# CEO Pet Projects*

**Paul H. Décaire**
Arizona State University

**Denis Sosyura**
Arizona State University

**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 pet 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. Using information from CEOs' relatives as an instrument for the location of their private assets, we argue that these effects are causal. Overall, we show the effect of CEOs' private monetary interests on capital budgeting decisions.

**JEL Codes:** G30, G34, G41

Keywords: CEO, private benefits, agency, rent extraction, corporate investment

* Send correspondence to Denis Sosyura, W. P. Carey School of Business, 400 E. Lemon St., P.O. Box 873906, Tempe, AZ 85287; telephone: (480) 965-4221. E-mail: dsosyura@asu.edu.

Electronic copy available at: https://ssrn.com/abstract=3747263

Academic theory and corporate finance textbooks usually define the main task of a firm's CEO as selecting investment projects that maximize the NPV. A central tenet in the agency theory is that some investment projects deliver private benefits to the CEO and drive a wedge between the incentives of managers and shareholders. The theoretical literature in corporate governance has pegged such investments as CEO pet projects. While CEO pet projects have become a staple in the agency theory, identifying them empirically has been elusive because such an analysis would require observing the opportunity set of possible 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 overseen by 412 CEOs in the oil and gas (O&G) industry where we can observe the costs, cash flows, and implementation schedules for each project. As a source of variation in the CEOs' private incentives, we exploit their personal ownership of investment land, whose value is strongly influenced by the exploration of fossil fuels. For example, the initiation of an O&G exploration project within a 3-mile radius from a private land lot is associated with a mean increase of 92% in its mineral rights value.

CEOs' private investments in land lots near O&G fields are common and economically important. Over 22% CEOs in our sample own investment land in O&G exploration regions, after excluding the CEOs' primary homes and residential investment properties. The large increase in the value of royalty payments and mineral rights that occurs after the start of resource extraction acts as a powerful monetary lever to explore the role of CEOs' private benefits in corporate decisions. The location of land properties is tightly linked to O&G fields, and the average distance between a CEO's land investment property and the nearest fossil fuel well is just 1.3 miles.

Our first result is that a firm is 21 percentage points more likely to initiate an exploration project in a region where its CEOs has a personal investment in a land lot. This empirical pattern 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



Electronic copy available at: https://ssrn.com/abstract=3747263

drilled near the CEO's personal investments should have higher productivity and lower dispersion in financial outcomes, consistent with the CEO's superior information. Alternatively, according to the agency hypothesis, the CEO shifts the company's drilling activity to O&G fields near his personal investments to realize private gains from land appreciation driven by the initiation of drilling. If such a shift prioritizes the CEO's personal interests over those of the shareholders, the wells near the CEO's personal investment properties should, all else equal, be less productive and have lower NPVs.

Our main findings support the agency hypothesis. When a firm enters an O&G field near the CEO's personal investment properties, such investment projects underperform. For example, wells drilled in the field near the CEO's investment properties produce 11.5% lower output and deliver 30.1% lower estimated NPVs than other projects of the same firm with observationally similar characteristics. 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 project characteristics, proximity to headquarters, and the well's geological composition of fossil fuels. These results also persist after controlling for unobservable factors affecting a given firm or a given state during the year, which are absorbed by firm∗year and state∗year fixed effects, respectively.

Since the location of a CEO's land investments is non-random, we develop an instrumental variable for the CEO's decision to purchase land in a given region by exploiting the idiosyncratic component in the geographic location of his relatives, such as siblings, adult children, and in-laws. Such an instrument serves as a powerful factor explaining the location of the CEO's land investments (F-statistics = 12–17). We show that CEOs are more likely to purchase investment land in the state where their relatives reside at the time of purchase, while the towns of residence of the CEO's relatives are plausibly unrelated to a firm's investment opportunity set. Using this idiosyncratic source of variation in the location of the CEO's personal properties, we show that the effect of CEO pet projects on the selection and prioritization of corporate investment is plausibly causal. We also replicate our findings by focusing on the CEOs' investment properties acquired prior to the discovery of the shale gas technology, where the choice of the land investments was likely exogenous to the fossil deposits that were yet-to-become commercially viable.



Electronic copy available at: https://ssrn.com/abstract=3747263

Our next finding is that the CEO's private incentives from personal land ownership increase the intensity of corporate investment and reduce its sensitivity to project-level information. Using project-level data on production, investment, and cash flows, we show that CEO pet projects are associated with lower investment efficiency for the firm and a weaker response to new project-specific information revealed in the investment process. For example, a firm is more likely to continue the exploration of an oil field adjacent to the CEO's investment land lot even after the initial exploration reveals poor fossil reserves (e.g., dry wells). More generally, when a CEO owns personal land in an oil field, the firm invests 9.1 percentage points more in the exploration of the field, and this investment becomes less sensitive to information about a project's investment opportunities revealed in the early years of its implementation.

To further distinguish the effect of CEO pet projects on corporate investment, we offer micro-level evidence that exploits geospatial variation in the location of a CEO's investment lot within each oil field, while controlling for township$*$year and firm$*$year fixed effects. This specification captures all 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 annual investment policy, among many others. These results set a high bar for a possible omitted variable, which would need to generate the same granular variation in a firm's investment activity within each oil field, while being unrelated to the CEO's private interests.

While CEO pet projects appear to introduce frictions into a firm's investment policy, they deliver large private gains to the CEO. Using proprietary data on the leasing terms for the owners of land adjacent to O&G fields, we show that the initiation of drilling activity within a 3-mile radius from the average land is associated with a 92% increase in the value of mineral rights and an increase in the royalty rate equivalent to an extra $74,000 in the present value of the annuity payments per each well drilled on the lot. Thus, the initiation of resource extraction yields large personal gains to the landowners, even after these deposits are already discovered, documented, and made available for extraction. Since the mean CEO investment adjacent to an O&G field exceeds $1 million, even the project initiation event triggers an economically important increase in the value of the CEO's personal assets. These estimates likely understate the true



Electronic copy available at: https://ssrn.com/abstract=3747263

personal benefits to the CEO because they do not capture the private benefits reaped by his personal associates who may own adjacent land lots, such as friends, neighbors, or relatives.

If CEO pet projects introduce frictions in a firm's investment policy and diverge from the interests of shareholders, this effect should be attenuated under stronger corporate governance. Consistent with this explanation, we find that the effect of CEO pet projects on investment is diminished when the CEO has a higher personal ownership stake in the firm and when the firm's other shareholders are more concentrated. Similarly, CEO pet projects have a significantly stronger effect on corporate investment at public (rather than private) firms, consistent with a starker separation of ownership and control rights at publicly traded companies relative to their privately owned peers.

The central contribution of this article is to provide the first evidence on how the CEO's personal investments affect the selection and implementation of corporate investment projects. We show that CEOs skew corporate investment towards projects whose implementation yields private monetary gains, and this practice dampens investment efficiency and erodes shareholders' net present value. Our findings add to three research strands: (1) CEOs' personal assets, (2) CEOs' private incentives and investment decisions, and (3) financial policies in the O&G industry.

We add to an emerging stream of work that studies the link between CEOs' personal assets and corporate decisions. Since CEOs' personal investments are not observable in standard datasets, this literature is only beginning to expand our understanding of CEOs' private assets. Liu and Yermack (2012) examine CEOs' transactions in their primary homes and find that CEOs' purchases of luxurious estates are followed by a decline in their firm's performance, consistent with CEO entrenchment. Ben-David, Birru, and Rossi (2019) study stock investments of CEOs and other executives (who appear in the discount brokerage data) and find that they earn positive abnormal returns. Duchin, Simutin, and Sosyura (forthcoming) show that CEOs come from wealthy backgrounds and are endowed with significant family assets. To our knowledge, our paper is among the first to study how CEO's personal assets affect their corporate investment decisions.



Electronic copy available at: https://ssrn.com/abstract=3747263

More broadly, we also contribute to research on how CEOs' private incentives affect their investment decisions. So far, this literature has mostly examined CEOs' investments in the context of mergers and acquisitions (M&A) and focused on CEOs' pecuniary and non-pecuniary benefits from deal completion. For example, Hartzell, Ofek, and Yermack (2004) and Fich, Cai, Tran (2011) show that target company CEOs are willing to accept lower acquisition premiums for their shareholders in transactions where CEOs obtain large personal payoffs. Other papers show that CEOs also trade-off shareholder value in M&A investment decisions in exchange for non-pecuniary benefits, such as obtaining executive appointments (Wulf 2004) or retiring at the desired age (Jenter and Lewellen 2015). Similar to this work, our paper finds that CEOs are willing to trade off shareholder value in exchange for private benefits. In contrast to the M&A setting, a once-in-lifetime event for a target firm where the negotiations are private and the opportunity set of bidders is unobservable, we offer side-by-side comparisons of CEO investments in thousands of homogenous projects and provide evidence on their ex-post performance. Our evidence suggests that CEOs' private incentives affect the selection and implementation of investment projects even when such projects are repeated, transparent, and standardized.

Finally, we add to a body of work that uses the oil and gas industry as a laboratory to address fundamental questions in corporate finance. Prior papers have used a similar industry setting to study the sensitivity of investment to cash flow (Lamont 1997), pay-for-luck in executive compensation (Bertrand and Mullainathan 2001), the effect of risk hedging on firm value (Jin and Jorion 2006), risk-shifting (Gilje 2016), debt overhang (Wittry 2020), and idiosyncratic risk in capital budgeting (Décaire 2020). We extend this literature by expanding our understanding of how CEOs' private incentives affect their project choice and investment performance.



Electronic copy available at: https://ssrn.com/abstract=3747263

## 1. Empirical Setting

### 1.1. The Oil and Gas Industry

The oil and gas (O&G) industry represents an important sector in the economy, which contributes 15.7% of private capital investment nationwide, accounts for 14% of the U.S. stock market capitalization, produces 8% of the GDP, and supports 10.3 million (or 9%) of jobs in the United States[1]. In comparison with other sectors of the economy, the oil and gas industry accounts for the largest fraction of capital investment and supports over $220 billion in annual investment in infrastructure (American Petroleum Institute 2018). These contributions suggest that the investment decisions in the O&G sector have a significant impact on the economy in supporting economic growth, regional development, and job creation.

Investment decisions in the O&G sector are highly centralized, and the CEO usually holds the main decision authority in establishing each firm's investment strategy (Graham, Harvey, and Puri 2015). This institutional feature makes the O&G sector particularly suitable for studying CEOs' investment decisions.

Another important feature of the O&G industry for studying CEOs' investment decisions is that investment projects are standardized. The typical investment project in the industry involves drilling a series of wells, and the project's location, investment, and cash flows are observable across projects. The drilling projects account for the dominant majority (83.5%) of total capital investment in the industry, with the remaining 16.5% spent on the acquisition of land and infrastructure (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, New York, and California. The states with oil and gas investment projects in our sample account for 51% of the U.S. population and 53% of the GDP. Figure 1 plots the geographic location of new oil and gas wells drilled across 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.

[1] According to the 2018 Industry Report of the American Petroleum Institute: https://www.api.org/-/media/Files/Policy/Taxes/DM2018-086_API_Fair_Share_OnePager_FIN3.pdf



Electronic copy available at: https://ssrn.com/abstract=3747263

In summary, the O&G industry accounts for one sixth of capital investment in the U.S. The investment decisions are usually centralized in each firm's executive suite. Investment projects are well-defined, homogenous, and scattered across two fifths of U.S. states. Thus, the O&G sector not only offers a convenient setting for studying CEOs' investment decisions but also plays a significant role in regional and national economic development.

### 1.2. Project Lifecycle, Cash Flows, and Technology

The lifecycle of a typical investment project in the O&G sector consists of two stages: (1) exploration and (2) development. At the exploration stage, a firm investigates the geological potential of an oil and gas field. After confirming the field's resources, a firm classifies it as a proven reserve. At any given point in time, 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.

The development stage of an investment project includes the preparation of the reserve for extraction, followed by drilling, extraction, and site cleanup. The pattern of cash flows for the typical project 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 of a project's life aimed at the conservation of a depleted well. The typical oil and gas well remains in production for 20–25 years, and this period corresponds to the useful life of an investment project in our setting.

The output for each drilling investment project is a combination of oil and natural gas, as their deposits are often extracted simultaneously in the drilling process. The widely available prices of these commodities facilitate the estimation of project cash flows. 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



Electronic copy available at: https://ssrn.com/abstract=3747263

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 (e.g., Fetkovich et al. 1996; Li and Horne 2003). These forecasts of a project's future cash flows allow us to test how CEOs' capital investment decisions respond to the revelation of value-relevant information after the project's initiation, as well as evaluate the efficiency of such investment decisions ex ante and ex post. The figure in Appendix 1 depicts a representative pattern of a well's productivity over time according to 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 during our sample period of 2000–2020 are executed via one of the two drilling technologies: (1) vertical drilling or (2) directional 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 resource extraction until the development of the hydraulic fracturing in the early 2000s, which made possible directional drilling. Directional 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, buildings, or abnormal reservoir shapes. By the end of 2011, new directional wells surpassed new vertical wells in total drilling footage, and by 2013, directional wells accounted for the majority of all new oil and gas wells drilled in the United States.

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 terms of their development technology, cash flow pattern, and production output. A project's initial productivity is informative of its future cash flows due to the predictability of reservoir depletion patterns.



Electronic copy available at: https://ssrn.com/abstract=3747263

### 1.3. The Effect of Resource Extraction on Local Landowners

The development of an oil and gas reservoir leads to a large increase in 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 owners of land and mineral rights—mostly private individuals. In exchange for the permit to drill, firms provide substantial monetary compensation to the mineral right owners in the form of an upfront cash bonus and a royalty stream. Common amounts of royalty payments range from 15% to 25% of the well's production output, a substantial annuity stream that drives up the local land prices.

Appendix Table A.1 confirms that the development of an oil and gas reservoir, both on the extensive and intensive margins, leads to a substantial increase in cash compensation to the owners of land and mineral rights in the area. The dependent variables are the royalty rate (columns 1–4) and cash bonus (columns 5–8) paid by oil and gas firms to landowners for drilling rights in 2000–2020. The data on cash and royalty payments are from DrillingInfo. The first independent variable of interest is the binary indicator *Drilling activity*, which is equal to 1 after the first well is drilled in a township and 0 otherwise. The second independent variable of interest is *Township drilling intensity*, the natural logarithm of the number of wells drilled in a township. Thus, the two main independent variables capture the extensive and intensive margins of the local drilling activity.

The results in Appendix Table A.1 show a clear pattern: the commencement of drilling and the intensification of drilling increase cash transfers to landowners in the township adjacent to the drilling site. These results are reliably significant, with most *t*-statistics greater than 3, and they hold after controlling for unobservable township heterogeneity and time trends via township and year fixed effects, respectively.

