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Do giant oilfield discoveries fuel internal armed conflicts?☆

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ABSTRACT

We use new data to examine the effects of giant oilfield discoveries around the world since 1946. On average, these discoveries increase per capita oil production and oil exports by up to 50%. But these giant oilfield discoveries also have a dark side: they increase the incidence of internal armed conflict by about 5–8 percentage points. This increased incidence of conflict due to giant oilfield discoveries is especially high for countries that had already experienced armed conflicts or coups in the decade prior to discovery.

1. Introduction

Do natural resource windfalls, such as those arising from the discovery of giant oilfields, increase the risk of internal armed conflict? Anecdotal evidence from Nigeria, Angola, and Iraq leads us to suspect that they may, and recent research (Acemoglu et al., 2010; Besley and Persson, 2009, 2011; Dal Bó and Dal Bó, 2011) even sheds light on the mechanisms that underlie some of these conflicts over resources. But as Norway, Canada, and Brazil show, not all oil rich countries experience conflict. Careful surveys of the literature on conflicts and natural resources (e.g. Blattman and Miguel, 2010; Ross, 2004, 2006) show how difficult it has been to estimate the causal effect of oil on armed conflict in all but a handful of countries.[1] The goal of this paper is to examine whether giant oilfield discoveries really do fuel internal armed conflicts around the world, and if so — in which settings.

We begin with a simple model, following Besley and Persson (2009), which guides our empirical analysis. In this model, giant oilfield discoveries increase oil revenues, generating windfall income for the incumbent. When the incumbent cannot credibly commit to share this windfall, the opposition may mobilize to challenge him, and this may lead to an internal armed conflict. Such conflicts over resources are especially likely in countries where political violence tends to translate into political and economic gains.

To investigate this model's predictions, we ideally require exogenous variation in resource windfalls. Finding such variation in multiple countries is challenging, since cross-country (or cross-conflict) comparisons may be contaminated by omitted variables bias. Using panel data to absorb country fixed effects is not straightforward either, because the quantity of natural resources extracted is a choice and oil prices may be affected by violent conflict. To overcome this difficulty, we focus on the discovery of giant oilfields, each of which contained ultimate recoverable reserves (URR) of 500 million barrels (bbl) equivalent or more before extraction began (data on these giant oilfields are reported in Horn, 2004).[2] Of the 910 giant oilfields that were known as of 2003,

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[1] Studies of the causal effect of natural resources on conflict tend to focus on specific countries. For example, Angrist and Kugler (2008) and Dube and Vargas (2013) study the effect of resource windfalls on conflict in Colombia, and Bellows and Miguel (2009) study this effect in Sierra Leone. Also closely related is contemporaneous work by Cotet and Tsui (2013) on oil and conflict, which we discuss below.

[2] Unless otherwise specified, we use "oil" as a shorthand that also includes condensate and natural gas. To determine whether an oilfield has estimated ultimate recoverable reserves of 500 million bbl of oil equivalent or more, the estimated reserves of oil and condensate are summed up. These are then added to the amount of natural gas, which is converted to oil at a ratio of 6000 cu ft/bbl (Horn, 2004). Note that ultimate recoverable reserves include the amount already extracted and the amount that has not yet been extracted.

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we focus on the 782 giants that were discovered since 1946 in 65 different countries.

We show evidence that in a panel of countries, controlling for country and year fixed effects, the timing of giant oilfield discoveries is plausibly exogenous, at least in the short-medium run. To see why, consider how important giant oilfields are as a global source of hydrocarbons. Horn (2007) concludes that giant oilfields account for over 40% of the world's URR of oil and gas. Discoveries of these giant fields are therefore economically important events, which are rare in all but a handful of countries: in less than 5% of the country–year observations in our global dataset was one or more giant oilfield discovered. It is true that countries can influence the prospecting efforts within their territory, and thus affect the discovery rate. But prospecting for oil is highly uncertain, and the odds of finding a giant oilfield are usually low, so countries have little control over the timing of such finds. Below we discuss a wide range of empirical tests, which support our interpretation that of the events that follow giant oilfield discoveries as causal. But before we further discuss our causal interpretation of the findings, we first describe them.

We find using a panel of 193 countries from 1946 to 2008 that on average oil production increases by about 35–50 percentage points within 4–10 years of a giant discovery.[3] Giant oilfield discoveries similarly increase oil exports by about 20–50% within 6–10 years.

Having found evidence suggesting a large impact of giant oilfield discoveries on oil output, we next examine their impact on conflict. We find that on average giant oilfield discoveries increase the incidence of internal armed conflicts (measured as a year with 25 or more conflict casualties) by about 5–8 percentage points within 4–8 years of discovery, compared to a baseline probability of about 10 percentage points.

