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 percent. 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.

Keywords: Natural Resources, Resource Curse, Petroleum, Armed Conflict, Civil War

JEL Classification: Q34, Q33, O13

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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 lead us to suspect that they may, and recent research (Dal Bó and Dal Bó 2011, Besley and Persson 2009, 2011, and Acemoglu et al. 2010) 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. Ross 2004, 2006 and Blattman and Miguel 2010) show how difficult it has been to estimate the causal effect of oil on armed conflict in all but a handful of countries.[2] 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).[3] Of

[2] 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.

[3] 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 6,000 cu ft/bbl (Horn 2004). Note that ultimate recoverable reserves include the amount already extracted and the amount that has not yet been extracted.

the 910 giant oilfields that were known as of 2003, 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 percent 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 percent 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 1946-2008 that on average oil production increases by about 35-50 percentage points within 4-10 years of a giant discovery.[4] Giant oilfield discoveries similarly increase oil exports by about 20-50 percent 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 percent) 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 percent) in countries that experienced at least one coup in the decade prior to discovery. In contrast, in countries that experienced no internal conflicts or

[4] 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.

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 percent 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 percent 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.[5]

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.

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

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 within countries. For example, Bellows and Miguel (2009) find that chiefdoms with more diamond wealth in Sierra Leone experienced more armed clashes, and studies of Colombia find that high coca prices increase conflict in coca producing regions (Angrist and Kugler 2008) and high oil prices increase conflict in areas where oil is extracted from or shipped through in pipelines (Dube and Vargas 2013).

Taken together, the evidence from within-country studies suggests that natural resource windfalls can fuel armed conflicts, at least in some countries and settings. But in order to generalize these findings to the rest of the world and to better understand in what settings natural resource windfalls are more likely to cause armed conflict, it seems useful to look beyond the boundaries of specific nations. It turns out, however, that using variation from multiple countries to identify the effect of natural resource on conflict is not straightforward.

To see why this is a challenge, consider first comparisons of resource rich countries with resource scarce ones, or of conflicts that take place in resource rich and resource scarce parts of the world. The main concern about this approach is that resource-rich areas might differ from others in ways that are difficult to measure and control for. For example, the Middle East is rich in oil but it also differed from other parts of the world in important ways before oil was discovered. These differences, which are notoriously hard to quantify, along with oil abundance, may have caused subsequent conflicts, and telling apart the causes is difficult.

To overcome the problem of fixed differences between countries, we could consider a second approach, which interacts country-specific measures of oil abundance with variation over time in oil prices. But this approach suffers from concerns about reverse causality, since conflicts may raise oil prices, as they probably did during the Arab-Israeli War in 1973, the Iranian Revolution in 1979, the Kuwait War in 1990, and the Libyan Civil War in 2011, making the direction of causality between conflict and resource revenues difficult to ascertain.[6]

A third approach we could have pursued uses time-varying measures of oil production or exports in each country. But this approach also has problems in shedding light on causality,

[6] The possibility that internal conflict in Libya increased oil prices was discussed by the media. See for example: http://www.bbc.co.uk/news/business-12522291. When we regress an indicator for internal conflict on an interaction of an indicator for countries with at least one giant oilfield and the log of inflation-adjusted oil price, controlling for country and year fixed effects, we get a coefficient of 0.044 (s.e. 0.024), suggesting a positive and marginally significant relation between the two.

since countries choose the amount of oil they extract, and potential buyers may also choose how much to buy from whom. These choices may respond, directly or indirectly, to armed conflicts or their underlying causes.[7]

Since identifying the causal effect of natural resources on conflict using the approaches described above is difficult, our paper focuses on the discovery of giant oilfields as a more plausibly exogenous source of variation. A closely related study in this respect is contemporaneous work by Cotet and Tsui (2013), which concludes that while the defense burden increases following oil discoveries, conflict does not increase significantly. There are several differences in the implementation of their paper and ours. First, our data, unlike theirs, cover the entire world, focus only on giant oilfield discoveries, and measure not only oil deposits, but also gas and condensate. Second, we report large and significant effects of giant discoveries on oil output and oil exports (both measured per capita), while they do not. The giant discoveries which we study, most likely reflect larger prizes over which rivals may fight. Third, while Cotet and Tsui (2013) choose to emphasize instrumental variables estimates where the relationship between oil discoveries and conflict is positive but imprecisely estimated, some of the other estimates that they report (e.g. in Table 10) actually are positive and significant. Finally, we have incorporated data used by Cotet and Tsui (2013) into our robustness checks. We show that applying our methodology to their data yields estimates that are quite similar to ours. In other words, even using their data, major oil discoveries are followed by increases in internal armed conflict.

3. A Model of Conflict for Resources

To guide our empirical analysis, we begin with a simple model of conflict over resources, following Besley and Persson (2009).[8] The model focuses on two potentially conflicting groups denoted by J: an incumbent I and an opposition O. Each group makes up half of the population and can mobilize a fraction A^J of its citizens to serve in its army. The decision of each group whether or not to mobilize an army is discrete, and is denoted by $\delta^J \in \{0, A^J\}$. The probability that power transitions from the incumbent to the opposition is determined by a conflict function: Prob(change of power)= $\frac{1}{2} + (1/\mu)[\delta^O - \delta^I]$. The parameter μ captures the degree to which the country can resist political violence, and low values of μ mean that i

[7] For example, the recent internal armed conflict in Syria appears to have reduced its oil production: http://www.ft.com/cms/s/0/c9d67952-e823-11e0-9fc7-00144feab49a.html#axzz1aOqrle6u

[8] As we explain below, we depart from their model only in relatively minor details.

political violence is a more practical means of transferring power. We assume that $A^I/\mu \leq ½ \leq 1 - A^O/\mu$, which holds as long as μ is sufficiently large.

The winning group has access to government revenue denoted by R, which comes from natural resources. These resources must be shared according to an institutional rule, which stipulates that the incumbent gets $(1-\theta)2R$ and the opposition gets $2\theta R$, where $\theta \in [0, ½]$. In other words, we consider sharing rules that range from institutions that lead to complete equality ($\theta = ½$) to institutions where the winner takes all ($\theta = 0$).

In addition to any revenues they may receive from the government, each citizen supplies one unit of labor to the market, earning a real wage w. A group that wants to finance its army does so by taxing its population. Since we are interested primarily in bilateral internal conflicts (as opposed to one-sided conflicts), we depart from Besley and Persson (2009) by assuming that the opportunity cost of fighting is equal for the opposition and the incumbent.[9]

The timing of events within each period is as follows. First the amount of resources at the government's disposal, R, is determined randomly. We assume that if a giant oilfield is discovered then $R = R^H$, and otherwise $R = 0$.[10] Second, the opposition decides whether to mobilize its army to fight the incumbent. Third, the government decides whether to mobilize its own army to fight the opposition. We assume that both the opposition and the incumbent only mobilize if the net expected returns to mobilization are strictly positive, and an internal conflict takes place if at least one party mobilizes an army. Fourth, these choices and the probabilistic conflict technology then determine who wins power. Finally, the winner allocates the resources R.

Given our assumptions, the expected per capita payoff to incumbent members is: $w(1- \delta^I)+[½ - (1/\mu)(\delta^O- \delta^I)(1-2\theta)]2R$, where the first term wages net of taxes, and the second is the expected size of the transfer. Similarly, the expected payoff to opposition members is: $w(1- \delta^O)+[½ + (1/\mu)(\delta^O- \delta^I)(1-2\theta)]2R$.

To solve for the equilibrium we identify the sub-game perfect Nash equilibrium in the sequential game where the opposition moves first. It turns out that this game has two equilibria:

Peace (when neither side mobilizes): $\delta^O = \delta^I = 0$, which occurs when $2R(1-2\theta)/w \leq \mu$.

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[9] Besley and Persson (2009) study repression as one-sided violence by an incumbent, which has lower opportunity cost of fighting than the opposition since he can finance part of his army by taxing that opposition. In our empirical analysis (Subsection 5.3) we therefore examine the possibility of repression in the aftermath of giant oil discoveries.

[10] Besley and Persson (2009) do not focus on oil discoveries but on rents in general. Our assumption of two states of the world – with and without giant oil discoveries – makes the model more closely related to our empirical analysis.

Internal conflict (when both sides mobilize): $\delta^I = A^I$ and $\delta^O = A^O$, which occurs when $2R(1-2\theta)/w > \mu$.

This model guides our empirical analysis of the effect of giant oilfields in a number of ways. First, the model assumes that giant oilfield discoveries increase oil revenues. While this assumption seems very plausible, it may take time to start generating revenues from newly discovered oilfields, especially if it is difficult to extract the oil or if the discovering country lacks the appropriate technology, capital, or infrastructure. While we cannot measure oil revenues, we can measure oil production and oil exports, and our first empirical challenge is to determine whether they increase significantly within a few years of discovery, and if so – by how much.

Second, we investigate the effect of oil discovery on internal armed conflict. The model predicts that in countries where $2R^H(1-2\theta)/w > \mu$, the discovery of a giant oilfield ends peace and sets off an internal conflict. This can happen when the incumbent receives most of the oil, and cannot commit to sharing them with the opposition. If conditions are otherwise ripe for conflict, a giant oilfield discovery can fuel conflict over the oil.

Third, giant oilfield discoveries are likely to set off conflict only in countries where political violence is seen as effective, namely where μ is sufficiently low. Empirically, we identify countries with low μ as those with a history of internal conflicts or coups in the decade prior to the discovery of a giant oilfield. It is in those countries that we expect giant oilfield discoveries to trigger armed conflicts over the control of the oil. The model also allows for the possibility that giant oilfield discoveries fuel conflicts in countries with low wages (which imply a low opportunity cost of fighting), poor institutions that increase inequality (θ close to zero represents "winner takes all" societies, where it pays to fight for control), or ethnic fractionalization that creates conflicting groups to begin with. In practice, however, underlying characteristics such as income, institutions, and ethnic fractionalization may be interrelated with each other and with the degree to which political violence pays off (μ). In the empirical analysis below (Section 5) we focus on the interaction of giant oilfield discoveries with empirical measures of μ, but we also examine other possible interactions related to the model.