The conclusion that the commencement of drilling and the intensification of drilling produce large increases in the cash transfers to local landowners is consistent with prior research. The positive wealth shocks from the drilling activity to the landowners are sufficiently large to drive up local bank deposits by 39% (Plosser 2014) and to lead the local landowners to quit their regular jobs (Bellon, Cookson, Gilje, and Heimer 2020). Consistent with the economic importance of these effects, Fedaseyeu, Gilje, and Strahan



Electronic copy available at: https://ssrn.com/abstract=3747263

(2019) conclude that "Landowners in shale-boom areas receive big inflows of wealth, tantamount to thousands of local residents 'winning the lottery'" (p. 6).

In summary, the commencement of drilling investment projects and the addition of new projects in the area produce large positive shocks for the landowners in the townships adjacent to the drilling sites. These effects provide private incentives for the local landowners to induce firms' drilling activity.

## 2. Data and Sample

### 2.1. Firms and Investment Projects

We begin our sample construction with 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, including its location coordinates, rock formation features, exploration technology (vertical vs. directional 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. Appendix Table A.2 shows the sequence of sample selection criteria and the number of observations retained after each filter.



Electronic copy available at: https://ssrn.com/abstract=3747263

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 $3.1 ($3.2) billion, has an annual investment rate of 28% (24%) of book assets, maintains a market-to-book ratio of 1.98 (1.57), and generates an annual return on assets of 12% (14%).

Panel B in Table 1 reports summary statistics for investment projects. The average (median) drilling project is located 766 (557) kilometers from the headquarters, requires an investment of $3.4 ($3.7) million, and generates an annual cash inflow of $3.2 ($1.4) million in the first year of production. The mean estimate of a project's net present value (NPV) is $1.76 million, suggesting a comfortable profitability index of 1.54 (see Appendix A.1 for the NPV estimation method). 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 of 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 and Their Families

For public firms, we collect CEO information from regulatory filings with the Securities and Exchange Commission (SEC), such as definitive proxy statements, quarterly and annual reports, and press releases. 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. Throughout this process, we obtain the CEO's full name, year of birth, and the starting and ending dates of his or her tenure.



Electronic copy available at: https://ssrn.com/abstract=3747263

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, marriage and divorce records, voter registrations, utility records, and criminal filings. Individuals are traced via a unique ID, which is linked to one's social security number and employment records. Prior research has used LNPR to obtain personal data on CEOs (Cronqvist, Makhija, and Yonker 2012; Yermack 2014), 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—namely, 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), state of origin (indicated by the first three digits of his social security number), and the list of immediate relatives (identified by LNPR via state vital records). 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. The average (median) CEO in our sample is 56 years old and has a firm tenure of 9.3 (8.0) years. The average CEO is connected to 10 relatives in LNPR (siblings, parents, adult children, spouses, and in-laws) who reside in four different states.



Electronic copy available at: https://ssrn.com/abstract=3747263

### 2.3. CEOs' 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 the CEO's personal investment properties, we exclude the CEO's primary residence because it is usually acquired for consumption rather than investment purposes. We also exclude properties for which the value of land accounts for less than 50% of the total assessment value.[2] Those properties are more likely to be acquired for the value of their buildings (e.g., rental homes) rather than for land speculation. 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).

[2] 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. We also test the sensitivity of our results by focusing on properties located within 1 kilometer on an oil and gas field. Appendix Tables A.3, A.4, A.5 show that our three main results are robust to using this alternative definition.



Electronic copy available at: https://ssrn.com/abstract=3747263

Using the address of each property and its GPS coordinates, we focus on CEOs' investment properties located within 20 kilometers (12 miles) of any proven oil and gas fields in the U.S. [3] We choose the radius of 20 kilometers because the shape of an oil and gas field typically grows as the field is being developed, and new reserves are discovered. To illustrate, Figure 2 plots the development of the Sandhill Field in Texas from 2000 to 2020, 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 2.1 kilometers (1.3 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 rights in the area. Figure 3 shows a sample CEO's land lot and plots the drilling activity in its vicinity. The property in the figure spans 95.7 acres.

The CEOs' real estate assets adjacent to oil fields are economically important. The mean (median) acquisition price of an investment property is $1,010,000 ($250,000), and the majority of the 92 CEOs with such investments own multiple investment assets near an oil field. The average CEO with such investments owns 1.7 properties near an oil and gas field.

## 3. Empirical Results

This section presents the main results. We first study how firms' likelihood to start exploration in a given region is related to the location of the CEO's private land assets. We then develop an instrumental variable for the location of the CEO's assets based on the location of his close relatives. Next, we explore the effect of CEOs' land ownership on the intensity of firms' investment activity. Finally, we investigate the performance of projects drilled in regions where CEOs hold personal real estate assets.

[3] We test the sensitivity of our results by focusing on properties located within 1 kilometer on an oil and gas field. See Tables A.3, A.4, A.5 in the appendix.



Electronic copy available at: https://ssrn.com/abstract=3747263

### 3.1. Propensity to Initiate Exploration and Production

Table 2 shows the main specifications for the effect of CEOs' personal investment on firms' decision to start investment in a state using an OLS regression. The dependent variable is a dummy equal to one if the firm enters the state during the year, and zero otherwise. The unit of observation is at the firm-year-state level. To define the set of states in which firms can enter during a given year, we consider all the states that have at least one well being drilled in a given year. This strategy enables us to define the opportunity set for each firm in the sample. Also, once a firm enters a state, the state is dropped from the sample for that firm. The main variable of interest is *CEOs' Personal Investment*, a dummy variable equal to one if the CEO owns land held for investment in the state in a given year, and zero otherwise. Across all specifications, we include a set of controls that capture firms' characteristics, such as firm size, investment intensity, and investment level in a particular state, and we also include a dummy variable that is equal to one if the distance between the firm's headquarters and the state is below the firm-year median, and zero otherwise. [4]

Columns (2) to (6) gradually include (1) firm, (2) year, (3) CEO and (4) state fixed effects, while columns (7) and (8) include firm∗year and state∗year fixed effects. The firm∗year fixed effect accounts for the selection of CEOs into firms and absorbs firms' characteristics that vary over time, whereas the state∗year fixed effect controls for the unobservable, such as the changing quality of the investment opportunity in each state available to firms.

Across all specifications, we find that CEOs' personal investment is positively associated with firms' propensity to initiate exploration and production activities in the state. On average, firms are 21 percentage points more likely to enter a state if the CEO owns an investment lot on an oil and gas field in that state. The relation is statistically significant for all specifications (*t*-statistics range between 2.12 and 3.06). [5]

[4] To measure the distance between the firm's headquarter and a state, we use the GPS coordinates of the center point of each state. For example, the state of New Mexico's GPS coordinates are 34.5199 N and 105.8701 W.
[5] In the appendix, Table A.6 presents a similar analysis using a cox duration model. Cox models are well suited for analyses focused on understanding the expected amount of time it can take for an event to happen such as finding



Electronic copy available at: https://ssrn.com/abstract=3747263

A potential limitation of this strategy is that there could be some omitted variables at the CEO-state-year level. This could be correlated with the CEO's decision to acquire a piece of land near an oil and gas region as well as the decision of the firms to start exploration and development in the state. We address this issue in two ways: (1) by introducing an instrumental variable, and (2) by restricting the sample to a subset of properties for which an omitted variable associated with the state's oil and gas potential is less plausible.

First, our instrumental variable strategy relies on the CEOs' family ties. Precisely, we create a dummy variable that is equal to one if the CEO is known to have family members residing in a state, and zero otherwise. For the instrumental variable to be valid, it must satisfy two conditions. First, for the relevance condition, having family in a state should be associated with a greater likelihood to acquire properties in that region. If, on average, people tend to acquire properties close to where they have relatives, we should expect a positive relation with having family ties in a state and the CEO's likelihood to buy a property in that state.

Panel A of Table 3 presents the first stage of the two-stage least squares estimation. We find a statistically significant and positive coefficient on the main variable of interest (i.e., relatives' location) across all specifications. Second, the exclusion restriction requires that the tendency of CEOs to have family members in in a given state is not directly related to the firm's investment policy.

Panel B of Table 3 shows the second stage of the instrumented regression. Across all specifications, the Kleibergen-Paap first-stage F-statistics, ranging from 11.91 to 17.34, are strictly above the traditional threshold of 10, required to rule out a weak instrument. The coefficient estimates for the main variable of interest are statistically significant for each specification (*t*-statistics range between 3.31 and 4.10). Finally, the results indicate that, on average, if the CEO has a piece of land on an oil and gas field in a state, firms are more than two times more likely to enter that state. The size of the coefficient obtained in the two-stage

when a firm will enter a state. However, this class of models yields biased estimates when including fixed effects. For this reason, we favor the OLS regression in the main specification, but we present the results using the cox model in a robustness test using less granular fixed effects. Across all specifications, the cox model presents estimates that are statistically significant and consistent with the results of Table 2.



Electronic copy available at: https://ssrn.com/abstract=3747263

least square regression is greater than the coefficient obtained in the OLS regression, which is not uncommon for instrumented results.

Our second strategy focuses on restricting the sample to the set of properties that were bought before oil and gas potential was identified in a state. In this analysis, we drop all the observations for which the year of acquisition of the properties is greater than the year oil and gas formation were first discovered in a state. Table A.7 presents the results of this alternative specification. The results are statistically significant across all specifications, and the coefficients have a similar economic magnitude than those presented in Table 2.

Overall, the results presented in this subsection suggest that CEOs' personal benefits affect firms' resource allocation on the extensive margin, by changing the firm's likelihood to enter a state.

### 3.2. The Intensity of Exploration and Production Activities

In this subsection, we study how CEOs' ownership of land held for investment on an oil and gas field affects the allocation of resources across the firm's existing projects.

Table 4 presents results consistent with the notion that CEOs tend to increase the investment rate in oil and gas fields that are associated with their personal properties. The regression specification includes multiple controls such as *Field Average Production Value,* which corresponds to the average production value of the firm in the specific field during the previous year. This control variable accounts for the quality of investment opportunities. In specifications (1) to (6), we gradually introduce a combination of firm, year, CEO, and state fixed effects, while specifications (7) and (8) include firm∗year and field∗year fixed effects. Our results are robust, and they remain statistically significant in all alternative specifications (*t*-statistics range from 1.99 to 2.72).

On average, our results suggest that when CEOs own land in a field, firms' investment rate in that field increases by 9.12 percentage points. We also have a second coefficient of interest in this table, which corresponds to the interaction term between *CEOs' Personal Investment* and *Field Average Production Value*. The associated coefficients are statistically significant across all specifications, and the sign is



Electronic copy available at: https://ssrn.com/abstract=3747263

negative. This suggests that a firm's investment rate becomes less sensitive to the quality of the investment opportunities in oil fields where CEOs hold personal investment assets.

Overall, our results are consistent with the idea that CEOs tend to favor allocating resources in fields that are associated with their own properties. This CEO favoritism reduces the efficiency of the capital allocation process.

### 3.3. The Economic Outcomes of Investment Projects

CEOs could acquire land and allocate firms' resources in a specific region based on private information. Acting on such private information would suggest that the allocation of resources we identified in the above section could be value-enhancing to the firms' shareholders. To test such alternative explanation, we investigate the performance of the projects.

Table 5 presents our main findings on the economic outcomes of investment projects. The unit of observation is at the project level, and the associated variable corresponds to the value of the first year of production in millions of dollars. Focusing on the first year of production is reasonable in the case of wells since the production function of those projects over time is mainly predictable (see Appendix 1) and enables us to obtain a clear unit of comparison across all the projects.

The granular nature of the data in this part of the analysis enables us to include a large set of restrictive fixed effects. Particularly, in specifications (1) to (6), we gradually introduce a firm, year, CEO, township, technology and CEO's state of birth. The township fixed effect accounts for the unobserved characteristics, such as the quality of the geological formation, associated with the drilling location of the wells at a very granular level. Also, the CEO's state of birth allows us to control for the state in which CEOs had their formative years, which is likely to be associated with their familiarity with the overall region. Then, in specifications (7) and (8), we include a firm$*$year, a township$*$year, and CEO$*$year fixed effects. These fixed effects enable us to control for unobserved time-varying variables. For example, the township$*$year fixed effect enables us to directly compare two wells that are drilled almost next to each other in the same time period, while the firm$*$year fixed effects account for changes in the firms' economic



Electronic copy available at: https://ssrn.com/abstract=3747263

conditions and investment policies that could alter CEOs' incentives or ability to influence the allocation of resources. Across all specifications, the coefficient on the main variable of interest is statistically significant ($t$-statistics range between -1.81 to -3.66). In terms of economic magnitudes, we find that the production value of wells drilled in fields associated with CEOs' personal investment is 11.5% lower.

Table 6 uses an estimate of the project's NPV as a dependent variable (see appendix 1 for more details on the variable construction). The results show that our general conclusion holds using this alternative definition of project performance, and that, on average, the NPV of projects drilled in fields associated with CEOs' personal investment is 30% lower. The larger magnitude associated with the projects' NPV is consistent with the notion that projects' drilling cost each year are mostly homogenous. Thus, a small variation in projects' cash flow can have a large effect on the projects' NPV.

### 3.4. The Role of Corporate Governance

CEOs' ability to divert corporate resources for their own benefit should be lower in firms with a greater level of monitoring by shareholders or in firms with a better incentive alignment between owners and the CEO. In general, private firms have a more concentrated ownership when compared to public firms, and we exploit this variation in ownership concentration to test the role of managerial incentives.

Table 7 shows that most of the negative performance identified in section 3.3 can be attributed to public firms. Precisely, for private firms, we find that the effect of drilling wells in fields associated with CEOs' personal investment has no significant effect (i.e., the combined effect of $\beta_1$ and $\beta_2$ is greater or equal to zero; it is not always statistically different from zero). We interpret this result as evidence suggesting that public firms, with their complex and less concentrated ownership, are more subject to having CEOs diverting resources and extracting wealth from the firm's owners.

To provide additional evidence on the role of ownership concentration, we investigate the effect of ownership structure in public firms. We measure ownership concentration using the Herfindahl index. Larger values of the index indicate that the ownership structure of the firm is more concentrated, whereas small values suggest a more disperse ownership structure.



Electronic copy available at: https://ssrn.com/abstract=3747263

Table 8 reports evidence on the role of ownership concentration in public firms. The results are statistically significant across all specifications, and the coefficient of interest, $\beta_2$, suggests that having a more concentrated ownership structure, among public firms, helps mitigate the negative relation identified in Table 2. On the whole, this result is consistent with the notion that ownership concentration increases monitoring and thus limits the CEO's ability to divert resources for private benefits.

## 4. Conclusion

This paper has studied how CEOs' incentives from personal assets affect their professional investment decisions. We find that CEOs prioritize corporate investment projects with private benefits to the CEO at the expense of shareholder value. Our findings suggest that CEOs' private monetary interests introduce frictions in capital budgeting decisions and produce large economic consequences for the firm. Although CEOs' pet projects have played a central role in the agency theory, our paper is among the first to identify such projects empirically and analyze their effects on investment efficiency and net present value.