We also find that the discovery of giant oilfields is especially likely to fuel internal conflicts in countries with recent histories of political violence. For example, giant oilfield discoveries increase the incidence of internal armed conflict by about 11–18 percentage points (compared to a baseline probability of about 37–39%) when a country experienced at least one such conflict in the decade prior to discovery. Giant oilfield discoveries similarly increase the odds of internal armed conflict by 11–14 percentage points (compared to a baseline probability of about 19–20%) in countries that experienced at least one coup in the decade prior to discovery. In contrast, in countries that experienced no internal conflicts or coups in the decade before a discovery, there is no significant effect of giant oilfield discoveries on the incidence of internal armed conflicts.

Turning to the effect of giant oilfield discoveries on economic outcomes, we find suggestive evidence that per capita GDP and government spending may have increased by about 4–6% within the decade following a giant discovery. But unlike our results on conflict, these estimates are not robust to the different specifications that we consider. Moreover, we find no evidence that giant oilfield discoveries significantly affect private consumption or spending.

To support our interpretation that the findings described above are the causal consequences of giant oilfield discoveries, we report results from a number of robustness checks. First, we address the concern that giant oilfield discoveries may have resulted from economic or political changes that preceded them. Reassuringly, we find no evidence of significant economic or political changes in the five years leading up to giant oilfield discoveries. We also test whether giant oilfield discoveries follow lulls in previous conflicts, and find no evidence to support this hypothesis. Second, we tackle the concern that giant oilfield discoveries are serially correlated over time, because some oilfields are close together, so one finding one may lead to another. While it is true that giant oilfield discoveries in a country's recent past increase the odds that it finds a giant oilfield in a given year, controlling for these past discoveries does not change our estimates by much. Our results are also robust to excluding country–year observations within a decade or less of previous giant discoveries. Observations with giant oilfield discoveries account for only about 1% of the remaining sample, making them especially difficult to anticipate. Third, we address concerns that economic or political conditions shortly before discovery may affect our estimates, by showing that our results are robust to controlling for (instrumented) lagged dependent variables, lagged institutional quality (polity 2), and lagged aggregate private investment. Fourth, we tackle the concern that observations with oil discoveries are different from others in ways that we cannot measure and control for directly. To do so, we use the Oil and Gas Journal Data Book (2008) to restrict our sample to observations where at least one oil discovery – not necessarily of a giant oilfield – was made. Regressions using this sample compare the effect of giant oilfield discoveries to the effect of smaller oilfield discoveries. Remarkably, even in this restricted sample we find that our results hold.

Our finding that giant oilfield discoveries fuel internal conflicts in countries prone to violence has policy implications. Those who strive to reduce armed conflict should be concerned about oil rents that incumbents obtain in conflict-prone areas, especially if those rents encourage challenges to the incumbents' power. And firms that prospect for oil in conflict-prone areas and those who regulate them ought to be concerned about negative externalities for many locals, who have little to gain from giant oilfield discoveries but may suffer from conflicts over the oil.

The remainder of the paper is organized as follows. Section 2 discusses the related literature, Section 3 presents a model of conflict over oil revenues, Section 4 discusses the data, Section 5 presents our results, and Section 6 concludes.

2. Related literature

Concerns that some natural resources – including oil – may fuel internal armed conflicts arise from observing at oil-rich countries, such as Angola, Colombia, Iraq, Sudan, and Indonesia. A number of influential papers including Collier and Hoeffler (1998, 2004) and Reno (1999) have investigated the relationship between natural resources and conflict, sparking considerable interest among social scientists and policy makers. Surveys of the developing literature on this topic, including Ross (2004, 2006), Humphreys (2005), and Blattman and Miguel (2010), conclude that there is evidence linking oil to some instances of internal armed conflict. At the same time, not all oil-rich countries experience internal armed conflict, so conflicts over resources are clearly not inevitable.[4]

Theoretical studies of the links between natural resource rents and conflict have focused on the possibility that these conflicts are the result of competition over resources. Summarizing this literature, Blattman and Miguel (2010) point out that models of armed conflict typically consider the cases where property rights are not well-protected, contracts are imperfectly enforced, and rulers are not always replaced by fair elections. Recent contributions to the literature on conflicts over resources include Garfinkel and Skaperdas (2007), Dal Bó and Dal Bó (2011), Besley and Persson (2009, 2011), Caselli and Cunningham (2009), Acemoglu et al. (2010), Miguel and Satyanath (2011), Harari and La Ferrara (2013), and Caselli et al. (2013). Recent evidence on the effect of U.S. food aid on civil conflict (Nunn and Qian, 2014) is also highly relevant.

But despite all this research on the relation between natural resources and armed conflict, establishing the causal effect of resource windfalls on conflict around the world has been difficult. Some of the best-identified studies examine causality using regional variation

[3] We use all the countries in the world, even those that do not discover giant oilfields. This allows us to control for countries where non-giant discoveries are made (as discussed below), and for variation in countries that do not discover oil, and which may affect the estimated year effects in the panel regressions.

[4] For example, Michaels (2011) and Caselli and Michaels (2013) find no evidence of armed conflict in the U.S. South and in Brazil.