in the first year of production. The median project generates an internal rate of return (IRR) of 14.1% per year. This pattern is consistent with high commodity prices during our sample period. The average (median) price of oil is $71 ($73) per barrel, and the average (median) price of natural gas is $4.96 ($4.24) per 1,000 cubic feet, well above the average extraction costs for these resources. As mentioned earlier, the drilling projects are spread out across 19 states, and the average (median) state has 12,053 (2,476) active wells.

2.2. CEOs

For public firms, we collect CEO information from regulatory filings with the Securities and Exchange Commission, such as definitive proxy statements and quarterly and annual reports. Next, using corporate press releases about management changes, we cross-verify the CEO's period of employment and collect the announcement dates for the CEO's appointment and departure. For private firms, we obtain CEO data from Capital IQ (People Intelligence) and BoardEx. We supplement these sources with information from executive biographies and historical archives of corporate websites retrieved via Wayback Machine. In this process, we obtain the CEO's full name, year of birth, and the starting and ending dates of his or her tenure.

Using the combination of the CEO's full name and birth year, we manually identify the executive in the Lexis Nexis Public Records database (LNPR), which aggregates information on over 500 million U.S. individuals (live and deceased) from federal, state, and county records. Such records include deed and assessment records, birth records, voter registrations, utility records, and criminal filings. Individuals are traced via a unique ID, linked to one's social security number and employment. Prior work has used LNPR to obtain personal data on CEOs (Cronqvist, Makhija, and Yonker 2012; Yermack 2014; Duchin, Simutin, and Sosyura 2021), directors (Alam, Chen, Ciccotello, and Ryan 2014), fund managers (Pool, Stoffman, and Yonker 2012; Chuprinin and Sosyura 2018), and securitization agents (Cheng, Raina, and Xiong 2014).

We manually validate the accuracy of each match to LNPR by ensuring that the CEO's employer, work email address, and occupation listed in the employment records in LNPR match the executive's career history. We also perform an external validity check of our matches. For a subset of CEOs with political contributions reported to the Federal Election Commission (FEC), we compare the CEO's home address listed in LNPR with his address, occupation, and employer listed in the FEC records. This step provides an external validation of our matches because the data on CEOs' addresses and employment in LNPR and FEC come from unconnected sources (county and employment records in LNPR and political contribution forms in FEC). We are able to establish reliable matches to LNPR for all domestic CEOs in our sample.

Using LNPR, we obtain each CEO's date of birth (month and year) and state of origin (indicated by the first three digits of his social security number). Panel C in Table 1 reports summary statistics for the 412 CEOs in our sample, of whom 236 lead public firms, and 176 run private firms. 408 CEOs (or 99% of the sample) are male, consistent with a higher prevalence of male CEOs in the energy sector. The average (median) CEO in our sample is 56.4 (56) years old and has a firm tenure of 9.3 (8.0) years.

We also obtain CEOs' education and board memberships from BoardEx and hand-collect data on CEOs' undergraduate majors from the archives of college yearbooks (retrieved from Ancestry.com) and executive biographies. The most common undergraduate majors for the CEOs in our sample are engineering (65%) and business (16%). One third of the CEOs (34.6%) hold graduate degrees, and the most common graduate degree is an MBA (18.5%). About 55% of CEOs serve as their firm's chair of the board.

2.3. Investment Properties

LNPR covers the universe of county deed records during our sample period, allowing us to reconstruct the history of each CEO's ownership of real estate assets. For each CEO, we retrieve the history of real estate transactions from the CEO's comprehensive person report in LNPR. We also identify the properties that CEOs own via family investment trusts, since these transactions are more common among the wealthy. When a CEO is a beneficiary of a trust, this business is linked to his comprehensive report in LNPR, and the deed record for the property usually lists the trust beneficiaries' names in a separate field.

For each real estate asset of interest, we obtain its LNPR property report, which aggregates information from deed, assessment, and mortgage records. While the level of detail varies by county, these sources typically include property details (e.g., land acreage, improvement value, and the breakdown of assessed value between land and structures), transaction details (e.g., purchase and sale dates and transaction prices), and ownership details (e.g., co-owners, liens, and parcel numbers). For some properties, we also observe financing information from mortgage records, such as the amount of the loan, the history of refinancing, and the lending institution.

To focus on investment properties, we exclude the CEO's primary residence because it is usually acquired for consumption rather than investment purposes. We define the CEO's primary residence as the address where the CEO is registered to vote, according to the history of voter registration records in LNPR. This is nearly always the address where the CEO lives together with his spouse (according to utility connection records) and the home address listed on the CEO's political contribution forms (for the subset of CEOs who make political contributions). We also exclude properties for which the value of land accounts for less than 50% of the total assessment value.[4] This filter screens out investments where a significant portion of value is contained in the buildings. While oil exploration unambiguously raises the price of vacant land, the effect on the value of buildings is more nuanced because oil exploration can produce negative externalities on groundwater-dependent homes (Muehlenbachs, Spiller, and Timmins 2015).

Using the address of each property and its GPS coordinates, we focus on CEOs' investment properties located within 20 kilometers (12 miles) of any documented oil and gas field in the U.S. Our results are not sensitive to this threshold and hold under narrower definitions, including the distance of 10 kilometers (6.2 miles) from an oil field. We choose the radius of 20 kilometers as our main specification because the shape of an oil and gas field typically grows as the field is being developed, and new reserves are discovered. Figure 3 illustrates this geospatial expansion by plotting the development of the Sandhill Field in Texas from 2000 to 2020 and showing how a typical oil field extends its boundaries over time.

Panel D in Table 1 shows that the CEOs in our sample own 155 investment properties near oil and gas fields. These investment properties come in the form of predominantly vacant land, and they are located in the immediate proximity to oil fields. For example, for the median investment property, land accounts for 97% of the property's assessment value, and the distance between the property and the nearest oil and gas well is 5.3 kilometers or 3.3 miles. This pattern is consistent with the idea that these investments stand to benefit the most from the oil field's exploration and the resulting increase in the prices of land and mineral

4 We test the sensitivity of our results to this threshold by restricting to the sample to properties for which the ratio of market land value to total value is no less than 99% and obtain similar results.

rights in the area. Figure 5 shows a sample CEO's land lot and plots the drilling activity in its vicinity. The CEO's property in the figure spans 95.7 acres.

The average CEO investment property was acquired in 2004, and 45% of properties were acquired before the 2003 technological breakthroughs that combined hydraulic fracturing with horizontal drilling (Yergin 2011). Thus, a large fraction of CEOs' investment properties were acquired before their fossil deposits were discovered or became commercially viable. Furthermore, 53% of CEOs with such investments acquired their investment properties before their appointments.

In summary, the majority of CEOs already own their personal properties by the time they assume control over the firm's investment policy. Thus, their personal assets mostly predate professional decisions.

2.4. CEOs' Monetary Incentives

The CEOs' real estate assets adjacent to oil fields are economically important. In our sample, 22.3% of CEOs own at least one investment property adjacent to an oil field, and the average CEO with such investments owns 1.68 properties near an oil field. The mean property value is $1,120,000 for all CEOs and $1,410,000 for the CEOs of public firms. Thus, the mean value of a CEO's investments in land assets adjacent to oil fields is $1.9 million for all CEOs and $2.3 million for the CEOs of public firms.

Personal investments in oil fields provide considerable monetary incentives for CEOs. If the development of an oil field is associated with a 45–49% appreciation in the adjacent land values (Figure 1 and Panel A in Table IA.1), the average CEO with oil investment properties would experience a private gain from the field's development of around $847,000–$922,000. For the average CEO of a public firm, the same calculation would imply a personal gain from the field's development of $1.04–$1.13 million. For the mean CEO of a public firm, the personal gain estimate is comparable to an amount between the annual salary ($815,870) and the combined value of the salary and bonus ($1.51 million), as shown in Panel C of Table 1. The potential gains from land appreciation are an order of magnitude greater than CEOs' personal gains from opportunistic insider trading. For example, Cziraki and Gider (2021) estimate the upper bound of mean dollar profits from CEOs' insider trading at $68,000 per year.

In summary, CEOs' personal investments in oil fields provide considerable incentives for private gains comparable to the annual cash compensation from regular employment.

2.5. Disclosure and Legality

Disclosure requirements depend on how corporate investment funds are used for projects near the CEO's private land. If a CEO's firm invests in projects on his private land and enters into a lease agreement to acquire the drilling rights from the CEO, such an investment is considered a related party transaction and is subject to disclosure in the proxy statement. Similarly, if a CEO sells his private land to his employer, such a sale is subject to disclosure as a related party transaction.

Appendix 1.1 shows sample disclosures of royalty payments collected by CEOs for leasing their private land back to their employers. To illustrate the case discussed in the introduction, during his tenure as CEO of Sandridge Energy in 2006–2013, Tom Ward obtained $5.9 million in royalties for leasing his private land back to his employer through family-controlled trusts (Example 1 in Appendix 1.1). Example 2 shows that Harold Hamm, CEO of Continental Resources, obtained $25.1 million in royalties from his firm in 2008–2018. Example 3 shows that Glenn Darden, CEO of Quicksilver Resources, established a trust with his wife, children, and one of his colleagues (Jeff Cook, Quicksilver's Executive VP). Through this trust, the CEO leased back to the firm 2,773 acres of private land on an oil field.

A typical lease agreement between a CEO and his firm entitles the CEO to receive a fraction of the field's output without bearing the full costs of exploration. Since the CEO's royalties are based on the total net revenue from the wells drilled on the CEO's land lot (rather than their NPV), such agreements incentivize the CEO to overinvest the firm's capital by drilling more wells on the CEO's land lot.

An alternative mechanism involves corporate investment in projects in the same oil field and the same reservoir as the CEO's property, but not directly on the CEO's privately owned parcel. In such a case, the firm's development of an oil field raises the value of the nearby land, and the CEO benefits from the appreciation of his investment assets by selling them to a third party or holding them as collateral. Under this scenario, the CEO's employer does not enter into a leasing or purchase agreement with the CEO, and there is no formal related party transaction that would require mandatory disclosure.

The dominant majority of investment projects developed in the same field as the CEOs' private assets fall into the latter category without mandatory disclosure. Using geolocation data, we confirm that investment projects on the CEO's oil field typically involve drilling wells in the immediate vicinity of, but not directly on the CEO's private investment lot. We also verify this pattern by examining deed transfers for the CEOs' private assets in LNPR. When CEOs sell their private land after its appreciation in response to field development, virtually all sales go to retail buyers rather than the CEO's firm or its competitors, thus avoiding the disclosure requirement and transacting with likely less sophisticated household buyers.

If the firm's investment practices comply with said disclosure requirements, using corporate funds for investment projects that benefit the CEO is not illegal, to our knowledge. In fact, some firms explicitly permit such investment transactions in the CEO's employment agreements. Appendix 1.2 provides examples of CEO contracts that allow the executive "to continue to conduct oil and gas activities individually or through affiliates" or permit "the ownership of royalty interests where the Executive owns, previously owned or acquires the surface of the land covered by the royalty interest."

A natural question that motivates our empirical analysis is why the board of directors condones such investment activities that could be viewed as serving the CEO's private interests. One possibility is that this policy allows the firm to benefit from the CEO's private information and select the highest-NPV projects. Another possibility is that that such a policy represents an optimal contract that allows the firm to attract high-quality CEOs and save on executive pay via alternative means of compensation. Yet another possibility is that such investment activities serve the private interests of the management at the expense of the shareholders. If so, members of the board might condone such activities because of their own private gains or because of a closer than an arm's length relationship with the management.

Appendix 1.3 provides disclosures indicating that at least some directors also own private assets on oil fields and obtain sizable cash payments for leasing them back to the firm. Example 1 in Appendix 1.3 shows that Thomas Carter, an independent director and the nominating committee chair at Carrizo Oil & Gas, collected $3.3 million in royalties from the firm in 2015–2016. Example 2 illustrates a similar situation with two independent directors at RSP Permian, Inc., who collectively received $904,222 in 2016. Example 3 shows that royalty payments to directors occur even at large, well-known oil firms, such as Anadarko.

Surprisingly, all directors in the above examples are classified as independent directors by their firms, despite the perception that such transactions may bias the directors' motoring of similar investment activities by the CEO. The boards of said firms are aware of this risk but dismiss any conflict of interest. For example, in its 2015 proxy statement, Carrizo Oil & Gas notes (p. 7): "The Board took into account the transactions between the Company and Mr. Carter described in "Related Party Transactions." The Board determined that these transactions did not result in a relationship that interferes with the exercise of Mr. Carter's independent judgment … and therefore did not preclude a finding that Mr. Carter is independent."

Given the sizable monetary benefits linked to CEOs' and directors' private investments, it appears plausible they could affect the CEOs' investment decisions and directors' monitoring effort. Kacperczyk and Pagnotta (2019) show that CEOs and directors find it worthwhile to engage in unequivocally illegal insider trading (prosecuted by the SEC) for the mean gain of $1 million. In contrast, steering some corporate funds to select projects offers similar monetary benefits without breaking the law, particularly given the subjectivity in investment decisions and a large pool of projects relative to those with private benefits.

In summary, most investment projects in CEOs' oil fields do not require mandatory disclosure because they benefit the CEO through land appreciation rather than entail a formal lease or purchase agreement. After the CEO's land appreciates in value from the development of an oil field, it is sold almost exclusively to private households, and such transactions do not trigger corporate disclosure. Some independent directors also invest in oil fields and obtain private gains from leasing them back to the firm.

3. CEOs' Personal Assets and the Likelihood of Firm Investment

3.1. Firm Entry into an Oil Field

We begin our analysis by studying how a firm's likelihood of entering an oil and gas field is related to the location of the CEO's private land assets. An oil and gas field (or reservoir) is a subsurface pool of hydrocarbons captured in porous formations of rock. We focus on oil and gas fields as a unit of geospatial variation to most closely match the capital budgeting process of oil and gas firms. In the financial disclosures pertaining to capital investment decisions, oil and gas firms typically discuss their investment plans and projections in terms of oil and gas fields, rather than counties, cities, or any other geopolitical units.[5] This unit of geospatial variation also follows the natural, irregular shapes of fossil fuel formations, which define the boundaries for drilling activity in a given location. An oil and gas field is a highly granular unit of analysis, with the mean radius of 53.6 km or 33.3 miles. Our sample contains 1,530 fields.

[5] For example, in the discussion of capital budgeting, Exxon Mobil notes "The corporate plan is a fundamental annual management process that is the basis for setting operating and capital objectives in addition to providing the economic assumptions used for investment evaluation purposes. Volume projections are based on individual field production profiles, which are also updated at least annually." Exxon Mobil Annual report for the fiscal year 2020, page 40.

Table 2 examines a firm's propensity to initiate exploration and production in a field with documented fossil fuel deposits. The regression is estimated as a linear probability model, where the dependent variable is a binary indicator that equals one if the firm enters an oil and gas field during a given year, and zero otherwise. The opportunity set includes all fields with confirmed commercially viable deposits in a given year. This approach accommodates the dynamic expansion of a firm's investment opportunity set across time as new oil and gas deposits are discovered or made commercially viable through technological innovation. The unit of observation is a firm-field-year.

The main independent variable is *CEO Personal Investment*, a binary indicator that equals one if, as of the beginning of a given calendar year, the firm's CEO owns a personal investment property adjacent to the oil and gas field of interest, where adjacent properties are defined as those located within a 20-km radius of the nearest well in a given field. As discussed, a land property is defined as a personal investment, other than the CEO's primary residence, where the value of land exceeds 50% of the total property value based on the tax assessment records. Other independent variables include the firm's realized investment budget for drilling projects in the respective year (*Firm capital spending*) and the characteristics of the oil and gas field of interest, such as its proximity to the headquarters, oil-to-gas ratio, and existing drilling activity. Variable definitions appear in Appendix 2. Here and henceforth, standard errors are adjusted for heteroskedasticity and clustered by firm to accommodate time-series dependence in residuals.

Column 1 shows that a CEO is significantly more likely to initiate his firm's entry into an oil and gas field in the vicinity of his personal investments, as shown by the positive and statistically significant coefficient on the term *CEO personal investment*, with a *t*-statistic of 2.47. The coefficients on control variables show expected outcomes. Firms are more likely to enter a given field when they invest more capital, when the field is closer to the headquarters, and when the field has more drilling activity.

Columns 2–6 sequentially enrich the specification with firm, year, CEO, and field fixed effects, respectively. In column 2, firm fixed effects absorb firm-level investment drivers that remain invariant during our sample period, such as the firm's location, industry composition, and business complexity. In column 3, year fixed effects account for the time-series variation in corporate investment across business cycles and control for the investment response of the oil and gas sector to new technological developments. In column 4, CEO fixed effects capture time-invariant differences across CEOs, such as their innate ability, investment style (aggressive vs. conservative), and execution skills. In column 5, field fixed effects capture time-persistent regional factors that may affect business entry, such as location, rock formation, climate, accessibility, infrastructure, and ease of regulation. In column 6, we include all four groups of fixed effects simultaneously, saturating the regression model with firm, year, CEO, and field fixed effects. The results show that our conclusions are robust to absorbing various sources of heterogeneity, both individually (columns 2–5) and collectively (column 6). Across all these specifications, the coefficient on the indicator *CEO personal investment* is positive, statistically significant at conventional levels (*t*-statistics of 2.29 to 2.49), and stable in economic magnitude (point estimates of 0.03 to 0.04).