Finally, the discovery of a giant oilfield increases government revenues, R, and total per capita GDP, R + w. The increase of log per capita GDP in this model is $\partial \ln(R + w)/\partial \ln(R) = R/(R + w)$, or in other words the proportional increase in GDP as a result of an oilfield discovery is less than the proportional increase in oil revenues as a result of this discovery. Moreover, as we discussed, in some cases oil discoveries cause mobilization, and this may reduce civilian per capita GDP. Any additional factors which are not modeled, such as the cost of conflict or any distortionary effect of oil on the rest of the economy, may further reduce the net benefits of giant oilfield discovery. Given these caveats, Subsection 5.3 investigates the effect of giant oil discoveries on GDP and its components.

4. Data on Oil, Conflicts, and Economic Outcomes

To analyze the effects of giant oilfield discoveries we require panel data on the timing of these discoveries in addition to outcome measures and control variables. Since country definitions differ over time and usage, we use the country definitions from the Penn World Table, (Heston et al. 2009), a commonly used dataset, as the basis for our analysis.[11] The Penn World Table reports data on countries from 1950-2007, but we examine all the conflicts that took place after the end of the Second World War (see below), so some of the variables we match in from other sources span the years from 1946-2008, which is our period of analysis.

Data on oil discovery and production. Our main regressor of interest is an indicator for the discovery of (at least one) giant oil field in a given country in a given year. We use data from Horn (2003, 2004), which reports the date of discovery, the name of the discovering country, and a number of other variables, for 910 giant oilfields discovered both onshore and offshore from 1868-2003. This dataset builds on previous datasets (e.g. Halbouty et al. 1970), and attempts to include every giant oilfield discovered around the world. To qualify as a giant (and thus be included in the dataset), an oilfield must have contained ultimate recoverable reserves (URR) of at least 500 million barrels of oil equivalent (MMOBE). One limitation of these data is that the oilfields it describes differ considerably in the identity of those who estimated the URR and in the way the URR was estimated. Moreover, the estimated URR of various oilfields was gradually updated, depending on the estimators and their methods.[12] Since this process may induce measurement error issues across oilfields, we simply construct an indicator for whether a country is mentioned in the dataset as having discovered at least

[11] We add three Communist countries which existed until the early 1990s: the USSR (until 1991), Yugoslavia (until 1991), and Czechoslovakia (until 1992); the countries that emerged from these three are covered in our dataset from the year following the corresponding collapse. We also add North Korea, Myanmar, and Netherlands Antilles. Our results are robust to excluding these countries.

[12] For example, some oilfields' URR was updated from an earlier version of the dataset we use (compare Horn 2004 and Horn 2003).

one giant oilfield in each given year. This does not avoid all forms of measurement error, as some oilfields may have been incorrectly included in the dataset or excluded from it, but we consider this a reasonable compromise given the limitations of the data.[13]

Of the 910 giant oilfields covered in Horn (2004), 782 were discovered from 1946 onwards, and these discoveries took place in 65 different countries. The 461 country-year observations with giant discoveries account for less than 5 percent of all the observations in our data, and in all but a few countries giant oilfield discoveries are rare events (Table A1 lists the number of observations with discoveries in each discovering country). The rate of giant oilfield discoveries peaked during the 1960s and 1970s, and country-year pairs with discoveries were most common in Asia (41%), followed by Europe (18%), Africa (16%), North America (12%), South America (9%), and Oceania (4%).[14] Our dataset contains 285 country-year observations with giant onshore discoveries and 213 country-year observations with giant offshore discoveries. These figures include 37 country-year observations with both onshore and offshore giant discoveries. Table 1 reports summary statistics for our measure of giant oilfield discoveries and for other variables that we describe below.

We complement our data on giant oilfield discoveries with data on the timing of other oilfield discoveries from the Oil and Gas Journal Data Book (2008). This source reports more discoveries than our main dataset, since it is not limited to giant oilfield discoveries, but its main drawback is that the quantity of oil discovered is not reported for most oilfields. In addition, these data seem to focus on oil-producing fields, so they may exclude some gas fields.[15] But these data are still useful, since they allow us to restrict parts of our analysis to observations with oil discoveries, and compare the effect of giant oilfield discoveries to discoveries of smaller fields.

In our robustness checks we incorporate into our dataset two variables from the dataset constructed by Cotet and Tsui (2013).[16] Both variables are measured by country-year

[13] Nonetheless, in some robustness checks below we report separate estimates for giant oilfields of different sizes.

[14] The continent classification follows that of the United Nations Statistical Division. The country-year distribution of discovery by decades is 3% for 1946-1949, 15% for 1950s, 22% for 1960s, 22% for 1970s, 14% for 1980s, 17% for 1990s, and 7% for 2000-2003.

[15] Some fields covered in Horn (2004) do not appear in the Oil and Gas Journal Data Book (2008), even though this latter source covers smaller fields, so it reports more fields overall. This may be because the coverage of the Oil and Gas Journal Data Book is uneven across countries, whereas Horn (2004) attempts to cover all giant oilfields in all countries.

[16] Their dataset is available at: http://www.aeaweb.org/aej/mac/data/2010-0022_data.zip, and is discussed in Cotet and Tsui (2013) and Tsui (2011).

observations, for 63 countries from 1946-2003.[17] The first variable is the number of "wildcat" (exploratory) oil wells drilled, which is a proxy for oil exploration efforts. In addition to using this variable directly, we also construct an indicator for a positive number of wildcat wells. The second variable is the quantity of oil discovered, which we use to construct indicators for years with "giant" discoveries (years with total URR of at least 500 million barrels) and for years with smaller discoveries. These variables differ from those that we use in our main analysis in several ways. First, the sources of data that Cotet and Tsui (2013) use are different from ours, and they differ in the way they estimate ultimate recoverable reserves (URR). Second, their measure includes only oil discoveries, while ours includes not only oil but also natural gas and condensate. Finally, the measure that Cotet and Tsui (2013) use aggregates the URR over all discoveries within a country in a given year, while our measure effectively uses only the largest single discovery. The correlation between our indicator for giant oilfield discoveries and an indicator for years where the Cotet and Tsui (2013) report discoveries with URR of at least 500 million barrels, is around 0.55.

Our final source for data on oil is Ross (2011), which reports the value of production of oil and gas by country and year from 1932 onwards.[18] These data allow us to examine whether giant oilfield discoveries affect the value of oil and gas which a country produces. We convert this variable into US$2005, in line with our other variables below, using the CPI index from US Bureau of Labor Statistics.

Data on economic outcomes. The Penn World Table (PWT 6.3, 2009) is our source for GDP-related measures and population from 1950-2007. We use this dataset to construct Purchasing Power Parity (PPP) adjusted per-capita GDP in constant US$2005, and to decompose it into private consumption, private investment, and government expenditure.[19] We also construct a measure of the real exchange by taking the ratio of the nominal exchange rate (XRAT, which measures dollars per local currency unit) to PPP. Using this definition, a decrease in the real exchange rate corresponds to a real exchange rate appreciation. In addition, we supplement the PWT data with International Monetary Fund (IMF) data (Abbas et al. 2010) on public debt as a percentage of GDP.

[17] The dataset that Cotet and Tsui (2013) construct includes Papua New Guinea, which is nonetheless excluded from their econometric analysis of the remaining 62 countries.

[18] Details of data construction can be found in Ross (2010).

[19] PPP-adjusted GDP per capita is constructed using rgdpl (real GDP per capita, Laspeyres) and the components of GDP are constructed by multiplying each share, kc (private consumption), ki (private investment), kg (government spending), to rgdpl. All these variables are from PWT 6.3.

To measure countries' international trade, we use the NBER-UN trade data (Feenstra et al. 2005), which reports trade outcomes from 1962-2000. We construct per capita measures of oil exports and non-oil exports. This last measure is constructed by summing up the exports in SITC Revision 2 categories 33 (Petroleum, petroleum products and related materials) and 34 (Gas, natural and manufactured). We convert all these measures into US$2005 as described above.

Data on political violence. We use the UCDP/PRIO dataset (Gleditsch et al. 2002) to measure the incidence of internal armed conflicts from 1946-2008.[20] One of our main outcomes of interest is an indicator for whether a given country experiences an internal conflict, which claims the lives of 25 people or more, in each given year. About 10 percent of our country-year observations involve such conflicts, and these conflicts take place in 97 different countries. Almost half of the internal conflicts in our data took place during the 1980s and 1990s, and the continent with the most conflicts was Asia (47% of conflict observations), followed by Africa (33%), South America (8%), North America (7%), Europe (6%), and Oceania (1%).[21]

For our robustness checks, we construct five other measures of internal armed conflict. The first is an intensity-scaled measure of internal armed conflicts, which takes on the value of one if the internal conflict's death toll in a given year was 25-999, two if it was 1000 or more, and zero otherwise. The second is an indicator for having either an internal or an internationalized internal conflict, since conflicts may switch from one type to the other. The third is an indicator for having any type of armed conflict (internal or not). The final two measures, following Collier and Hoeffler (2004) and Cotet and Tsui (2013), are: an indicator for onset of internal armed conflict (having an internal conflict and no internal armed conflict in the preceding year); and a measure of internal armed conflict transitions (an indicator for an internal armed conflict in the current year minus the indicator for the previous year).

Another measure of political violence that we use is an indicator for having at least one coup in a given year, based on data from the Polity IV project (Marshall and Marshall 2011). A coup is defined as a forceful seizure of executive authority and office by a dissident or opposition faction within the country's ruling or political elites that results in a substantial

[20] Conflicts are classified into four types in the UCDP/PRIO dataset: interstate, internal, internationalized internal, and extra-systemic (conflicts between a state and a non-state group outside its territory). Our main incidence measure is constructed using internal conflicts, but we consider others below.

