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# Investing, Producing and Paying Taxes Under Weak Property Rights: Evidence from Oil and Gas

Oil majors often choose to operate in countries with weak property rights. This may appear surprising, since the lack of constraints on governments may create incentives to renege on initial promises with firms and renegotiate tax payments once investments have occurred and, in the worst case, expropriate the firm. In theory, backloading investments, production and tax payments may be used to create self-enforcing agreements which do not depend on legal enforcement. Using a new dataset covering the universe of oil majors' assets that started production between 1974 and 1999, we indeed show in an [ongoing project](#) (Paltseva, Toews, and Troya-Martinez, 2022) that investments, production and tax payments are delayed by two years in countries with weak institutions relative to countries with strong institutions. Extending the dataset back to 1960 and exploiting the transition to a new world oil order where expropriation became easier, allows us to interpret our estimates as causal. In particular, prior to the transition expropriations were not feasible, due to the omnipresent and credible military threat imposed by the oil majors' countries of origin. As the new order sat in, a new equilibrium emerged, in which expropriations became a feasible option. This transition incited an increase in expropriations and forced firms to adjust to the new reality by backloading contracts.

## The Hold-up Problem

In December of 2006, when the oil price was climbing towards new heights, [the Guardian reported](#) that the Russian government was about to successfully force Shell into transferring their controlling stake in a huge liquified gas project back into the hands of the government. While officially this was motivated by environmental concerns surrounding the Sakhalin-II project, most observers agreed that this might be considered a textbook example of the hold-up problem faced by oil firms when investing in countries with limited constraints on the executive. At its core, the hold-up problem refers to the idea that the government may renege on the initial promise and appropriate a bigger share of the pie once investments have been made. Obviously, this is not an oil-specific issue and concerns any type of investment in countries with weak property rights. Academics, who worked on resolving these issues, suggest the use of self-enforcing agreements (Thomas and Worrall, 1994). These agreements use future gains from trade (as opposed to third-party enforcement) to incentivize the governments not to expropriate. And while the theoretical literature has prolifically developed over the last 30 years (Ray, 2002), to the best of our knowledge no empirical evidence has been provided on the use and dynamic patterns of self-enforcing backloaded contracts.

## Data and Sample

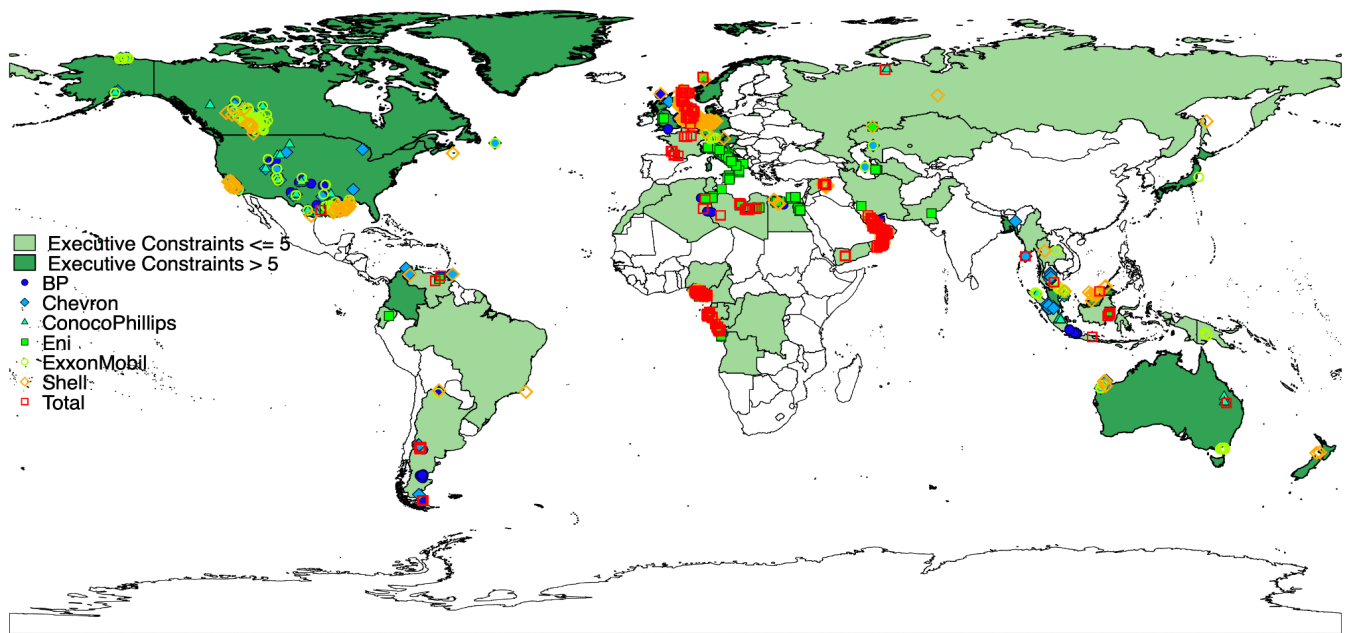
In Paltseva, Toews and Troya-Martinez (2022), we rely on micro-level data on oil and gas projects provided by [Rystad Energy](#), an energy