Column 7 augments the specification by replacing firm and year fixed effects with firm∗year fixed effects, while also including CEO and field fixed effects. The inclusion of firm∗year fixed effects accounts for the dynamic determinants of a firm's investment in a given year, such as changes in the firm's financial condition, availability of investment funds, and investment opportunities. Our results remain similar in significance and economic magnitude in this specification.

Column 8 shows the most restrictive specification with firm∗year, field∗year, and CEO state fixed effects. The addition of field∗year fixed effects accounts for field-level changes in the investment opportunities every year, such as changes in taxation, mining costs, business incentives, and discoveries of fossil fuels. The addition of these fixed effects absorbs dynamic control variables at the firm and field level.

Finally, CEO state fixed effects control for unobservable connections that may exist between the firm's CEO and his home state. The CEO's state of origin is inferred from the first three digits of his social security number (from LNPR), as in Yonker (2017a) and Duchin and Sosyura (2021). The inclusion of CEO state fixed effects accounts for any time-invariant relationships between the CEO and his home state (such as a home bias) and augments dynamic controls for the distance between the CEO's location at the headquarters and the drilling site (local bias). Prior work shows that firms are more likely to hire CEOs from the same state (Yonker 2017a), less likely to divest assets in the CEO's home state (Yonker 2017b), and more likely to acquire targets in the CEO's home state (Chung, Green, and Schmidt 2018 and Jiang, Qian, and Yonker 2019).

The results in column 8 show that a firm is more likely to enter an oil field where its CEO holds private assets, and that this conclusion is robust to absorbing high-dimensional sources of heterogeneity. The coefficient on the indicator *CEO personal investment* remains positive, statistically significant (*t*-statistic = 2.20), and economically important. The point estimate of 0.034 in this most restrictive model (rounded to 0.03 in the table output) suggests that a firm is 3.4 percentage points more likely to initiate an exploration project in an oil field where its CEO has a personal investment. A comparison of this marginal effect with the unconditional likelihood of entry into a field in a given year (1.8%) suggests that the same firm is 2.9 times more likely to initiate an investment in an oil and gas field in the vicinity of the CEO's private property than in an economically comparable field in the same year.[6] Thus, the CEO's private incentives are a first-order factor in the firm's investment policy.

Next, we investigate the robustness of the main results on firm entry into an oil field by imposing additional filters on CEOs' investment properties and using alternative econometric models. Internet Appendix Table IA.3 (henceforth Table IA.3) tests the robustness of our results to a more restrictive definition of the CEOs' land investment properties. In this specification, we focus on nearby investment properties that include only vacant land (over 99% of the parcel value) and that are located within 10 kilometers (6.2 miles) of the respective oil field (measured by its nearest well). These properties stand to benefit the most when a firm initiates the exploration of an oil and gas field. Consistent with stronger private incentives from such properties, our results are sharper in this specification and have greater point estimates than those in Table 2. According to the most restrictive specification in column 8 in Table IA.3, the point estimate of 0.04 suggests that a firm is 4 percentage points more likely to initiate an exploration project within a 10-km radius of a CEO's private investment. This marginal effect is about 18 percent stronger than the baseline point estimate of 0.034 in Table 2. Relative to the unconditional likelihood of entry into a given field (1.8%), the same firm is 3.2 times more likely to initiate a drilling project within 10 km of the CEO's private investment land than in another comparable field in the same year.

Table IA.4 tests the robustness of our results to an alternative estimation method and replaces a linear probability model with the Cox proportional hazard rate model (Cox 1972). This specification

[6] Relative to the unconditional probability of entry of 1.8 percent, the incremental increase of 3.4 percentage points raises the probability of entry to 5.2 percent, which represents an increase of 2.89 times (5.2/1.8 = 2.89).

evaluates the expected amount of time (the hazard rate) that it takes for a firm to enter into a given field in the vicinity of the CEO's private investments. The estimation confirms the results of our main analysis and yields an additional insight: firms are quicker to enter the fields where their CEO holds private investment assets. This conclusion is reliably statistically significant, with a *t*-statistic of 4.67.

Finally, following the agency theories of self-dealing (Jensen and Meckling 1976; Jensen 1986), we study how the relation between the CEO's private assets and firm investment varies with the firm's free cash flow. As a source of variation in free cash flow, we exploit fluctuations in the market prices of oil, under the assumption that such fluctuations contain an idiosyncratic component outside of the firm's control, such as geopolitical tensions in the Middle East. Table IA.5 shows that the empirical link between the CEO's private assets and firm investment is significantly stronger during periods when oil prices exceed the sample median price ($73 per barrel) and when CEOs are likely to have more managerial slack. This marginal effect is captured by the positive and significant indicator *High oil prices*, and this conclusion holds across both linear probability models (columns 1–4) and probit specifications (columns 5–6), which accommodate the binary structure of the outcome variable (invest or not).

In summary, a firm is significantly more likely to invest in the field where its CEO holds private investment assets, even after controlling for the firm's investment opportunities and changes in the attractiveness of each oil field. This relation is stronger for the CEO's properties in the immediate proximity of an oil field that stand to benefit the most from the field's exploration. This relation is also stronger during periods of high oil prices and greater free cash flow.

3.2. Timing of CEO Land Acquisitions

Depending on the timing of CEOs' property acquisitions, we consider two non-mutually exclusive economic channels of investment self-dealing. The first channel, which we label front running, involves purchasing investment land in anticipation of the firm's entry into an oil field. In this case, the date of the CEO's property acquisition should be fairly close to the date of the firm's entry, that is, within the firm's immediate investment planning horizon (typically up to three years in the industry). The second, which we label diverting, involves actively steering the firm's capital towards drilling projects in the fields where the CEO has pre-existing investment properties. In this case, the CEO's property acquisitions should predate his access to private information about the firm's investment plans. Both of these channels reflect self-dealing behaviors and flag projects with private benefits to the CEO from corporate investment. Both channels are likely to coexist together, as suggested by sample CEO employment agreements referenced in Appendix 1.2, where the language appears to allow both diverting and front running (example 2).

Table 3 provides suggestive evidence to distinguish between the two channels by exploiting the timing of the CEO's private land acquisitions, using administrative data on deed transfers. To separate the diverting channel from the front-running channel, we shut down the front running channel by relying on three settings where investment properties are likely acquired without private information about the firm's near-term investment strategy. In Panel A, we limit CEO investment properties to those acquired before the CEO's professional appointment at the firm. In Panel B, we focus on investment properties acquired prior to the discovery of commercially viable fossil fuel deposits in the area. In Panel C, we consider investment properties that were acquired more than five years before the firm's first entry into their oil field. We then replicate the baseline analysis of a firm's decision to enter an oil field, while including all variations of control variables and fixed effects in Table 2.

The results in Table 3 are consistent across all panels and show that a firm is significantly more likely to invest in an oil field encompassing its CEO's private assets even when these assets were acquired before the CEO's professional tenure, before the discovery of the oil deposits, and long before the firm's first entry into an oil field. For example, Panel A shows that a firm is 5 percentage points (or about 3.8 times) more likely to enter an oil field that contains its CEO's investment property acquired prior to his professional tenure with the firm. This result is stable in magnitude and statistical significance across all columns and shows higher point estimates than those reported in the general sample in Table 2. Since about two-thirds (64%) of investment properties were acquired prior to the CEO's tenure with the firm, and over 91% of investment properties were acquired over five years prior to the firm's first entry into the field, these results suggest that the diverting channel is likely more economically important.

In summary, self-dealing in corporate investment likely involves front running and diverting of investment capital. Both channels appear to operate in our setting. When we isolate the diverting channel, we find that CEO's private incentives from pre-existing assets influence corporate investment decisions.

3.3. Firm Exit from an Oil Field

In the final analysis of the extensive margin of corporate investment, we study a firm's propensity to exit from the oil fields where its CEO owns private assets. We also examine how this relationship changes after the CEO sells his private investments in a given field.

Table IA.6 studies the firm's decision to cease its investment activity in an oil field. The dependent variable, *Exit*, is a binary indicator that equals 1 if a firm discontinues its drilling activity in an oil field for at least two consecutive years, and 0 otherwise. The main independent variables are the same as in the baseline analysis of firm entry into oil fields. They include the indicator *CEO personal investment*, the firm's investment intensity in the respective year (*Firm capital spending*) and the characteristics of the oil field, such as its proximity to the headquarters, oil-to-gas ratio, and trailing drilling intensity.

The results in columns 1–3 show that firms are significantly less likely to suspend investment in an oil field while the CEO owns private assets in the field. According to the full specification in column 3, a firm is 11 percentage points less likely to stop further drilling in an oil field where its CEO owns private assets than to stop developing a comparable field with similar attributes. This is a large effect, representing a decline in the exit probability of 27.6% relative to the unconditional probability of exit in a given year.

The results in columns 4–6 show that the exit pattern reverses completely after the CEO sells his private investment in the field. This result is captured by the positive coefficients on the indicator *CEO sale of personal investment*, which assumes the value of 1 for field-years following the CEO's disposition of his private assets in the field. After a CEO sells his private investment in a given field, his firm is significantly more likely to halt any future investment projects in the same field.

In summary, a firm is significantly less likely to suspend investment in an oil field where its CEO owns private assets, but only during the period of the CEO's ownership. After the CEO sells his private assets, the same firm ceases further investment projects in the field and redirects its investment activity.

4. The Intensity of Firm Investment

The motivating evidence at the start of our analyses indicates that a higher intensity of oil and gas exploration increases monetary benefits accruing to the local landowners. This section tests the effect of such monetary incentives on CEOs' capital budgeting decisions, focusing on the intensity of corporate investment in oil and gas fields encompassing the CEOs' private assets.

Table 4 studies whether firms increase the intensity of drilling and exploration in the oil and gas fields where their CEOs own private investment assets. The dependent variable is the firm's annual investment rate in a given oil and gas field (expressed in percent), where the investment rate is measured as the ratio of new wells drilled in the field of interest to the total number of new wells drilled by the firm in a given year. The main variable of interest is the indicator *CEO personal investment*. All regressions include controls for the firm's overall investment budget for drilling projects in the respective year (*Firm capital spending*) and the characteristics of the field that capture its extraction costs and productivity, such as the oil-to-gas ratio, distance to the headquarters, and production output (in dollars based on the annual extraction volume and the prevailing commodity prices). As in prior analyses, we sequentially enrich the specification with year, firm, CEO, and field fixed effects, and then saturate the models with high-dimensional fixed effects for firm∗year and field∗year.

The results in Table 4 yield two conclusions. First, a firm invests more capital in projects adjacent to its CEO's private land, as indicated by the positive and statistically significant coefficient on the indicator *CEO personal investment*. This result holds robustly (with a *t*-statistic of 2.12) even in the most restrictive specification in column 8, saturated with firm∗year, field∗year, and CEO fixed effects. Such a specification accounts for the dynamic drivers of investment at the firm-year level (such as the firm's annual budget, financial condition, and investment opportunities) and field-year level (such as changes in its investment attractiveness, extraction costs, productivity, or local regulation). The inclusion of CEO fixed effects absorbs the effect of time-persistent CEO characteristics, such as innate ability and investment style, as well as the CEO's home state and the state where he obtained his education. According to the point estimate in the most restrictive specification in column 8, a firm invests 6.08 percentage points more into an oil field where its CEO owns private investment land.

Second, Table 4 shows that corporate investment becomes less responsive to signals of project quality revealed in the exploration process. This result is captured by the coefficients on the interaction term *CEO personal investment* ∗ *Field productivity*, where productivity measures the wells' average production output in dollars per year. The coefficients on the interaction term are uniformly negative and statistically significant at 5% or 10% in all specifications. To the extent that a well's annual output captures the marginal product of investment capital, this result suggests that a firm's investment becomes less sensitive to investment opportunities when projects involve the CEO's private assets. In other words, a firm continues to invest in the CEO's field even if the initial drilling outcomes are mediocre. A muted responsiveness of capital investment to its marginal product generally signals lower investment efficiency (Shin and Stulz 1998; Ozbas and Scharfstein 2010) and appears consistent with the predictions of the agency theory (e.g., Jensen and Meckling 1976; Jensen 1986; Rajan, Servaes, and Zingales 2000).

In summary, a firm commits more investment capital to the oil and gas fields where its CEO holds private assets. The greater capital spending on such fields dampens the firm's investment efficiency and weakens the responsiveness of capital to its marginal product.

5. Investment Outcomes

This section seeks to distinguish between two possible interpretations of the firms' propensity to invest in the oil fields with the CEO's private assets. On the one hand, such investments could take advantage of the CEO's private information and improve investment outcomes. On the other hand, such investments could prioritize the CEO's private benefits over those of the shareholders and lead to suboptimal capital allocations. To test these predictions, we study the performance of projects with private benefits to the CEO (section 5.1) and examine how it varies with the alignment of incentives between the CEO and the shareholders (section 5.2).

5.1. Project Performance

Table 5 studies the performance of corporate investments in the oil fields adjacent to CEO properties. The unit of observation is a drilling investment project, defined at the well level. The dependent variable is the project's production output in the first full year of operation, measured in millions of dollars. As discussed earlier and detailed in Appendix 3, a well's output in the first full year of operation is the highest level of production during its useful life. This initial output is highly informative about the well's quality because of the strong predictability in depletion patterns of fossil fuel deposits. By focusing on the output in the first year, we obtain a useful and timely measure of each project's revealed quality without the need to restrict the analysis to only late-stage projects (20–25 years old) where all of the cash flows have been realized.

The high granularity of project-level data allows us to selectively absorb the sources of heterogeneity in project performance across CEOs, firms, years, townships, and project technologies, as well as compare between the projects of the same firm in the same year (firm*year fixed effects) and between the projects in the same township and in the same year (township*year fixed effects). For example, the comparisons at the township level effectively juxtapose the performance of projects with private benefits to the CEO against other projects within the same 100 square km (36 square mile) land lot. As discussed, the mean distance between a CEO's private assets and the nearest well is 5.3 km (3.3 miles).

The results in Table 5 show that investments in wells adjacent to the CEOs' private assets have weaker performance. The coefficients on the variable *CEO personal investment* are uniformly negative across all columns (*t*-statistics of 1.77–3.72). According to the point estimate in the most restrictive specification in column 8 (coefficient = -0.43), wells adjacent to the CEO's private land, on average, yield $430,000 less in the first year of production. Relative to the unconditional value of the first-year production ($3.3 million), this marginal effect represents a 13% decline in productivity. Since these estimates are derived in a specification with township*year and firm*year fixed effects, they suggest that the wells with private benefits to the CEO deliver lower output for the firm, relative to other wells drilled by the same firm in the same year, and those drilled in the same township in the same year.

One interpretation of this evidence is that the location of the CEO's private assets adds an idiosyncratic constraint on the firm's drilling activity, and, as a result, such a constrained choice is associated with lower project quality. Also, the higher intensity of the firm's drilling near its CEO's investment properties is likely to lead to overinvestment, resulting in stepping down in a project's quality relative to the first-best counterfactuals in the same township but away from the CEO's assets.

Table IA.7 shows that the underperformance of investment projects with private benefits to the CEO persists in a subsample of properties acquired through inheritance. We consider a property to be inherited if it was previously owned or occupied by one of the CEO's senior relatives (e.g., parents, siblings, or in-laws), according to the records in LNPR. By focusing on such endowed properties, this analysis mostly shuts down the selection mechanism in property acquisitions. This analysis also isolates the outcomes of the diverting channel of self-dealing by largely muting the possibility of front-running.

Table IA.7 indicates that the underperformance of CEO-benefitting projects persists and becomes more pronounced if we focus on endowed investment assets. The coefficients on the term *CEO personal investment* are negative, statistically significant, and larger in economic magnitude relative to the unconditional sample of CEOs' private assets. The increase in the performance gap of such investment projects is consistent with the view that a focus on inherited properties mutes the positive impact of the CEO's private information, while retaining the agency incentives for private benefits.

Table 6 evaluates project outcomes according to the internal rate of return (IRR) and the net present value (NPV)—the two most common project evaluation criteria applied by corporate executives in capital budgeting decisions (Graham and Harvey 2001). Appendix 3 provides details on the estimation of capital budgeting criteria at the project level. We alert the reader that the estimation of such capital budgeting criteria inevitably requires assumptions. To minimize subjectivity, we also introduce a conservative performance measure that requires minimal assumptions. That is, we examine the fraction of projects with negative nominal cash flows, which erode value under any positive cost of capital.

Columns 1–2 show that CEO-benefitting projects deliver a lower IRR to the firm. According to the full specification in column 2, the IRR of wells adjacent to CEOs' investment properties is 8 percentage points lower than the IRR of other wells drilled by the same firm in the same year and located in the same geographic area. The performance differential is mainly attributable to the difference in cash inflows (e.g., a higher likelihood of dry wells and a lower likelihood of blockbuster wells) rather than cash outflows. In unreported tests that separately examine cash inflows and outflows, we find that the drilling costs of wells adjacent to CEOs' properties are statistically indistinguishable from those of other wells drilled by the same firms. This is consistent with prior evidence on project costs in the oil industry (Gilje and Taillard 2016).

Columns 3–4 show that projects with private benefits to the CEO deliver lower estimated NPVs to the firm, consistent with the evidence from other project metrics. We acknowledge that the NPV estimates are inherently more subjective and require additional assumptions in the estimation of the discount rate. Thus, we view this evidence as confirmatory and suggestive. According to the full specification in column 4, the average drilling project in the vicinity of a CEO's property yields an NPV that is \$0.67 million less than that of a comparable project with the same technology drilled by the same firm in the same year. One explanation for this outcome is that the higher intensity of drilling around CEO properties is associated with diminishing marginal returns, consistent with overinvestment.