[21] The country-year distribution of conflict incidence by decades is 2% for 1946-1949, 5% for 1950s, 10% for 1960s, 15% for 1970s, 22% for 1980s, 27% for 1990s, 17% for 2000-2008.

change in the executive leadership and the policies of the prior regime, or an attempt to do so (we do not distinguish between successful or unsuccessful coups). About 5.5 percent of our observations are classified as having at least one coup, and coups thus defined took place in 116 different countries from 1946-2008. Coups were fairly evenly distributed from the 1960s onwards (and rarer before), and the continent with the most country-year observations with coups is Africa (51%), followed by Asia (25%), South America (9%), North America (9%), Europe (5%), and Oceania (1%).[22]

As an indicator for repression, we use a measure for purges from Banks (2010). This indicator takes on a value of one if a country experiences at least one purge in a given year, and zero otherwise. A purge is defined as systematic murder and elimination of political opponents by incumbent regimes. About 8.6 percent of our observations are classified as having involved repression, and repression thus defined took place in 112 countries from 1946-2008. Repressions peaked during the beginning of the sample period - the1940s and 1950s - and gradually declined over time.[23]

We also follow Besley and Persson (2011) in constructing an indicator for countries with strong institutions. They use the fraction of time spent having the highest score for executive constraints variable (XCONST) from Polity IV project (Marshall et al. 2010) as the criterion for having strong institutions.[24] In our analysis, we also use the Polity 2 score from the Polity IV project as a measure for institutional quality. This is a common measure of a country's political institutions, taking on values from -10 (strongly autocratic) to 10 (strongly democratic). Finally, we use the ethnic fractionalization measure from Alesina et al. (2003).

5. Results

This section begins by discussing our baseline empirical specifications and estimates of the effect of giant oilfield discoveries on oil production and exports and on internal armed conflicts (Subsection 5.1). We then discuss the robustness of our estimates using a number of

[22]The country-year distribution of coup incidence by decades is 4% for 1946-1949, 7% for 1950s, 19% for 1960s, 20% for 1970s, 20% for 1980s, 18% for 1990s, 12% for 2000-2008.

[23] The country-year distribution of repression incidence by decades is 32% for 1946-1949, 30% for 1950s, 17% for 1960s, 11% for 1970s, 3% for 1980s, 2% for 1990s, and 1% for 2000-2008.

[24] Details can be found in Besley and Persson (2011, pp. 1430-1431). There are 26 countries they define as having strong institutions: Australia, Austria, Belgium, Canada, Costa Rica, Denmark, Estonia, Finland, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Sweden, Switzerland, South Africa, United Kingdom, and the United States.

alternative specifications (Subsection 5.2). We conclude this section by discussing the estimates of giant oilfield discoveries on other economic and political outcomes (Subsection 5.3).

5.1. Baseline Specifications and Results

In order to examine the effect of giant oilfield discoveries, we use our panel data on countries over time to estimate the following specification:

$$Y_{it+j} = \beta_{1j}Disc_{it} + Country_i + Year_t + \varepsilon_{it}, \quad (1)$$

where Y_{it+j} is the outcome in country i in year t+j, $Disc_{it}$ is an indicator for the discovery of a giant oilfield in country i in year t, $Country_i$ and $Year_t$ are country and year fixed effects, and ε_{it} is a stochastic error. We begin by estimating this specification for different lags j, where in most cases $j \in \{2, 4, 6, 8, 10\}$. This allows us to non-parametrically trace the effect of discovery on outcomes over a decade.[25] In addition, some of our specifications add controls, as explained in below and in the various tables.

As we later discuss, we find that after controlling for country and year fixed effects, the timing of giant oilfield discoveries is largely uncorrelated with countries' economic and political performance in the five preceding years. One notable exception to this, however, is that giant oilfield discoveries in a country's recent past raise the odds of additional discoveries in its near future. Specifically, we find that the unconditional probability of a giant discovery in year t increases from about 1 percent when there were no giant oilfield discoveries from t-10 to t-1 to 87 percent if there was a giant discovery in every year from t-10 to t-1. Controlling for country and (year fixed effects) significantly reduces the predictive power of past discoveries, though it remains statistically significant. In a regression where the dependent variable is $Disc_{it}$ and the regressor of interest is the number of years with giant oilfield discoveries from t-10 to t-1, controlling for country and year fixed effects, the estimated coefficient is 0.032 (s.e. 0.004).[26]

[25] Below we report estimates for other values of j, including odd and negative values.
[26] One implication of this is that part of the effect of giant discoveries on subsequent outcomes may operate through a (slightly) increased probability of making further discoveries.

These results suggest that giant oilfield discoveries in a country's recent past have some predictive power for whether a subsequent discovery is made.[27] We account for this serial correlation in the timing of giant oilfield discoveries by repeating our estimates of specification (1) with another specification, which we call (1a), and which includes the number of years with giant oilfield discoveries from t-10 to t-1 (labeled $PDisc_{it}$) as a control.

In addition to reporting estimates from specifications (1) and (1a) in tables, we also plot the regression estimates and 95 percent confidence intervals for $j \in \{-5, -4, \dots, 9, 10\}$ using figures. These figures allow us to economize on space when we examine whether pre-discovery years differed from post-discovery years in terms of the outcomes of interest, and to display outcomes in years t+j where j is zero or positive and odd.

Having explained our baseline estimation strategy, we now examine the model's first prediction (or rather its assumption) that giant oilfield discoveries increase income from oil. As Panel A of Table 2 shows, oil production increases by about 25-30 percentage points within two years of a giant discovery. This effect of discovery on oil production rises to about 40-50 percentage points within four years, and remains stable (at least) until 10 years after discovery.[28] Past discoveries also matter, and their effect declines from about 26 percentage points two years after discovery to about 16 percentage points ten years after discovery. These large and precise estimates confirm that giant oilfield discoveries have an important economic impact on the discovering countries, as we can expect from the sheer size of these oilfields.

Panel B of Table 2 reports the effect of giant oilfield discoveries on oil exports. These discoveries increase oil exports by about 20-30 percentage points after six years, and this rises to about 40-50 percentage points after ten years. Past discoveries again matter, increasing oil exports by about 10-20 percent. These estimates are similar to the effects we find on oil production, although oil exports appear to take a bit longer to respond to giant discoveries.

Our finding that giant oilfield discoveries increase per capita production and exports of oil lead us to investigate the second prediction of the model, that internal armed conflict increases after giant oilfields are discovered. Panel A of Table 3 documents the effect of giant oilfield discoveries on the subsequent incidence of internal armed conflict. In line with the

[27] Interestingly, we find no significant correlation between the number of giant oilfields discovered in a year and the inflation-adjusted price of oil in that year from 1946-2003.

[28] The outcomes in the tables are in logs, and in the text we convert them into percentage changes. For example, the 3rd-5th columns of Panel A of Table 2 show that log oil production increases by 0.39-0.41 within 6-10 years of giant discoveries, which corresponds to an increase of about 48-50 percentage points.

second prediction of the model, we find that giant oilfield discoveries increase the incidence of internal armed conflict by about 5-8 percentage points within 4-8 years of discovery. This effect is sizeable, since the mean of the conflict variable is just 10 percent, as we report in Table 1. Table 3 also shows that our estimates of the effect of giant oilfield discoveries on internal armed conflict do not change much when we control for the number of discoveries in t-10 to t-1.

Our finding that giant oilfield discoveries increase the incidence of internal conflicts is also robust to alternative ways of measuring conflict. For example, Panel B of Table 3 shows that giant oilfield discoveries have a similar impact on an intensity-scaled measure of armed conflict, which gives more weight to conflict years with 1,000 casualties or more, as described in Section 4. Giant discoveries increase this scaled measure of internal conflict by about 6-9 percentage points within 4-6 years of discovery. Panel C of Table 3 shows an increase of about 5-8 percentage points after discovery in a measure of conflict, which includes both internal and internationalized internal armed conflicts.[29]

Given this evidence that giant oilfield discoveries increase the incidence of internal armed conflict, we now ask: which countries are particularly likely to experience internal conflicts after giant oilfield discoveries? According to Prediction 3 of our model, armed conflict over oil is prevalent in countries where political violence pays off. In order to identify these conflict-prone countries, we use past violence as an indicator. As Panel A of Table 4 shows, countries that experienced at least one coup from t-10 to t-1 were more likely to plunge into internal conflict following giant oilfield discoveries. In fact, in these countries giant oilfield discoveries raised the incidence of an internal conflict by as much as 11-14 percentage points from t+4 to t+8. This figure is high, but we should bear in mind that the mean incidence of an internal conflict following a coup is about 19-20 percent. By contrast, in countries that experienced no coups from t-10 to t-1, oil discoveries have no significant effect on the incidence of internal conflict, again consistent with the model's predictions.

Another indicator that political violence pays off is that a country already experienced internal conflict at some point from t-10 to t-1. In those countries, giant oilfield discoveries raise the probability of conflict by as much as 11-18 percentage points. The baseline level of violence in these cases is also very high, with a mean of about 37-39 percent. Panel D of the

[29] We also estimate similar regressions for the onset of internal armed conflict and for internal armed conflict transitions, find no contemporaneous relation between these and giant oilfield discoveries, a finding that is similar to Cotet and Tsui (2013). These measures increase significantly 4 years after discovery.

table shows that there is no significant effect of giant oilfield discoveries on internal conflict in countries with no recent history of internal conflicts.

5.2. Robustness of Our Main Results

The results discussed so far indicate that giant oilfield discoveries increase oil output and the incidence of internal armed conflict, and that the latter increases particularly for countries with recent histories of violence. We now examine the robustness of these results, and we begin by looking at what happens in the years leading up to giant oilfield discoveries.