consultancy based in Norway. Its database contains current and historical data on physical, geological and financial features for the universe of oil and gas assets. We focus on the assets owned by the oil majors (*BP, Chevron, ConocoPhillips, Eni, ExxonMobile, Shell, and Total*) using all assets that started production between 1960 and 1999, leaving us with a total of 3494 assets. An asset represents a production site with at least one well, operated by at least one firm, and with the initial property right being owned by at least one country. Being able to conduct the analysis on the asset level is particularly valuable since it allows us to control for a large number of confounding factors and rule out several alternative explanations of our main finding.

Moreover, there are three advantages of focusing our analysis on the oil and gas sector in general and the oil majors in particular. First, the sunk investments in the development of oil and gas wells are enormous, making the hold-up problem in the oil sector particularly severe. Second, oil majors have been around for many years since all of them were created before WWII. This provides us with a sufficiently long horizon to capture backloading over time. Third, the majors are simultaneously investing in many countries which provides us the necessary cross-sectional variation in institutional quality. To differentiate between countries with weak and strong institutions, we use a specific dimension from the [Polity IV](#) dataset measuring the constraints on the executive. The location of all the assets disaggregated by firm as well as a binary distinction in a country's institutional quality is shown in Figure 1.



**Figure 1. Spatial distribution of assets and institutional quality**



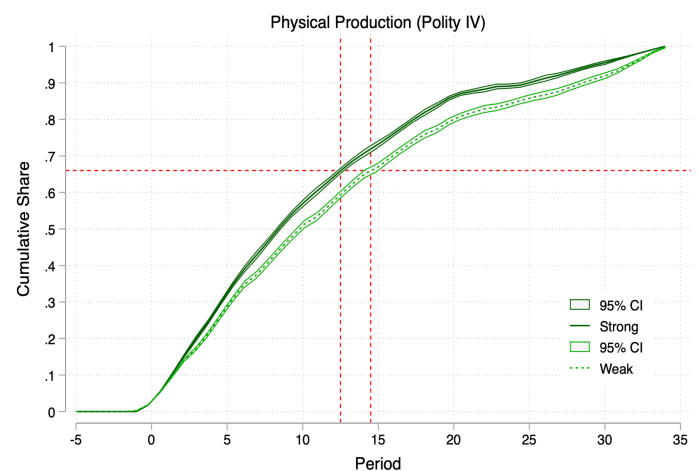
Note: Location and ownership of assets are provided by Rystad Energy. The executive constraint indicator is taken from Polity IV and we use the median from the period 1950 to 1975 to define whether the country is considered to have strong or weak institutions. The cut-off of 5 implies that roughly 1/3 of the countries are defined as having strong institutions and roughly 50% of all the assets which started operation between 1950 and 2000 are located in countries with weak institutions.