Our study makes a step towards understanding the role of CEOs' monetary motives outside of their 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' assets and incentives outside of the firm will continue to expand our understanding of their corporate decisions.



Electronic copy available at: https://ssrn.com/abstract=3747263

## References


Alam, Z., Chen, M., Ciccotello, C., Ryan, H., 2014. Does the location of directors matter? Information acquisition and board decisions. *Journal of Financial and Quantitative Analysis* 49, 131–164.

Bellon, A., Cookson, A., Gilje, E., Heimer, R., 2020. Personal wealth and self-employment. Working paper.

Ben-David, I., Birru, J., Rossi, A., 2019. Industry familiarity and trading: Evidence from the personal portfolios of industry insiders. *Journal of Financial Economics* 132, 49–75.

Bertrand, M., Mullainathan, S., 2001. Are CEOs rewarded for luck? The ones without principals are. *Quarterly Journal of Economics* 116, 901–932.

Cheng, I, Raina, S., Xiong, W., 2014. Wall Street and the housing bubble. *American Economic Review* 104, 2797–2829.

Chuprinin, O., Sosyura, D., 2018. Family descent as a signal of managerial quality: Evidence from mutual funds. *Review of Financial Studies* 31, 3756–3820.

Cronqvist, H., Makhija, A., Yonker, S., 2012. Behavioral consistency in corporate finance: CEO personal and corporate leverage. *Journal of Financial Economics* 103, 20–40.

Décaire, P., 2020. Capital Budgeting and Idiosyncratic Risk. Working paper.

Duchin, R., Simutin, M., Sosyura, D., 2020. The origins and real effects of the gender gap: Evidence from CEOs' formative years. *Review of Financial Studies*, forthcoming.

Fedaseyeu, V., Gilje, E., Strahan, P., 2019. Technology, economic booms, and politics: Evidence from fracking. Working paper.

Fetkovich, M.J., Fetkovich, E.J., Fetkovich, M.D., 1996. Useful concepts for decline curve forecasting, reserve estimation, and analysis. *Society of Petroleum Engineers Reservoir Engineering* 11, 13–22.

Fich, E., Cai, J., Tran, A., 2011. Stock option grants to target CEOs during private merger negotiations. *Journal of Financial Economics* 101, 413–430.

Gilje, E., 2016. Do firms engage in risk shifting? Empirical evidence. *Review of Financial Studies* 29, 2925–2954.

Gilje, E., 2019. Does local access to finance matter? Evidence from U.S. oil and natural gas shale booms. *Management Science* 65, 1–18.

Gilje, E., Taillard, J., 2016. Do private firms invest differently than public firms? Taking cues from the natural gas industry. *Journal of Finance* 71, 1733–1778.

Graham, J., Harvey, C., Puri, M., 2015. Capital allocation and delegation of decision-making authority within firms. *Journal of Financial Economics* 115, 449–470.

Hartzell, J., Ofek, E., Yermack, D., 2004. What's in it for me? Personal benefits obtained by CEOs whose firms get acquired. *Review of Financial Studies* 17, 37–61.

Jenter, D., Lewellen, K., 2015. CEO Preferences and Acquisitions. *Journal of Finance* 70, 2813–2852.

Jin, Y., Jorion, P., 2006. Firm value and hedging: Evidence from U.S. oil and gas producers. *Journal of Finance* 61, 893–919.

Lamont, O., 1997. Cash flow and investment: Evidence from internal capital markets. *Journal of Finance* 52, 83–109.




Electronic copy available at: https://ssrn.com/abstract=3747263

Li, K., Horne, R., 2003. A decline curve analysis model based on fluid flow mechanisms. *Society of Petroleum Engineers* 19–24.

Liu, C., Yermack, D., 2012. Where are the shareholders' mansions? CEOs' home purchases, stock sales, and subsequent company performance. In Corporate governance: Recent developments and new trends, eds. D. K. Nguyen and S. Boubaker. New York: Springer-Verlag.

Plosser, M., 2014. Bank heterogeneity and capital allocation: Evidence from 'fracking' shocks. Working paper.

Pool, V., Stoffman, N,, Yonker, S., 2012. No place like home: Familiarity in mutual fund manager portfolio choice. *Review of Financial Studies* 25, 2563–2599.

Wittry, M., 2020. (Debt) Overhang: Evidence from Resource Extraction. *Review of Financial Studies*, forthcoming.

Wulf, J. 2004. Do CEOs in mergers trade power for premium? Evidence from "mergers of equals." *Journal of Law, Economics, and Organization* 20, 60–101.

Yermack, D. 2014. Tailspotting: Identifying and profiting from CEO vacation trips. *Journal of Financial Economics* 113, 252–269.



Electronic copy available at: https://ssrn.com/abstract=3747263

**FIGURE 1**

**Oil and Gas Exploration and Production in the United States**

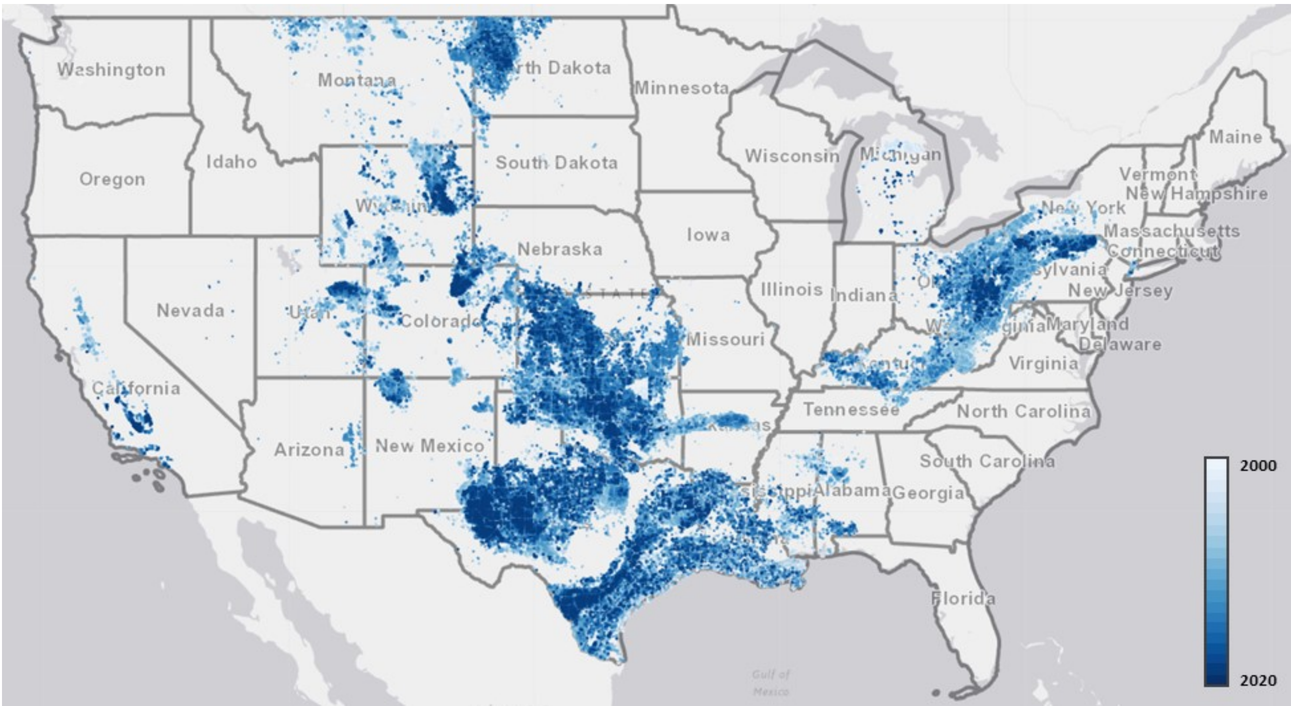



**Figure 1: Oil and Gas Exploration and Production (Excluding Alaska)**

The figure plots the geographic location of the oil and gas wells drilled across the United State for the period 2000 to 2020, for which our dataset contains at least the spud date (i.e., the date the drilling for the well started). The wells are color coded in different shades of blue to indicate the year during which they were drilled. For example, a well color coded in light blue denotes a well drilled in the earlier part of the sample, while a well color coded in darker shade of blue denotes a well that was drilled in the later part of the sample. The source of the figure is: https://www.enverus.com/.



Electronic copy available at: https://ssrn.com/abstract=3747263

**FIGURE 2**

**Oil and Gas Field Development Over Time**

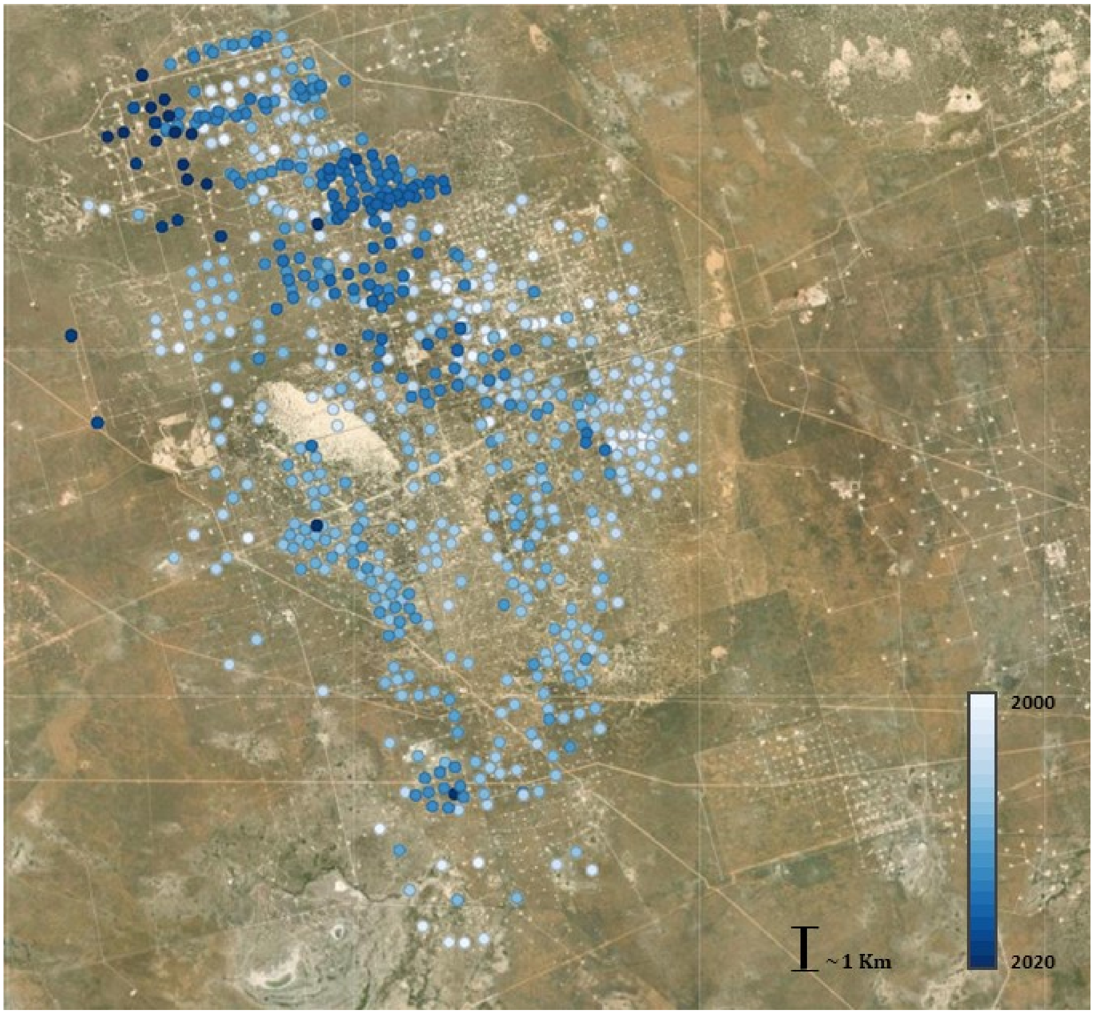



**Figure 2: Oil and Gas Field Development**

The figure plots the development of the Sandhill Field in Texas over the period 2000 to 2020, using the wells for which our dataset contains at least the spud date (i.e., the date the drilling for the well started). The figure illustrates that, on average, drilling activities generally starts in one section of the field, and then extend to other part of the field in a smooth and gradual fashion. The wells are color coded in different shades of blue to indicate the year during which they were drilled. For example, a well color coded in light blue denotes a well drilled in the earlier part of the sample, while a well color coded in darker shade of blue denotes a well that was drilled in the later part of the sample. The source of the figure is: https://www.enverus.com/.


Electronic copy available at: https://ssrn.com/abstract=3747263

**FIGURE 3**

**Properties and Oil and Gas Exploration**


**Figure 3: Property and Oil and Gas Exploration**

The figure represents a property included in our sample and the associated drilling activity in its vicinity. The yellow circle indicates the location of the property as indicated on google map. The property in the figure spans roughly 95.65 acres (i.e., ~0.4 $km^2$). Each red dot on the figure represents a distinct oil and gas well drilled during the sample period 2000 and 2020. The source of the figure is: https://www.enverus.com/.



Electronic copy available at: https://ssrn.com/abstract=3747263

## TABLE 1

## Summary Statistics

This table reports summary statistics. The sample consists of oil and gas firms actively engaged in exploration and production in continental U.S. for the period 2000 to 2020. Variable definitions and sample selection criteria appear in Appendixes A1 and A2, respectively.