Sub-Figure A of Figure 1 shows estimates of specification (1) for our measure of oil production before and after discovery. The figure suggests that oil production did not change much in the years leading up to giant oilfield discoveries. Similarly, Sub-Figure B of Figure 1 shows that oil exports also did not increase during the lead-up to the discovery of giant oilfields, and we can again see that oil exports took longer to respond to giant oilfield discoveries than oil production. Sub-figure C of Figure 1 shows that the probability of internal armed conflicts also did not change much in the years leading up to giant discoveries. Finally, Sub-Figure D of Figure 1 shows that in countries that experienced at least one internal armed conflict from t-10 to t-1, conflicts did not systematically flare up in the years prior to giant oilfield discoveries.

The four sub-figures of Figure 2 show estimates similar to the corresponding sub-figures of Figure 1, except that this time we control for the number of years with giant oilfield discoveries from t-10 to t-1 (the estimates for Figure 2 are generated using specification (1a) instead of specification 1). The results once again show no evidence of significant trends before giant discoveries. Moreover, the estimates are quantitatively very similar to those in Figure 1. From this point on, to economize on space, we focus primarily on estimates that control for discoveries before t, as in specification (1a).

In Figure 3 we examine the changes before and after discovery in some of the alternative measures of conflict discussed above. Sub-Figures A and B of this figure correspond to Panels B and C of Table 3, using as outcomes internal armed conflicts scaled by intensity and internal armed conflict including ones that were internationalized. These outcomes, like our main measure of armed conflict, show little change in the years leading up to discovery, and become positive and significant within 4-8 years after discovery. Sub-Figure C of the figure corresponds to panel A of Table 4, showing that in countries that had at least one coup from t-10 to t-1, internal armed conflicts increase more with giant oilfield discoveries, and there were no significant changes in the years leading up to discovery. Sub-Figure D shows similar results for countries that experienced any type of armed conflict from t-10 to t-1.

The finding that our key variables of interest do not change systematically in the years leading up to giant oilfield discoveries supports our interpretation that our estimated effects of giant oilfield discoveries are plausibly causal. In the following paragraphs we address further potential concerns regarding this interpretation.

One concern that may linger, for example, is that there may be serial correlation not only in the timing of giant oilfield discoveries but also in the outcomes we examine. To address this concern, panel B of Table 5 re-estimates specification (1a), but this time also controlling for the dependent variable in t-1, which is instrumented by the dependent variable in t-2. The outcome here is our measure of oil production, and the estimates are smaller than the baseline, but still positive and significant.

Another related concern is that political conditions in the discovering country may have changed shortly before discovery. But Panel C of the table adds to specification (1a) a control for polity 2 (a common measure of intuitional quality) in t-1 and this does not change the estimates much. Since we do not have a measure of investment in the oil sector, Panel D reports estimates of specification (1a) with a control for log PPP-adjusted per capita private investment in 2005 US dollar in t-1, and again the estimates remain statistically significant. Panel E adds together all the controls from Panels B-D, and again the estimates remain significant for t+2 through to t+10, this time with the exception of the estimate for t+8, which is marginally significant.

While the results discussed so far include all discoveries of giant oilfields since 1946 and control for discoveries in countries' recent past, a concern remains that the odds of discovery are not the same in all countries and in all years. More specifically, the regressions discussed so far include country-year observations where the probability of discovery was relatively high given the history of past discovery, along with many (most) observations where the odds of discovery were low. Panel F of Table 5 focuses on giant oilfield discoveries that were especially surprising, since no giant oilfield was discovered in the country from t-10 to t-1. When we focus only on observations for which no giant discoveries were made in the prior decade, the odds of a giant discovery fall to just over 1 percent, so these discoveries were in all likelihood highly unexpected. The results show that the effect of these unexpected discoveries on oil production are about twice as large as in the baseline, and precisely estimated. This is probably because in the countries that make these discoveries, oil production prior to the giant discovery was usually very low.

Another potential concern regarding our identification is that the countries that discover giant oilfields differ from others in ways that change over time and are therefore not fully controlled for by country fixed effects. To address this concern, Panel G re-estimates the baseline specification using only countries that make at least one giant discovery in the period we analyze (from 1946 onwards). The estimates in this specification are similar to those in the baseline, althoug slightly larger.

Finally, we address the concern that country-year observations with oil discoveries differ from others not only across countries, but also within countries, and in ways that we cannot observe and control for directly. To mitigate this concern, we use data from the Oil and Gas Journal Data Book (2008), which records country-year pairs where some oil discoveries, not necessarily giant, were made. Estimating specification (1a) using only these country-year observations, we essentially compare instances of giant oilfield discoveries to instances of smaller discoveries. As Panel H of the table shows, even when we restrict ourselves to these cases, the effect of giant oilfield discoveries on oil production remains positive and significant, albeit smaller, for t+6 to t+10.

Table 6 repeats the robustness checks described above for our main result, that giant oilfield discoveries increase the probability of internal armed conflict from t+4 to t+8. Controlling for the (instrumented) lagged dependent variable, lagged polity 2 score and lagged investment, or all of these together, tends to increase the coefficients very slightly, and they remain statistically significant. Excluding observations that follow one or more discoveries in t-10 to t-1 makes the estimate for t+4 imprecise, but the coefficients for t+6 and t+8 are still precise – the latter is even larger than in the baseline specification. Restricting the sample to countries with giant oilfield discoveries leaves the baseline coefficients almost unchanged. And using only observations with some oil discoveries tends to increase both the point estimates and the standard errors, leaving the estimates for t+4 and t+6 positive and statistically significant.

Table 7 reports estimates for the same robustness checks as in Tables 5 and 6, but this time for the effect of giant oilfield discoveries on internal armed conflicts in countries that experienced at least one year of conflict from t-10 to t-1. As before the controls we include make little difference to our estimates when they are included separately or simultaneously: the estimates for t+4 to t+8 remain significant and change little in magnitude. Excluding observations with recent past discoveries makes the estimate for t+4 imprecise, but the estimates for t+6 and t+8 are still precise. Restricting our analysis to the set of countries with giant oilfield discoveries again makes almost no difference relative to the baseline. Finally, using only observations with some oil discoveries, while restricting our sample to about 400 observations, still results in positive and significant estimates for t+4 and t+6.

The estimates reported thus far show that the effect of oil discovery on conflict are larger in countries with a history of conflict. We now compare the interaction of giant discoveries and recent conflicts with interactions of giant discoveries with other features of the discovering country. To do so, we begin by estimating the following equation:

$$Y_{it+j} = \beta_{2j}Disc_{it} + \gamma_{2j}PConf_{it} + \delta_{2j}PDisc_{it} + \theta_{2j}Disc_{it} \text{ x } PConf_{it} + Country_i + Year_t + \varepsilon_{it}, \quad (2)$$

where $PConf_{it}$ measures the number of years from t-10 to t-1 in which country i experienced internal armed conflict. Panel A of Table 8 reports estimates of β_{2j} and θ_{2j} for $j \in \{2, 4, 6, 8, 10\}$. As the table shows, θ_{2j} is positive and significant for 4, 6, 8, and even 10 years after discovery, confirming again that giant oil discoveries spell trouble in countries with recent histories of violence.

We now add to this specification interactions of giant discoveries with other country characteristics, following our discussion in Section 3. First, we consider the possibility that in countries with strong institutions, giant oilfield discoveries lead to less conflict. To test this, we add to specification (2) an interaction of giant discoveries with strong institutions, which may proxy for an institutionalized commitment to share revenues with the opposition (θ close to ½). Second, much of the literature (see survey in Blattman and Miguel 2010) finds that conflicts are more prevalent in poor countries. In the model this corresponds to low-wage countries, and given our data limitations we proxy this using lagged per capita GDP. Specifically, we examine whether giant oilfield discoveries are more likely to tip poor countries into internal conflict by further adding to specification (2) controls for log per capita GDP in t-1 (as discussed in the data section) and its interaction with our indicator for giant discoveries, $Disc_{it}$. Finally, we consider the possibility that in countries with higher ethnic fractionalization, giant discoveries are more likely to cause conflict, possibly because those countries are more prone to be divided into opposing factions that willing to fight each other. We test this hypothesis by further adding to specification (2) an interaction of our measure of ethnic fractionalization (again see data section) with $Disc_{it}$. Panel B of Table 8 shows that none of the three interactions we added is statistically significant in any of the regressions, while the interaction of giant discoveries and past conflict is still positive and significant from 4 years after discovery onwards.[30] This suggests that the countries that should be most concerned about tipping into violent conflict over resources are those with recent histories of conflict.

We also examine whether giant oilfield discoveries might themselves take place during periods of lull following conflicts. We estimate a regression where the dependent variable is an indicator for giant discovery and the regressor of interest is an indicator for having no internal armed conflict in periods t-j to t-1 and conflict in period t-j-1, for j∈{1, 2, 3, 4, 5}, controlling for country and year fixed effects. The coefficient of interest in all these regressions is small and imprecise (results available from the authors), providing evidence that lulls in fighting do not predict the timing of giant oilfield discoveries.

But while lulls in conflict do not predict giant oilfield discoveries, do they affect search effort to discover new oilfields more generally? To answer this question, we use data from Cotet and Tsui (2013) on the number of "wildcat" wells, which are wells exploratory wells drilled outside known oil-producing areas. Appendix Table A2 shows that the number of wildcat wells drilled (and an indicator for any wildcat drilling) does not change significantly in the years following a lull of any length from 1-5 years. These results are robust to measuring the outcome during the final year of the lull or in the year after the lull.

Our finding that wildcat drilling does not increase following lulls in conflict differs from the finding that Cotet and Tsui (2013) report in columns 4-6 of Table 9 of their paper, since they report a negative association between wildcat drilling and conflict. Their regressions, however, do not control for country fixed effects, so they effectively use cross-sectional variation, whereas we consistently use panel variation within countries and over time.