Columns 5–6 indicate that CEO-benefitting projects are 4 percentage points more likely to erode value for the shareholders, using a conservative benchmark. In these columns, the outcome variable is a binary indicator that equals one if a project's nominal cash inflows fall short of recouping the nominal cost of drilling, as in the case of drilling a dry well. An increased likelihood of dry wells suggests overinvestment in the CEO's field, an outcome that arises when the investment costs are borne by the firm.

In summary, investment projects with private benefits to the CEO deliver weaker performance for the firm. This result persists across several project outcomes and a variety of benchmark groups. This evidence suggests that the CEO's ownership of personal assets adds constraints in capital budgeting decisions and engenders local overinvestment with diminished marginal returns for the shareholders.

5.2. The Role of Corporate Governance

This subsection studies how the association between CEO-benefitting projects and investment outcomes varies with the separation of ownership and control and the balance of power between the CEO and shareholders. If such investments reflect agency frictions, theory predicts that they will produce worse outcomes for the firm when the agency conflict between the CEO and the shareholders is more severe. We examine three measures of governance: (1) separation of ownership and control, (2) concentration of ownership, and (3) CEO power. We alert the reader that these governance dimensions are endogenous, and our goal is to test their associations with project outcomes without implying causality.

Panel A in Table 7 focuses on the separation of ownership and control. Agency theory predicts that managerial self-dealing arises from the conflict of interest between principals and agents (Coase 1937; Jensen and Meckling 1976; Fama and Jensen 1983). Thus, if the underperformance of CEO-benefitting projects reflects an agency conflict, it should disappear at small firms managed by their principals. To identify such firms in our sample, we use the National Establishment Time-Series, a longitudinal database with information on employment, chief executives, and business fundamentals for over 44 million establishments. Recently, these data have been used in the micro analyses of small private firms, such as the employment consequences of private equity buyouts (Faccio and Hsu 2017) and entrepreneurship in response to investor tax credits (Denes at al. 2022). We consider a firm to be owner-managed if it is privately held and has 50 or fewer employees. To test whether the separation of ownership and control matters for project outcomes, we introduce an indicator *Owner managed* and test its interaction effect with production output, using the same specification as in Table 5.

Panel A shows that the underperformance of investment projects in the vicinity of the CEO's private assets disappears at owner-managed firms. This result is captured by the positive and statistically significant coefficients on the interaction term *CEO personal investment* * *Owner managed*. The economic magnitude of the interaction term fully offsets the baseline negative effect of the indicator *CEO personal investment* across all columns. One interpretation of this evidence is that when managers serve as principals and personally bear the costs of corporate investment, they refrain from overinvesting the firm's capital in the oil fields with their private assets beyond the point of diminishing marginal returns.

Panel B examines how the performance of CEO-benefitting investment projects varies between public and private firms. CEOs of private firms are typically key stakeholders of their enterprises, and their ownership interest is persistent and more difficult to sell without a liquid market for shares. This pattern increases the alignment of their incentives with the maximization of firm value. In contrast, the CEOs of public firms are professional managers, whose private incentives are more likely to deviate from those of the shareholders. The evidence in Panel B shows that the negative performance consequences of CEO-benefitting projects are driven by publicly traded firms, a baseline effect significant at 1% across all columns and consistent with a higher likelihood of frictions in large organizations with public ownership.

Panel C zooms in further on the structure of public ownership, focusing on the relative power of the shareholders, as measured by their ownership concentration. This measure, computed as the Herfindahl index of the shares of institutional shareholders, is motivated by the evidence that the presence of blockholders (captured by the high value of the index) increases the shareholders' monitoring incentives and serves as a control mechanism against agency-motivated behaviors. Panel C shows that the underperformance of investment projects in the vicinity of the CEO's private assets is mitigated in the presence of a more concentrated shareholder base.

Panel D examines CEO power and the monitoring capacity of the board. As a source of variation in the CEO's control rights, we exploit the separation of the position of CEO and board chair, an outcome observed in 45% of our sample firms. CEOs who simultaneously serve as the chair of their board typically possess greater control rights over the firm's investment policy and face weaker monitoring from the board.

Panel D shows that the underperformance of CEO-benefitting projects is concentrated at firms where the CEO holds the chief monitoring position in the firm—that of the chair of the board. This finding is consistent with the importance of a control mechanism on the CEO's decision rights emphasized in the classical frameworks of the CEO's private motives in investment decisions. For example, Fama and Jensen (1983) argue that agency costs are reduced by the separation of decision rights from decision control, and Jensen (1993) concludes that "for the board to be effective, it is important to separate the CEO and Chairman positions." (p. 36). This is also consistent with a strong recent trend towards the separation of CEO and chairman duties to curb self-serving managerial behaviors.

In summary, the underperformance of projects in the vicinity of the CEO's private assets disappears at owner-managed firms where managers internalize the costs of corporate investment. In contrast, negative performance outcomes are concentrated at publicly owned firms run by professional CEOs. This underperformance is more pronounced when the CEO has stronger control rights (chairman of the board) and faces weaker monitoring (less concentrated shareholder ownership). Overall, managerial self-dealing at the shareholders' expense is correlated with the tension between the CEO's private incentives and a system of controls curbing managerial opportunism.

6. Alternative Hypotheses

The evidence so far appears consistent with the self-dealing interpretation of CEO-benefitting projects and aligns closely with the predictions of the agency theory about the main effects and their mediating factors. This section challenges the agency interpretation by motivating and testing alternative explanations, such as optimal contracting (section 6.1) and CEO overconfidence (section 6.2).

6.1. Optimal Contracting

According to the optimal contract hypothesis, the board could allow the CEO to realize private benefits from corporate investment because it views such benefits as an efficiency-improving alternative form of executive compensation. For example, given a large number of investment projects for a typical firm, permitting self-dealing on some projects crucial to the CEO could be optimal for the shareholders if such a policy allows the firm to realize savings on executive pay or to recruit better CEO talent for the same pay.

Table IA.8 studies CEO pay. The dependent variables are various measures of CEO compensation, hand-collected from proxy statements to maximize coverage and augmented with Execucomp for overlapping observations. We also collect CEO perquisites, such as corporate housing, chauffer services, relocation expenses, or the private use of the firm's property or corporate jet. According to item 402 of SEC Regulation S-K, firms must report such expenditures as other pay in the proxy if their combined value exceeds $10,000 per year. The main independent variables are the indicator *CEO with private investments*, which equals one for CEOs who own private land in the oil fields developed by their firm during their tenure and *Number of CEO-benefitting projects,* which captures the number of the firm's investments in the vicinity (20 km) of the CEO's private land. The analysis makes a comparison between the CEOs at the same firm and controls for temporal variation in executive pay driven by the business cycle and time trends.

The results show that CEOs with self-benefitting projects earn no less formal compensation than their peers without such personal investments hired by the same firm, whether we focus on salary, current compensation with bonuses, perquisites, or total compensation. If anything, CEOs with private investments extract directionally higher pay and perquisites. This pattern is shown by the uniformly positive coefficients on the measures of the CEO's involvement in private investments across all columns, although these point estimates fall short of being statistically significant at conventional levels.

Next, we evaluate whether allowing the CEO to realize private benefits from corporate investment attracts higher-quality managerial talent. We rely on a direct measure of the CEO's value to the firm from the shareholders' perspective—namely, the announcement return to the CEO's departure. Such a measure quantifies the CEO's personal contribution to firm value, captures the information revealed during his time in office, and compares him to the best feasible replacement. To compute announcement returns, we hand-collect the dates of CEO departures from corporate press releases and calculate market-adjusted cumulative abnormal returns (CARs) over one, two, and three days following the event. We exclude any departures disclosed with other corporate news, such as mergers, acquisitions, delistings, and bankruptcies.

Table IA.9 shows that the departures of CEOs with self-benefitting projects increase firm value. The positive and statistically significant coefficients on the indicator *CEO with private investments* indicate an increase in firm value of 5.3–7.5% over the one- to three-day horizons, respectively. The magnitudes suggest that our micro evidence is symptomatic of a broader scope of the CEO's self-dealing behaviors beyond capital budgeting. In contrast, the departures of CEOs without private investments in oil fields are met with slightly negative returns of 0.7–0.9%, as shown by the coefficients on the intercept. The latter pattern parallels prior evidence that CEO departures in general settings generate near-zero or slightly negative announcement returns, reflecting the costs of CEO replacement (Reinganum 1985; Warner, Watts, and Wruck 1988; Weisbach 1988; Jenter, Matveyev, and Roth 2018).

In our final test of the optimal contracting hypothesis, Table IA.10 studies whether boards reinforce or revise their policies on CEOs' private investments after a first-hand experience with such CEOs. This table studies the likelihood of a firm that has previously employed a CEO with private investments in oil fields to appoint another CEO with such investments in the future. The dependent variable is an indicator that equals 1 if the firm appoints another CEO with private investments in oil fields, and 0 otherwise, and the regressions are estimated as linear probability models. *Past CEO with private investments* is a binary indicator that equals 1 if the company employed such a CEO in the past appointment.

The results show that after employing a CEO with private investments in oil fields, a firm becomes significantly less likely to hire another CEO with such investments in the future. In the full specification in column 2, which includes year and firm fixed effects, this result is strongly significant with a *t*-statistic of -7.1. The evidence in Table IA.10 is consistent with board learning from its experience with self-dealing CEOs or yielding to the pressure from activist shareholders, as in the example discussed in the introduction. In support of this interpretation, we have come across cases when boards make contractual revisions in employment agreements and explicitly prohibit future CEOs from investing in oil fields.

In summary, CEOs with private investments in oil fields earn the same compensation as other CEOs at the same firm. Departures of CEOs with private investments generate strong positive returns, suggesting that such CEOs destroy firm value. In contrast to the optimal contract view, after observing a CEO with private investments, the board is less likely to hire such a CEO in the future, and some boards make amendments in employment contracts to limit the scope for future CEO self-dealing.

6.2. CEO Overconfidence

In our concluding analysis, we test whether CEOs knowingly engage in self-benefitting projects or merely suffer from naïve overconfidence and believe they are acting in the shareholders' best interests.

According to the overconfidence hypothesis, the CEO overinvests in the field with his private assets because he is overconfident and naively ignores signals that deviate from his priors. Research from CEOs' detailed personality assessments shows that overconfidence is a persistent personal trait (Kaplan, Sorensen, and Zakolyukina 2022), and overconfident CEOs continue with their investments irrespective of the revealed information about their quality (Malmendier and Tate 2008). This pattern would explain the CEOs' tendency to overinvest in the vicinity of their private assets, ignore negative signals about project quality, and, consequently reduce investment efficiency and firm value without any self-serving motives.

A fundamental tenet of the theory of CEO overconfidence is that the CEO persistently has a higher private valuation for his assets than their market value (Malmendier and Tate 2005). Thus, even when the CEO's assets appreciate in value, an overconfident CEO retains his holdings and increases them despite strong reasons to cash out in the open market. For example, Malmendier and Tate (2005) find that overconfident CEOs resist exercising their in-the-money options and continue to buy the firm's appreciated stock, when it is rationally optimal to sell (Hall and Murphy 2000).

Table IA.11 tests the overconfidence hypothesis by studying the CEOs' private transactions in land lots after the firm invests in the respective oil field and drives up its land prices. The dependent variable is a binary indicator that equals 1 if the CEO sells his private assets in an oil field in a given year, and 0 if the CEO retains his holdings. The regressions are estimated as linear probability models with fixed effects.

We find that after a firm invests in the CEO's oil field and drives up its land values, the CEO cashes out. According to the full specification in column 4, the CEO's annual probability of selling spikes by 136% after the CEO's firm invests in the field's exploration.[7] This estimate is reliably significant at 1% (*t*-statistic = 5.95) after controlling for the CEO's general propensity to sell properties (CEO fixed effects), as well as the property's state and year of acquisition. In unreported results, we use deed transfer records to examine

[7] The point estimate of 0.10 in column 4 reflects a 10 percentage point increase in the annual probability of sale relative to the unconditional probability of sale in a given year (7.37%), equivalent to an increase of 136% (=0.1/0.0737).

the counterparties in asset sales and find that virtually all of the CEOs' assets are sold to retail buyers—those who are likely to be less informed and would not trigger corporate disclosure.

In summary, after a firm develops the CEO's oil field, the CEO cashes out. As shown earlier, after the CEO's sale, the firm is more likely to halt further investments in the respective oil field. This pattern appears consistent with the CEO's pursuit of private gains rather than naïve overconfidence.

7. Conclusion

This paper has studied how CEOs' incentives from personal assets affect their professional decisions. CEOs prioritize corporate investments that raise the value of their private assets at the expense of shareholders. While CEO self-dealing is fundamental to the principal-agent conflict in the theory of the firm, our paper is among the first to offer project-level evidence on self-dealing and study its effects on net present value.

Our study makes a step towards understanding the role of CEOs' monetary motives outside of the firm. While most prior work has focused on CEOs' professional incentives, such as career concerns or compensation contracts aimed to align the incentives of principals and agents, our evidence suggests that the efficacy of these mechanisms could be outweighed by CEOs' private monetary gains. We hope that the growing interest in constructing a more complete picture of CEOs' personal assets and private incentives outside of the firm will continue to expand our understanding of their professional decisions.

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Appendix 1: Sample Disclosures

This appendix includes sample disclosures of CEOs' and directors' private investments in oil and gas fields. The appendix also provides excerpts from CEOs' employment contracts that regulate such private investments.

Appendix 1.1: **CEOs' Transactions with their Firms Pertaining to Oil Fields**

This appendix provides excerpts from corporate proxy statements that disclose related party transactions between CEOs and their firms.

Example 1

CEO: Tom L. Ward   Firm: Sandridge Energy   Amount Paid to CEO: $5.85 mil.

	Excerpts from Sandridge Energy Form Def 14A	**Total Amount**
2008	We leased the minerals under a certain area in Woods County, Oklahoma from TLW Land & Cattle LP ("TLW-LC"), which is an entity affiliated with Mr. Ward. We developed the area and in 2008 made royalty payments totaling $850,739 to TLW-LC in connection with the transaction.	$850,739
2009	We leased the minerals under a certain area in Woods County, Oklahoma, from TLW Land & Cattle LP ("TLW-LC"), which is an entity affiliated with Mr. Ward. We developed the area and in 2009 made royalty payments totaling $351,630 to TLW-LC in connection with the transaction.	$351,630
2010	We lease rights to minerals under certain areas of land in northwest Oklahoma from TLW Land & Cattle LP ("TLW LC"), an entity in which Mr. Ward has an ownership interest. In 2010, we developed some of the surface lands associated with these mineral interests and paid $33,046 to TLW-LC pursuant to the development. We also paid royalties totaling $302,554 to TLW-LC in connection with the production of oil and natural gas from these properties. In September 2010, we purchased a portion of the working interest in leases covering acreage in northeast Oklahoma from WCT Resources, L.L.C., a limited liability company formed in 2002 and owned by trusts established in 1989 for the benefit of Mr. Ward's children ("WCT"), for $1,791,120, and in January 2011, we acquired a working interest in additional acreage in the area for $391,955. Our Board approved the transactions in accordance with its Related Party Transactions Policy.	$2,518,675
2011	We own wells on certain areas of land in northwest Oklahoma under which TLW Land & Cattle LP ("TLW LC"), an entity in which Mr. Ward has an ownership interest, owns a royalty interest. In 2011, we paid royalties totaling $925,735 to TLW-LC in connection with the production of oil and natural gas from these properties. In January 2011, we purchased a portion of the working interest in leases covering acreage in northeast Oklahoma from WCT Resources, L.L.C., a limited liability company formed in 2002 and owned by trusts established in 1989 for the benefit of Mr. Ward's children ("WCT"), for $391,955.	$1,317,690
2012	In May 2012 and August 2012, we purchased a portion of the working interest in leases covering acreage in northern Oklahoma from WCT Resources, L.L.C., a limited liability company formed in 2002 and owned by trusts established in 1989 for the benefit of Mr. Ward's children ("WCT"), for $333,612 and $480,000, respectively.	$813,612

Example 2

<u>CEO</u>: Harold G. Hamm | <u>Firm</u>: Continental Resources | <u>Amount Paid to CEO</u>: $25.09 mil.