**Panel A: Firms**

| Variable | **Mean** | **Std. Dev.** | **25th Pct.** | **Median** | **75th Pct.** | **No. Obs.** |
|---|---|---|---|---|---|---|
| **All Firms** | | | | | | |
| Wells per Firm-State | 259.81 | 542.03 | 10.00 | 60.00 | 243.00 | 823 |
| No. State of Activity | 2.76 | 2.21 | 1.00 | 2.00 | 3.00 | 298 |
| Firm Budget (No. Wells per Year) | 71.54 | 141.69 | 7.00 | 23.00 | 68.00 | 3,201 |
| Total No. of Wells | 591.65 | 1371.74 | 46.00 | 158.00 | 483.00 | 3,201 |
| **Private Firm** | | | | | | |
| Wells per Firm-State | 125.74 | 224.03 | 6.00 | 39.00 | 158.00 | 417 |
| No. State of Activity | 1.93 | 1.31 | 1.00 | 1.00 | 2.00 | 215 |
| Firm Budget (No. Wells per Year) | 30.08 | 42.56 | 5.00 | 14.00 | 36.00 | 1,712 |
| Total No. of Wells | 205.63 | 304.22 | 31.00 | 109.00 | 246.00 | 1,712 |
| **Public Firm** | | | | | | |
| Wells per Firm-State | 299.64 | 674.73 | 9.00 | 49.00 | 251.00 | 555 |
| No. State of Activity | 3.26 | 2.50 | 1.00 | 2.00 | 4.00 | 170 |
| Firm Budget (No. Wells per Year) | 115.53 | 176.86 | 14.00 | 46.00 | 136.00 | 1,489 |
| Total No. of Wells | 916.71 | 1,685.36 | 54.00 | 238.00 | 867.00 | 1,489 |
| **Financial Statistics** | | | | | | |
| Firm Size | 8.05 | 1.91 | 6.77 | 8.07 | 9.37 | 1,489 |
| Book Leverage | 0.31 | 0.16 | 0.20 | 0.30 | 0.41 | 1,489 |
| Investment Rate | 0.28 | 0.16 | 0.15 | 0.24 | 0.37 | 1,483 |
| Market-to-Book | 1.98 | 1.56 | 1.10 | 1.57 | 2.34 | 1,388 |
| Return-on-Asset | 0.12 | 0.13 | 0.08 | 0.14 | 0.20 | 1,488 |
| **Number of Firms** | | | | | | |
| All Firms | | | | | | 298 |
| Public | | | | | | 170 |
| Private | | | | | | 128 |

**Panel B: Properties**

| Variable | **Mean** | **Std. Dev.** | **25th Pct.** | **Median** | **75th Pct.** | **No. Obs.** |
|---|---|---|---|---|---|---|
| **All Properties** | | | | | | |
| Market Land Value (Millions of $) | 0.68 | 1.13 | 0.06 | 0.23 | 0.73 | 155 |
| Total Market Value (Millions of $) | 1.01 | 1.79 | 0.06 | 0.25 | 1.03 | 155 |
| Land-to-Total Market Value (%) | 83.01 | 18.80 | 64.59 | 97.10 | 100.00 | 155 |
| **No. of Properties** | | | | | | |
| Total No. of Land | | | | | | 155 |
| No. of Cities with Land | | | | | | 55 |



Electronic copy available at: https://ssrn.com/abstract=3747263

**Panel C: CEOs**

| Variable | **Mean** | **Std. Dev.** | **25th Pct.** | **Median** | **75th Pct.** | **No. Obs.** |
|---|---|---|---|---|---|---|
| Age | 56.37 | 10.20 | 50.00 | 56.00 | 62.00 | 3,127 |
| Tenure | 9.27 | 6.44 | 4.00 | 8.00 | 15.00 | 412 |
| No. of Distinct States with Relatives | 4.48 | 2.10 | 3.00 | 4.00 | 6.00 | 412 |
| **Number of CEOs** | | | | | | |
| All Firms | | | | | | 412 |
| Public | | | | | | 236 |
| Private | | | | | | 176 |
| **No. CEO with at least One Land Property** | | | | | | 92 |

**Panel D: Projects**

| Variable | **Mean** | **Std. Dev.** | **25th Pct.** | **Median** | **75th Pct.** | **No. Obs.** |
|---|---|---|---|---|---|---|
| First Year of Production Value (Millions of $) | 3.22 | 4.17 | 0.35 | 1.40 | 4.59 | 229,001 |
| Project NPV (Millions of $) | 1.76 | 5.57 | -1.67 | 0.15 | 3.26 | 223,049 |
| Cost (Millions of $) | 3.40 | 2.16 | 1.55 | 3.71 | 4.91 | 223,049 |
| Price of Oil ($ per Barrel) | 70.91 | 27.24 | 48.47 | 73.04 | 94.51 | 229,001 |
| Price of Natural Gas ($ per mcf) | 4.96 | 2.26 | 3.32 | 4.24 | 6.22 | 229,001 |
| Distance from Headquarter (in Km) | 766.21 | 655.02 | 265.37 | 557.21 | 1,145.15 | 228,963 |
| **Number of Wells** | | | | | | |
| All Firms | | | | | | 229,001 |
| Public | | | | | | 175,582 |
| Private | | | | | | 53,419 |
| **Oil and Gas Activity** | | | | | | |
| No. Wells Per State | 12,052.68 | 27,252.85 | 35.00 | 2,476.00 | 12,833.00 | 19 |
| No. of States with O&G activity | | | | | | 19 |


Electronic copy available at: https://ssrn.com/abstract=3747263

## TABLE 2

### Extensive Margin: CEO's Personal Investment and the Decision to Enter an Oil and Gas Region (i.e., State)

This table studies the decision of firms to enter a region/state depending on having the CEO owning plots of land located on oil and gas formations using a OLS regression. The dependent variable, $Enter_{i,r,t}$, is a dummy variable equal to 1 if firm "$i$" decides to enter an oil and gas producing state "$r$" during year "$t$" to start developing resources, and 0 otherwise. The variable of interest $\text{CEO's Land}_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on an oil and gas formation in region/state "$r$" during year "$t$", and 0 otherwise. The sample period is from 2000 to 2020. For each firm, we define the opportunity set of available states as all the states that have active oil and gas exploration and production. For example, if drilling activity in state **A** starts in 2007, then we construct the panel data such that state **A** becomes an investment opportunity available to firms starting in 2007, and the state is not included in the sample during prior years. Once a firm enters a state, we drop that state from the sample for that specific firm. Finally, the variable $\text{Close to HQ}_{z,i,r,t}$ is a dummy variable equal to 1 if the state distance from the firm's HQ is below the firm-year median, and 0 otherwise. Variable definitions and sample selection criteria appear in Appendixes A1 and A2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

| | $\text{Enter}_{i,r,t} = 1$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ($\beta_1$) CEO's Personal $\text{Investment}_{i,r,t}$ | 0.33*** | 0.33*** | 0.33*** | 0.30*** | 0.21** | 0.20** | 0.20** | 0.21** |
| | (3.01) | (3.06) | (3.06) | (2.96) | (2.12) | (2.19) | (2.13) | (2.40) |
| ($\beta_2$) State's Oil-to-Gas $\text{Ratio}_{r,t}$ | -0.01*** | -0.00 | -0.00 | 0.00 | -0.01*** | -0.01*** | -0.01*** | |
| | (-3.35) | (-0.70) | (-0.70) | (0.89) | (-2.82) | (-4.16) | (-4.11) | |
| ($\beta_3$) $\text{Investment}_{i,t}$ | 1.32*** | 0.10 | 0.10 | 1.13*** | 1.25*** | 0.37 | | |
| | (6.24) | (0.56) | (0.56) | (5.71) | (6.14) | (1.61) | | |
| ($\beta_4$) State's Drilling $\text{Activity}_{r,t}$ | 0.22*** | 0.22*** | 0.22*** | 0.21*** | -0.05** | -0.03* | -0.04** | |
| | (10.00) | (9.99) | (9.99) | (9.67) | (-2.55) | (-1.67) | (-1.98) | |
| ($\beta_5$) Firm's $\text{Size}_{i,t}$ | -0.11*** | -0.23*** | -0.23*** | -0.07*** | -0.08*** | -0.19*** | | |
| | (-6.31) | (-8.15) | (-8.15) | (-4.22) | (-5.00) | (-4.27) | | |
| ($\beta_6$) State's $\text{Size}_{r,t}$ | -0.01*** | -0.01*** | -0.01*** | -0.01*** | -0.03*** | -0.03*** | -0.03*** | |
| | (-9.75) | (-9.40) | (-9.40) | (-8.45) | (-11.15) | (-9.65) | (-9.72) | |
| ($\beta_7$) Close to $\text{HQ}_{i,r,t}$ | 0.02*** | 0.02*** | 0.02*** | 0.02*** | 0.01*** | 0.01*** | 0.02*** | 0.01*** |
| | (13.51) | (13.14) | (13.14) | (13.63) | (5.35) | (5.93) | (7.10) | (6.68) |
| 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 |
| State FE | No | No | No | No | Yes | Yes | Yes | No |
| Firm∗Year FE | No | No | No | No | No | No | Yes | Yes |
| State∗Year FE | No | No | No | No | No | No | No | Yes |
| $R^2$ | 0.05 | 0.08 | 0.08 | 0.10 | 0.10 | 0.16 | 0.23 | 0.27 |
| F-Statistics | 50.21 | 60.08 | 60.08 | 42.99 | 37.46 | 25.85 | 36.16 | 24.88 |
| No. Obs. | 42,287 | 42,287 | 42,287 | 42,287 | 42,287 | 42,287 | 42,235 | 42,235 |


Electronic copy available at: https://ssrn.com/abstract=3747263

## TABLE 3

### Instrumented: CEO's Personal Investment and the Decision to Enter an Oil and Gas Region (i.e., State)

This table studies the decision of firms to enter a region/state depending on having the CEO owning plots of land located on oil and gas formations using a OLS regression. The results in Panel A report coefficient estimates of the first stage regression. Panel B reports the instrumented results, and the first stage F test statistic for the two-stage estimation is reported at the bottom of panel B. The dependent variable, $Enter_{i,r,t}$, is a dummy variable equal to 1 if firm "$i$" decides to enter an oil and gas producing state "$r$" during year "$t$" to start developing resources, and 0 otherwise. The variable of interest $\text{CEO's Land}_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on an oil and gas formation in region/state "$r$" during year "$t$", and 0 otherwise. The sample period is from 2000 to 2020. For each firm, we define the opportunity set of available states as all the states that have active oil and gas production each year. For example, if drilling activity in state **A** starts in 2007, then we construct the panel data such that state **A** becomes an investment opportunity for the firms starting in 2007, and the state is not included in the sample during prior years. Once a firm enters a state, we drop that state from the sample. Finally, the variable $\text{Close to HQ}_{z,i,r,t}$ is a dummy variable equal to 1 if the state distance from the firm's HQ is below the firm-year median, and 0 otherwise. Variable definitions and sample selection criteria appear in Appendixes A1 and A2, respectively. The $t$-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

| **Panel A** | $\text{CEO's Personal Investment}_{i,r,t} = 1$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ($\beta_1$) $\text{Relatives Live in State}_{r,t}$ | 0.02*** | 0.03*** | 0.02*** | 0.03*** | 0.02*** | 0.02*** | 0.02*** | 0.02*** |
| | (4.14) | (4.17) | (4.08) | (4.16) | (3.57) | (3.56) | (3.47) | (3.45) |
| ($\beta_2$) $\text{State's Oil-to-Gas Ratio}_{r,t}$ | 0.00*** | 0.00*** | 0.00*** | 0.00*** | 0.00 | -0.00 | -0.00 | |
| | (3.16) | (3.37) | (3.41) | (3.45) | (0.84) | (-1.49) | (-1.46) | |
| ($\beta_3$) $\text{Investment}_{i,t}$ | -0.03 | -0.09** | -0.02 | -0.07** | -0.06* | -0.08** | | |
| | (-1.07) | (-2.51) | (-1.16) | (-2.10) | (-1.94) | (-2.53) | | |
| ($\beta_4$) $\text{State's Drilling Activity}_{r,t}$ | 0.06*** | 0.06*** | 0.06*** | 0.06*** | -0.02 | -0.02 | -0.02 | |
| | (2.95) | (3.16) | (3.03) | (3.10) | (-1.00) | (-1.14) | (-1.17) | |
| ($\beta_5$) $\text{Firm's Size}_{i,t}$ | -0.00 | -0.01 | -0.00 | -0.01 | 0.00 | 0.00 | | |
| | (-0.85) | (-1.46) | (-0.04) | (-1.64) | (0.91) | (0.16) | | |
| ($\beta_6$) $\text{State's Size}_{r,t}$ | -0.00 | -0.00 | -0.00 | -0.00 | -0.01** | -0.01** | -0.01** | |
| | (-0.07) | (-0.09) | (-0.22) | (-0.11) | (-2.36) | (-2.36) | (-2.29) | |
| ($\beta_7$) $\text{Close to HQ}_{i,r,t}$ | 0.00** | 0.00** | 0.00*** | 0.00** | 0.00* | 0.00 | 0.00* | 0.00* |
| | (2.58) | (2.49) | (2.71) | (2.46) | (1.69) | (1.62) | (1.88) | (1.71) |
| **Panel B** | $\text{Enter}_{i,r,t} = 1$ | | | | | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ($\beta_1$) $\text{CEO's Personal Investment}_{i,r,t}$ | 2.72*** | 2.65*** | 2.48*** | 2.59*** | 2.67*** | 2.48*** | 2.44*** | 2.31*** |
| | (4.10) | (4.07) | (4.01) | (4.06) | (3.49) | (3.41) | (3.33) | (3.31) |
| ($\beta_2$) $\text{State's Oil-to-Gas Ratio}_{r,t}$ | -0.01*** | -0.01*** | -0.01*** | -0.01*** | -0.01** | -0.01* | -0.01* | |
| | (-5.26) | (-3.57) | (-3.43) | (-3.52) | (-2.35) | (-1.84) | (-1.71) | |
| ($\beta_3$) $\text{Investment}_{i,t}$ | 1.37*** | 0.34* | 1.18*** | 0.65*** | 1.40*** | 0.56** | | |
| | (6.40) | (1.89) | (5.95) | (2.74) | (6.37) | (2.49) | | |
| ($\beta_4$) $\text{State's Drilling Activity}_{r,t}$ | 0.06 | 0.06 | 0.05 | 0.06 | -0.00 | 0.02 | 0.01 | |
| | (1.41) | (1.61) | (1.41) | (1.63) | (-0.03) | (0.28) | (0.18) | |
| ($\beta_5$) $\text{Firm's Size}_{i,t}$ | -0.10*** | -0.21*** | -0.07*** | -0.22*** | -0.09*** | -0.19*** | | |
| | (-5.69) | (-7.91) | (-4.22) | (-4.90) | (-4.83) | (-4.04) | | |
| ($\beta_6$) $\text{State's Size}_{r,t}$ | -0.01*** | -0.01*** | -0.01** | -0.01*** | -0.02** | -0.02* | -0.02* | |
| | (-2.84) | (-2.70) | (-2.29) | (-2.65) | (-2.41) | (-1.87) | (-1.89) | |
| ($\beta_7$) $\text{Close to HQ}_{i,r,t}$ | 0.01*** | 0.01*** | 0.01*** | 0.01*** | 0.01*** | 0.01*** | 0.01*** | 0.01*** |
| | (8.82) | (9.01) | (9.43) | (9.07) | (2.74) | (3.65) | (4.67) | (4.22) |
| 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 |
| State FE | No | No | No | No | Yes | Yes | Yes | No |
| Firm∗Year FE | No | No | No | No | No | No | Yes | Yes |
| State∗Year FE | No | No | No | No | No | No | No | Yes |
| First Stage F-test (Kleibergen-Paap) | 17.15 | 17.34 | 16.64 | 17.28 | 12.71 | 12.70 | 12.06 | 11.91 |
| No. Obs. | 42,287 | 42,287 | 42,287 | 42,287 | 42,287 | 42,287 | 42,235 | 42,235 |