We further compare our results to those of Cotet and Tsui (2013) in Appendix Table A3. Panel A of the table reports estimates as in Table 3 of our paper using only the observations for which we have non-missing wildcat data from Cotet and Tsui (2013). While the sample is considerably smaller (since Cotet and Tsui 2013 have data on fewer countries than we do) the coefficients and their precision are quite similar to our baseline estimates. Panel B of the same table re-estimates these regressions controlling for the number of wildcat wells drilled, and the results are almost unchanged.

We next use the data from Cotet and Tsui (2013) to construct an indicator for years with oil discoveries whose total estimated URR is at least 500 million barrels of oil. This measure is still different from our measure of giant discoveries, not only because the sources are

[30] Esteban et al. (2012) also find that ethnic fractionalization does not heighten the risk generated by oil discoveries

different, but also because their measure excludes natural gas and condensate. In addition, their measure use aggregates the URR over all discoveries within a country in a given year, while our measure effectively uses only the largest single discovery. As Panel C of Appendix Table A3 shows, estimates using this new measure are still positive and similar in magnitude to our baseline estimates, although only the estimated effect on conflict 6 years after a major discovery is significant. Finally, the last panel of the table shows that years where Cotet and Tsui (2013) report smaller discoveries (which add up to less than 500 million barrels of oil) are not followed by an increase in internal armed conflict.

We further explore the relationship between the size of giant oilfields discovered and internal armed conflict using our main data. Specifically, we divide the giant oilfield discoveries into four quartiles by the size of the estimated Ultimate Recoverable Reserves (URR). In Panel A of Appendix Table A4 we report estimates as in Table 3 of the paper, but this time allowing for differential effects of discoveries of different quartiles. The effects of giant oilfield discoveries at all sizes are generally positive. Although only some of the estimates are statistically significant, we do find a positive and significant effect for at least some lag between 4-8 years after giant oilfield discoveries of all sizes, although the strongest effects are concentrated in the 2nd and 3rd quartiles. One might (cautiously) interpret this finding as suggesting an inverted U-shape effect of giant oilfield discoveries, whereby the very largest giant oilfield discoveries might not have as strong an effect as mere giant discoveries. This result may be somewhat related to the pattern documented in Collier and Hoeffler (2004), where high levels of primary commodity exports are associated with more conflict, but in the case of the very highest levels, "as in Saudi Arabia, the government is so well-financed that rebellion is militarily infeasible." At the same time, in our analysis we find that even the largest discoveries still increase the odds of conflict.[31]

Panel B of the same table repeats the exercise, but this time includes an indicator for smaller (non-giant) oilfield discovery years, based on the Oil and Gas Journal Data Book. These smaller (non-giant) discoveries have small and insignificant effects on conflict, unlike the giant discoveries.

Another question that we examine is whether giant oilfields discovered onshore have a different effect on conflict from those made offshore. Panel A of Appendix Table A5 reports estimates of specifications as in Table 3 of our paper, but this time using separate indicators

[31] Panel B of the same table repeats the exercise, but this time includes an indicator for smaller (non-giant) oilfield discovery years, based on the Oil and Gas Journal Data Book. These smaller (non-giant) discoveries have small and insignificant effects on conflict, unlike the giant discoveries.

for giant onshore and offshore discoveries instead of our usual indicator for all giant discoveries. The estimates show that onshore discoveries significantly increase the odds of internal armed conflict within a few years of discovery. The estimated effect of offshore discoveries on subsequent conflict is also positive, but somewhat smaller and imprecisely estimated, except in one case. At the same time, a one-sided hypothesis test of whether the effect of onshore discoveries is significantly larger than that of offshore discoveries cannot reject the null.[32] Taken together, our findings are broadly consistent with Lujala (2010) and Ross (2006, 2012), who conclude that onshore oil increases conflict more than offshore oil, but in the specifications that we estimate the difference between onshore and offshore giant discoveries is imprecisely estimated.

5.3. Additional Results

The results discussed so far suggest that giant oilfield discoveries have two opposing effects on the discovering countries' economy: they increase oil income, but also the incidence of a costly internal conflict. We now turn our attention to the fourth and last outcome that we discuss in the model section – whether these discoveries have a positive or a negative effect on per capita GDP and its components. Using these as outcomes, Table 9 reports estimates of specification (1a), and an augmented specification, which includes controls as in Panel E of Tables 5-7, namely the dependent variable in t-1 (instrumented by that same variable in t-2) and polity 2 and log PPP-adjusted per capita private investment, both also measured in t-1.

Panel A of Table 9 suggests that giant oilfield discoveries increase per capita GDP by about 4-6 percent. But as Panel B shows, this estimate is imprecise when more controls are added. Having also experimented with similar specifications with various controls, we conclude that the positive effect we find in Panel A is not very robust, so we are unable to say conclusively whether giant oilfield discoveries have a small positive effect on per capita GDP, or whether this effect is zero.

The next two panels of Table 9 show similar results for the effect of giant oilfield discoveries on per capita government spending. Once again the effect is either positive (around 4-6 percent in Panel C), or insignificantly different from zero (Panel D) when more controls are added.

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[32] In Panel B of Appendix Table A5 we report estimates of similar specifications, but this time instead of controlling for years with giant discoveries in the decade prior to each giant discovery, we control separately for the number of years in the previous decade with onshore discoveries and offshore discoveries. The results are very similar to those discussed above.

The remainder of Table 9 shows that giant oilfield discoveries have no significant effect on per capita private consumption and (with the exception of one negative estimate for t+6 in panel H), also no effect on per capita private investment.[33]

We conclude this section of the paper with an investigation of other possible economic and political consequences of giant oilfield discoveries in Table 10. In Panels A and B of this table we test one of the mechanisms often discussed in the "Dutch Disease" literature (e.g. Corden and Neary 1982), whereby natural resource booms may cause a real exchange rate appreciation. This may happen, for example, if an oil-producing country spends some of its proceeds from oil on local non-tradable goods. As a result of such spending, the nominal exchange rate may appreciate (if the exchange rate is flexible) or local prices may rise. Either (or both) of these can cause real exchange rate appreciation, which can hurt the non-oil exporting industries. Panels A and B of Table 10, however, show that giant oilfield discoveries decrease the real exchange rate only for some years after discovery, and even then the effect is quite small and imprecisely estimated. Panels C and D similarly show that non-oil exports are not significantly reduced by giant oilfield discoveries. A more thorough investigation of various related "Dutch Disease" mechanisms is, however, outside the scope of this paper and we leave it for future work.

We next examine an alternative hypothesis on a potential cost of oil production, namely that it may lead, in some cases, to over-spending and indebtedness by the government (for related discussions see Tornell and Lane 1999 and Manzano and Rigobón 2008). As Panels E and F of Table 10 show, we find no support for this hypothesis using our global dataset. Again, we leave further investigations of this issue for particular countries or regions for future work.

Turning to other political economy hypotheses on the effect of natural resources, Panels G and H of Table 10 examine whether competition over oil takes the form of coups to replace the incumbent. As the table shows, we find no evidence that giant oilfield discoveries increase the odds of coups in the subsequent decade. Finally, the last two panels of Table 10 test the prediction of Besley and Persson (2009, 2011), that resource windfalls increase repression. Our estimates show no significant increase in repression in the aftermath of giant oil discoveries.

In sum, the results discussed in this subsection suggest that while the economic gains from giant oilfield discoveries to the local population may be limited, we do not identify other

[33] We do not report figures for the effect of giant oilfield discoveries on per capita GDP and its components, but these are available on request from the authors, and they also suggest that the changes before and around discoveries are small and imprecisely estimated.

costs to from discovery, except for our main result of an increased risk of internal armed conflict.

6. Conclusions

We began this paper by asking whether natural resource windfalls fuel internal armed conflicts, and if so – in which settings. To answer this question, we use new data on giant oilfield discoveries to identify the effect of oil on economic and political outcomes around the world. We find that within a few years of giant oilfield discoveries, per capita oil production and oil exports in discovering countries increase by up to 50 percent. But we also find that discovering giant oilfields increases the incidence of internal armed conflict by about 5-8 percentage points. This increase is driven predominantly by countries with recent histories of political violence – those that experienced coups or armed conflicts during the decade prior to discovery. We show that these findings are robust to a wide range of specification checks.

Our findings shed light on the questions we began with. Giant oil and gas field discoveries in Norway, Canada, and Australia, are unlikely to fuel internal armed conflicts, since these countries' recent histories include little political violence. But in countries where political disputes are often resolved by violence (or remain unresolved despite violence), giant oilfield discoveries can fuel the flames of internal conflicts.

Our finding that giant oilfield discoveries fuel internal conflicts in countries that are 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. At the same time, the 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.