Year	Excerpts from Continental Resources Form Def 14A	Total Amount
2008	We disbursed to the Trust **[of Harold Hamm]** $1.8 million in 2008 for the Trust's share of oil and gas sales attributed to these interests which were received from the purchasers of production.	$1,800,000
2009	We disbursed to the Trust **[of Harold Hamm]** $894,000 in 2009 for the Trust's share of oil and gas sales attributed to these interests which were received from the purchasers of production.	$894,000
2010	We disbursed to the Trust **[of Harold Hamm]** $1.2 million in 2010 for the Trust's share of oil and gas sales attributed to these interests which were received from the purchasers of production.	$1,200,000
2011	We disbursed to the Hamm Revocable Trust $10 million in 2011 for the Hamm Revocable Trust's share of oil and gas sales attributed to these interests which were received from the purchasers of production. At December 31, 2011 $43,000 was due from the Hamm Revocable Trust and $680,000 was due to the Hamm Revocable Trust.	$10,000,000
2012	We disbursed to the Hamm Revocable Trust $5.2 million in 2012 for the Hamm Revocable Trust's share of oil and gas sales attributed to these interests which were received from the purchasers of production. At December 31, 2012, $193,000 was due from the Hamm Revocable Trust and $271,000 was due to the Hamm Revocable Trust.	$5,200,000
2013	We disbursed to the Hamm Revocable Trust $2.3 million in 2013 for the Hamm Revocable Trust's share of oil and gas sales attributed to these interests which were received from the purchasers of production. At December 31, 2013, $358,000 was due from the Hamm Revocable Trust and $159,000 was due to the Hamm Revocable Trust.	$2,300,000
2014	We disbursed to the Hamm Revocable Trust $1.7 million in 2014 for the Hamm Revocable Trust's share of oil and gas sales attributed to these interests which were received from the purchasers of production. At December 31, 2014, $199,000 was due from the Hamm Revocable Trust and $128,000 was due to the Hamm Revocable Trust.	$1,700,000
2015	We disbursed to the Hamm Revocable Trust $615,000 in 2015 for the Hamm Revocable Trust's share of oil and gas sales attributed to these interests which were received from the purchasers of production. At December 31, 2015, $94,000 was due from the Hamm Revocable Trust and $50,000 was due to the Hamm Revocable Trust.	$615,000
2016	We disbursed to the Hamm Revocable Trust approximately $392,000 in 2016 for the Hamm Revocable Trust's share of oil and gas sales attributed to these interests which were received from the purchasers of production. At December 31, 2016, approximately $79,000 was due from the Hamm Revocable Trust and approximately $42,000 was due to the Hamm Revocable Trust.	$392,000
2017	We disbursed to the Hamm Revocable Trust approximately $458,000 in 2017 for the Hamm Revocable Trust's share of oil and gas sales attributed to these interests which were received from the purchasers of production. At December 31, 2017, approximately $47,000 was due from the Hamm Revocable Trust and approximately $46,000 was due to the Hamm Revocable Trust.	$458,000
2018	We disbursed to the Hamm Revocable Trust approximately $527,000 in 2018 for the Hamm Revocable Trust's share of oil and gas sales attributed to these interests which were received from the purchasers of production. At December 31, 2018, approximately $63,000 was due from the Hamm Revocable Trust and approximately $38,000 was due to the Hamm Revocable Trust.	$527,000

Example 3

CEO: Glenn Darden | Firm: Quicksilver Resources | Amount Paid to CEO: $700,000

Excerpt from Quicksilver Resources Form Def 14A	Amount
On June 23, 2006, Quicksilver received an assignment from KC7 Ranch Ltd. of an oil and gas lease dated October 25, 2005 from Si Bar, KC Ranch, Ltd. as lessor to KC7 Ranch Ltd. as lessee covering 2,773 acres in exchange for $0.2 million in cash. Under the terms of the assignment of the lease, KC7 is entitled to a 3.3% overriding royalty interest, pursuant to which KC7 will receive payments from Quicksilver based on any future production of oil or gas from the acreage subject to the lease. On July 7, 2006, KC7 Ranch Ltd. as lessor granted an oil and gas lease to Quicksilver covering 2,773 acres in exchange for a cash payment of $0.3 million. The lease has a three-year primary term and KC7 is entitled to receive a 20% royalty interest pursuant to which it will receive payments from Quicksilver based on any future production of oil or gas from the acreage subject to the lease. Aggregate payments to KC7 Ranch Ltd. in 2007 were $0.2 million. Future payments, if any, pursuant to the royalty and overriding royalty interests cannot be estimated at this time. KC7 is a limited partnership in which Quicksilver Energy LP, **an entity controlled by members of the Darden family**, owns an 80% limited partner interest and maintains additional preferences in distributions of profit from KC7; the other 20% limited partner interest is owned or controlled by Jeff Cook, Quicksilver's Executive Vice President — **Operations, individually and as trustee for his three children. KC7's general partner is owned equally by Glenn Darden, Thomas Darden, and Anne Darden Self.**	$700,000

Appendix 1.2: CEO Employment Agreements and Private Investments

This appendix includes sample disclosures from CEOs' employment agreements that pertain to the private ownership of assets on oil and gas fields and the rights to acquire, lease back, and sell such assets.

Example 1

Excerpt from the disclosure pertaining to the Employment Contract between Aubrey McClendon, Chief Executive Officer, and Chesapeake Energy, included in form DEF 14A dated July 1, 2001:

"Terms regarding Mr. McClendon right "to continue to conduct oil and gas activity individually or through affiliates":

The employment agreements permit [Mr. McClendon] to continue to conduct oil and gas activities individually or through [Mr. McClendon] affiliates, but only to the extent such activities are conducted on oil and gas leases or interests owned, or had the right to acquire as of July 1, 2001, or acquired from the Company pursuant to [Mr. McClendon] employment or other agreements.

Example 2

Excerpt from the Employment Contract between Tom L. Ward, Chief Executive Officer and Sandridge Energy, dated Dec. 20, 2011:

Royalty Interests and Gifts, Outside Oil and Gas Drilling, and Certain Other Drilling Units. *The foregoing restriction in clause (c) will not prohibit, in areas not being pursued by the Company: (a) the ownership of royalty interests where the Executive owns, previously owned or acquires the surface of the land covered by the royalty interest and the ownership of the royalty interest is incidental to the ownership of the surface estate, or the ownership of royalty, overriding royalty or working interests that are received by gift or inheritance subject to disclosure by the Executive to the Company in writing; (b) the Executive's participation in outside operated oil and gas drilling; or (c) the Executive's participation as a working interest owner in properties operated by the Company where wells are proposed in drilling units with respect to which the surface or royalty ownership rights are held by TLW Holdings, L.L.C., an Oklahoma limited liability company, 192 Investments, L.L.C., an Oklahoma limited liability company, and entities owned or controlled by the Executive.*

Appendix 1.3: Royalty Payments to Independent Directors

This appendix includes sample disclosures of related party transactions pertaining to the leasing of directors' private assets in oil fields back to their firms in exchange for monetary compensation.

Example 1

Firm: Carrizo Oil & Gas Independent director: Thomas L. Carter, Jr Amount Paid: $3,300,000

Excerpt from the 2016 definitive proxy statement (form Def 14A) of Carrizo Oil and Gas regarding royalties paid Thomas L. Carter, Jr, an independent director, and his family members:

We paid the Black Stone Entities ***[owned by Thomas Carter and his immediate family members]*** *approximately $2.5 million and $0.8 million in 2016 and 2015, respectively, in net working interest revenues and royalties attributable to wells owned by the Company.*

Example 2

Firm: RSP Permian, Inc. Independent director 1: Ted Collins, Jr. Amount Paid: $904,222
Independent director 2: Michael W. Wallace

Excerpt from the 2017 proxy statement (form Def 14A) of RSP Permian, Inc., regarding royalty payments to Ted Collins, Jr., and Michael W. Wallace, independent board members:

During 2016, the Company made mineral royalty payments to ***Mr. Collins*** *in the amount of $508,271, $278,634 to the* ***Wallace Family Partnership LP****, $117,040 to* ***Leslyn Wallace****, the spouse of* ***Mr. Wallace****, and $277 to* ***Mr. Wallace*** *directly.*

Example 3

Firm: Anadarko Petroleum Independent director: Preston M. Geren III Amount Paid: $134,902

Excerpt from the 2014 proxy statement of Anadarko Petroleum Corporation regarding cash compensation for a mineral interest paid to Preston M. Geren, an independent board member:

The Company leased a mineral interest in Ward County, Texas owned by Mr. Geren. The Company paid Mr. Geren $134,902 in royalty payments during 2013, pursuant to a lease with standard industry terms.

Appendix 2: Variable Definitions

This appendix defines the variables. The variables are listed by category.

Dependent Variables	**Definition**
Appointment of another CEO with private investment $_{i}$	A binary variable equal to 1 if the firm appoints another CEO with private investment, and 0 otherwise.
Current Compensation $_{i,t}$	ExecuComp data, with variable name "total_curr", expressed in $1,000. This variable is composed of $\text{Salary}_{i,t} + \text{Bonus}_{i,t}$, for the CEO of firm "i" on year "t".
Enter $_{i,r,t}$	A binary variable equal to1 if firm "i" commences drilling activity in oil and gas field "r" in year "t", and 0 otherwise.
Exit $_{i,r,t}$	A binary variable equal to 1 if firm "i" decides to exit an oil and gas field "r" during year "t", and 0 otherwise
Estimated NPV $_{z}$	Defined as: $(\frac{\text{Well's Production Value} * (1-\text{FC})}{\text{Depletion Rate} + \text{Discount Rate}} - \text{Cost})/100{,}000$.
Investment rate (%) $_{i,r,t}$	$\text{Investment Rate}_{i,r,t+1}$ denotes firm "i" investment (in number of wells) in field "r" during year "t+1" scaled by the firm's total number of active wells at time "t" such that: $\text{Investment Rate}_{i,r,t+1} = \frac{\text{No. Wells Drilled}_{i,r,t+1}}{\text{Total No. Active Wells}_{i,t}} * 100$.
Investment near personal property $_{i,t}$	A binary variable equal to 1 if the CEO allocates firms resources to drill next to his property during the year, and 0 otherwise.
Land market value per acre ($/acre) $_{r,t}$	The average market value of the properties' land per acre, in a given township. For a property to be included in our sample, it must be located within 20 kilometers from the closest well in the sample, and the land-to-total market value ratio must exceed 50%. Data provided by Zillow through the Zillow Transaction and Assessment Dataset.
Negative NPV $_{z}$	A binary variable equal to 1 if the total estimated production value is lower than the drilling cost, and 0 otherwise.
Perquisites $_{i,t}$	ExecuComp data, with variable name "othcomp", expressed in $1,000. This variable is composed of the additional compensation items that accrue to the CEO (e.g., private jets, relocation package), for the CEO of firm "i" on year "t".
Royalty rate (%) $_{r,t}$	The average royalty rate in township "r" on year "t". The royalty rate is the main term included in mineral right leasing contracts. It corresponds to the fraction of the well's produced cash flow that the landowner will receive once a well is drilled.
Salary $_{i,t}$	Execucomp data, with variable name "Salary", expressed in $1,000. This variable is composed of $\text{Salary}_{i,t}$, for the CEO of firm "i" on year "t".
Sell the property $_{m,t}$	A binary variable equal to 1 if the CEO sold property "m" on year "t", and 0 otherwise.
Total compensation $_{i,t}$	ExecuComp data, with variable name "TDC1", expressed in $1,000. This variable is composed of $\text{Salary}_{i,t} + \text{Bonus}_{i,t} + \text{Other Compensation}_{i,t}$, for the CEO of firm "i" on year "t".
Well production value $_{z}$	Measures the value of the first year of production of the well by computing: First Year Production of Natural Gas * Natural Gas Price + First Year Production of Oil * Oil Price scaled by $1,000,000.
Variable of Interest	
CEO personal investment $_{i,r,t}$	A binary variable equal to 1 if CEO "i" owns a plot of land on an oil and gas formation "r" during year "t", and 0 otherwise.

CEO sale of personal investment $_{i,r,t}$	A binary variable equal to 1 for field-years following the CEO's disposition of his private assets in the field, and 0 otherwise.
CEO with private investment $_{m}$	A binary variable equal to 1 if CEO "m" engaged in co-invested projects, and 0 otherwise.
Cumulative abnormal return (%) $_{i,t}$	Cumulative excess return (CAR) of firm "i" on the date the CEO is fired, using a market excess return benchmark. The cumulative abnormal return is obtained from Eventus on WRDS. Excluded from the sample are CEOs still in office at the end of the sample, CEOs that were in power when the firm went bankrupt, CEOs that lost their position following a merger or takeover, and CEO that got fired 5 days or less before the firm was delisted.
Drilling initiation $_{r,t}$	A binary variable equal 1 after the first well is drilled in a township and 0 otherwise.
Drilling intensity $_{r,t}$	Captures the cumulative number of wells drilled in the property's township; a standardized areal unit measured 6 miles by 6 miles (about 10 km by 10 km).
High oil prices $_{i,t}$	A binary variable equal to 1 if oil prices are above the sample median, and 0 otherwise.
Number of CEO-benefitting projects $_{m}$	The total number of co-invested projects conducted by the CEO.
Owner-managed $_{i}$	A binary variable equal to 1 if the firm has 50 employees or less, and 0 otherwise.
Ownership concentration $_{i,t}$	Ownership concentration as measured by the Herfindahl index of firm "i" on year "t". Larger values indicate that the ownership of the firm is more concentrated. For each firm-year, we measure the Herfindahl index such that $\text{Ownership Concentration}_{i,t} = \sum_k (\frac{\text{Share Owned}_{k,i,t}}{\text{Share Outstanding}_{i,t}})^2$, where "k" denotes a specific institutional investor, "i" indicates a firm, and "t" indexes the year of the calculation. Source:13f dataset from Thompson Reuters on WRDS.
Private $_{i,t}$	A binary variable equal to 1 if the firm reports in Compustat, and 0 otherwise.
Past CEO with private investments $_{i}$	A binary variable equal to 1 if the company previous employed CEO had private investment, and 0 otherwise
Separation of chair and CEO $_{i,t}$	A binary variable equal to 1 if the CEO is not the chairman of the firm "i" on year "t", and 0 otherwise. We obtain the data on CEOs chairman appointment from BoardEx database on WRDS.
Control Variables	
CEO State Fixed Effects	A binary variable equal to 1 if the well/field is located in the CEO's state of origin (i.e., the state associated with the first 3 digits of the CEO's social security number) or the firm headquarters' state, and 0 otherwise.
Field distance from HQ $_{i,r,t}$	Distance in kilometers between a field "r" centerpoint and the firm's headquarters, scaled by 10,000.
Field oil-to-gas ratio $_{i,r,t}$	Measure the averaged proportion of the wells production that is attributable to oil at the firm-field-year level such that: Oil-to-Gas $\text{Ratio}_{i,r,t} = \text{Average First Year Prod. Oil}_{i,r,t}/$

	$(\text{Average First Year Prod. Oil}_{i,r,t} + \text{Average First Year Prod. Gas}_{i,r,t}/6)$. Natural gas production is divided by 6 to follow SEC standard and work with standardize unit (Barrel of Oil Equivalent "BOE").
Field Oil-to-Gas $\text{Ratio}_{r,t}$	Measure the averaged proportion of the wells production that is attributable to oil at the field-year level such that: Oil-to-Gas $\text{Ratio}_{r,t} = \text{Average First Year Prod. Oil}_{r,t}/(\text{Average First Year Prod. Oil}_{r,t} + \text{Average First Year Prod. Gas}_{r,t}/6)$. Natural gas production is divided by 6 to follow SEC standard and work with standardize unit (Barrel of Oil Equivalent "BOE").
Field productivity $_{i,r,t}$	Average well's production value of firm "i" in field "r" on year "t".
Firm capital spending $_{i,t}$	Corresponds to the number of wells drilled by firm "i" during year "t", scaled by 10,000.
Technology Fixed Effects	Fixed effect to control for the different production technology of the wells: (1) vertical, (2) horizontal drilling technology.
Township	A ~ 6 miles per 6 miles squares of land, following the Public Land Survey System definition of a Township. For each well, we round the GPS coordinates (latitude and longitude are in WGS84 format) to the 0.1 decimal, and construct synthetic township based on these rounded coordinates.
Well distance from HQ $_z$	Distance in kilometers between a well "z" and the firm's headquarters, scaled by 10,000.
Well oil-to-gas ratio $_z$	Measure the proportion of the well production that is attributable to oil at the firm-field-year level such that: Oil-to-Gas $\text{Ratio}_{z,i,r,t} = \text{First Year Prod. Oil}_{z,i,r,t}/(\text{First Year Prod. Oil}_{z,i,r,t} + \text{First Year Prod. Gas}_{z,i,r,t}/6)$. Natural gas production is divided by 6 to follow SEC standard and work with standardize unit (Barrel of Oil Equivalent "BOE").
WRDS Measures	
Book equity $_{i,t}$	$\text{Seq}_{i,t} + \text{Txdb}_{i,t} + \text{Itcb}_{i,t} - \text{Pref}_{i,t}$. $\text{Pref}_{i,t} = \text{Pstkrv}_{i,t}$. If $\text{Pstkrv}_{i,t}$ is missing, we define the preferred shares such that $\text{Pref}_{i,t} = \text{Pstkl}_{i,t}$, and if $\text{Pstkl}_{i,t}$ is also missing, we define it as $\text{Pref}_{i,t} = \text{Pstk}_{i,t}$.
"Compustat" firm size(%) $_{i,t}$	Natural logarithm of firm total assets (at).
"Compustat" investment rate (%) $_{i,r,t+1}$	$\frac{\text{Capx}_{i,t}}{\text{Ppent}_{i,t}} * 100$
Book leverage $_{i,t}$	$(\text{Dlc}_{i,t}+\text{Dltt}_{i,t})/\text{At}_{i,t}$.
Market equity $_{i,t}$	$\text{Prcc\_f}_{i,t} * \text{Csho}_{i,t}$.
Market-to-book $_{i,t}$	$\text{Me}_{i,t}/\text{Be}_{i,t}$, if Book Equity is greater than 0.
Return-on-assets (ROA) $_{i,t}$	$\text{Oibdp}_{i,t} / \text{At}_{i,t}$.

Appendix 3: Estimation of Project Cash Flows and Net Present Value

This appendix details the estimating of project cash flows and capital budgeting criteria.

A central feature of oil and gas investment projects is the gradual depletion of a well's deposits. The production level peaks during the year when the well is drilled and then gradually declines as the well's reserves are depleted. Internet Appendix Figure IA.1 illustrates this temporal pattern.