Electronic copy available at: https://ssrn.com/abstract=3747263

## TABLE 4

### Intensive Margin: CEO's Personal Investment and Investment Rate in a field

This table studies the investment rate of firms depending on having the CEO owning plots of land located on oil and gas formations using a OLS regression. The dependent variable, $\text{Investment Rate}_{i,r,t+1}$ 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 $\text{Investment Rate}_{i,r,t+1} = \text{No. Wells Drilled}_{i,r,t+1}/\text{Total No. Active Wells}_{i,t}$. The variable of interest $\text{CEO's Land}_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on the oil and gas formation "*r*" during year "*t*", and 0 otherwise. . Finally, the variable $\text{Close to HQ}_{z,i,r,t}$ is a dummy variable equal to 1 if the field distance from the firm's HQ is below the firm-year median, and 0 otherwise. The sample period is from 2000 to 2020. Variable definitions and sample selection criteria appear in Appendixes A1 and A2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

| | $\text{Investment Rate}_{i,r,t+1}$ (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ($\beta_1$) $\text{CEO's Personal Investment}_{i,r,t}$ | 12.09** | 11.93** | 11.11** | 9.26** | 8.71** | 8.93** | 11.11*** | 9.12** |
| | (2.57) | (2.55) | (2.48) | (2.57) | (1.99) | (2.07) | (2.72) | (2.56) |
| ($\beta_2$) $\text{CEO's Perso. Inv.}_{i,r,t}$ x $\text{Field Avg. Prod. Value}_{i,r,t}$ | -2.45** | -2.31** | -2.75** | -2.02*** | -2.44** | -2.38** | -2.68*** | -1.99*** |
| | (-2.45) | (-2.30) | (-2.54) | (-2.92) | (-2.49) | (-2.44) | (-2.82) | (-2.90) |
| ($\beta_3$) $\text{Oil-to-Gas Ratio}_{i,r,t}$ | 0.87** | 0.97** | 0.14 | -0.18 | 0.77* | 0.97** | -0.08 | -0.18 |
| | (2.05) | (2.29) | (0.16) | (-0.21) | (1.93) | (2.45) | (-0.10) | (-0.20) |
| ($\beta_4$) $\text{Field Avg. Prod. Value}_{i,r,t}$ | 0.04 | 0.03 | 0.20*** | 0.16*** | 0.05* | 0.05* | 0.18** | 0.15** |
| | (1.25) | (1.03) | (2.92) | (2.65) | (1.73) | (1.78) | (2.50) | (2.58) |
| ($\beta_5$) $\text{Firm's Size}_{i,t}$ | | | | | 0.00*** | 0.00*** | 0.00*** | |
| | | | | | (4.19) | (4.40) | (3.45) | |
| ($\beta_6$) $\text{Field's Drilling Activity}_{r,t}$ | | | | | 0.01*** | 0.01*** | | |
| | | | | | (9.32) | (8.95) | | |
| ($\beta_7$) $\text{Close to HQ}_{i,r,t}$ | | | | | -0.63*** | -0.62*** | -1.54*** | -0.93** |
| | | | | | (-3.76) | (-3.78) | (-2.75) | (-2.15) |
| Firm FE | Yes | Yes | No | No | Yes | Yes | No | 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 | Yes | No | No | No | Yes | No |
| Firm*Year FE | No | No | No | Yes | No | No | No | Yes |
| Field*Year FE | No | No | Yes | Yes | No | No | Yes | Yes |
| $R^2$ | 0.37 | 0.41 | 0.68 | 0.78 | 0.41 | 0.44 | 0.69 | 0.78 |
| F-Statistics | 2.64 | 2.71 | 4.24 | 3.85 | 16.26 | 16.27 | 5.35 | 3.80 |
| No. Obs. | 14,395 | 14,378 | 7,291 | 6,267 | 14,395 | 14,378 | 7,291 | 6,267 |



Electronic copy available at: https://ssrn.com/abstract=3747263

## TABLE 5

### CEO's Personal Investment and Projects' Outcome: First Year of Production

This table studies the firms' projects production value firms depending on having the CEO owning plots of land located on oil and gas formations using an OLS regression. The dependent variable, Well's Production Value$_{z,i,r,t}$, denotes the value of well "z" first year of production drilled by firm "i" in township "r" during year "t" in millions of dollars. Well's Production Value$_{z,i,r,t}$ is defined as: (Gas Production * Gas Price + Oil Production * Oil Price)/1,000,000, in the first year of operation of the well. The variable of interest CEO's Land$_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on oil and gas field "*r*" during year "*t*", and 0 otherwise. . Finally, the variable Close to HQ$_{z,i,r,t}$ is a dummy variable equal to 1 if the well distance from the firm's HQ is below the firm-year median, and 0 otherwise. The sample period is from 2000 to 2020. Variable definitions and sample selection criteria appear in Appendixes A1 and A2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

| | Well's Production Value$_{z,i,r,t}$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ($\beta_1$) CEO's Personal Investment$_{i,r,t}$ | -0.62*** | -0.61*** | -0.67*** | -0.67*** | -0.71** | -0.73** | -0.52** | -0.37* |
| | (-3.63) | (-3.66) | (-3.28) | (-3.31) | (-2.32) | (-2.38) | (-2.11) | (-1.81) |
| ($\beta_2$) Oil-to-Gas Ratio$_{z,i,r,t}$ | 0.68*** | 0.75*** | 0.65*** | 0.72*** | 0.86*** | 0.81*** | 1.35*** | 1.40*** |
| | (2.96) | (3.30) | (2.92) | (3.26) | (5.80) | (5.82) | (8.33) | (8.70) |
| ($\beta_3$) Close to HQ$_{z,i,r,t}$ | | | -0.01 | -0.01 | 0.00 | -0.01 | -0.01 | -0.01 |
| | | | (-0.09) | (-0.09) | (0.02) | (-0.16) | (-0.45) | (-0.26) |
| ($\beta_4$) Firm Local Investment$_{i,r,t}$ | | | -0.00* | -0.00 | -0.00 | 0.00 | 0.00 | 0.01*** |
| | | | (-1.82) | (-1.51) | (-0.45) | (0.22) | (1.32) | (2.91) |
| ($\beta_5$) Firm's Size$_{i,t}$ | | | 0.00 | 0.00 | -0.00 | -0.00 | 0.00 | |
| | | | (1.10) | (0.80) | (-0.13) | (-0.12) | (1.38) | |
| ($\beta_6$) Firm Local Experience$_{i,r,t}$ | | | -0.00** | -0.00** | -0.00* | -0.00** | -0.00 | -0.00** |
| | | | (-2.09) | (-2.24) | (-1.96) | (-2.34) | (-1.53) | (-2.15) |
| ($\beta_7$) Local Drilling Activity$_{r,t}$ | | | 0.01*** | 0.01*** | 0.00*** | 0.00*** | | |
| | | | (3.92) | (4.10) | (3.44) | (3.03) | | |
| 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's 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 |
| $R^2$ | 0.51 | 0.51 | 0.51 | 0.51 | 0.67 | 0.67 | 0.77 | 0.78 |
| F-Statistics | 10.12 | 11.02 | 4.11 | 4.83 | 8.12 | 7.72 | 12.31 | 16.24 |
| No. Obs. | 228,198 | 228,198 | 228,198 | 228,198 | 227,230 | 214,463 | 204,966 | 204,805 |


Electronic copy available at: https://ssrn.com/abstract=3747263

**TABLE 6**

**CEO's Personal Investment and Projects' Outcome: Estimated NPV**

This table studies the firms' projects NPV depending on having the CEO owning plots of land located on oil and gas formations using an OLS regression. The dependent variable, Estimated $\text{NPV}_{z,i,r,t}$ denotes the estimated NPV of well "z" drilled by firm "i" in township "r" during year "t" in millions of dollars. Estimated $\text{NPV}_{z,i,r,t}$ is defined as: $(\frac{\text{Well's Production Value}*(1-\text{FC})}{Depletion\ Rate+Discount\ Rate} - Cost)/1{,}000{,}000$. A full description and motivation of the calculation is available in Appendixes A1. The variable of interest $\text{CEO's Land}_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on oil and gas field "*r*" during year "*t*", and 0 otherwise. Finally, the variable $\text{Close to HQ}_{z,i,r,t}$ is a dummy variable equal to 1 if the well distance from the firm's HQ is below the firm-year median, and 0 otherwise. The sample period is from 2000 to 2020. Variable definitions and sample selection criteria appear in Appendixes A1 and A2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

| | Estimated $\text{NPV}_{z,i,r,t}$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| $(\beta_1)$ CEO's Personal $\text{Investment}_{i,r,t}$ | -0.74*** | -0.73*** | -0.87*** | -0.86*** | -1.13*** | -1.16*** | -0.63* | -0.53* |
| | (-2.87) | (-2.85) | (-2.73) | (-2.71) | (-2.68) | (-2.68) | (-1.71) | (-1.85) |
| $(\beta_2)$ Oil-to-Gas $\text{Ratio}_{z,i,r,t}$ | 0.96*** | 1.05*** | 0.93*** | 1.01*** | 1.31*** | 1.21*** | 2.14*** | 2.24*** |
| | (2.68) | (2.92) | (2.66) | (2.90) | (4.95) | (5.08) | (7.76) | (8.06) |
| $(\beta_3)$ Close to $\text{HQ}_{z,i,r,t}$ | | | 0.06 | 0.06 | -0.00 | -0.02 | -0.03 | -0.02 |
| | | | (0.29) | (0.29) | (-0.01) | (-0.28) | (-0.57) | (-0.34) |
| $(\beta_4)$ Firm Local $\text{Investment}_{i,r,t}$ | | | -0.01** | -0.01* | -0.00 | 0.00 | 0.00 | 0.01** |
| | | | (-1.98) | (-1.79) | (-0.57) | (0.22) | (1.25) | (2.59) |
| $(\beta_5)$ Firm's $\text{Size}_{i,t}$ | | | 0.00 | 0.00 | -0.00 | -0.00 | 0.00 | |
| | | | (0.55) | (0.63) | (-0.26) | (-0.22) | (0.99) | |
| $(\beta_6)$ Firm Local $\text{Experience}_{i,r,t}$ | | | -0.00* | -0.00* | -0.00* | -0.00** | -0.00 | -0.00* |
| | | | (-1.70) | (-1.77) | (-1.72) | (-2.24) | (-1.14) | (-1.66) |
| $(\beta_7)$ Local Drilling $\text{Activity}_{r,t}$ | | | 0.01*** | 0.01*** | 0.01** | 0.00* | | |
| | | | (2.92) | (3.09) | (2.21) | (1.80) | | |
| 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's 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 |
| $R^2$ | 0.29 | 0.29 | 0.29 | 0.30 | 0.53 | 0.53 | 0.66 | 0.67 |
| F-Statistics | 6.92 | 7.38 | 2.40 | 2.64 | 5.39 | 5.52 | 11.98 | 14.93 |
| No. Obs. | 222,245 | 222,245 | 222,245 | 222,245 | 221,275 | 208,774 | 199,520 | 199,365 |



Electronic copy available at: https://ssrn.com/abstract=3747263

## TABLE 7

### CEO's Personal Investment and Projects' Outcome: Private V.S. Public Firms

This table studies the firms' projects production value depending on having the CEO owning plots of land located on oil and gas formations using an OLS regression. The dependent variable, $\text{Well's Production Value}_{z,i,r,t}$, denotes the value of well "z" first year of production drilled by firm "i" in township "r" during year "t" in millions of dollars. $\text{Well's Production Value}_{z,i,r,t}$ is defined as: (Gas Production * Gas Price + Oil Production * Oil Price)/1,000,000, in the first year of operation of the well. A full description and motivation of the calculation is available in Appendixes A1. The variable of interest $\text{CEO's Personal Investment}_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on oil and gas field "*r*" during year "*t*", and 0 otherwise. Finally, the variable $\text{Close to HQ}_{z,i,r,t}$ is a dummy variable equal to 1 if the well distance from the firm's HQ is below the firm-year median, and 0 otherwise, and the variable $\text{Private}_{i,t}$ is a dummy variable equal to 1 if the firm is privately held, and 0 otherwise. The sample period is from 2000 to 2020. Variable definitions and sample selection criteria appear in Appendixes A1 and A2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

| | Well's Production $\text{Value}_{z,i,r,t}$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ($\beta_1$) $\text{CEO's Personal Investment}_{i,r,t}$ | -0.89*** | -0.85*** | -0.78*** | -0.50*** | -0.96*** | -0.94*** | -0.77*** | -0.50*** |
| | (-9.37) | (-9.69) | (-3.42) | (-2.92) | (-7.50) | (-7.62) | (-3.46) | (-2.94) |
| ($\beta_2$) $\text{CEO's Perso. Inv.}_{i,r,t} * \text{Private}_{i,t}$ | 1.13*** | 1.03*** | 1.06*** | 1.05*** | 1.22*** | 1.13*** | 1.05*** | 1.06*** |
| | (3.61) | (3.82) | (3.05) | (2.78) | (3.79) | (4.12) | (3.11) | (2.85) |
| ($\beta_3$) $\text{Private}_{i,t}$ | -0.64 | 0.06 | -0.37** | | -0.68 | 0.01 | -0.38** | |
| | (-1.44) | (0.16) | (-2.03) | | (-1.56) | (0.03) | (-2.07) | |
| ($\beta_4$) $\text{Oil-to-Gas Ratio}_{z,i,r,t}$ | 0.68*** | 0.75*** | 1.36*** | 1.41*** | 0.65*** | 0.72*** | 1.35*** | 1.40*** |
| | (2.94) | (3.27) | (8.33) | (8.71) | (2.90) | (3.22) | (8.32) | (8.69) |
| ($\beta_5$) $\text{Close to HQ}_{z,i,r,t}$ | | | | | -0.01 | -0.01 | -0.01 | -0.01 |
| | | | | | (-0.07) | (-0.07) | (-0.34) | (-0.24) |
| ($\beta_6$) $\text{Firm Local Investment}_{i,r,t}$ | | | | | -0.00* | -0.00 | 0.00 | 0.01*** |
| | | | | | (-1.81) | (-1.52) | (1.29) | (2.93) |
| ($\beta_7$) $\text{Firm's Size}_{i,t}$ | | | | | 0.00 | 0.00 | 0.00 | |
| | | | | | (1.23) | (0.81) | (1.48) | |
| ($\beta_8$) $\text{Firm Local Experience}_{i,r,t}$ | | | | | -0.00** | -0.00** | -0.00 | -0.00** |
| | | | | | (-2.17) | (-2.25) | (-1.58) | (-2.17) |
| ($\beta_9$) $\text{Local Drilling Activity}_{r,t}$ | | | | | 0.01*** | 0.01*** | | |
| | | | | | (4.06) | (4.14) | | |
| Firm FE | No | Yes | Yes | No | No | Yes | Yes | No |
| Year FE | Yes | Yes | No | No | Yes | Yes | No | No |
| CEO FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Township FE | No | No | No | No | No | No | No | No |
| Technology FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| CEO's State FE | No | No | Yes | Yes | No | No | Yes | Yes |
| Firm*Year FE | No | No | No | Yes | No | No | No | Yes |
| Township*Year FE | No | No | Yes | Yes | No | No | Yes | Yes |
| $R^2$ | 0.51 | 0.51 | 0.77 | 0.78 | 0.51 | 0.51 | 0.77 | 0.78 |
| F-Statistics | 24.98 | 27.26 | 19.57 | 25.34 | 12.53 | 13.41 | 10.02 | 13.50 |
| No. Obs. | 228,198 | 228,198 | 204,966 | 204,805 | 228,198 | 228,198 | 204,966 | 204,805 |