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Table 1: Summary Statistics

Outcome in year:	Obs	Mean	Std. Dev.	First year of data	Last year of data
Discovery (indicator for giant oilfield discovery)	10,141	0.05	0.21	1946	2003
Indicator for discovery size in quartile 4, URR ϵ (2733, 160673]	10,141	0.01	0.11	1946	2003
Indicator for discovery size in quartile 3, URR ϵ (1180, 2733]	10,141	0.01	0.11	1946	2003
Indicator for discovery size in quartile 2, URR ϵ (658, 1180]	10,141	0.01	0.11	1946	2003
Indicator for discovery size in quartile 1, URR ϵ [500, 658]	10,141	0.01	0.11	1946	2003
Onshore discovery (indicator for giant onshore oil discovery)	10,141	0.03	0.17	1946	2003
Offshore discovery (indicator for giant offshore oil discovery)	10,141	0.02	0.14	1946	2003
Indicator for any oilfield discovery, not necessarily of a giant	11,091	0.12	0.32	1946	2008
Number of wildcats drilled	2,951	128	790	1946	2003
Indicator for positive wildcats drilled	2,951	0.86	0.35	1946	2003
Giant-equivalent discovery (As discovery indicator, but using data from Cotet and Tsui 2013)	2,951	0.15	0.36	1946	2003
Non-giant discovery (As indicator for any oil discovery, but using data from Cotet and Tsui 2013)	2,951	0.52	0.50	1946	2003
Log PPP-adjusted per capita oil and gas production (US$2005)	3,759	5.33	2.92	1950	2007
Log per capita oil exports (US$2005)	4,599	2.64	3.48	1962	2000
Log per capita non-oil export (US$2005)	5,562	5.69	1.92	1962	2000
Internal armed conflict indicator	11,091	0.10	0.30	1946	2008
Internal armed conflict indicator scaled by intensity	11,091	0.13	0.41	1946	2008
Internal or internationalized internal armed conflict indicator	11,091	0.11	0.32	1946	2008
Armed conflict indicator	11,091	0.14	0.34	1946	2008
Coup indicator	11,091	0.05	0.23	1946	2008
Repression indicator	8,497	0.09	0.28	1946	2008
Polity 2 score (between -10 and 10)	7,831	0.17	7.49	1946	2008
Ethnic fractionalization (time-invariant, between 0 and 1)	10,650	0.44	0.27	1946	2008
Log real exchange rate	8,362	0.71	0.55	1950	2007
Log public debt as percentage of GDP	5,698	3.75	0.89	1946	2008
Log PPP-adjusted per capita GDP (US$2005)	8,342	8.46	1.13	1950	2007
Log PPP-adjusted per capita government spending (US$2005)	8,342	6.63	1.18	1950	2007
Log PPP-adjusted per capita private consumption (US$2005)	8,342	7.97	0.99	1950	2007
Log PPP-adjusted per capita private investment (US$2005)	8,338	6.69	1.59	1950	2007
PPP-adjusted per capita military expenses (US$2005)	6,119	0.34	1.10	1950	2001
Ratio of PPP-adjusted military expenses to GDP	6,115	0.04	0.08	1950	2001

Notes: This table reports summary statistics for a panel of 193 countries from 1946-2008. Giant oilfields are those having an estimated ultimate recoverable reserves (URR) of oil, including gas and condensate equivalent, of at least 500 million barrels (Horn 2004). URR figures in this table are in million of barrels of oil equivalent. There are 461 observations with at least one giant oilfield discovery from 1946-2003.

Table 2: Effect of Giant Oil Discoveries on Oil Production and Oil Export

Outcome in year:	t+2	t+4	t+6	t+8	t+10	t+2	t+4	t+6	t+8	t+10
Panel A. Dependent variable: Log PPP-adjusted per capita oil and gas production in US$2005										
Discovery	**0.28**	**0.37**	**0.39**	**0.41**	**0.40**	**0.22**	**0.30**	**0.31**	**0.33**	**0.33**
	(0.08)	(0.08)	(0.09)	(0.09)	(0.10)	(0.07)	(0.06)	(0.07)	(0.07)	(0.08)
Years with discoveries from t-10 to t-1						**0.23**	**0.22**	**0.20**	**0.18**	**0.15**
						(0.05)	(0.05)	(0.05)	(0.05)	(0.06)
Observations	3,535	3,705	3,629	3,551	3,470	3,535	3,705	3,629	3,551	3,470
Panel B. Dependent variable: Log oil and gas exports per capita in US$2005										
Discovery	-0.04	0.14	**0.25**	**0.37**	**0.40**	-0.09	0.08	**0.19**	**0.31**	**0.36**
	(0.10)	(0.11)	(0.11)	(0.11)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
Years with discoveries from t-10 to t-1						**0.17**	**0.18**	**0.18**	**0.15**	**0.11**
						(0.05)	(0.05)	(0.04)	(0.04)	(0.05)
Observations	4,563	4,530	4,492	4,453	4,436	4,563	4,530	4,492	4,453	4,436

Notes: This table reports the effect of discovering at least one giant oilfield in a panel of country-year observations. The panel includes 193 countries and uses data from 1946-2008. All regressions control for country and year fixed effects. Giant oilfields are those having an estimated ultimate recoverable reserves of oil, including gas and condensate equivalent, of at least 500 million barrels (Horn 2004). Robust standard errors in parentheses are clustered by country.

Table 3: Effect of Giant Oil Discoveries on Internal Armed Conflicts

Outcome in year:	t+2	t+4	t+6	t+8	t+10	t+2	t+4	t+6	t+8	t+10
Panel A. Dependent variable: Internal armed conflict										
Discovery	0.015	**0.061**	**0.079**	**0.060**	0.031	0.003	**0.050**	**0.072**	**0.057**	0.031
	(0.021)	(0.021)	(0.026)	(0.027)	(0.027)	(0.017)	(0.016)	(0.021)	(0.022)	(0.025)
Years with discoveries from t-10 to t-1						0.020	0.018	0.011	0.005	0.000
						(0.012)	(0.011)	(0.010)	(0.010)	(0.009)
Observations	10,135	10,129	9,933	9,547	9,161	10,135	10,129	9,933	9,547	9,161
Panel B. Dependent variable: Internal armed conflict scaled by intensity										
Discovery	0.009	**0.084**	**0.085**	0.060	0.009	-0.002	**0.076**	**0.081**	**0.060**	0.012
	(0.028)	(0.030)	(0.034)	(0.034)	(0.029)	(0.023)	(0.025)	(0.029)	(0.028)	(0.027)
Years with discoveries from t-10 to t-1						0.018	0.013	0.007	0.000	-0.005
						(0.015)	(0.013)	(0.013)	(0.013)	(0.014)
Observations	10,135	10,129	9,933	9,547	9,161	10,135	10,129	9,933	9,547	9,161
Panel C. Dependent variable: Internal and internationalized internal armed conflict										
Discovery	0.014	**0.060**	**0.076**	0.050	0.021	0.003	**0.051**	**0.070**	**0.049**	0.023
	(0.022)	(0.020)	(0.027)	(0.027)	(0.026)	(0.019)	(0.016)	(0.022)	(0.023)	(0.024)
Years with discoveries from t-10 to t-1						0.019	0.015	0.008	0.002	-0.004
						(0.012)	(0.011)	(0.010)	(0.010)	(0.010)
Observations	10,135	10,129	9,933	9,547	9,161	10,135	10,129	9,933	9,547	9,161

Notes: This table reports the effect of discovering at least one giant oilfield in a panel of country-year observations. The panel includes 193 countries and uses data from 1946-2008. All regressions include country and year fixed effects. Giant oilfields are those having an estimated ultimate recoverable reserves of oil, including gas and condensate equivalent, of at least 500 million barrels (Horn 2004). Robust standard errors in parentheses are clustered by country.

Table 4: Heterogeneous Effect of Giant Oil Discoveries on Internal Armed Conflicts

Outcome in year:	t+2	t+4	t+6	t+8	t+10	t+2	t+4	t+6	t+8	t+10
Panel A. Countries that experienced at least one coup from t-10 to t-1										
Discovery	0.044	**0.139**	**0.140**	**0.114**	0.047	0.041	**0.136**	**0.138**	**0.113**	0.048
	(0.050)	(0.044)	(0.037)	(0.033)	(0.049)	(0.048)	(0.042)	(0.034)	(0.032)	(0.049)
Years with discoveries from t-10 to t-1						**0.070**	**0.055**	0.034	0.009	-0.006
						(0.016)	(0.015)	(0.017)	(0.019)	(0.020)
Observations	2,605	2,605	2,557	2,457	2,347	2,605	2,605	2,557	2,457	2,347
Panel B. Countries that experienced no coups from t-10 to t-1										
Discovery	0.010	0.039	0.057	0.037	0.022	-0.001	0.026	0.046	0.025	0.012
	(0.024)	(0.021)	(0.033)	(0.034)	(0.034)	(0.016)	(0.014)	(0.024)	(0.026)	(0.029)
Years with discoveries from t-10 to t-1						0.016	0.019	0.016	0.015	0.013
						(0.014)	(0.014)	(0.012)	(0.011)	(0.010)
Observations	7,337	7,331	7,183	6,897	6,621	7,337	7,331	7,183	6,897	6,621
Panel C. Countries that experienced at least one internal armed conflict from t-10 to t-1										
Discovery	-0.021	**0.124**	**0.179**	**0.114**	0.057	-0.032	**0.113**	**0.172**	**0.108**	0.053
	(0.058)	(0.049)	(0.042)	(0.046)	(0.063)	(0.050)	(0.042)	(0.037)	(0.038)	(0.059)
Years with discoveries from t-10 to t-1						0.040	**0.042**	0.026	0.016	0.011
						(0.026)	(0.021)	(0.023)	(0.021)	(0.019)
Observations	1,958	1,958	1,907	1,797	1,679	1,958	1,958	1,907	1,797	1,679
Panel D. Countries that experienced no internal armed conflicts from t-10 to t-1										
Discovery	0.019	0.024	0.018	0.018	0.000	0.016	0.022	0.019	0.022	0.005
	(0.014)	(0.017)	(0.019)	(0.020)	(0.018)	(0.011)	(0.014)	(0.018)	(0.019)	(0.017)
Years with discoveries from t-10 to t-1						0.006	0.003	-0.002	-0.006	-0.009
						(0.007)	(0.006)	(0.006)	(0.006)	(0.006)
Observations	7,984	7,978	7,833	7,557	7,289	7,984	7,978	7,833	7,557	7,289

Notes: This table reports the effect of discovering at least one giant oilfield in a panel of country-year observations. The panel includes 193 countries and uses data from 1946-2008. All regressions include country and year fixed effects. Giant oilfields are those having an estimated ultimate recoverable reserves of oil, including gas and condensate equivalent, of at least 500 million barrels (Horn 2004). Robust standard errors in parentheses are clustered by country.