To obtain an estimate of a well's projected NPV, we rely on the Arp model, a petroleum production model developed in Fetkovich et al. (1996). Using the exponential Arp model, one can approximate the net discounted value of an oil and gas well by measuring:

$$\text{Projected NPV} = \int_0^\infty Prod_0 * (1 - FC) * e^{-(d+r)t}\, dt - Cost$$

Where $Prod_0$ corresponds to the value of the production in the first year, *FC* denotes the flexible costs associated with the overall operation of the wells (in proportion to production), *d* denotes the depletion rate of production (i.e., the speed at which production declines over time), *r* is the discount rate used to evaluate the well, *t* corresponds to the number of years since the well was drilled, and *Cost* is the cost of drilling the well. Using the Arp model, we separately estimate the depletion for the average vertical and horizontal wells in our sample as:

$$\text{E[d]} = E[\frac{\ln(Prod_0) - \ln(Prod_t)}{t}]$$

Using this method, we obtain annual depletion rate estimates, d, of 0.23 and 0.42 for the vertical and horizontal technology drilling technologies, respectively. Since the depletion rate estimates for these projects are high, we measure the well's NPV until infinity without loss of generality. Effectively, the expected production ten years from the start of drilling is 99% smaller than in year one. It is thus reasonable to approximate a well's projected NPV by computing:

$$\text{Projected NPV} = (\frac{Prod_0 * (1 - FC)}{d + r} - Cost).$$

For each well, we define $Prod_0$= First Year Production of Natural Gas * Natural Gas Price + First Year Production of Oil * Oil Price. We set the flexible cost (FC) to 20%, following the methodology of Decaire et al. (2020). We follow the methodology in Kellogg (2014) and set the discount rate *r* to 10%. To obtain an estimate of a well's drilling cost, we use hand-collected data and estimate the drilling cost average for each technology.

Figure 1: The Economic Importance of the Oil & Gas Sector

This figure plots the economic contribution of the oil and gas sector to the U.S. annual capital expenditures and stock market capitalization in 2000–2020. The solid line corresponds to the combined weight of publicly traded oil and gas companies in the market capitalization of the S&P 500 index, using data from Bloomberg. The dotted line plots the share of the oil and gas industry in the total U.S. capital expenditures, using data from the annual capital spending reports of the U.S. Census Bureau. Since the oil and gas industry is aggregated within the broader mining category in the census capital spending reports, its share is estimated according to the industry breakdown of capital spending within the mining category. Data on the industry breakdown of capital spending within the mining category come from the U.S. Census reports on total capital expenditures for mining industries, applied retroactively to the sample.

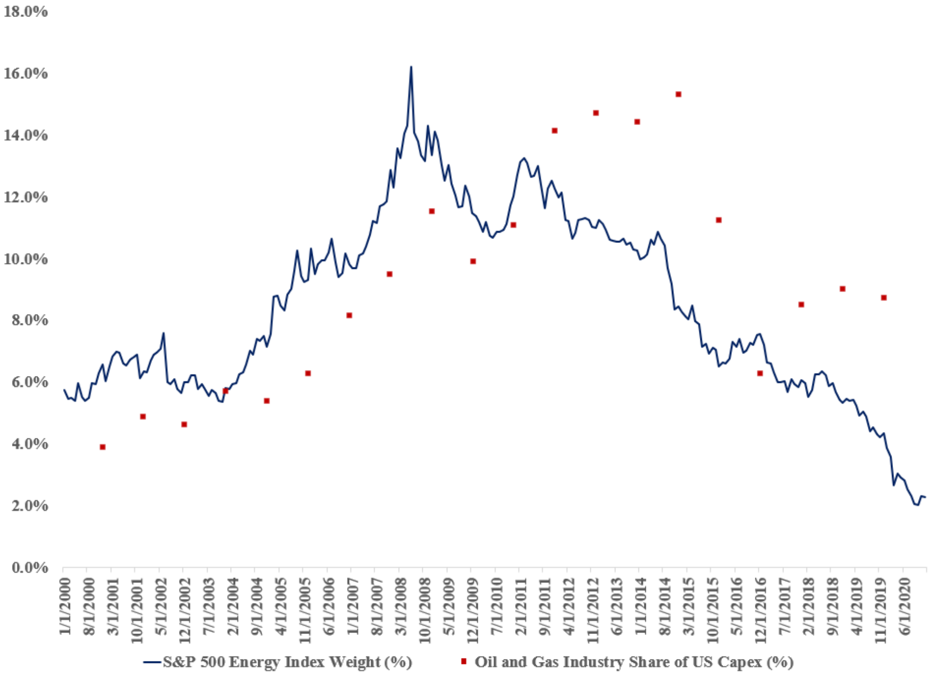


Figure 2: Oil & Gas Regions in the United States

This figure plots the locations of onshore oil and gas wells drilled in the U.S. in 2000–2020. The state of Alaska is shown in the bottom left corner. Darker shades indicate wells drilled later in the sample period. The data are from DrillingInfo, and the plot is restricted to wells with available spud dates (the dates of the commencement of drilling).

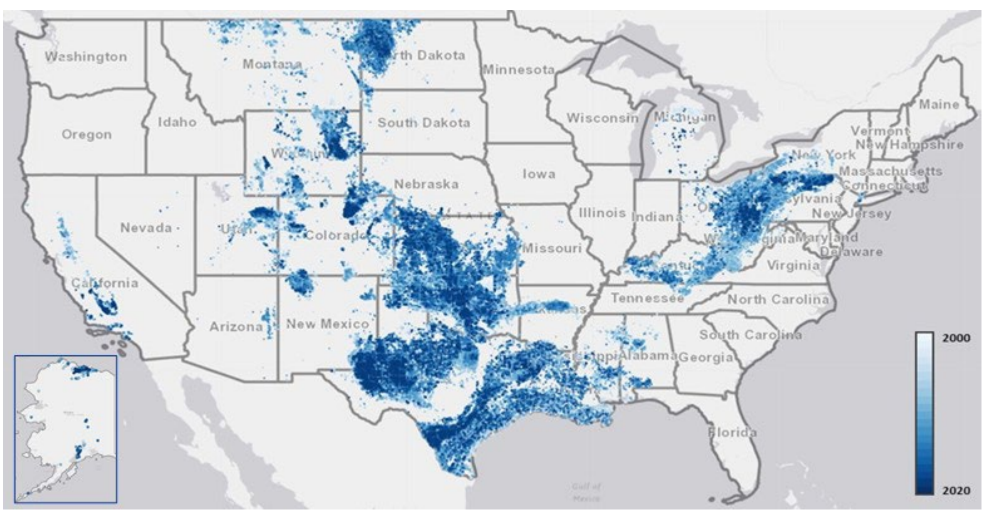


Figure 3: The Effect of Drilling Activity on Land Market Value

This figure plots the average market value of land in a township in event time relative to the initiation of drilling. Year 0 indicates the year when the first well is drilled in a township. The effects are estimated for properties that comprise primarily vacant land (land value exceeds 50% of the assessed property value) within 20 kilometers (12 miles) of an oil and gas formation. Value estimates are based on property-level market transactions obtained from the Zillow Transaction and Assessment Dataset (ZTRAX, August 2021).

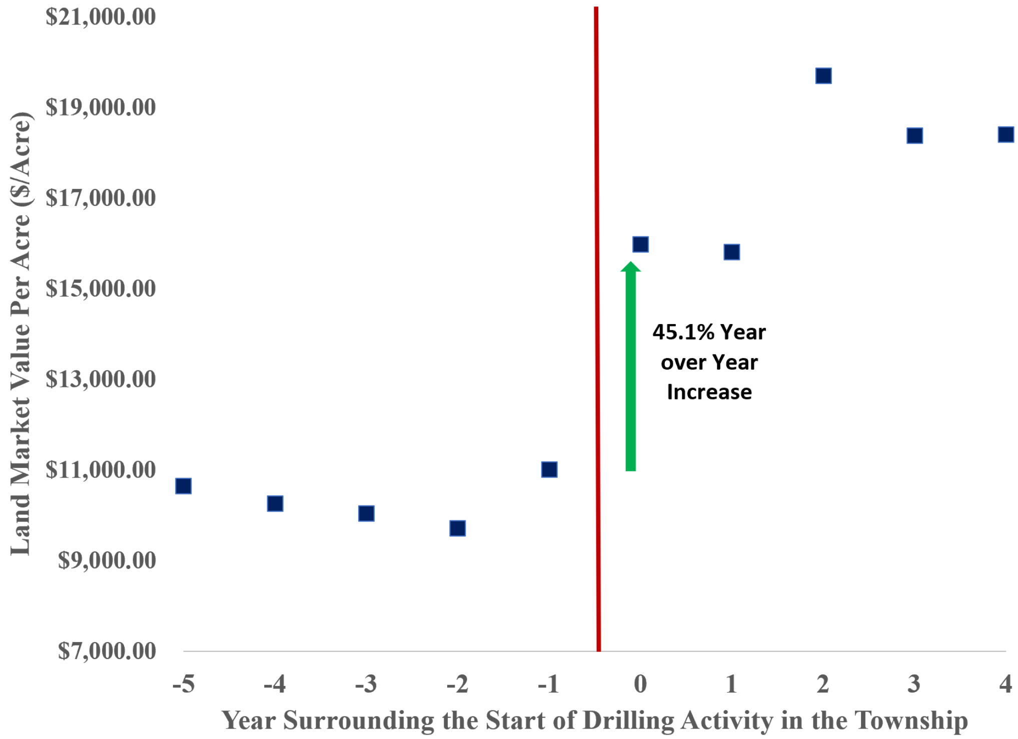


Figure 4: The Development of an Oil and Gas Field Over Time

This figure illustrates the gradual development of the Sandhill Oil Field in Texas in 2000–2020. Circles indicate individual wells, and darker shades correspond to wells drilled later in the sample period. The data are from DrillingInfo, and the plot is restricted to wells with available spud dates (i.e., the dates of the commencement of drilling).

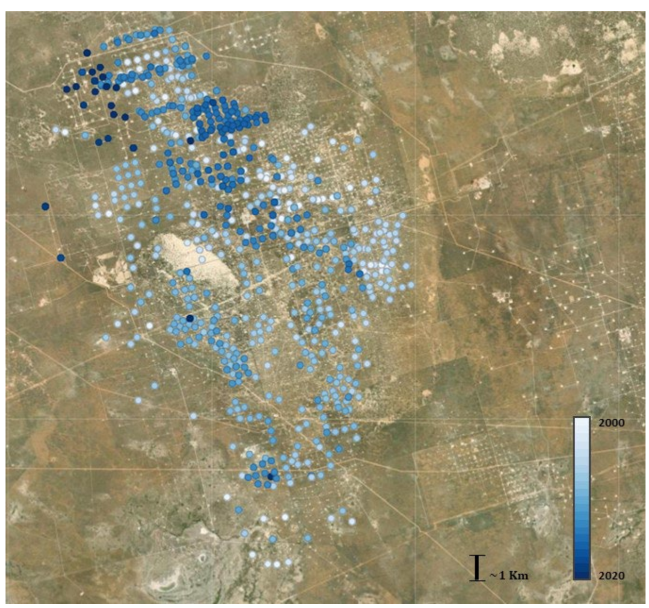


Figure 5: Drilling in the Vicinity of a CEO's Investment Property

This figure shows a sample CEO's land investment property and corporate drilling activity in its vicinity. The CEO's investment property in the figure spans 95.65 acres (0.4 square km). The solid line with a shaded inside area corresponds to the property's borders. Circles indicate oil and gas wells drilled on or around the property in 2000-2020. Data on investment properties are from county records compiled by Lexis Nexis Public Records. Data on corporate drilling activity are from DrillingInfo.

TABLE 1

Summary Statistics

This table reports summary statistics. The sample consists of 298 firms, 412 CEOs, and 229,001 investment projects in the oil and gas industry. The projects are individual wells drilled for the production of hydrocarbons in the onshore United States in 2000–2020. Panels A and B describe sample firms and their investment projects, respectively. Panels C and D focus on CEOs and their investment properties, respectively. Variable definitions and sample selection criteria appear in Appendix 2 and Internet Appendix Table IA.2, respectively.

Panel A: Firms

Variable	Mean	25th Pct.	Median	75th Pct.	Std. Dev.	No. Obs.
All Firms						
Wells per Firm-State	278.25	10.00	60.00	243.00	679.04	823
Firm Budget (No. Wells per Year)	71.54	7.00	23.00	68.00	141.69	3,201
Total No. of Wells	591.65	46.00	158.00	483.00	1,371.74	3,201
Private Firms						
Wells per Firm-State	128.10	6.00	39.00	158.00	238.59	417
Firm Budget (No. Wells per Year)	31.20	5.00	14.00	36.00	51.00	1,712
Total No. of Wells	208.97	31.00	109.00	246.00	323.74	1,712
Public Firms						
Wells per Firm-State	316.36	9.00	49.00	251.00	790.29	555
Firm Budget (No. Wells per Year)	117.92	14.00	46.00	136.00	190.15	1,489
Total No. of Wells	931.73	54.00	238.00	867.00	1,772.91	1,489
Financial Statistics (Compustat)						
Firm Assets (Total Assets_t $ mil.)	16,592.01	869.64	3,196.55	11,728.84	44,327.52	1,489
Book Leverage ((Lt Debt_t + St Debt_t) / Total Assets_t)	0.31	0.20	0.30	0.41	0.16	1,489
Firm-level Investment Rate ($\text{Capex}_t/\text{Total Assets}_{t-1}$)	0.28	0.15	0.24	0.37	0.17	1,483
Market-to-Book (Market Equity_t/ Book Equity_t)	2.02	1.10	1.57	2.34	5.26	1,388
Return-on-Assets ($\text{Oibdp}_t/\text{Total Assets}_t$)	0.12	0.08	0.14	0.20	0.16	1,488
Number of Firms						
All Firms						298
Public						170
Private						128

Panel B: Projects

Variable	Mean	25th Pct.	Median	75th Pct.	Std. Dev.	No. Obs.
First Year of Production Value ($ mil.)	3.30	0.35	1.40	4.59	4.72	229,001
Project NPV ($ mil.)	1.96	-1.67	0.15	3.26	7.52	223,049
Profitability Index	3.50	0.40	1.09	2.42	24.08	223,049
Internal Rate of Return (%)	98.71	-13.21	14.08	73.15	799.78	222,256
Cost ($ mil.)	3.40	1.55	3.71	4.91	2.16	223,049
Price of Oil ($ per Barrel)	70.91	48.47	73.04	94.51	27.24	229,001
Price of Natural Gas ($ per mcf)	4.96	3.32	4.24	6.22	2.26	229,001
Distance from Headquarters (Km)	777.04	265.37	557.21	1,145.15	719.27	228,963
Average Royalty Rate per Township (%)	17.96	15.94	18.55	20.00	3.52	32,053
Number of Wells						
All Firms						229,001
Public						175,582
Private						53,419
Oil and Gas Activity						
No. Wells Per State	12,052.68	35.00	2,476.00	12,833.00	27,252.85	19
No. of States with O&G activity						19

Panel C: CEOs

Variable	Mean	25th Pct.	Median	75th Pct.	Std. Dev.	No. Obs.
Demographic and Professional Attributes						
Age (Years)	56.37	50.00	56.00	62.00	10.20	3,127
Tenure as CEO in the Firm (Years)	9.27	4.00	8.00	15.00	6.44	412
Number of Board Seats	1.62	0.00	1.00	2.00	2.10	311
Compensation (CEOs of Public Firms)						
Salary ($000 per Year)	815.87	500.00	750.00	1,050.00	461.50	1,042
Current Comp. (Salary & Bonus, $000 per Year)	1,508.83	670.00	997.76	1,600.00	2,351.75	1,042
Other Comp. ($000 per Year)	368.99	24.41	75.02	226.31	3,041.60	1,042
Number of CEOs						
All Firms						412
Public						236
Private						176
Female						4
Male						408
Number of CEOs with Investment Properties						92
No. of Properties per CEO (investing CEOs)	1.68	1.00	1.00	2.00	1.60	92
No. of Prpty per CEO (investing CEOs of public firms)	1.65	1.00	1.00	2.00	1.22	60

Variable – Education

Highest Degree	**No. Obs.**	**Proportion**	**Main Major**	**No. Obs.**	**Proportion**
High School or Associate Degree	9	2.4%	Engineering / Geology	127	65.1%
Undergraduate	235	63.2%	Science (Other)	6	3.1%
JD	20	5.4%	Business Administration	31	15.9%
MBA	69	18.5%	Social Science	7	3.6%
Other Masters	27	7.3%	Law	21	10.8%
Ph.D.	12	3.2%	None	3	1.5%
Total	372		Total	195	
N.A.	40		**N.A.**	217	

Panel D: CEO Investment Properties

Variable	Mean	25th Pct.	Median	75th Pct.	Std. Dev.	No. Obs.
Properties						
Holding Period (Years)	11.62	5.00	9.00	17.00	8.66	155
Year of Acquisition	2004	1999	2005	2010	8.64	155
Land as Fraction of Property Market Value (%)	83.01	64.59	97.10	100.00	18.80	155
Land Market Value ($ mil.)	0.75	0.06	0.23	0.73	1.61	155
Property Market Value ($ mil.)	1.12	0.06	0.25	1.03	2.55	155
Land Market Value, CEOs of Public Firms ($ mil.)	0.95	0.06	0.39	1.03	1.94	99
Property Market Value, CEOs of Public Firms ($ mil.)	1.41	0.06	0.50	1.32	3.04	99
No. of Properties						
Total No. of Land				155		
No. of Cities with Land				55		
Land Market Value per Acre ($)	13,986.30	2,440.65	6,126.53	12,975.76	38,931.79	3,297

