Do political risks harm development of oil fields?

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\section{A B S T R A C T}

We examine the impact of political risks and financial development on investments in the petroleum industry utilizing a unique dataset of investments in individual oil and gas fields around the world. We find that the expected time to investment is shorter in countries that are politically stable, have solid property rights protection and more developed financial systems. Political risks have the strongest impact on multinational companies, whereas financial development matters only for domestic national oil companies. At the company level we find that expected time to investment is shorter for companies with higher valuation and lower debt. Moreover, companies are more likely to invest in countries where they invested recently and less likely to invest in countries where their competitors invested recently.

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\section{1. Introduction}

Understanding how companies make investment decisions and which factors influence these decisions is extremely important. Since investments are a necessary precursor of economic growth, this knowledge is important for various economic agents, including policy makers, and has potential to benefit the whole society. We investigate how investments in petroleum extraction are influenced by political risk and financial development in the countries in which oil and gas fields are located.

There are several reasons why the petroleum industry in particular is conducive to studying the impact of political risks on investments. First, crude oil and gas have been our primary energy sources for the better part of the last 60 years. The close link between politics and crude oil and gas suggests that political factors may be particularly important in oil and gas investment decisions.

The second reason is that the sensitivity to political risks depends on capital intensity (Bohn and Deacon, 2000). The petroleum industry is a typical example of a capital intensive industry, and it is therefore particularly suitable for studying this question.

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The process of oil and gas extraction involves three separate but closely interrelated activities: exploration, development, and extraction. In most cases, development requires a large investment, which makes this decision particularly interesting to investigate. We therefore examine how the decision to develop is influenced by political stability and property rights protection.

Moreover, since investment decisions play such a major role for oil companies and since they are made repetitively, these companies are very likely to put a lot of time and resources into investment decisions. This is confirmed by Horst et al. (2017) who find that advanced methods for evaluating investments, such as real options, are most frequently used by decision makers in the energy sector.

Last, it is useful, in analyzing investment decisions, if decision problems are similar, recorded, and available to the researcher. This is not the case for most companies. A typical company faces investment decisions of various types. Moreover, there is usually no available recorded history of individual decisions. Most of the literature therefore study investments as reported in accounting statements, which is necessarily aggregated (usually over a year-long period) and is not particularly suitable for studying investment timing. On the contrary, the petroleum industry is a very convenient exception. We use unique a dataset which enables us to study development decisions for individual oil fields.

Petroleum exploration and field development have been the subjects of economic research for decades. Researchers have investigated the influence of oil prices and oil price volatility (Berntsen et al., 2018; Favero et al., 1994; Hurn and Wright, 1994; Kellogg, 2014; Mohn and Osmundsen, 2008), geological variables (Osmundsen et al., 2010), strategic interaction (Levitt, 2016; Lin, 2009; 2013), as well as environmental protection (Lewis, 2015).

These studies are all based on datasets from one particular country. However, in order to investigate the impact of political risks and financial development, a multi-country dataset is needed. There is a long history of research on how polity and political factors affect wealth and investments, but very few researchers conduct cross-country analyzes based on micro-level data.

We find that expected time to investment of petroleum companies is shorter for politically less risky and financially more developed countries. The conclusion that investments respond to such risks is in accordance with (Cooray et al., 2017), who find that benefits from trade openness are more pronounced in less risky countries.

Moreover, there are significant differences across company types. Political risks most strongly impact major multinational companies, whereas financial development matters only for domestic national oil companies. We further find that expected time to investment is shorter for companies with higher relative valuation (Tobin's Q) and lower indebtedness. Moreover, companies are more likely to invest in countries where they have previously invested, yet are less likely to invest in countries where their competitors have invested. Our data set on oil and gas assets is unique and has not been subject to any similar kind of analysis prior to this study.

To our knowledge, there have been no studies analyzing the impact of financial development on petroleum investments, and there are only two studies based on detailed micro-level data investigating the impact of political stability and property rights protection on oil and gas investments. Bohn and Deacon (2000) investigate the forestry and petroleum industries, and find that property rights significantly impact the extraction of these natural resources. Cust and Harding (2017) estimate the effect of institutional quality on the location of oil and gas exploration. They use data on the location of exploration wells and national borders and find that exploration and production companies drill on the side of a national border with better institutional quality. They also investigate the variation of this relationship across company types and find that the impact of institutional quality on investments is stronger for multinational oil companies than for national oil companies and smaller specialized exploration and production companies.

Our research question is most closely related to Cust and Harding (2017). However, there are many differences between our studies. First, they use different dataset than we do. Second, Cust and Harding (2017) study investment location, whereas we study investment timing utilizing duration analysis. Third, Cust and Harding (2017) utilize only time-invariant measures of institutional quality, whereas our analysis is based on institutional quality varying over time. Fourth, we also investigate the role of financial development.

Lastly, the studies by Bohn and Deacon (2000) and Cust and Harding (2017) are based on observed outcomes, i.e. observations where the whole process of investment was completed. Unlike these studies, we focus particularly on the second part of the investment process, i.e. the decision to develop the field following the discovery of oil. Since petroleum exploration is very costly, it is likely that companies already consider political risks in this early stage. It is therefore a priori not obvious whether political risks also play an important role in the decision to develop a field once the oil was found. Interestingly, our results regarding political risks are in line with Cust and Harding (2017)’s results.

The remainder of this paper is organized as follows. Section 2 describes the data, Section 3 outlines the methodology, Section 4 presents our results and discusses the findings, and Section 5 concludes.

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2 Duration analysis has previously been applied across scientific fields and in the analysis of investment behavior. With regard to research on the oil and gas industries, hazard rate models have been used to study petroleum refineries (Dunne and Mu, 2010) and the development of oil and gas fields (Favero et al., 1994; Hurn and Wright, 1994).
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