Table 5: Robustness of Effect of Giant Oil Discoveries on Oil Production

Outcome in year:	t+2	t+4	t+6	t+8	t+10
Panel A. Baseline - as in Panel A of Table 2					
Discovery	**0.215**	**0.297**	**0.310**	**0.329**	**0.332**
	(0.069)	(0.061)	(0.065)	(0.068)	(0.076)
Observations	3,535	3,705	3,629	3,551	3,470
Panel B. As baseline, but controlling for the dependent variable in t-1, instrumented by the dependent variable in t-2					
Discovery	**0.136**	**0.172**	**0.160**	0.135	**0.164**
	(0.050)	(0.057)	(0.067)	(0.074)	(0.076)
Observations	3,134	3,121	2,919	2,718	2,525
Panel C. As baseline, but controlling for polity2 score in t-1					
Discovery	**0.215**	**0.279**	**0.259**	**0.254**	**0.266**
	(0.072)	(0.062)	(0.072)	(0.075)	(0.082)
Observations	3,290	3,400	3,296	3,185	3,068
Panel D. As baseline, but controlling for log PPP-adjusted per capita private investment in US$2005 in t-1					
Discovery	**0.144**	**0.221**	**0.222**	**0.231**	**0.242**
	(0.070)	(0.066)	(0.077)	(0.078)	(0.084)
Observations	3,356	3,426	3,291	3,151	3,005
Panel E. As baseline, but with all controls from panels B-D					
Discovery	**0.139**	**0.173**	**0.162**	0.133	**0.168**
	(0.050)	(0.058)	(0.068)	(0.075)	(0.075)
Observations	2,977	2,964	2,772	2,579	2,394
Panel F. As baseline, but excluding observations with one or more discoveries from t-10 to t-1					
Discovery	0.384	**0.574**	**0.555**	**0.627**	**0.672**
	(0.197)	(0.189)	(0.173)	(0.184)	(0.195)
Observations	2,202	2,337	2,302	2,269	2,226
Panel G. As baseline, but using only countries that discovered at least one giant oilfield					
Discovery	**0.239**	**0.320**	**0.338**	**0.355**	**0.352**
	(0.071)	(0.064)	(0.067)	(0.070)	(0.079)
Observations	2,570	2,686	2,637	2,587	2,535
Panel H. As baseline, but using only countries*year observations with one or more discoveries in the 2008 Oil and Gas Journal Data Book.					
Discovery	0.023	0.086	**0.144**	**0.172**	**0.170**
	(0.080)	(0.068)	(0.070)	(0.058)	(0.063)
Observations	1,107	1,138	1,142	1,140	1,119

Notes: This table reports the effect of discovering at least one giant oilfield in a panel of country-year observations. The panel includes 193 countries and uses data from 1946-2008. All regressions include country, year fixed effects, and control for the number of years with discoveries from t-10 to t-1. Giant oilfields are those having an estimated ultimate recoverable reserves of oil, including gas and condensate equivalent, of at least 500 million barrels (Horn 2004). Robust standard errors in parentheses are clustered by country.

Table 6: Robustness of Effect of Giant Oil Discoveries on Internal Armed Conflicts

Outcome in year:	t+2	t+4	t+6	t+8	t+10
Panel A. Baseline - as in Panel A of Table 3					
Discovery	0.003	**0.050**	**0.072**	**0.057**	0.031
	(0.017)	(0.016)	(0.021)	(0.022)	(0.025)
Observations	10,135	10,129	9,933	9,547	9,161
Panel B. As baseline, but controlling for the dependent variable in t-1, instrumented by the dependent variable in t-2					
Discovery	0.005	**0.053**	**0.072**	**0.055**	0.029
	(0.016)	(0.019)	(0.023)	(0.022)	(0.025)
Observations	9,749	9,743	9,547	9,161	8,775
Panel C. As baseline, but controlling for polity2 score in t-1					
Discovery	0.009	**0.060**	**0.086**	**0.065**	0.036
	(0.020)	(0.020)	(0.025)	(0.025)	(0.028)
Observations	6,894	6,888	6,726	6,407	6,087
Panel D. As baseline, but controlling for log PPP-adjusted per capita private investment in US$2005 in t-1					
Discovery	0.015	**0.060**	**0.084**	**0.064**	0.025
	(0.026)	(0.024)	(0.026)	(0.028)	(0.036)
Observations	7,404	7,404	7,218	6,845	6,471
Panel E. As baseline, but with all controls from panels B-D					
Discovery	0.013	**0.058**	**0.092**	**0.067**	0.027
	(0.023)	(0.024)	(0.029)	(0.028)	(0.037)
Observations	5,942	5,942	5,789	5,481	5,171
Panel F. As baseline, but excluding observations with one or more discoveries from t-10 to t-1					
Discovery	0.031	0.036	**0.068**	**0.098**	0.057
	(0.030)	(0.029)	(0.027)	(0.039)	(0.040)
Observations	8,590	8,586	8,424	8,111	7,791
Panel G. As baseline, but using only countries that discovered at least one giant oilfield					
Discovery	0.007	**0.052**	**0.072**	**0.058**	0.026
	(0.018)	(0.016)	(0.022)	(0.022)	(0.024)
Observations	3,572	3,570	3,504	3,374	3,244
Panel H. As baseline, but using only countries*year observations with one or more discoveries in the 2008 Oil and Gas Journal Data Book.					
Discovery	0.011	**0.066**	**0.100**	0.067	0.040
	(0.033)	(0.030)	(0.038)	(0.036)	(0.035)
Observations	1,311	1,307	1,298	1,276	1,247

Notes: This table reports the effect of discovering at least one giant oilfield in a panel of country-year observations. The panel includes 193 countries and uses data from 1946-2008. All regressions include country, year fixed effects, and control for the number of years with discoveries from t-10 to t-1. Giant oilfields are those having an estimated ultimate recoverable reserves of oil, including gas and condensate equivalent, of at least 500 million barrels (Horn 2004). Robust standard errors in parentheses are clustered by country.

Table 7: Robustness of Effect of Giant Oil Discoveries on Internal Armed Conflicts in Countries with at Least One Internal Armed Conflict in Decade Before Discovery

Outcome in year:	t+2	t+4	t+6	t+8	t+10
Panel A. Baseline - as in Panel C of Table 4					
Discovery	-0.032	**0.113**	**0.172**	**0.108**	0.053
	(0.050)	(0.042)	(0.037)	(0.038)	(0.059)
Observations	1,958	1,958	1,907	1,797	1,679
Panel B. As baseline, but controlling for the dependent variable in t-1, instrumented by the dependent variable in t-2					
Discovery	-0.029	**0.115**	**0.176**	**0.110**	0.050
	(0.044)	(0.043)	(0.037)	(0.036)	(0.057)
Observations	1,948	1,948	1,898	1,788	1,670
Panel C. As baseline, but controlling for polity2 score in t-1					
Discovery	-0.025	**0.109**	**0.181**	**0.111**	0.054
	(0.050)	(0.044)	(0.036)	(0.039)	(0.062)
Observations	1,879	1,879	1,830	1,723	1,607
Panel D. As baseline, but controlling for log PPP-adjusted per capita private investment in US$2005 in t-1					
Discovery	-0.012	**0.125**	**0.196**	**0.128**	0.066
	(0.060)	(0.048)	(0.037)	(0.040)	(0.068)
Observations	1,753	1,753	1,704	1,597	1,481
Panel E. As baseline, but with all controls from panels B-D					
Discovery	-0.019	**0.109**	**0.198**	**0.130**	0.066
	(0.052)	(0.049)	(0.039)	(0.038)	(0.067)
Observations	1,708	1,708	1,662	1,558	1,444
Panel F. As baseline, but excluding observations with one or more discoveries from t-10 to t-1					
Discovery	-0.031	0.154	**0.131**	**0.118**	-0.009
	(0.057)	(0.082)	(0.058)	(0.057)	(0.096)
Observations	1,437	1,437	1,400	1,323	1,236
Panel G. As baseline, but using only countries that discovered at least one giant oilfield					
Discovery	-0.026	**0.113**	**0.172**	**0.108**	0.049
	(0.051)	(0.041)	(0.038)	(0.038)	(0.059)
Observations	986	986	964	916	864
Panel H. As baseline, but using only countries*year observations with one or more discoveries in the 2008 Oil and Gas Journal Data Book.					
Discovery	-0.028	0.052	**0.215**	**0.129**	0.087
	(0.066)	(0.049)	(0.056)	(0.046)	(0.066)
Observations	406	406	403	398	384

Notes: This table reports the effect of discovering at least one giant oilfield in a panel of country-year observations. The panel includes 193 countries and uses data from 1946-2008. All regressions include country, year fixed effects, and control for the number of years with discoveries from t-10 to t-1. Giant oilfields are those having an estimated ultimate recoverable reserves of oil, including gas and condensate equivalent, of at least 500 million barrels (Horn 2004). Robust standard errors in parentheses are clustered by country.