TABLE 2

CEO Properties and Firm Entry into Oil and Gas Fields

This table studies how the CEO's ownership of private investment assets in an oil and gas field is associated with the firm's entry into the respective field. The dependent variable, *Enter* $_{i,r,t}$, is a binary indicator that equals 1 if firm *i* commences drilling activity in oil and gas field *r* in year *t*, and 0 otherwise. The variable of interest is *CEO Personal Investment* $_{i,r,t}$, defined as a binary indicator that equals 1 if the CEO of firm *i* owns an investment property adjacent to oil and gas field *r* during year *t*, and 0 otherwise. An investment property is a CEO's privately-owned parcel of land, other than his primary residence, for which the value of vacant land exceeds 50% of the property value and which is located within 20 kilometers from the nearest oil and gas well. The investment opportunity set for a given firm consists of all active fields in a given year, where an active field is defined as a field with at least one active oil and gas exploration site in that year. Once a firm enters a field, we drop that field from the sample for that specific firm. *Field Oil-to-Gas Ratio* is the averaged proportion of the field's production output of oil (in barrels) to the output of gas (in barrel-of-oil equivalents). *Field Drilling Activity* is the total number of wells drilled in the field, divided by 10,000. *Field Distance from HQ* is the distance between the field's center point and the firm's headquarters, expressed in kilometers and divided by 10,000. *Firm Capital Spending* is the total number of wells drilled by the firm in a given year, divided by 10,000. CEO State FE is equal to 1 if the field is located in the CEO's state of origin (i.e., the state issuing the CEO's social security number) or the firm's state of headquarters, and 0 otherwise. The sample period is 2000–2020. Variable definitions and sample selection criteria appear in Appendix 2 and Internet Appendix Table IA.2, respectively. The regressions are estimated using ordinary least squares, and the *t*-statistics (in parentheses) are based on standard errors that are heteroscedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	$Enter_{i,r,t}$ = 1							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) CEO Personal Investment$_{i,r,t}$	0.04**	0.04**	0.04**	0.04**	0.03**	0.03**	0.03**	0.03**
	(2.47)	(2.40)	(2.49)	(2.42)	(2.37)	(2.29)	(2.28)	(2.20)
(β_2) Firm Capital Spending$_{i,t}$	0.26***	0.10**	0.26***	0.10**	0.26***	0.09		
	(11.83)	(1.99)	(11.75)	(2.04)	(11.88)	(1.64)		
(β_3) Field Oil-to-Gas Ratio$_{r,t}$	-0.00**	-0.00*	-0.00	-0.00	-0.00***	0.00	0.00	
	(-2.52)	(-1.84)	(-0.11)	(-1.24)	(-4.20)	(1.04)	(1.01)	
(β_4) Field Drilling Activity$_{r,t}$	0.11***	0.11***	0.12***	0.11***	0.06***	0.06***	0.06***	
	(9.60)	(9.53)	(9.78)	(9.55)	(3.93)	(4.10)	(4.08)	
(β_5) Field Distance from HQ$_{i,r,t}$	-0.01**	-0.02***	-0.01**	-0.02***	-0.01*	-0.04***	-0.04***	-0.03***
	(-2.37)	(-7.49)	(-2.36)	(-7.30)	(-1.90)	(-6.76)	(-6.72)	(-4.99)
Firm FE	No	Yes	No	No	No	Yes	No	No
Year FE	No	No	Yes	No	No	Yes	No	No
CEO FE	No	No	No	Yes	No	Yes	Yes	Yes
Field FE	No	No	No	No	Yes	Yes	Yes	No
Firm*Year FE	No	No	No	No	No	No	Yes	Yes
Field*Year FE	No	No	No	No	No	No	No	Yes
CEO State FE	No	No	No	No	No	No	No	Yes
R^2	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
F-Statistics	53.49	32.43	52.13	33.14	36.38	13.95	17.12	14.06
No. Obs.	2,456,189	2,456,189	2,456,189	2,456,189	2,456,189	2,456,189	2,456,182	2,456,182

TABLE 3

Timing of CEO Land Acquisitions

This table studies how the CEO's ownership of private investment assets in an oil field is associated with the firm's entry into the field, depending on the timing of the CEO's acquisition of private assets. Panel A studies CEO properties acquired before the CEO's appointment at the firm. Panel B examines CEO properties acquired before the discovery of commercially viable oil and gas deposits in the field. Panel C investigates CEO properties acquired more than five years before the firm's entry into the respective oil field. The dependent variable, $Enter_{i,r,t}$, is a binary indicator that equals 1 if firm *i* commences drilling activity in oil and gas field *r* in year *t*, and 0 otherwise. The variable of interest is *CEO Personal Investment* $_{i,r,t}$, defined as a binary indicator that equals 1 if the CEO of firm *i* owns an investment property adjacent to oil and gas field *r* during year *t*, and 0 otherwise. An investment property is a CEO's privately-owned parcel of land, other than his primary residence, for which the value of vacant land exceeds 50% of the property value and which is located within 20 kilometers from the nearest oil and gas well. The investment opportunity set for a given firm consists of all active fields in a given year, where an active field is defined as a field with at least one active oil and gas exploration site in that year. Once a firm enters a field, we drop that field from the sample for that specific firm. Control variables include the firm's realized annual investment (*Firm Capital Spending*) and the characteristics of the oil field: *Field Oil-to-Gas Ratio*, *Field Drilling Activity,* and *Field Distance from HQ,* defined as in Table 2. CEO State FE is equal to 1 if the field is located in the CEO's state of origin (i.e., the state issuing the CEO's social security number) or the firm's state of headquarters, and 0 otherwise. The sample period is 2000–2020. Variable definitions and sample selection criteria appear in Appendix 2 and Internet Appendix Table IA.2, respectively. The regressions are estimated using ordinary least squares, and the *t*-statistics (in parentheses) are based on standard errors that are heteroscedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

Panel A: Properties acquired before the CEO's appointment	$Enter_{i,r,t} = 1$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) CEO Personal $Investment_{i,r,t}$	0.05**	0.05**	0.05**	0.05**	0.05**	0.05**	0.05**	0.05**
	(2.20)	(2.14)	(2.20)	(2.14)	(2.14)	(2.05)	(2.05)	(1.99)
R^2	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
F-Statistics	49.25	29.74	47.50	30.46	34.93	12.44	15.30	12.89
No. Obs.	2,162,708	2,162,708	2,162,708	2,162,708	2,162,708	2,162,708	2,162,700	2,162,700
Panel B: Properties acquired before the discovery of fossil fuel deposits	$Enter_{i,r,t} = 1$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) CEO Personal $Investment_{i,r,t}$	0.02**	0.02**	0.02**	0.02**	0.02**	0.02*	0.02*	0.02*
	(2.21)	(2.07)	(2.21)	(2.09)	(2.11)	(1.91)	(1.93)	(1.80)
R^2	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
F-Statistics	49.32	28.69	46.89	29.22	36.32	12.49	15.38	12.58
No. Obs.	2,171,688	2,171,688	2,171,688	2,171,688	2,171,688	2,171,688	2,171,675	2,171,675
Additional Controls and Fixed Effects Included in Regressions for Each Panel:								
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	No	No	Yes	No	No
Year FE	No	No	Yes	No	No	Yes	No	No
CEO FE	No	No	No	Yes	No	Yes	Yes	Yes
Field FE	No	No	No	No	Yes	Yes	Yes	No
Firm∗Year FE	No	No	No	No	No	No	Yes	Yes
Field∗Year FE	No	No	No	No	No	No	No	Yes
CEO State FE	No	No	No	No	No	No	No	Yes

Panel C: Properties acquired 5+ years before firm's entry into the field	$Enter_{i,r,t} = 1$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) CEO Personal $Investment_{i,r,t}$	0.04**	0.04**	0.04**	0.04**	0.04**	0.04**	0.04**	0.04**
	(2.48)	(2.41)	(2.49)	(2.43)	(2.40)	(2.31)	(2.31)	(2.22)
R^2	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
F-Statistics	54.18	31.10	52.10	31.54	39.28	13.33	16.36	13.70
No. Obs.	2,322,758	2,322,758	2,322,758	2,322,758	2,322,758	2,322,758	2,322,750	2,322,750

Additional Controls and Fixed Effects Included in Regressions for Each Panel:								
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	No	No	Yes	No	No
Year FE	No	No	Yes	No	No	Yes	No	No
CEO FE	No	No	No	Yes	No	Yes	Yes	Yes
Field FE	No	No	No	No	Yes	Yes	Yes	No
Firm∗Year FE	No	No	No	No	No	No	Yes	Yes
Field∗Year FE	No	No	No	No	No	No	No	Yes
CEO State FE	No	No	No	No	No	No	No	Yes

TABLE 4

Investment Intensity in Oil Fields Adjacent to CEOs' Properties

This table studies how a CEO's ownership of private land in an oil field is associated with his firm's investment rate in the field. The dependent variable, *Investment Rate* $_{i,r,t+1}$ (in percent), denotes the investment of firm *i* (in number of wells) in field *r* during year *t+1*, scaled by the firm's total number of active wells at time *t*, such that *Investment Rate* $_{i,r,t+1}$ = *No. Wells Drilled* $_{i,r,t+1}$ / *Total No. Active Wells* $_{i,t}$ *100. The variable of interest is *CEO Personal Investment* $_{i,r,t}$, defined as a binary indicator that equals 1 if the CEO of firm *i* owns an investment property adjacent to oil and gas field *r* during year *t*, and 0 otherwise. *Field Productivity* $_{i,r,t}$ denotes the average production value of wells drilled by firm *i* in field *r* during year *t*. The sample period is 2000–2020. Variable definitions and sample selection criteria appear in Appendix 2 and Internet Appendix Table IA.2, respectively. The regressions are estimated using ordinary least squares, and the *t*-statistics (in parentheses) are based on standard errors that are heteroscedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	Investment Rate$_{i,r,t+1}$ (%)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) CEO Personal Investment$_{i,r,t}$	12.69**	8.72**	8.02*	6.10**	7.97*	6.34*	7.99*	6.08**
	(2.59)	(2.24)	(1.94)	(2.10)	(1.82)	(1.66)	(1.95)	(2.12)
(β_2) CEO Perso. Inv.$_{i,r,t}$ x Field Productivity$_{i,r,t}$	-1.97**	-1.63*	-1.93*	-1.32**	-1.90**	-1.61*	-1.92*	-1.31**
	(-2.31)	(-1.90)	(-1.85)	(-2.46)	(-2.21)	(-1.79)	(-1.84)	(-2.48)
(β_3) Field Productivity$_{i,r,t}$	-0.11***	0.01	0.12***	0.09**	-0.04*	0.03**	0.12***	0.09**
	(-4.39)	(0.68)	(2.83)	(2.51)	(-1.96)	(2.10)	(2.89)	(2.44)
(β_4) Firm Capital Spending$_{i,t}$					-48.55***	19.69***	22.05**	
					(-4.38)	(3.05)	(2.52)	
(β_5) Field Oil-to-Gas Ratio$_{i,r,t}$	1.49***	0.60**	-0.04	-0.13	1.01**	0.65**	-0.05	-0.14
	(3.01)	(1.98)	(-0.07)	(-0.21)	(2.25)	(2.24)	(-0.08)	(-0.21)
(β_6) Field Drilling Activity$_{r,t}$					51.35***	33.69***		
					(9.89)	(8.56)		
(β_7) Field Distance from HQ$_{i,r,t}$					-4.43**	0.48	-2.87	-4.25
					(-2.23)	(0.39)	(-0.77)	(-1.29)
Firm FE	No	Yes	Yes	No	No	Yes	Yes	No
Year FE	Yes	Yes	No	No	Yes	Yes	No	No
CEO FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Field FE	No	No	No	No	No	No	No	No
Firm*Year FE	No	No	No	Yes	No	No	No	Yes
Field*Year FE	No	No	Yes	Yes	No	No	Yes	Yes
CEO State FE	No	No	No	Yes	No	No	No	Yes
R^2	0.04	0.48	0.69	0.74	0.16	0.50	0.70	0.74
F-Statistics	8.11	2.27	3.24	3.14	17.13	17.58	3.07	2.58
No. Obs.	14,409	14,381	7,294	6,271	14,406	14,379	7,294	6,271

TABLE 5

CEO Personal Investments and Project Output

This table studies the production output of corporate investments in oil fields adjacent to the CEO's private assets. The unit of observation is an investment project (an oil and gas well), and the dependent variable, *Well Production Value*, is the production output in the first full year of operation (in millions of dollars) for well *z* drilled by firm *i* in township *r* during year *t*. The monetary value of production output is calculated by multiplying the well's production volume of oil and gas by the respective average annual prices of each commodity, scaled by 1,000,000, to denote millions of dollars. The variable of interest is *CEO Personal Investment* $_{i,r,t}$, defined as a binary indicator that equals 1 if the CEO of firm *i* owns an investment property adjacent to oil and gas field *r* during year *t*, and 0 otherwise. Technology fixed effects denote the type of drilling method (vertical, horizontal, or mixed) for the investment project. CEO state fixed effects are equal to 1 if the well is located in the CEO's state of origin (i.e., the state issuing the CEO's social security number) or the firm's state of headquarters, and 0 otherwise. The sample period is 2000–2020. Variable definitions and sample selection criteria appear in Appendix 2 and Internet Appendix Table IA.2, respectively. The regressions are estimated using ordinary least squares, and the *t*-statistics (in parentheses) are based on standard errors that are heteroscedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	Well Production Value$_z$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) CEO Personal Investment$_{i,r,t}$	-0.70***	-0.68***	-0.58***	-0.56***	-0.79**	-0.79**	-0.58**	-0.43*
	(-3.72)	(-3.71)	(-2.74)	(-2.79)	(-2.41)	(-2.43)	(-2.04)	(-1.77)
(β_2) Firm Capital Spending$_{i,t}$			-6.96**	-9.03***	-0.90	-0.90	-1.08	
			(-2.05)	(-2.74)	(-0.39)	(-0.38)	(-0.79)	
(β_3) Well Oil-to-Gas Ratio$_z$	0.71***	0.79***	0.72***	0.79***	0.80***	0.80***	1.36***	1.42***
	(2.79)	(3.10)	(2.93)	(3.24)	(4.53)	(4.53)	(7.97)	(8.38)
(β_4) Well Distance from HQ$_z$			4.00*	3.61*	-1.56*	-1.56	-0.77	-1.62
			(1.90)	(1.66)	(-1.90)	(-1.65)	(-0.96)	(-1.64)
(β_5) Township Drilling Activity$_{r,t}$			17.77	21.27*	23.82***	23.82***		
			(1.57)	(1.90)	(3.16)	(3.16)		
Firm FE	No	Yes	No	Yes	Yes	Yes	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	No	No
CEO FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Township FE	No	No	No	No	Yes	Yes	No	No
Technology FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CEO State FE	No	No	No	No	No	Yes	Yes	Yes
Firm*Year FE	No	No	No	No	No	No	No	Yes
Township*Year FE	No	No	No	No	No	No	Yes	Yes
R^2	0.42	0.42	0.42	0.42	0.60	0.60	0.71	0.72
F-Statistics	9.79	10.47	5.71	7.11	6.04	5.97	16.08	23.56
No. Obs.	228,991	228,991	228,953	228,953	227,989	227,989	218,234	218,076

TABLE 6

CEO Personal Investments and Project Outcomes: IRR, Estimated NPV, and Dry Holes

This table studies the performance of corporate investments in oil fields adjacent to the CEO's private assets, focusing on project-level capital budgeting criteria. The unit of observation is an investment project. In columns 1–2, the dependent variable, *Project IRR*, is the annual internal rate of return for the project estimated according to the Arp petroleum production model of Fetkovich et al. (1996). In columns 3–4, the dependent variable, *Estimated NPV*, denotes the project's approximate net present value, expressed in millions of dollars. Estimated NPV = $(\frac{Well\ Production\ Value_z*(1-FC)}{Depletion\ Rate+Discount\ Rate} - Cost)/1{,}000{,}000$. The flexible costs (FC) are set to 20% following Decaire et al. (2020), and the discount rate is set to 10% following Kellogg (2014). The cash flow estimates are derived according to the petroleum production model of Fetkovich et al. (1996). In columns 5–6, the dependent variable, *Negative NPV*, is an indicator that equals 1 for investment projects with negative nominal cash flows—that is, projects whose estimated lifetime production output is below the cost of the initial investment. Additional details on the estimation of cash flows and capital budgeting criteria appear in Appendix 1. The variable of interest is *CEO Personal Investment* $_{i,r,t}$, defined as a binary indicator that equals 1 if the CEO of firm *i* owns an investment property in oil and gas field *r* during year *t*, and 0 otherwise. Variable definitions and sample selection criteria appear in Appendix 2 and Internet Appendix Table IA.2, respectively. The regressions are estimated using ordinary least squares, and the *t*-statistics (in parentheses) are based on standard errors that are heteroscedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	Project IRR_z		Estimated NPV_z		Negative NPV_z	
	(1)	(2)	(3)	(4)	(5)	(6)
(β_1) CEO Personal $Investment_{i,r,t}$	-0.54*	-0.08**	-1.21***	-0.67**	0.04**	0.04*
	(-1.85)	(-2.25)	(-2.83)	(-2.04)	(2.24)	(1.71)
(β_2) Firm Capital $Spending_{i,t}$	-5.20		-1.17		0.36	
	(-1.26)		(-0.32)		(1.16)	
(β_3) Well Oil-to-Gas $Ratio_{z,}$	-1.24**	-0.80	0.96***	2.18***	-0.17***	-0.23***
	(-2.27)	(-1.56)	(2.62)	(6.42)	(-6.61)	(-7.66)
(β_4) Well Distance from HQ_z	-0.09	-1.22*	-1.52	-1.36	-0.18	0.04
	(-0.07)	(-1.88)	(-1.27)	(-0.78)	(-1.50)	(0.39)
(β_5) Township Drilling $Activity_{r,t}$	-24.52*		14.78		-2.19	
	(-1.73)		(0.91)		(-1.34)	
Firm FE	Yes	No	Yes	No	Yes	No
Year FE	Yes	No	Yes	No	Yes	No
CEO FE	No	Yes	No	Yes	No	Yes
Township FE	Yes	No	Yes	No	Yes	No
Technology FE	Yes	Yes	Yes	Yes	Yes	Yes
CEO State FE	No	Yes	No	Yes	No	Yes
Firm*Year FE	No	Yes	No	Yes	No	Yes
Township*Year FE	No	Yes	No	Yes	No	Yes
R^2	0.20	0.46	0.42	0.58	0.46	0.60
F-Statistics	2.12	3.58	2.52	13.91	10.66	19.95
No. Obs.	221,251	211,588	222,044	212,378	222,044	212,378