Electronic copy available at: https://ssrn.com/abstract=3747263

## TABLE 8

### CEO's Personal Investment and Projects' Outcome: Ownership Concentration

This table studies the firms' projects production value depending on having the CEO owning plots of land located on oil and gas formations using an OLS regression. The dependent variable, $\text{Well's Production Value}_{z,i,r,t}$, denotes the value of well "z" first year of production drilled by firm "i" in township "r" during year "t" in millions of dollars. $\text{Well's Production Value}_{z,i,r,t}$ is defined as: (Gas Production * Gas Price + Oil Production * Oil Price)/1,000,000, in the first year of operation of the well. A full description and motivation of the calculation is available in Appendixes A1. The variable of interest $\text{CEO's Personal Investment}_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on oil and gas field "*r*" during year "*t*", and 0 otherwise. Finally, the variable $\text{Close to HQ}_{z,i,r,t}$ is a dummy variable equal to 1 if the well distance from the firm's HQ is below the firm-year median, and 0 otherwise, and the variable $\text{Ownership Concentration}_{i,t}$ corresponds to the institutional ownership concentration measured using the Herfindahl number. The sample period is from 2000 to 2020. Variable definitions and sample selection criteria appear in Appendixes A1 and A2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

| | $\text{Well's Production Value}_{z,i,r,t}$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| $(\beta_1)$ $\text{CEO's Personal Investment}_{i,r,t}$ | -0.95*** | -0.96*** | -0.93*** | -1.26*** | -1.08*** | -1.13*** | -0.92*** | -1.24*** |
| | (-6.16) | (-6.99) | (-3.37) | (-4.39) | (-5.05) | (-5.71) | (-3.30) | (-4.29) |
| $(\beta_2)$ $\text{CEO's Perso. Inv.}_{i,r,t}$ x $\text{Owner. Concent.}_{i,t}$ | 0.04*** | 0.05*** | 0.05* | 0.17*** | 0.04*** | 0.06*** | 0.05* | 0.17*** |
| | (2.78) | (3.98) | (1.94) | (6.04) | (2.65) | (4.22) | (1.88) | (6.16) |
| $(\beta_3)$ $\text{Ownership Concentration}_{i,t}$ | -0.01 | -0.00 | -0.02** | | -0.01 | 0.00 | -0.01* | |
| | (-0.93) | (-0.17) | (-2.08) | | (-0.97) | (0.00) | (-1.82) | |
| $(\beta_4)$ $\text{Oil-to-Gas Ratio}_{z,i,r,t}$ | 0.85*** | 0.88*** | 1.60*** | 1.62*** | 0.83*** | 0.87*** | 1.59*** | 1.61*** |
| | (3.14) | (3.24) | (7.22) | (7.40) | (3.07) | (3.20) | (7.18) | (7.36) |
| $(\beta_5)$ $\text{Close to HQ}_{z,i,r,t}$ | | | | | -0.01 | -0.01 | -0.05 | -0.03 |
| | | | | | (-0.03) | (-0.03) | (-1.04) | (-0.65) |
| $(\beta_6)$ $\text{Firm Local Investment}_{i,r,t}$ | | | | | -0.00 | -0.00 | 0.00 | 0.01*** |
| | | | | | (-0.89) | (-0.86) | (1.06) | (3.06) |
| $(\beta_7)$ $\text{Firm's Size}_{i,t}$ | | | | | -0.00* | -0.00* | -0.00 | |
| | | | | | (-1.73) | (-1.79) | (-0.92) | |
| $(\beta_8)$ $\text{Firm Local Experience}_{i,r,t}$ | | | | | -0.00** | -0.00** | -0.00* | -0.00** |
| | | | | | (-2.26) | (-2.25) | (-1.94) | (-2.32) |
| $(\beta_9)$ $\text{Local Drilling Activity}_{r,t}$ | | | | | 0.01*** | 0.01*** | | |
| | | | | | (3.40) | (3.37) | | |
| Firm FE | No | Yes | Yes | No | No | Yes | Yes | No |
| Year FE | Yes | Yes | No | No | Yes | Yes | No | No |
| CEO FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Township FE | No | No | No | No | No | No | No | No |
| Technology FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| CEO's State FE | No | No | Yes | Yes | No | No | Yes | Yes |
| Firm∗Year FE | No | No | No | Yes | No | No | No | Yes |
| Township∗Year FE | No | No | Yes | Yes | No | No | Yes | Yes |
| $R^2$ | 0.49 | 0.49 | 0.77 | 0.78 | 0.49 | 0.49 | 0.77 | 0.78 |
| F-Statistics | 14.90 | 15.64 | 17.50 | 31.17 | 10.74 | 11.89 | 9.85 | 17.96 |
| No. Obs. | 158,933 | 158,933 | 140,915 | 140,884 | 158,933 | 158,933 | 140,915 | 140,884 |



Electronic copy available at: https://ssrn.com/abstract=3747263

**TABLE 9**

**CEO's Personal Investment and Projects' Outcome: Proximity to Headquarter**

This table studies the firms' projects production value depending on having the CEO owning plots of land located on oil and gas formations using an OLS regression. The dependent variable, $\text{Well's Production Value}_{z,i,r,t}$, denotes the value of well "z" first year of production drilled by firm "i" in township "r" during year "t" in millions of dollars. $\text{Well's Production Value}_{z,i,r,t}$ is defined as: (Gas Production * Gas Price + Oil Production * Oil Price)/1,000,000, in the first year of operation of the well. A full description and motivation of the calculation is available in Appendixes A1. The variable of interest $\text{CEO's Personal Investment}_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on oil and gas field "*r*" during year "*t*", and 0 otherwise. Finally, the variable $\text{Close to HQ}_{z,i,r,t}$ is a dummy variable equal to 1 if the well distance from the firm's HQ is below the firm-year median, and 0 otherwise, and the variable $\text{Ownership Concentration}_{i,t}$ corresponds to the institutional ownership concentration measured using the Herfindahl number. The sample period is from 2000 to 2020. Variable definitions and sample selection criteria appear in Appendixes A1 and A2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

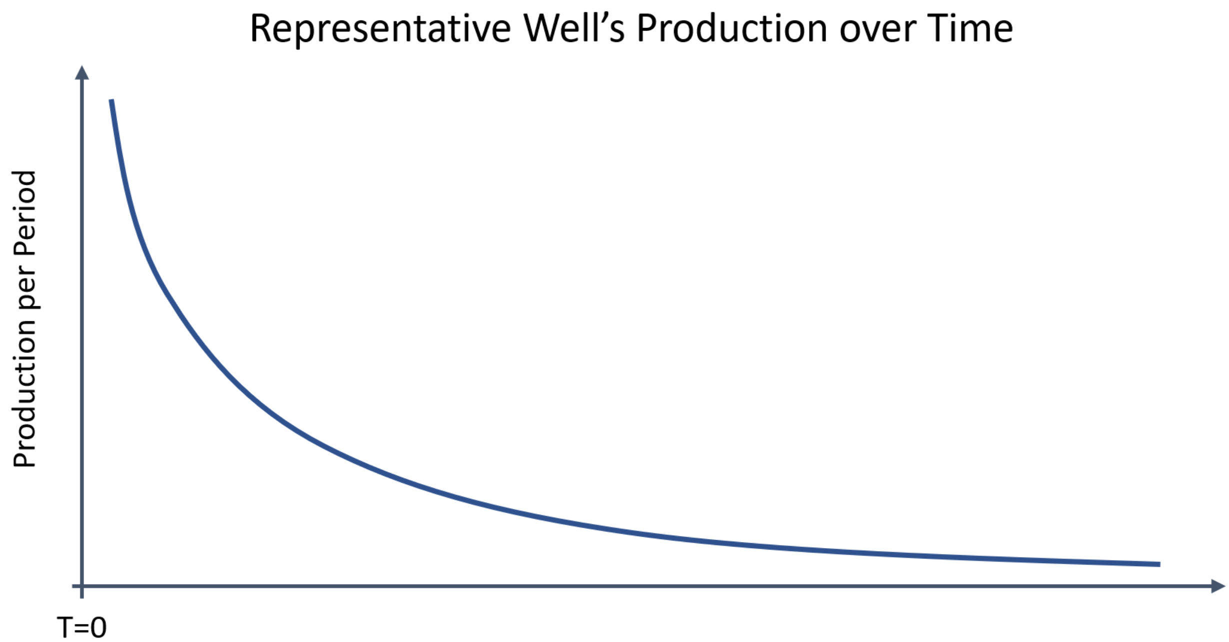
| | $\text{Well's Production Value}_{z,i,r,t}$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ($\beta_1$) $\text{CEO's Personal Investment}_{i,r,t}$ | -1.71*** | -1.73*** | -1.33*** | -1.70*** | -1.79*** | -1.85*** | -1.35*** | -1.71*** |
| | (-5.12) | (-5.37) | (-4.53) | (-5.34) | (-5.61) | (-6.09) | (-4.62) | (-5.30) |
| ($\beta_2$) $\text{CEO's Perso. Inv.}_{i,r,t}$ x $\text{Close to HQ}_{z,i,r,t}$ | 0.83** | 0.83** | 0.44*** | 0.52*** | 0.77** | 0.78** | 0.45*** | 0.52*** |
| | (2.57) | (2.60) | (4.06) | (3.68) | (2.46) | (2.51) | (4.12) | (3.62) |
| $\text{CEO's Perso. Inv.}_{i,r,t}$ x $\text{Owner. Concent.}_{i,t}$ | 0.04*** | 0.05*** | 0.05* | 0.16*** | 0.04*** | 0.06*** | 0.05* | 0.16*** |
| | (2.92) | (4.04) | (1.96) | (5.96) | (2.89) | (4.52) | (1.90) | (6.08) |
| ($\beta_3$) $\text{Close to HQ}_{z,i,r,t}$ | -0.02 | -0.02 | -0.07 | -0.05 | -0.01 | -0.01 | -0.07 | -0.04 |
| | (-0.10) | (-0.10) | (-1.29) | (-0.92) | (-0.08) | (-0.08) | (-1.28) | (-0.84) |
| ($\beta_4$) $\text{Ownership Concentration}_{i,t}$ | -0.01 | -0.00 | -0.01** | | -0.01 | -0.00 | -0.01* | |
| | (-0.97) | (-0.48) | (-2.04) | | (-1.03) | (-0.39) | (-1.76) | |
| ($\beta_5$) $\text{Oil-to-Gas Ratio}_{z,i,r,t}$ | 0.80*** | 0.83*** | 1.59*** | 1.63*** | 0.78*** | 0.81*** | 1.59*** | 1.63*** |
| | (2.84) | (2.94) | (7.25) | (7.50) | (2.78) | (2.90) | (7.22) | (7.47) |
| ($\beta_6$) $\text{Close to HQ}_{z,i,r,t}$ | | | | | -0.00 | -0.00 | 0.00 | 0.01*** |
| | | | | | (-0.94) | (-0.91) | (1.09) | (3.07) |
| ($\beta_7$) $\text{Firm Local Investment}_{i,r,t}$ | | | | | -0.00 | -0.00 | -0.00 | |
| | | | | | (-1.56) | (-1.59) | (-0.99) | |
| ($\beta_8$) $\text{Firm's Size}_{i,t}$ | | | | | -0.00** | -0.00** | -0.00** | -0.00** |
| | | | | | (-2.23) | (-2.23) | (-2.09) | (-2.57) |
| ($\beta_9$) $\text{Firm Local Experience}_{i,r,t}$ | | | | | 0.01*** | 0.01*** | | |
| | | | | | (3.37) | (3.33) | | |
| Firm FE | No | Yes | Yes | No | No | Yes | Yes | No |
| Year FE | Yes | Yes | No | No | Yes | Yes | No | No |
| CEO FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Township FE | No | No | No | No | No | No | No | No |
| Technology FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| CEO's State FE | No | No | Yes | Yes | No | No | Yes | Yes |
| Firm*Year FE | No | No | No | Yes | No | No | No | Yes |
| Township*Year FE | No | No | Yes | Yes | No | No | Yes | Yes |
| $R^2$ | 0.49 | 0.49 | 0.77 | 0.78 | 0.49 | 0.49 | 0.77 | 0.78 |
| F-Statistics | 9.49 | 9.90 | 15.26 | 21.19 | 9.05 | 10.36 | 10.78 | 16.67 |
| No. Obs. | 160,581 | 160,581 | 142,491 | 142,461 | 160,581 | 160,581 | 142,491 | 142,461 |



Electronic copy available at: https://ssrn.com/abstract=3747263

**Appendix 1: Methodology to Measure Projected NPV**

One of the principal features of oil and gas well regarding production over time relates to the notion of reserves depletion. The production starts at an initial level when the well just got drilled, and then over time the production declines.




To obtain an estimate of the wells projected NPV we rely on the Arp model, a petroleum production model (Fetkovich et al., 1996), to measure the average depletion rate of the wells in our sample. 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" are the flexible cost associated with the overall operations of the wells (in proportion of the 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 months since the well was drilled, and Cost is the cost of drilling the well. Without loss of generality, we can approximate the Project NPV over the range 0 to infinity given that the annual depletion rate for the wells in the sample is 0.23 and 0.42 for the wells drilled using vertical and horizontal technology, respectively. Such high depletion rate numbers combined with a discount rate of 10% imply that the

Electronic copy available at: https://ssrn.com/abstract=3747263

estimated production value for periods that take place further into the future are close to zero (e.g., the discounted value of production on year 10 is roughly 99% smaller than on year 1). It is thus reasonable to approximate wells' projected NPV by computing:

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

To obtain an estimate, for each well we define $Prod_0$= First Year Production of Natural Gas * Natural Gas Price + First Year Production of Oil * Oil Price, FC is set to 20% following the methodology of Decaire et al. (2020), "r" is set to 10% following Kellogg (2014) and Decaire et al. (2020). Then, considering that our sample contains two different types of drilling technologies, vertical and horizontal, we separately estimate the average depletion rate for each technology in the sample using the Arp Exponential model such that:

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

Finally, to obtain an estimate of the wells' drilling cost, we use hand collected data, and estimate the year drilling cost average for each technology, respectively. The drilling cost data spans the period 2000-2017, excluding from our analysis the last 3 years of the sample.