## A Stylized Fact

For the empirical analysis, our variables of interest are investment, production and tax payments normalized by the respective asset-specific cumulative sum over a period of 35 years. The resulting cumulative shares are depicted in Figure 2. We focus on physical production which, in addition to being considered the most reliable measure of an asset's activity, does not require discounting. Real values of investment and tax payment depict a very similar picture. Most importantly, the dashed lines illustrate that 2/3 of cumulative production shares are reached approximately two years earlier in countries with strong institutions, in comparison to countries with weak institutions. The average asset size does not differ significantly between these groups. Such delays are costly for countries with weak institutions. Our back-of-the-envelope calculation suggests that the average country loses around 120 million US\$ per year due to the delayed

production and the respective tax payments. We confirm that the two-year delay cannot be explained by geographical, geological or financial confounders such as the location of the well, fuel type or contract features.

**Figure 2. Years to reach 66% of cumulative flows in 35 years**



Note: We use the Epanechnikov kernel with an optimally chosen bandwidth to plot the cumulative production over the 35-year life span of the asset. We group countries into two



groups with weak and strong institutions according to Polity IV. This figure contains assets that started producing between 1975 and 1999.

## The Transition to a New World Order

To push towards a causal interpretation of the results, we exploit the global transition to a new world oil order. This change affected the probability of expropriations in countries with weak institutions while leaving countries with strong institutions unaffected. In particular, the post-WWII weakening of the OECD members as political and military actors provides a natural experiment of global proportions. Expropriations are first viewed as impossible due to the military threat of British, French and US armies, and then become possible due to a global movement aiming at returning sovereignty over natural resources to the resource-rich economies. In the words of Daniel Yergin (1993): “The postwar petroleum order in the Middle East had been developed and sustained under American-British ascendancy. By the latter half of the 1960s, the power of both nations was in political recession, and that meant the political basis for the petroleum order was also weakening. [...] For some in the developing world [...] the lessons of Vietnam were [...] that the dangers and costs of challenging the United States were less than they had been in the past, certainly nowhere near as high as they had been for Mossadegh, [the Iranian politician challenging UK and US before the coup d’état in 1953], while the gains could be considerable.” Consequently, the number of expropriations has grown substantially since 1968, marking the transition to a new world order (Figure 3). However, Kobrin (1980) finds that even during the peak of expropriations in 1960-1976, only less than 5 % of all foreign-owned firms in the developing countries were expropriated. We suggest that this is, at least partly, thanks to the use of backloaded self-enforcing contracts.

**Figure 3.** *Transition to a new world order*



Note: Data on firm expropriations across all industries from Kobrin (1984).

Indeed, focusing on the years around the transition to the new world oil order, we show that there have not been any differences in investment, production or tax payments dynamics between countries with weak and strong institutions in the early years of the 1960s. But investment, production and the payments of taxes started experiencing significant delays after 1968 in the countries with weak institutions, using countries with strong institutions as a control. Intuitively, the omnipresence of a credible military threat in response to an expropriation served as an effective substitute for strong local formal institutions and eliminated the need for contracts to be self-enforced and backloaded in countries with weak institutions. Once this threat disappeared, contracts had to be self-enforcing and investment, production and tax payments had to be backloaded to decrease the risk of being expropriated by the governments of resource-rich economies. Theoretically, these initial differences in contract backloading between countries with strong and weak institutions should disappear in the long run, because the future gains from trade need to materialize eventually. We confirm empirically that this point is reached on average 20 years after firms start a contractual relationship with a country.



## Conclusion

We provide evidence that oil firms seem to backload contracts in countries with weak institutions. We show that such backloading appears in the data during the transition to a new world order since 1968, when firms were in need of a new mechanism to deal with weak property rights and the risk of expropriations. We estimate the cost of such delays to be around 120 US\$ per country and year. While this cost is high, it is important to emphasize that in the absence of such backloading, forward-looking CEOs of oil majors would often choose not to invest in the first place, since they would anticipate the severe commitment problems (Cust and Harding, 2020). Thus, as a second-best, the cost of the backloading may be marginal compared to the value added from trade when oil majors are willing to invest in countries with weak institutions and questionable property rights.

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