TABLE 7

Corporate Governance and the Performance of CEO-Benefitting Projects

This table studies how the performance of investment projects adjacent to the CEO's private assets varies with corporate governance. The unit of observation is an investment project (an oil and gas well), and the dependent variable, *Well Production Value*, is the production output in the first full year of operation (in millions of dollars) for well *z* drilled by firm *i* in township *r* during year *t*. The monetary value of production output is calculated by multiplying the well's production volume of oil and gas by the respective average annual prices of each commodity, scaled by 1,000,000, to denote millions of dollars. The variable of interest is *CEO Personal Investment* $_{i,r,t}$, defined as a binary indicator that equals 1 if the CEO of firm *i* owns an investment property in oil and gas field *r* during year *t*, and 0 otherwise. In Panel A, *Owner-managed*, is a binary indicator that equals 1 for firms that employ 50 or fewer employees. In Panel B, *Private*, is a binary indicator that equals 1 for private-held firms and 0 for publicly-traded firms. In Panel C, *Ownership Concentration*, is defined as the Herfindahl-Hirschman Index of institutional ownership for each firm-year, where higher values correspond to more concentrated firm ownership. In Panel D, *Separation of Chair and CEO*, is the binary indicator that equals 1 for firm-years when the CEO does not serve as the chairman of the board of directors, and 0 otherwise. Control variables include *Firm Capital Spending*, *Township Drilling Activity*, *Well Oil-to-gas ratio*, and *Well Distance from HQ*. Variable definitions and sample selection criteria appear in Appendix 2 and Internet Appendix Table IA.2, respectively. The regressions are estimated using ordinary least squares, and the *t*-statistics (in parentheses) are based on standard errors that are heteroscedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

Panel A: Owner-Managed Firms	Well Production Value$_z$					
	(1)	(2)	(3)	(4)	(5)	(6)
(β_1) CEO Personal Investment$_{i,r,t}$	-0.75***	-0.74***	-0.65**	-0.44*	-0.65**	-0.44*
	(-4.37)	(-4.37)	(-2.25)	(-1.80)	(-2.27)	(-1.83)
(β_2) CEO Perso. Inv.$_{i,r,t}$* Owner − managed$_i$	0.99**	0.98**	1.27***	0.66*	1.27***	0.65*
	(2.55)	(2.54)	(2.77)	(1.85)	(2.75)	(1.84)
(β_3) Owner − managed$_i$	-1.17***					
	(-2.76)					
F-Statistics	7.66	8.64	23.71	25.01	14.33	18.81
No. Obs.	228,991	228,991	218,252	218,090	218,234	218,076
Panel B: Public vs. Private Firms	Well Production Value$_z$					
(β_1) CEO Personal Investment$_{i,r,t}$	-0.93***	-0.89***	-0.86***	-0.58***	-0.85***	-0.58***
	(-10.84)	(-9.75)	(-3.18)	(-2.76)	(-3.21)	(-2.80)
(β_2) CEO Perso. Inv.$_{i,r,t}$* Private Firm$_{i,t}$	0.98***	0.86***	1.16***	1.24**	1.15***	1.22**
	(3.70)	(3.18)	(3.17)	(2.27)	(3.17)	(2.25)
(β_3) Private Firm$_{i,t}$	-0.46	-0.01	-0.37***		-0.39***	
	(-1.32)	(-0.04)	(-2.72)		(-2.80)	
F-Statistics	30.43	25.01	18.38	23.35	12.39	17.58
No. Obs.	228,991	228,991	218,252	218,090	218,234	218,076

Additional Controls and Fixed Effects Included in Regressions for Each Panel:

Controls	No	No	No	No	Yes	Yes
Firm FE	No	Yes	Yes	No	Yes	No
Year FE	Yes	Yes	No	No	No	No
CEO FE	Yes	Yes	Yes	Yes	Yes	Yes
Township FE	No	No	No	No	No	No
Technology FE	Yes	Yes	Yes	Yes	Yes	Yes
CEO State FE	No	No	Yes	Yes	Yes	Yes
Firm*Year FE	No	No	No	Yes	No	Yes
Township*Year FE	No	No	Yes	Yes	Yes	Yes

Panel C: Ownership Concentration			Well Production Value$_z$			
(β_1) CEO Personal Investment$_{i,r,t}$	-0.99***	-0.94***	-1.03***	-1.65***	-1.02***	-1.64***
	(-6.96)	(-6.59)	(-3.07)	(-4.72)	(-3.12)	(-4.72)
(β_2) CEO Perso. Inv.$_{i,r,t}$* Ownership Concentration$_{i,t}$	0.03**	0.03*	0.06***	0.24***	0.06***	0.24***
	(2.19)	(1.75)	(2.81)	(6.13)	(2.78)	(6.14)
(β_3) Ownership Concentration $_{i,t}$	-0.01	-0.00	-0.02**		-0.02**	
	(-0.94)	(-0.13)	(-2.57)		(-2.58)	
F-Statistics	18.52	18.23	21.08	33.63	14.82	25.20
No. Obs.	159,503	159,503	151,472	151,440	151,472	151,440
Panel D: Separation of CEO and Chairman Roles			Well Production Value$_z$			
(β_1) CEO Personal Investment$_{i,r,t}$	-0.87***	-0.85***	-1.03***	-0.85***	-1.01***	-0.84***
	(-7.74)	(-7.91)	(-3.85)	(-4.04)	(-3.90)	(-4.02)
(β_2) CEO Perso. Inv.$_{i,r,t}$* Separation of Chair and CEO$_{i,t}$	0.69***	0.65***	1.04***	1.43***	1.02***	1.41***
	(3.73)	(3.55)	(2.88)	(3.50)	(2.87)	(3.42)
(β_3) Separation of Chair and CEO$_{i,t}$	-0.10	0.06	0.20		0.21	
	(-0.37)	(0.25)	(1.00)		(1.09)	
F-Statistics	16.86	17.94	16.31	23.39	11.14	17.63
No. Obs.	187,120	187,120	178,063	177,972	178,063	177,972

Additional Controls and Fixed Effects Included in Regressions for Each Panel:

Controls	No	No	No	No	Yes	Yes
Firm FE	No	Yes	Yes	No	Yes	No
Year FE	Yes	Yes	No	No	No	No
CEO FE	Yes	Yes	Yes	Yes	Yes	Yes
Township FE	No	No	No	No	No	No
Technology FE	Yes	Yes	Yes	Yes	Yes	Yes
CEO State FE	No	No	Yes	Yes	Yes	Yes
Firm*Year FE	No	No	No	Yes	No	Yes
Township*Year FE	No	No	Yes	Yes	Yes	Yes

Internet Appendix

Self-Dealing in Corporate Investment

PAUL H. DÉCAIRE AND DENIS SOSYURA

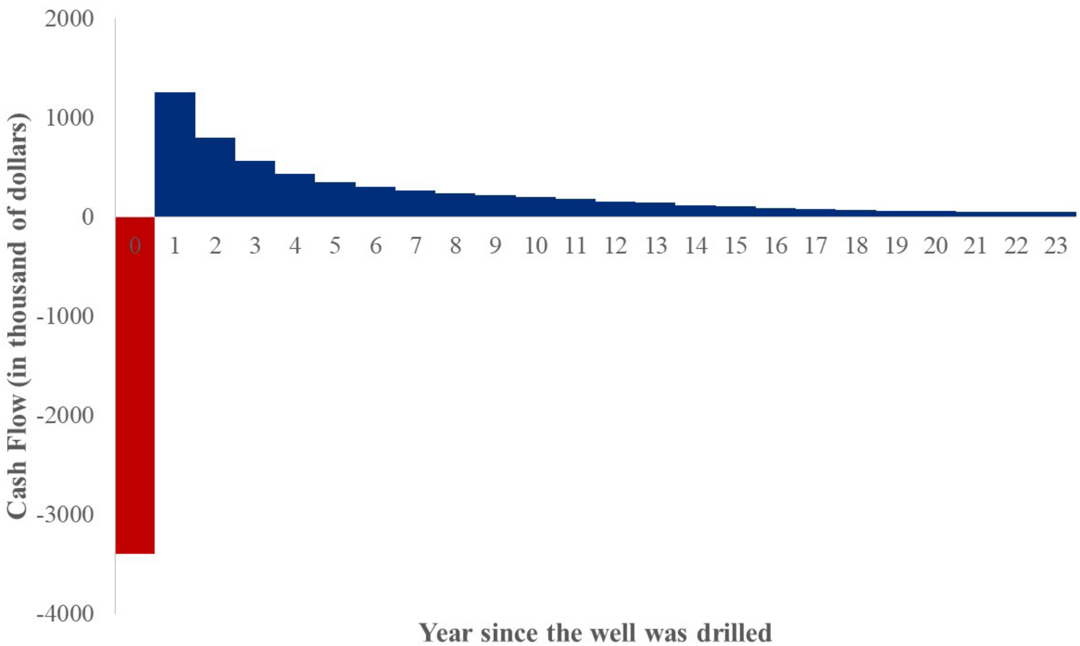
This Internet Appendix presents additional analyses and robustness tests.

Contents

INTERET APPENDIX FIGURE IA.1

Cash Flow Pattern for a Typical Investment Project

This figure plots the cash flow pattern for the typical investment project (an oil and gas well). Cash flow estimates are from the Arp model, a petroleum production model in Fetkovich et al. (1996). Using the Arp model, we obtain an estimate of the project cash flow for the year of initiation and subsequent years as follows: Projected cash flow $_0$ = $Prod_0 * (1 - FC) - Cost$, Projected cash flow $_t$ = $Prod_0 * (1 - FC) * e^{-(d+r)t}$. $Prod_0$ corresponds to the production output in the first year, *FC* denotes the flexible costs associated with the well's operation (in proportion to production), *d* denotes the depletion rate of production (the speed at which production declines over time), *r* is the discount rate for evaluating the well, *t* indicates the number of months since the well was drilled, and *Cost* is the cost of drilling the well. Variable definitions and additional details on cash flow estimation appear in Appendixes 2 and 3, respectively.



INTERNET APPENDIX TABLE IA.1

The Effect of Oil Exploration on Land Value

This table studies the effect of oil and gas exploration on the market value of land and the royalty rate paid to the mineral right owners. In columns 1–2, the dependent variable *Land Market Value per Acre* $_{r,t}$ is the average market value of land (in dollars per acre) in township *r* in year *t*. The market value of land value is measured for properties that comprise primarily vacant land—those for which the value of land exceeds 50% of the assessed property value. Market value estimates are based on property-level market transactions from the Zillow Transaction and Assessment Dataset (ZTRAX). In columns 3–4, the dependent variable *Royalty rate* $_{r,t}$ is the average royalty rate (measured in percent of the well's net revenue) paid to the local mineral right owners in township *r* during year *t*. The royalty rate is calculated based on the transaction-level data on lease agreements from DrillingInfo. A township is a standardized geographical unit measuring 6 miles by 6 miles (about 10 km by 10 km). Panel A studies the effects of the initiation of oil and gas exploration (extensive margin). In Panel A, the main variable of interest is the binary indicator *Drilling initiation* $_{r,t}$ that equals 1 after the first well is drilled in a township and 0 otherwise. Panel B focuses on the intensity of oil and gas exploration (intensive margin). In Panel B, the independent variable of interest *Drilling intensity* $_{r,t}$ captures the cumulative number of wells drilled in the property's township *r* during year *t*. Variable definitions and sample selection criteria appear in Appendix 2 and Internet Appendix Table IA.2, respectively. The sample period is 2000–2020. The *t*-statistics (in parentheses) are based on standard errors that are heteroscedasticity consistent and clustered at the township level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

Panel A: Extensive margin of oil exploration	Land Market Value per Acre ($/Acre)$_{r,t}$		Royalty Rate (%)$_{r,t}$	
	(1)	(2)	(3)	(4)
(β_1) Drilling Initiation$_{r,t}$	14,347.04***	5,384.11**	1.25***	0.25***
	(4.49)	(2.61)	(17.63)	(4.24)
Township FE	Yes	Yes	Yes	Yes
Drilling Cohort*Year FE	No	Yes	No	Yes
R^2	0.35	0.62	0.74	0.75
F-Statistics	20.17	6.83	310.87	17.96
No. Obs.	3,252	3,223	31,634	31,634

Panel B: Intensive margin of oil exploration	Land Market Value per Acre ($/Acre)$_{r,t}$		Royalty Rate (%)$_{r,t}$	
	(1)	(2)	(3)	(4)
(β_1) $Drilling\ Intensity_{r,t}$	152.23**	154.76*	0.02***	0.01***
	(2.82)	(1.86)	(8.50)	(7.42)
Township FE	Yes	Yes	Yes	Yes
Drilling Cohort*Year FE	No	Yes	No	Yes
R^2	0.75	0.77	0.76	0.77
F-Statistics	7.95	3.47	72.26	55.03
No. Obs.	1,690	1,655	20,044	20,044

INTERNET APPENDIX TABLE IA.2

Sample Construction

This table shows the sample selection criteria and the number of firms, CEOs, and projects screened out by each sample filter. The sample period is from 2000 to 2020.

Sample	**Firms**	**CEOs**	**Projects**
Firms with available information on CEOs	318	452	254,842
- Firms with incomplete information on CEOs' personal assets*	20	32	4,876
- Projects with incomplete information	0	8	20,965
= Final Sample	298	412	229,001

* Information on CEOs' real estate assets is from Lexis Nexis Public Records, a database that covers U.S. residents with a social security number. The missing CEOs are those who live outside the U.S. and manage foreign firms.

INTERNET APPENDIX TABLE IA.3

Robustness: Firm Entry into an Oil Field under a Restrictive Definition of CEO Properties

This table provides a robustness test for the evidence on a firm's entry into an oil field (Table 2) after imposing a more restrictive definition of the CEO's investment properties. The analysis examines how the CEO's ownership of private investment assets in an oil and gas field is associated with the firm's entry into the respective field. The dependent variable, *Enter* $_{i,r,t}$, is a binary indicator that equals 1 if firm *i* commences drilling activity in oil and gas field *r* in year *t*, and 0 otherwise. The variable of interest is *CEO Personal Investment* $_{i,r,t}$, defined as a binary indicator that equals 1 if the CEO of firm *i* owns an investment property adjacent to oil and gas field *r* during year *t*, and 0 otherwise. An investment property is a CEO's privately-owned parcel of land, other than his primary residence, for which the value of vacant land exceeds 99% of the property value and which is located within 10 kilometers from the nearest oil and gas well. The investment opportunity set for a given firm consists of all active fields in a given year, where an active field is defined as a field with at least one active oil and gas exploration site in that year. Once a firm enters a field, we drop that field from the sample for that specific firm. *Field Oil-to-Gas Ratio* is the averaged proportion of the field's production output of oil (in barrels) to the output of gas (in barrel-of-oil equivalents). *Field Drilling Activity* is the total number of wells drilled in the field, divided by 10,000. *Field Distance from HQ* is the distance between the field's center point and the firm's headquarters, expressed in kilometers and divided by 10,000. *Firm Capital Spending* is the total number of wells drilled by the firm in a given year, divided by 10,000. CEO State FE is equal to 1 if the field is located in the CEO's state of origin (i.e., the state issuing the CEO's social security number) or the firm's state of headquarters, and 0 otherwise. The sample period is 2000–2020. Variable definitions and sample selection criteria appear in Appendix 2 and Internet Appendix Table IA.2, respectively. The regressions are estimated using ordinary least squares, and the *t*-statistics (in parentheses) are based on standard errors that are heteroscedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	$Enter_{i,r,t} = 1$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) CEO Personal Investment$_{i,r,t}$	0.04**	0.04**	0.04**	0.04**	0.04**	0.04**	0.04**	0.04**
	(2.56)	(2.49)	(2.58)	(2.49)	(2.46)	(2.38)	(2.35)	(2.26)
(β_2) Firm Capital Spending$_{i,t}$	0.26***	0.10**	0.26***	0.10**	0.26***	0.09		
	(11.84)	(2.00)	(11.76)	(2.04)	(11.90)	(1.64)		
(β_3) Field Oil-to-Gas Ratio$_{r,t}$	-0.00**	-0.00*	-0.00	-0.00	-0.00***	0.00	0.00	
	(-2.56)	(-1.88)	(-0.11)	(-1.27)	(-4.39)	(1.08)	(1.04)	
(β_4) Field Drilling Activity$_{r,t}$	0.11***	0.11***	0.12***	0.11***	0.06***	0.06***	0.06***	
	(9.70)	(9.63)	(9.88)	(9.65)	(3.93)	(4.08)	(4.06)	
(β_5) Field Distance from HQ$_{i,r,t}$	-0.01**	-0.02***	-0.01**	-0.02***	-0.01*	-0.04***	-0.04***	-0.03***
	(-2.37)	(-7.50)	(-2.36)	(-7.31)	(-1.90)	(-6.77)	(-6.74)	(-4.98)
Firm FE	No	Yes	No	No	No	Yes	No	No
Year FE	No	No	Yes	No	No	Yes	No	No
CEO FE	No	No	No	Yes	No	Yes	Yes	Yes
Field FE	No	No	No	No	Yes	Yes	Yes	No
Firm*Year FE	No	No	No	No	No	No	Yes	Yes
Field*Year FE	No	No	No	No	No	No	No	Yes
CEO State FE	No	No	No	No	No	No	No	Yes
R^2	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02
F-Statistics	52.27	32.66	51.03	33.35	34.87	14.05	17.31	13.95
No. Obs.	2,456,189	2,456,189	2,456,189	2,456,189	2,456,189	2,456,189	2,456,182	2,456,182