Electronic copy available at: https://ssrn.com/abstract=3747263

**Appendix A2: Variables Description**

| Variable | Definition |
|---|---|
| CEO's Personal Investment$_{i,r,t}$ | A dummy 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. |
| Close to HQ$_{z,i,r,t}$ | Dummy variable equal to 1 if the distance between the well and the firm's headquarter is smaller than the firm-year median, and 0 otherwise. |
| Drilling Activity$_{r,t}$ | A dummy variable equal to 1 if there was already some drilling activity at the time of signing the lease, and 0 otherwise. |
| Exit$_{i,r,t}$ | Dummy variable equal to 1 if firm "i' exited field "r" on year "t", and 0 otherwise. For an exit to be recorded in the sample, we require that firms are not active in that field for at least 2 years. |
| Enter$_{i,r,t}$ | Dummy variable equal to 1 if firm "i' entered state "r" on year "t", and 0 otherwise. |
| Firm Local Investment$_{i,r,t}$ | Number of wells drilled by firm "i" in township "r" on year "t". |
| Firm's Size$_{i,t}$ | Total number of wells firm "i" has drilled up to year "t". |
| Firm Local Experience$_{i,r,t}$ | Total number of wells firm "i" has drilled in township "r" up to year "t". |
| Field Avg. Prod. Value$_{i,r,t}$ | Average well's production value of firm "i" in field "r" on year "t". |
| Investment Rate$_{i,r,t+1}$ (%) | A variable that corresponds to the number of wells drilled by firm "i" in field "r" during year "t+1" scaled by the total number of active wells of the firm during the prior period, such that: $\text{Investment Rate}_{i,r,t+1} = \frac{\text{No. Wells Drilled}_{i,r,t+1}}{\text{Total No. Active Wells}_{i,t}} * 100$. |
| Local Drilling Activity$_{r,t}$ | Total number of wells drilled in township "r" on year "t". |
| 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 $\text{Ownership Concentration}_{i,t} = \sum_k \left(\frac{\text{Share Owned}_{k,i,t}}{\text{Share Outstanding}_{i,t}}\right)^2$, where "k" denotes a specific institutional investor, "i" indicates a firm, and "t" indexes the year of the calculation. To calculate the measure, we use the 13f dataset from Thompson Reuters on WRDS. |
| 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 $\text{Ratio}_{i,r,t} = \text{Avg. First Year Prod. Oil}_{i,r,t} / (\text{Avg. First Year Prod. Oil}_{i,r,t} + \text{Avg. First Year Prod. Gas}_{i,r,t}/6)$. Natural gas production is divided by 6 to follow SEC standard and work with standardize unit (Barrel of Oil Equivalent "BOE"). |
| Oil-to-Gas Ratio$_{z,i,r,t}$ | Measure the proportion of the well production that is attributable to oil at the firm-field-year level such that: $\text{Oil-to-Gas Ratio}_{z,i,r,t} = \text{First Year Prod. Oil}_{z,i,r,t} / (\text{First Year Prod. Oil}_{z,i,r,t} + \text{First Year Prod. Gas}_{z,i,r,t}/6)$. Natural gas production is divided by 6 to |

Electronic copy available at: https://ssrn.com/abstract=3747263

| | |
|---|---|
| | follow SEC standard and work with standardize unit (Barrel of Oil Equivalent "BOE"). |
| $\text{Private}_{i,t}$ | A dummy equal to 1 if the firm reports in Compustat, and 0 otherwise. |
| $\text{Projected NPV}_{z,i,r,t}$ | Defined as: $(\frac{\text{Well's Production Value}*(1-\text{FC})}{\text{Depletion Rate}+\text{Discount Rate}} - \text{Cost})/100{,}000$. |
| $\text{Relatives Live in State}_{i,r}$ | Dummy variable equal to 1 if the CEO of firm "i" has at least one relative with a recorded address listed in state "r". |
| $\text{Royalty Rate (\%)}_{r,t}$ | 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. |
| $\text{Signing Bonus Per Acres}_{r,t}$ | The average signing bonus per acres in township "r" on year "t". |
| $\text{State's Size}_{r,t}$ | The total number of wells drilled in state "r" up to year "t". |
| $\text{State's Oil-to-Gas Ratio}_{r,t}$ | Measure the averaged proportion of the wells production that is attributable to oil at the state-year level such that: Oil-to-Gas $\text{Ratio}_{i,r,t} = \text{Average First Year Prod. Oil}_{r,t} / (\text{Average First Year Prod. Oil}_{r,t} + \text{Average First Year Prod. Gas}_{r,t}/6)$. Natural gas production is divided by 6 to follow SEC standard and work with standardize unit (Barrel of Oil Equivalent "BOE"). |
| 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. |
| $\text{Township Drilling Intensity}_{r,t}$ | The natural logarithm of the total number of wells drilled in township "r" on year "t". |
| $\text{Township Prod. Value}_{r,t}$ | Average wells' production value of township "r" on year "t". |
| $\text{Well's Production Value}_{z,i,r,t}$ | 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. |

Electronic copy available at: https://ssrn.com/abstract=3747263

# Internet Appendix

# CEO Pet Projects

Paul H. Décaire and Denis Sosyura

Electronic copy available at: https://ssrn.com/abstract=3747263

This Internet Appendix presents additional empirical results and some results to assess the robustness of our key results.

Contents

- **Table A.1** studies the relation between the start of drilling activity in a township and the lease terms landowners obtain when selling/leasing their mineral rights to oil and gas companies.
- **Table A.2** shows the effect of the different filters we apply to the data on the sample size.
- **Table A.3** Version of Table 2 using an alternative method to identify which property is a plot of land located on an oil and gas producing formation such that the property must have at least 1 oil and gas well within 1 kilometer from the GPS coordinate provided by the Census data using R (package "tidygeocoder") and excluding properties for which that ratio of land value to total value is smaller than 99%.
- **Table A.4** Version of Table 5 using an alternative method to identify which property is a plot of land located on an oil and gas producing formation such that the property must have at least 1 oil and gas well within 1 kilometer from the GPS coordinate provided by the Census data using R (package "tidygeocoder") and excluding properties for which that ratio of land value to total value is smaller than 99%.
- **Table A.5** Version of Table 6 using an alternative method to identify which property is a plot of land located on an oil and gas producing formation such that the property must have at least 1 oil and gas well within 1 kilometer from the GPS coordinate provided by the Census data using R (package "tidygeocoder") and excluding properties for which that ratio of land value to total value is smaller than 99%.
- **Table A.6** Version of Table 2 using an alternative econometric specification (Cox duration model) to evaluate the relation between CEO's personal investment and the decision to enter a particular region for exploration and production of fossil fuel.
- **Table A.7** Version of Table 2 in which we exclude properties that are purchased after oil and gas formations are confirmed in a given state.

Electronic copy available at: https://ssrn.com/abstract=3747263

## TABLE A.1

### The Effect of Drilling Activity of Land Owner's Monetary Gains

This table presents the relation between drilling activity and the terms landowners obtain when leasing their land using an OLS regression. The first dependent variable, $\text{Royalty Rate (\%)}_{r,t}$, denotes the percentage of the wells revenues the landowners is expected to receive from the drilling company. For example, if the royalty rate is 18%, it means that the landowner will receive 18% of the cash flow generate by the well. The second dependent variable, $\text{Signing Bonus Per Acres}_{r,t}$, corresponds to the amount of money landowners receive at the moment of signing the lease, per acre. For example, if the bonus per acre is 10$ and a land landowners lease 1000 acres, he would receive $10,000. The main variable of interest, $\text{Drilling Activity}_{r,t}$, is a dummy variable equal to 1 if there is already some drilling activity in the township at the time the lease was signed, and 0 otherwise. In the alternative specification, the variable of interest is $\text{No. of Wells in Township}_{r,t}$, which denotes the natural logarithm of the total number of wells drilled in the township up to the moment the lease was signed. The sample period is from 2000 to 2020. Variable definitions and sample selection criteria appear in Appendixes A1 and A2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

| | $\text{Royalty Rate (\%)}_{r,t}$ | | | | $\text{Signing Bonus Per Acres}_{r,t}$ | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| $(\beta_1)$ $\text{Drilling Activity}_{r,t}$ | 0.52*** | 0.43*** | | | 18.61*** | 13.04*** | | |
| | (5.53) | (4.28) | | | (3.66) | (3.10) | | |
| $(\beta_2)$ $\text{Township Drilling Intensity}_{r,t}$ | | | 0.35*** | 0.31*** | | | 17.27*** | 15.34** |
| | | | (8.73) | (7.40) | | | (2.92) | (2.38) |
| $(\beta_3)$ $\text{Township Prod. Value}_{r,t}$ | | 0.06*** | | 0.03** | | 3.52*** | | 2.12* |
| | | (3.62) | | (2.01) | | (3.96) | | (1.87) |
| Township FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| $R^2$ | 0.50 | 0.50 | 0.50 | 0.50 | 0.10 | 0.10 | 0.10 | 0.10 |
| F-Statistics | 30.54 | 24.25 | 76.27 | 40.42 | 13.40 | 8.61 | 8.55 | 10.66 |
| No. Obs. | 128,883 | 128,883 | 128,883 | 128,883 | 128,883 | 128,883 | 128,883 | 128,883 |

Electronic copy available at: https://ssrn.com/abstract=3747263

## TABLE A.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 information about their CEOs | 318 | 452 | 254,842 |
| - Firms with incomplete information on CEOs* | 20 | 32 | 4,876 |
| - Projects with incomplete information | 0 | 8 | 20,965 |
| **= Final Sample** | 298 | 412 | 229,001 |

* Information on CEOs real estate holding is missing if CEOs are not included in LexisNexis dataset. This is the case for 32 CEOs in our sample, because they are living outside the US and they manage foreign firms.

Electronic copy available at: https://ssrn.com/abstract=3747263

## TABLE A.3

### Extensive Margin: CEO's Personal Investment and the Decision to Enter an Oil and Gas Region (i.e., State)

This table studies the decision of firms to enter a region/state depending on having the CEO owning plots of land located on oil and gas formations using a OLS regression. For a property to be include in the sample, it must have at least 1 oil and gas well within 1 kilometer from the GPS coordinate provided by the Census data using R (package "tidygeocoder") and we exclude properties for which that ratio of land value to total value is smaller than 99%. The dependent variable, $Enter_{i,r,t}$, is a dummy variable equal to 1 if firm "$i$" decides to enter an oil and gas producing state "$r$" during year "$t$" to start developing resources, and 0 otherwise. The variable of interest $\text{CEO's Land}_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on an oil and gas formation in region/state "$r$" during year "$t$", and 0 otherwise. The sample period is from 2000 to 2020. For each firm, we define the opportunity set of available states as all the states that have active oil and gas exploration and production. For example, if drilling activity in state **A** starts in 2007, then we construct the panel data such that state **A** becomes an investment opportunity available to firms starting in 2007, and the state is not included in the sample during prior years. Once a firm enters a state, we drop that state from the sample for that specific firm. Finally, the variable $\text{Close to HQ}_{z,i,r,t}$ is a dummy variable equal to 1 if the state distance from the firm's HQ is below the firm-year median, and 0 otherwise. Variable definitions and sample selection criteria appear in Appendixes A1 and A2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

| | $\text{Enter}_{i,r,t} = 1$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ($\beta_1$) CEO's Personal $\text{Investment}_{i,r,t}$ | 0.69*** | 0.67*** | 0.67*** | 0.66*** | 0.47*** | 0.46*** | 0.50*** | 0.50*** |
| | (5.31) | (4.84) | (4.84) | (5.62) | (3.02) | (2.90) | (2.96) | (3.45) |
| ($\beta_2$) State's Oil-to-Gas $\text{Ratio}_{r,t}$ | -0.01*** | -0.00 | -0.00 | 0.00 | -0.01*** | -0.01*** | -0.01*** | |
| | (-2.99) | (-0.30) | (-0.30) | (1.43) | (-2.79) | (-4.28) | (-4.22) | |
| ($\beta_3$) $\text{Investment}_{i,t}$ | 1.31*** | 0.07 | 0.07 | 1.12*** | 1.25*** | 0.36 | | |
| | (6.19) | (0.39) | (0.39) | (5.67) | (6.09) | (1.54) | | |
| ($\beta_4$) State's Drilling $\text{Activity}_{r,t}$ | 0.24*** | 0.24*** | 0.24*** | 0.23*** | -0.05*** | -0.04* | -0.04** | |
| | (10.44) | (10.48) | (10.48) | (10.17) | (-2.73) | (-1.84) | (-2.16) | |
| ($\beta_5$) Firm's $\text{Size}_{i,t}$ | -0.11*** | -0.24*** | -0.24*** | -0.07*** | -0.08*** | -0.19*** | | |
| | (-6.35) | (-8.11) | (-8.11) | (-4.21) | (-4.99) | (-4.27) | | |
| ($\beta_6$) State's $\text{Size}_{r,t}$ | -0.01*** | -0.01*** | -0.01*** | -0.01*** | -0.03*** | -0.03*** | -0.03*** | |
| | (-9.94) | (-9.77) | (-9.77) | (-8.70) | (-11.46) | (-9.99) | (-10.05) | |
| ($\beta_7$) Close to $\text{HQ}_{i,r,t}$ | 0.02*** | 0.02*** | 0.02*** | 0.02*** | 0.01*** | 0.01*** | 0.02*** | 0.02*** |
| | (13.73) | (13.33) | (13.33) | (13.80) | (5.42) | (6.00) | (7.17) | (6.77) |
| 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 |
| State FE | No | No | No | No | Yes | Yes | Yes | No |
| Firm∗Year FE | No | No | No | No | No | No | Yes | Yes |
| State∗Year FE | No | No | No | No | No | No | No | Yes |
| $R^2$ | 0.04 | 0.07 | 0.07 | 0.09 | 0.10 | 0.15 | 0.23 | 0.26 |
| F-Statistics | 59.94 | 68.90 | 68.90 | 52.94 | 41.80 | 28.00 | 39.64 | 27.84 |
| No. Obs. | 42,287 | 42,287 | 42,287 | 42,287 | 42,287 | 42,287 | 42,235 | 42,235 |