INTERNET APPENDIX TABLE IA.4

Robustness: Firm Entry into an Oil Field under a Hazard Rate Model

This table provides a robustness test for the evidence on a firm's entry into an oil field (Table 2), using the Cox proportional hazard rate model. The analysis examines how the CEO's ownership of private investment assets in an oil and gas field is associated with the firm's entry into the respective field. The dependent variable, *Enter* $_{i,r,t}$, is a binary indicator that equals 1 if firm *i* commences drilling activity in oil and gas field *r* in year *t*, and 0 otherwise. The variable of interest is *CEO Personal Investment* $_{i,r,t}$, defined as a binary indicator that equals 1 if the CEO of firm *i* owns an investment property adjacent to oil and gas field *r* during year *t*, and 0 otherwise. An investment property is a CEO's privately-owned parcel of land, other than his primary residence, for which the value of vacant land exceeds 50% of the property value and which is located within 20 kilometers from the nearest oil and gas well. The investment opportunity set for a given firm consists of all active fields in a given year, where an active field is defined as a field with at least one active oil and gas exploration site in that year. Once a firm enters a field, we drop that field from the sample for that specific firm. *Field Oil-to-Gas Ratio* is the averaged proportion of the field's production output of oil (in barrels) to the output of gas (in barrel-of-oil equivalents). *Field Drilling Activity* is the total number of wells drilled in the field, divided by 10,000. *Field Distance from HQ* is the distance between the field's center point and the firm's headquarters, expressed in kilometers and divided by 10,000. *Firm Capital Spending* is the total number of wells drilled by the firm in a given year, divided by 10,000. The sample period is 2000–2020. Variable definitions and sample selection criteria appear in Appendix 2 and Internet Appendix Table IA.2, respectively. The regressions are estimated via the Cox proportional hazard rate model (Cox 1972), and the *z*-statistics (in parentheses) are based on standard errors that are heteroscedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	Hazard Model for Field Entry
	(1)
(β_1) CEO Personal Investment$_{i,r,t}$	2.10***
	(4.67)
(β_2) Firm Capital Spending$_{i,t}$	28.78***
	(9.43)
(β_3) Field Oil-to-Gas Ratio$_{r,t}$	-0.28**
	(-1.97)
(β_4) Field Drilling Activity$_{r,t}$	10.49***
	(20.43)
(β_5) Field Distance from HQ$_{i,r,t}$	-6.61***
	(-3.73)
No. Obs.	2,093,485

INTERNET APPENDIX TABLE IA.5

Managerial Slack and CEO-benefitting Investments

This table studies how a firm's propensity to invest in the vicinity of the CEO's private assets varies with managerial slack, proxied by high oil prices. The dependent variable, *Investment near personal properties* $_{i,t}$, is a binary indicator that equals 1 if firm *i* in year *t* initiates an investment project in a field adjacent to the CEO's private land, and 0 otherwise. The main variable of interest is *High Oil Prices* $_t$, a binary indicator that equals 1 if the average market price for oil during year *t* exceeds the sample median ($73 per barrel), and 0 otherwise. In columns 1–4, the regressions are estimated via ordinary least squares, and the *t*-statistics (in parentheses) are based on standard errors that are heteroscedasticity consistent and clustered at the firm level. In columns 5–6, the regressions are estimated via the probit model for binary outcomes, and the *z*-statistics (in parentheses) are based on standard errors that are heteroscedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	OLS				Probit	
	Investment near personal properties$_{i,t}$ = 1					
	(1)	(2)	(3)	(4)	(5)	(6)
(β_1) High Oil Prices$_t$	0.02**	0.02**	0.02***	0.02***	0.33***	0.29**
	(2.46)	(2.47)	(2.98)	(2.93)	(2.76)	(2.51)
(β_2) Firm Capital Spending$_{i,t}$		0.00		0.00		0.00**
		(1.37)		(1.52)		(2.06)
Firm FE	No	No	Yes	Yes	No	No
R^2	0.00	0.01	0.56	0.56		
F-Statistics	6.04	3.16	8.89	4.67		
No. Obs.	3,201	3,201	3,195	3,195	3,201	3,201

INTERNET APPENDIX TABLE IA.6

CEO Investment Properties and Firm Exit from Oil and Gas Fields

This table studies how the CEO's ownership of private investment assets in an oil and gas field is associated with the firm's exit from the respective field. The dependent variable, *Exit* $_{i,r,t}$, is a binary indicator that equals 1 if firm *i* discontinues its drilling activity in oil and gas field *r* for at least two consecutive years as of year *t*, and 0 otherwise. The first variable of interest is *CEO Personal Investment* $_{i,r,t}$, defined as a binary indicator that equals 1 if the CEO of firm *i* owns an investment property adjacent to oil and gas field *r* during year *t*, and 0 otherwise. An investment property is a CEO's privately-owned parcel of land, other than his primary residence, for which the value of vacant land exceeds 50% of the property value and which is located within 20 kilometers from the nearest oil and gas well. The second variable of interest is *CEO Sale of Personal Investment* $_{i,r,t}$, a binary indicator that assumes the value of 1 for field-years following the CEO's disposition of his private assets in the field, and 0 otherwise. Once a firm exits a field, this field is dropped from the opportunity set of active fields available for exit for that firm. *Field Oil-to-Gas Ratio* is the averaged proportion of the field's production output of oil (in barrels) to the output of gas (in barrel-of-oil equivalents). *Field Drilling Activity* is the total number of wells drilled in the field, divided by 10,000. *Field Distance from HQ* is the distance between the field's center point and the firm's headquarters, expressed in kilometers and divided by 10,000. *Firm Capital Spending* is the total number of wells drilled by the firm in a given year, divided by 10,000. The sample period is 2000–2020. Variable definitions and sample selection criteria appear in Appendix 2 and Internet Appendix Table IA.2, respectively. The regressions are estimated using ordinary least squares, and the *t*-statistics (in parentheses) are based on standard errors that are heteroscedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	Exit $_{i,r,t}$ = 1					
	(1)	(2)	(3)	(4)	(5)	(6)
(β_1) CEO Personal Investment$_{i,r,t}$	-0.20***	-0.11**	-0.11***			
	(-4.53)	(-2.18)	(-2.66)			
(β_2) CEO Sale of Personal Investment$_{i,r,t}$				0.26***	0.31***	0.18*
				(2.67)	(3.06)	(1.69)
(β_3) Firm Capital Spending$_{i,t}$		1.03**	0.28		1.04**	0.29
		(2.30)	(0.72)		(2.36)	(0.76)
(β_4) Field Oil-to-Gas Ratio$_{i,r,t}$	-0.00	0.00	-0.09***	-0.00	0.00	-0.09***
	(-0.12)	(0.01)	(-5.45)	(-0.08)	(0.03)	(-5.41)
(β_5) Field Avg. Prod. Value$_{i,r,t}$	-0.00**	-0.00**	-0.01***	-0.00**	-0.00**	-0.01***
	(-2.44)	(-2.38)	(-8.34)	(-2.46)	(-2.43)	(-8.34)
(β_6) Field Drilling Activity$_{r,t}$		-1.67***	-1.82***		-1.71***	-1.86***
		(-18.87)	(-18.25)		(-20.66)	(-19.59)
(β_7) Field Distance from HQ$_{i,r,t}$		0.02	0.07		0.03	0.08
		(0.15)	(0.49)		(0.20)	(0.53)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	No	No	Yes
CEO FE	No	No	Yes	No	No	Yes
R^2	0.04	0.05	0.15	0.04	0.06	0.15
F-Statistics	8.38	72.02	81.20	4.94	74.50	84.30
No. Obs.	30,669	30,641	30,631	30,669	30,641	30,631

INTERNET APPENDIX TABLE IA.7

Robustness: Inherited CEO Properties and Project Output

This table tests the robustness of performance outcomes of corporate investment projects adjacent to CEO properties, focusing on inherited CEO properties. The analysis examines the production output of corporate investments in oil fields adjacent to the CEO's inherited assets. An inherited CEO property is a property previously owned by one of the CEO's senior relatives (such as parents, siblings, or in-laws), according to the deed records in Lexis Nexis Public Records. The unit of observation is an investment project (an oil and gas well), and the dependent variable, *Well Production Value*, is the production output in the first full year of operation (in millions of dollars) for well *z* drilled by firm *i* in township *r* during year *t*. The monetary value of production output is calculated by multiplying the well's production volume of oil and gas by the respective average annual prices of each commodity, scaled by 1,000,000, to denote millions of dollars. The variable of interest is *CEO Personal Investment* $_{i,r,t}$, defined as a binary indicator that equals 1 if the CEO of firm *i* owns an investment property adjacent to oil and gas field *r* during year *t*, and 0 otherwise. Technology fixed effects denote the type of drilling method (vertical, horizontal, or mixed) for the investment project. The sample period is 2000–2020. Variable definitions and sample selection criteria appear in Appendix 2 and Internet Appendix Table IA.2, respectively. The regressions are estimated using ordinary least squares, and the *t*-statistics (in parentheses) are based on standard errors that are heteroscedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	Well Production Value$_z$			
	(1)	(2)	(3)	(4)
(β_1) CEO Personal Investment$_{i,r,t}$	-1.09***	-1.03***	-0.71**	-0.69**
	(-4.65)	(-4.44)	(-2.36)	(-2.34)
(β_2) Firm Capital Spending$_{i,t}$			-7.03**	-9.13***
			(-2.06)	(-2.75)
(β_3) Well Oil-to-Gas Ratio$_z$	0.71***	0.78***	0.72***	0.79***
	(2.76)	(3.08)	(2.91)	(3.22)
(β_4) Well Distance from HQ$_z$			4.03*	3.64*
			(1.91)	(1.67)
(β_5) Township Drilling Activity$_{r,t}$			17.43	20.92*
			(1.54)	(1.87)
Firm FE	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes
CEO FE	Yes	Yes	Yes	Yes
Technology FE	Yes	Yes	Yes	Yes
R^2	0.42	0.42	0.42	0.42
F-Statistics	32.34	32.25	16.47	16.17
No. Obs.	228,991	228,991	228,953	228,953

INTERNET APPENDIX TABLE IA.8

CEO Compensation

This table examines the compensation of CEOs with private investments in oil and gas fields. The dependent variables are measures of executive compensation, expressed in thousands of dollars and collected from proxy statements and Execucomp. *Salary* is the annual CEO salary. *Current Compensation* is the current component of CEO pay that includes the annual salary and performance bonus (Execucomp item *Total_curr*). *Perquisites* is the total annual value of executive perquisites, such corporate housing, chauffer services, and the private use of the firm's property or corporate jet, disclosed as "other pay." *Total compensation* is the total annual compensation (Execucomp item *TDC1*) that combines the annual salary, bonus, other pay, stock and option grants, and long-term incentive pay payouts. The main independent variable is the binary indicator *CEO with private investments*, which equals one for CEOs who own private land in the oil fields developed by their firm during their tenure, and 0 otherwise. The second independent variable of interest is *Number of CEO-benefitting projects*, which denotes the number of the firm's investments in the vicinity (20 km) of the CEO's private land. The sample period is 2000–2020. Variable definitions and sample selection criteria appear in Appendix 2 and Internet Appendix Table IA.2, respectively. The regressions are estimated using ordinary least squares, and the *t*-statistics (in parentheses) are based on standard errors that are heteroscedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	$Salary_{m,t}$	Current $Comp._{m,t}$	$Perquisites_{m,t}$	Total $Comp._{m,t}$	$Salary_{m,t}$	Current $Comp._{m,t}$	$Perquisites_{m,t}$	Total $Comp._{m,t}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) CEO with private $investments_m$	44.56	156.14	1,447.39	2,982.39				
	(0.27)	(0.44)	(0.88)	(0.74)				
(β_2) No. of CEO − benefitting $projects_m$					26.87	39.64	525.90	1,011.68
					(0.49)	(0.31)	(0.99)	(0.72)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.86	0.60	0.27	0.62	0.86	0.60	0.27	0.62
F-Statistics	0.07	0.20	0.77	0.55	0.24	0.10	0.98	0.52
No. Obs.	1,036	1,036	1,036	1,032	1,036	1,036	1,036	1,032

INTERNET APPENDIX TABLE IA.9

Announcement Returns around CEO Departures

This table studies announcement returns around the departures of CEOs with private investments in oil and gas fields. The dependent variable is the cumulative abnormal return (CAR) over various time horizons starting on the date of the announcement. The dates of CEO departures are hand-collected from corporate press releases. When a CEO's departure is announced on a non-trading date, the announcement date is set to the first subsequent trading day. The analysis excludes CEO departures disclosed with other corporate news, such as mergers, acquisitions, delistings, and bankruptcies. The abnormal returns are computed as market-adjusted returns winsorized at 2% in each tail, using data from Eventus on WRDS. The main variable of interest is *CEO with private investments* $_{m}$, defined as a binary indicator that equals 1 if during the CEO's tenure, his firm invested in CEO-benefitting drilling projects in the vicinity of the CEO's private assets, and 0 otherwise. Variable definitions and sample selection criteria appear in Appendix 2 and Internet Appendix Table IA.2, respectively. The *t*-statistics (in parentheses) are based on robust standard errors. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	Cummulative Abnormal Return (CAR in %)$_{i,t}$		
	CAR (0,1)	CAR (0,2)	CAR (0,3)
(β_0) Intercept$_{i,t}$	-0.76*	-0.90**	-0.70
	(-1.93)	(-2.20)	(-1.52)
(β_1) CEO with private investments$_{m}$	5.31**	5.24**	7.53**
	(2.15)	(2.27)	(2.04)
R^2	0.05	0.04	0.07
F-Statistics	4.60	5.13	4.16
No. Obs.	135	135	135

INTERNET APPENDIX TABLE IA.10

Persistency in the Appointment of CEOs with Private Investments

This table studies the likelihood of a firm that has previously employed a CEO with private investments in oil and gas fields to appoint another CEO with such private investments. The dependent variable is an indicator that equals 1 if a firm subsequently appoints another CEO with private investments, and 0 otherwise. *Past CEO with private investments* $_i$ is a binary indicator that equals 1 if firm *i* has previously employed a CEO with private investments in oil and gas fields, and 0 otherwise. The sample period is 2000–2020. Variable definitions and sample selection criteria appear in Appendix 2 and Internet Appendix Table IA.2, respectively. The regressions are estimated as linear probability models via ordinary least squares. The *t*-statistics (in parentheses) are based on standard errors that are heteroscedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	Appointment of another CEO with private investments$_i$	
	(1)	(2)
(β_1) Past CEO with private investments$_i$	-0.04**	-0.86***
	(-2.47)	(-7.13)
Firm FE	No	Yes
Year FE	No	Yes
R^2	0.00	0.92
F-Statistics	6.09	50.87
No. Obs.	147	82

INTERNET APPENDIX TABLE IA.11

CEO Sales of Private Investments in Oil Fields

This table studies a CEO's propensity to sell his private investments in an oil and gas field after his firm develops the field. The dependent variable, *Sell the Property* $_{m,t}$, is a binary indicator that equals 1 if the CEO sells his private investment *m* in an oil field in a given year, and 0 if the CEO retains his investment. The variable of interest is *Enter* $_{i,r,t}$, defined as a binary indicator that equals 1 if the CEO's firm *i* enters the oil and gas field *r* during year *t*, and 0 otherwise. The sample period is 2000–2020. The regressions are estimated as linear probability models with fixed effects. Variable definitions and sample selection criteria appear in Appendix 2 and Internet Appendix Table IA.2, respectively. The *t*-statistics (in parentheses) are based on standard errors that are heteroscedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	$\text{Sell the Property}_{m,t} = 1$			
	(1)	(2)	(3)	(4)
(β_1) $\text{Enter}_{i,r,t}$	0.03**	0.09***	0.10***	0.10***
	(2.49)	(4.54)	(5.95)	(5.95)
CEO FE	No	Yes	Yes	Yes
Year-Vintage FE	Yes	No	Yes	Yes
State FE	No	No	No	Yes
R^2	0.04	0.06	0.07	0.07
F-Statistics	6.18	20.58	35.42	35.34
No. Obs.	1,815	1,815	1,815	1,815