Electronic copy available at: https://ssrn.com/abstract=3747263

## TABLE A.4

### Intensive Margin: CEO's Personal Investment and Investment Rate

This table studies the investment rate of firms depending on having the CEO owning plots of land located on oil and gas formations using a OLS regression. . For a property to be include in the sample, it must have at least 1 oil and gas well within 1 kilometer from the GPS coordinate provided by the Census data using R (package "tidygeocoder") and we exclude properties for which that ratio of land value to total value is smaller than 99%. The dependent variable, $\text{Investment Rate}_{\text{i,r,t+1}}$ 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 $\text{Investment Rate}_{\text{i,r,t+1}} = \text{No. Wells Drilled}_{\text{i,r,t+1}}/\text{Total No. Active Wells}_{\text{i,t}}$. The variable of interest $\text{CEO's Land}_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on the oil and gas formation "*r*" during year "*t*", and 0 otherwise. Finally, the variable $\text{Close to HQ}_{\text{z,i,r,t}}$ is a dummy variable equal to 1 if the field distance from the firm's HQ is below the firm-year median, and 0 otherwise. The sample period is from 2000 to 2020. Variable definitions and sample selection criteria appear in Appendixes A1 and A2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

| | $\text{Investment Rate}_{\text{i,r,t+1}}$ (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ($\beta_1$) $\text{CEO's Personal Investment}_{\text{i,r,t}}$ | 25.56*** | 25.02*** | 15.79** | 16.85*** | 20.29*** | 20.10*** | 15.54*** | 16.80*** |
| | (4.94) | (4.62) | (2.48) | (5.48) | (3.33) | (3.21) | (2.68) | (5.64) |
| ($\beta_2$) $\text{CEO's Perso. Inv.}_{\text{i,r,t}}$ x $\text{Field Avg. Prod. Value}_{\text{i,r,t}}$ | -5.69** | -5.47** | -3.35 | -3.90*** | -6.50** | -6.36** | -3.48* | -3.94*** |
| | (-2.59) | (-2.46) | (-1.56) | (-3.82) | (-2.33) | (-2.28) | (-1.85) | (-3.98) |
| ($\beta_3$) $\text{Field Oil-to-Gas Ratio}_{\text{i,r,t}}$ | 0.77* | 0.86** | 0.11 | -0.14 | 0.67* | 0.85** | -0.12 | -0.13 |
| | (1.80) | (2.01) | (0.12) | (-0.16) | (1.71) | (2.15) | (-0.13) | (-0.15) |
| ($\beta_4$) $\text{Field Avg. Prod. Value}_{\text{i,r,t}}$ | 0.04 | 0.03 | 0.19*** | 0.15** | 0.05* | 0.05* | 0.16** | 0.15** |
| | (1.23) | (0.97) | (2.72) | (2.60) | (1.75) | (1.78) | (2.32) | (2.53) |
| ($\beta_5$) $\text{Firm's Size}_{\text{i,t}}$ | | | | | 0.00*** | 0.00*** | 0.00*** | |
| | | | | | (3.67) | (3.60) | (3.45) | |
| ($\beta_6$) $\text{State's Drilling Activity}_{\text{r,t}}$ | | | | | 0.01*** | 0.00*** | | |
| | | | | | (9.33) | (8.92) | | |
| ($\beta_7$) $\text{Close to HQ}_{\text{i,r,t}}$ | | | | | -0.61*** | -0.60*** | -1.57*** | -0.95** |
| | | | | | (-3.65) | (-3.67) | (-2.79) | (-2.13) |
| Firm FE | Yes | Yes | No | No | Yes | Yes | No | 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 | Yes | No | No | No | Yes | No |
| Firm∗Year FE | No | No | No | Yes | No | No | No | Yes |
| Field∗Year FE | No | No | Yes | Yes | No | No | Yes | Yes |
| $R^2$ | 0.37 | 0.41 | 0.68 | 0.78 | 0.41 | 0.44 | 0.68 | 0.78 |
| F-Statistics | 8.40 | 7.57 | 4.85 | 11.49 | 22.17 | 21.15 | 6.43 | 10.79 |
| No. Obs. | 14,395 | 14,378 | 7,291 | 6,267 | 14,395 | 14,378 | 7,291 | 6,267 |

Electronic copy available at: https://ssrn.com/abstract=3747263

## TABLE A.5

### CEO’s Personal Investment and Projects’ Outcome: First Year of Production

This table studies the firms’ projects production value firms depending on having the CEO owning plots of land located on oil and gas formations using an OLS regression. For a property to be include in the sample, it must have at least 1 oil and gas well within 1 kilometer from the GPS coordinate provided by the Census data using R (package “tidygeocoder”) and we exclude properties for which that ratio of land value to total value is smaller than 99%. The dependent variable, Well’s Production Value$_{z,i,r,t}$, denotes the value of well “z” first year of production drilled by firm “i” in township “r” during year “t” in hundreds of thousands of dollars. Well’s Production Value$_{z,i,r,t}$ is defined as: (Gas Production * Gas Price + Oil Production * Oil Price)/100,000, in the first year of operation of the well. The variable of interest CEO’s Land$_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm “i” possess a plot of land on oil and gas field “$r$” during year “$t$”, and 0 otherwise. . Finally, the variable Close to HQ$_{z,i,r,t}$ is a dummy variable equal to 1 if the well distance from the firm’s HQ is below the firm-year median, and 0 otherwise. The sample period is from 2000 to 2020. Variable definitions and sample selection criteria appear in Appendixes A1 and A2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

| | Well’s Production Value$_{z,i,r,t}$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ($\beta_1$) CEO’s Personal Investment$_{i,r,t}$ | -0.82*** | -0.81*** | -0.81*** | -0.81*** | -1.17*** | -1.20*** | -0.79*** | -0.62*** |
| | (-4.09) | (-4.11) | (-3.76) | (-3.77) | (-4.73) | (-4.78) | (-2.83) | (-3.13) |
| ($\beta_2$) Oil-to-Gas Ratio$_{z,i,r,t}$ | 0.68*** | 0.75*** | 0.66*** | 0.73*** | 0.86*** | 0.82*** | 1.35*** | 1.40*** |
| | (2.98) | (3.32) | (2.93) | (3.27) | (5.80) | (5.81) | (8.33) | (8.70) |
| ($\beta_3$) Close to HQ$_{z,i,r,t}$ | | | -0.01 | -0.01 | 0.00 | -0.01 | -0.01 | -0.01 |
| | | | (-0.11) | (-0.11) | (0.04) | (-0.15) | (-0.46) | (-0.22) |
| ($\beta_4$) Firm Local Investment$_{i,r,t}$ | | | -0.00* | -0.00 | -0.00 | 0.00 | 0.00 | 0.00*** |
| | | | (-1.75) | (-1.44) | (-0.38) | (0.31) | (1.27) | (2.92) |
| ($\beta_5$) Firm's Size$_{i,t}$ | | | 0.00 | 0.00 | -0.00 | -0.00 | 0.00 | |
| | | | (1.11) | (0.81) | (-0.13) | (-0.12) | (1.39) | |
| ($\beta_6$) Firm Local Experience$_{i,r,t}$ | | | -0.00** | -0.00** | -0.00* | -0.00** | -0.00 | -0.00** |
| | | | (-2.09) | (-2.23) | (-1.93) | (-2.30) | (-1.41) | (-2.11) |
| ($\beta_7$) Local Drilling Activity$_{r,t}$ | | | 0.01*** | 0.01*** | 0.00*** | 0.00*** | | |
| | | | (3.89) | (4.07) | (3.37) | (2.97) | | |
| 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's 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 |
| $R^2$ | 0.51 | 0.51 | 0.51 | 0.51 | 0.67 | 0.67 | 0.77 | 0.78 |
| F-Statistics | 10.85 | 11.63 | 4.37 | 5.03 | 9.00 | 8.12 | 12.33 | 16.30 |
| No. Obs. | 228,198 | 228,198 | 228,198 | 228,198 | 227,230 | 214,463 | 204,966 | 204,805 |

Electronic copy available at: https://ssrn.com/abstract=3747263

**TABLE A.6**

**Extensive Margin: CEO's Personal Investment and the Decision to Enter an Oil and Gas Region (i.e., State)**

This table studies the decision of firms to enter a region/state depending on having the CEO owning plots of land located on oil and gas formations using a Cox hazard model. The coefficients reported in the table correspond to the hazard impact percentage (HI), which is the percentage change in the hazard rate per unit change of the covariate. The dependent variable, $Enter_{i,r,t}$, is a dummy variable equal to 1 if firm "$i$" decides to enter an oil and gas producing state "$r$" during year "$t$" to start developing resources, and 0 otherwise. The variable of interest $\text{CEO's Land}_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on an oil and gas formation in region/state "$r$" during year "$t$", and 0 otherwise. The sample period is from 2000 to 2020. For each firm, we define the opportunity set of available states as all the states that have active oil and gas exploration and production. For example, if drilling activity in state **A** starts in 2007, then we construct the panel data such that state **A** becomes an investment opportunity available to firms starting in 2007, and the state is not included in the sample during prior years. Once a firm enters a state, we drop that state from the sample for that specific firm. Variable definitions and sample selection criteria appear in Appendixes A1 and A2, respectively. The z-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

| | $\text{Enter}_{i,r,t} = 1$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ($\beta_1$) $\text{CEO's Personal Investment}_{i,r,t}$ | 1.16** | 1.23** | 1.10** | 1.49** | 1.64*** | 1.15** | 1.44** | 1.68*** |
| | (2.32) | (2.46) | (2.38) | (2.56) | (3.15) | (2.49) | (2.38) | (3.04) |
| ($\beta_2$) $\text{State's Oil-to-Gas Ratio}_{r,t}$ | -0.34* | 0.15 | -0.43 | -0.13 | -0.13 | -0.28 | 0.09 | 0.08 |
| | (-1.78) | (0.62) | (-1.60) | (-0.62) | (-0.57) | (-0.74) | (0.36) | (0.32) |
| ($\beta_3$) $\text{Investment}_{i,t}$ | 0.00*** | 0.00*** | 0.00*** | 0.00*** | 0.00*** | 0.00*** | 0.00*** | 0.00*** |
| | (6.95) | (5.84) | (6.47) | (4.16) | (4.11) | (5.57) | (3.77) | (3.11) |
| ($\beta_4$) $\text{State's Drilling Activity}_{r,t}$ | 0.00*** | 0.00*** | 0.00*** | 0.00*** | 0.00*** | 0.00 | 0.00*** | 0.00*** |
| | (7.22) | (4.54) | (3.70) | (5.40) | (5.76) | (0.91) | (4.29) | (4.33) |
| ($\beta_5$) $\text{Firm's Size}_{i,t}$ | -0.00** | -0.00 | -0.00 | -0.00*** | -0.00*** | -0.00 | -0.00** | -0.00*** |
| | (-2.02) | (-1.21) | (-0.64) | (-2.95) | (-3.35) | (-0.41) | (-2.01) | (-2.68) |
| ($\beta_6$) $\text{State's Size}_{r,t}$ | -0.00*** | -0.00 | -0.00*** | -0.00 | -0.00* | -0.00 | -0.00 | -0.00 |
| | (-3.71) | (-1.45) | (-3.36) | (-1.44) | (-1.93) | (-0.98) | (-0.88) | (-1.01) |
| ($\beta_7$) $\text{Close to HQ}_{i,r,t}$ | 0.96*** | 0.99*** | 0.95*** | 0.93*** | 0.96*** | 0.95*** | 0.99*** | 0.99*** |
| | (7.13) | (7.05) | (5.16) | (6.37) | (6.45) | (5.13) | (6.57) | (6.53) |
| Firm FE | No | No | No | Yes | No | No | Yes | No |
| Year FE | No | Yes | No | No | No | Yes | Yes | Yes |
| CEO FE | No | No | No | No | Yes | No | No | Yes |
| State FE | No | No | Yes | No | No | Yes | No | No |
| N | 37,548 | 37,548 | 37,548 | 37,548 | 37,548 | 37,548 | 37,548 | 37,548 |

Electronic copy available at: https://ssrn.com/abstract=3747263

## TABLE A.7

### Extensive Margin: CEO's Personal Investment and the Decision to Enter an Oil and Gas Region (i.e., State)

This table studies the decision of firms to enter a region/state depending on having the CEO owning plots of land located on oil and gas formations using a OLS regression. For a property to be include in the sample, it must have been bought before oil and gas formations were discovered in the state. The dependent variable, $Enter_{i,r,t}$, is a dummy variable equal to 1 if firm "$i$" decides to enter an oil and gas producing state "$r$" during year "$t$" to start developing resources, and 0 otherwise. The variable of interest $\text{CEO's Land}_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on an oil and gas formation in region/state "$r$" during year "$t$", and 0 otherwise. The sample period is from 2000 to 2020. For each firm, we define the opportunity set of available states as all the states that have active oil and gas exploration and production. For example, if drilling activity in state **A** starts in 2007, then we construct the panel data such that state **A** becomes an investment opportunity available to firms starting in 2007, and the state is not included in the sample during prior years. Once a firm enters a state, we drop that state from the sample for that specific firm. Finally, the variable $\text{Close to HQ}_{z,i,r,t}$ is a dummy variable equal to 1 if the state distance from the firm's HQ is below the firm-year median, and 0 otherwise. Variable definitions and sample selection criteria appear in Appendixes A1 and A2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

| | $\text{Enter}_{i,r,t} = 1$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ($\beta_1$) $\text{CEO's Personal Investment}_{i,r,t}$ | 0.35*** | 0.35*** | 0.35*** | 0.31*** | 0.19* | 0.18* | 0.19* | 0.18** |
| | (3.02) | (3.01) | (3.01) | (2.94) | (1.89) | (1.89) | (1.83) | (2.07) |
| ($\beta_2$) $\text{State's Oil-to-Gas Ratio}_{r,t}$ | -0.01*** | -0.00 | -0.00 | 0.00 | -0.01*** | -0.01*** | -0.01*** | 0.00 |
| | (-3.16) | (-0.51) | (-0.51) | (0.84) | (-2.64) | (-4.05) | (-3.95) | |
| ($\beta_3$) $\text{Investment}_{i,t}$ | 1.45*** | 0.21 | 0.21 | 1.21*** | 1.36*** | 0.50** | | |
| | (6.82) | (1.05) | (1.05) | (5.88) | (6.38) | (1.99) | | |
| ($\beta_4$) $\text{State's Drilling Activity}_{r,t}$ | 0.22*** | 0.22*** | 0.22*** | 0.22*** | -0.05** | -0.03 | -0.04* | |
| | (9.57) | (9.56) | (9.56) | (9.36) | (-2.31) | (-1.49) | (-1.81) | |
| ($\beta_5$) $\text{Firm's Size}_{i,t}$ | -0.12*** | -0.25*** | -0.25*** | -0.07*** | -0.09*** | -0.21*** | | |
| | (-5.95) | (-7.21) | (-7.21) | (-4.05) | (-4.75) | (-4.16) | | |
| ($\beta_6$) $\text{State's Size}_{r,t}$ | -0.01*** | -0.01*** | -0.01*** | -0.01*** | -0.03*** | -0.03*** | -0.03*** | |
| | (-9.46) | (-9.10) | (-9.10) | (-8.56) | (-10.62) | (-9.28) | (-9.37) | |
| ($\beta_7$) $\text{Close to HQ}_{i,r,t}$ | 0.02*** | 0.02*** | 0.02*** | 0.02*** | 0.01*** | 0.01*** | 0.02*** | 0.01*** |
| | (11.77) | (11.55) | (11.55) | (11.90) | (4.97) | (5.49) | (6.46) | (6.09) |
| 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 |
| State FE | No | No | No | No | Yes | Yes | Yes | No |
| Firm∗Year FE | No | No | No | No | No | No | Yes | Yes |
| State∗Year FE | No | No | No | No | No | No | No | Yes |
| $R^2$ | 0.05 | 0.08 | 0.08 | 0.10 | 0.10 | 0.16 | 0.24 | 0.27 |
| F-Statistics | 41.66 | 48.69 | 48.69 | 35.51 | 34.18 | 23.21 | 32.53 | 20.59 |
| No. Obs. | 37,094 | 37,094 | 37,094 | 37,094 | 37,094 | 37,094 | 36,968 | 36,968 |

Electronic copy available at: https://ssrn.com/abstract=3747263