Table 8: Effect of Giant Oil Discoveries and Interactions on Internal Armed Conflicts

Outcome in year:	t+2	t+4	t+6	t+8	t+10
Panel A. As Panel A of Table 3, but including discovery interaction with number of years with internal conflicts from t-10 to t-1					
Discovery	0.012	0.030	**0.037**	0.030	0.007
	(0.018)	(0.017)	(0.018)	(0.021)	(0.020)
Years with internal armed conflicts from t-10 to t-1	**0.044**	**0.028**	**0.015**	0.005	-0.006
	(0.004)	(0.005)	(0.006)	(0.006)	(0.006)
Discovery x (Years with internal armed conflicts from t-10 to t-1)	-0.007	0.013	**0.023**	**0.017**	**0.016**
	(0.009)	(0.008)	(0.006)	(0.007)	(0.007)
Observations	10,135	10,129	9,933	9,547	9,161
Panel B. As Panel A, but including various interactions of discovery					
Discovery	0.085	0.191	0.079	0.071	-0.051
	(0.252)	(0.197)	(0.188)	(0.193)	(0.169)
Years with internal armed conflicts from t-10 to t-1	**0.038**	**0.019**	0.003	-0.010	**-0.023**
	(0.005)	(0.006)	(0.007)	(0.007)	(0.008)
Log ppp-adjusted per capita GDP in t-1	-0.014	-0.010	-0.012	-0.013	-0.012
	(0.020)	(0.021)	(0.023)	(0.025)	(0.027)
Discovery x (Years with internal armed conflicts from t-10 to t-1)	-0.002	0.015	**0.029**	**0.025**	**0.029**
	(0.012)	(0.011)	(0.007)	(0.009)	(0.009)
Discovery x (Log ppp-adjusted per capita GDP in t-1)	-0.003	-0.015	-0.009	-0.007	0.007
	(0.029)	(0.021)	(0.019)	(0.021)	(0.018)
Discovery x (Countries with strong institution)	0.028	0.029	0.077	0.088	0.102
	(0.072)	(0.062)	(0.080)	(0.086)	(0.083)
Discovery x (Ethnic fractionalization)	-0.102	-0.080	0.031	-0.018	-0.119
	(0.121)	(0.110)	(0.097)	(0.100)	(0.118)
Observations	7,209	7,209	7,028	6,666	6,304

Notes: This table reports the effect of discovering at least one giant oilfield in a panel of country-year observations. The panel includes 193 countries and uses data from 1946-2008. All regressions include country, year fixed effects, and control for the number of years with discoveries from t-10 to t-1. Giant oilfields are those having an estimated ultimate recoverable reserves of oil, including gas and condensate equivalent, of at least 500 million barrels (Horn 2004). Robust standard errors in parentheses are clustered by country.

Table 9: Effect of Giant Oil Discoveries on Per Capita GDP and its Components

Outcome in year:	t+2	t+4	t+6	t+8	t+10
Panel A. Dependent variable: Log PPP-adjusted per capita GDP in US$2005					
Discovery	**0.040**	**0.048**	**0.036**	**0.059**	**0.059**
	(0.018)	(0.019)	(0.018)	(0.020)	(0.024)
Observations	7,937	8,266	8,108	7,940	7,760
Panel B. As Panel A, but controlling for the dependent variable in t-1, instrumented by the dependent variable in t-2, polity2 score in t-1, and log PPP-adjusted per capita private investment in US$2005 in t-1					
Discovery	0.016	0.014	0.002	0.004	-0.001
	(0.010)	(0.014)	(0.014)	(0.017)	(0.021)
Observations	5,839	5,838	5,532	5,222	4,912
Panel C. Dependent variable: Log PPP-adjusted per capita government spending in US$2005					
Discovery	0.017	**0.041**	**0.048**	**0.053**	**0.062**
	(0.016)	(0.018)	(0.021)	(0.024)	(0.029)
Observations	7,937	8,266	8,108	7,940	7,760
Panel D. As Panel C, but including controls as Panel B					
Discovery	0.017	0.026	0.035	0.035	0.023
	(0.012)	(0.018)	(0.026)	(0.027)	(0.026)
Observations	5,839	5,838	5,532	5,222	4,912
Panel E. Dependent variable: Log PPP-adjusted per capita private consumption in US$2005					
Discovery	-0.004	-0.002	-0.009	-0.001	0.013
	(0.016)	(0.018)	(0.020)	(0.019)	(0.021)
Observations	7,937	8,266	8,108	7,940	7,760
Panel F. As Panel E, but including controls as Panel B					
Discovery	0.015	0.017	0.003	0.010	0.015
	(0.010)	(0.014)	(0.012)	(0.015)	(0.017)
Observations	5,839	5,838	5,532	5,222	4,912
Panel G. Dependent variable: Log PPP-adjusted per capita private investment in US$2005					
Discovery	0.038	0.026	0.004	0.049	0.051
	(0.032)	(0.026)	(0.025)	(0.036)	(0.038)
Observations	7,933	8,262	8,104	7,936	7,756
Panel H. As Panel G, but including controls as Panel B					
Discovery	0.008	-0.019	**-0.053**	-0.004	-0.005
	(0.016)	(0.021)	(0.025)	(0.043)	(0.042)
Observations	5,834	5,833	5,527	5,217	4,907

Notes: This table reports the effect of discovering at least one giant oilfield in a panel of country-year observations. The panel includes 193 countries and uses data from 1946-2008. All regressions include country, year fixed effects, and control for the number of years with discoveries from t-10 to t-1. Giant oilfields are those having an estimated ultimate recoverable reserves of oil, including gas and condensate equivalent, of at least 500 million barrels (Horn 2004). Robust standard errors in parentheses are clustered

Table 10: Effect of Giant Oil Discoveries on Other Outcomes

Outcome in year:	t+2	t+4	t+6	t+8	t+10
Panel A. Dependent variable: Log real exchange rate					
Discovery	0.045	0.021	0.020	-0.014	-0.027
	(0.033)	(0.028)	(0.026)	(0.026)	(0.029)
Observations	7,957	8,286	8,126	7,956	7,774
Panel B. As panel A, but controlling for the dependent variable in t-1, instrumented by the dependent variable in t-2, polity2 score in t-1, and log PPP-adjusted per capita private investment in US$2005 in t-1					
Discovery	0.036	0.017	0.014	-0.035	-0.048
	(0.028)	(0.026)	(0.026)	(0.028)	(0.037)
Observations	5,840	5,839	5,533	5,223	4,913
Panel C. Dependent variable: Log per capita non-oil export in US$2005					
Discovery	-0.053	0.020	0.017	0.001	0.030
	(0.069)	(0.070)	(0.057)	(0.065)	(0.061)
Observations	5,519	5,475	5,431	5,387	5,367
Panel D. As Panel C, but including controls as Panel B					
Discovery	-0.036	-0.008	-0.011	0.024	0.051
	(0.027)	(0.027)	(0.035)	(0.049)	(0.068)
Observations	4,134	3,846	3,540	3,292	3,045
Panel E. Dependent variable: Log Public debt (as percentage of GDP)					
Discovery	0.046	0.041	0.045	-0.022	-0.067
	(0.033)	(0.039)	(0.050)	(0.048)	(0.043)
Observations	5,144	5,424	5,517	5,438	5,337
Panel F. As Panel E, but including controls as Panel B					
Discovery	0.021	0.034	0.011	0.009	-0.024
	(0.020)	(0.035)	(0.043)	(0.045)	(0.035)
Observations	3,733	3,725	3,577	3,305	3,038
Panel G. Dependent variable: Coup					
Discovery	-0.009	0.005	0.008	0.018	-0.005
	(0.010)	(0.013)	(0.013)	(0.013)	(0.012)
Observations	10,135	10,129	9,933	9,547	9,161
Panel H. As Panel G, but including controls as Panel B					
Discovery	-0.007	0.002	0.014	0.009	-0.018
	(0.011)	(0.014)	(0.018)	(0.012)	(0.017)
Observations	5,942	5,942	5,789	5,481	5,171
Panel I. Dependent variable: Repression					
Discovery	0.007	-0.022	-0.019	-0.020	-0.003
	(0.024)	(0.019)	(0.019)	(0.017)	(0.015)
Observations	7,778	7,974	7,987	7,805	7,611
Panel J. As Panel I, but including controls as Panel B					
Discovery	-0.004	**-0.032**	-0.014	-0.009	-0.007
	(0.020)	(0.016)	(0.015)	(0.013)	(0.013)
Observations	5,694	5,693	5,542	5,238	4,932

Notes: This table reports the effect of discovering at least one giant oilfield in a panel of country-year observations. The panel includes 193 countries and uses data from 1946-2008. All regressions include country, year fixed effects, and control for the number of years with discoveries from t-10 to t-1. Giant oilfields are those having an estimated ultimate recoverable reserves of oil, including gas and condensate equivalent, of at least 500 million barrels (Horn 2004). Robust standard errors in parentheses are clustered by country.

Appendix Table A1: Number of Years (from 1946-2003) with One or More Giant Oilfield Discoveries, by Country

Outcome in year:	Years (from 1946-2003) with at least one giant oilfield discovery	country	Years (from 1946-2003) with at least one giant oilfield discovery	country	Years (from 1946-2003) with at least one giant oilfield discovery
Former USSR	41	Angola	7	Albania	1
Saudi Arabia	29	Malaysia	6	Austria	1
Iran	27	Colombia	5	Azerbaijan	1
United States	25	Pakistan	5	Bangladesh	1
China	21	Qatar	5	Côte d'Ivoire	1
Iraq	20	Argentina	4	Denmark	1
Nigeria	19	Congo, Republic of	4	Ecuador	1
Australia	18	Netherlands	3	Equatorial Guinea	1
Libya	16	Peru	3	Gabon	1
Norway	15	Thailand	3	Germany	1
Canada	14	Trinidad and Tobago	3	Hungary	1
Indonesia	14	Tunisia	3	Morocco	1
Mexico	14	Bolivia	2	Namibia	1
United Arab Emirates	14	Brunei	2	New Zealand	1
Brazil	13	France	2	Papua New Guinea	1
United Kingdom	12	Italy	2	Philippines	1
Venezuela	12	Kazakhstan	2	Romania	1
Egypt	11	Myanmar	2	Russian Federation	1
Oman	10	Sudan	2	Spain	1
Kuwait	9	Viet Nam	2	Syria	1
Algeria	8	Yemen	2	Turkmenistan	1
India	8	Afghanistan	1		

Notes: This table reports the number of country-year cells with one or more discovery of a giant oilfield from 1946-2003, by country.

Appendix Table A2: Oil Explorations During Lull Periods Following Internal Armed Conflict

Dependent variable	Number of wildcats drilled					Indicator for positive wildcats drilled				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Panel A. Indicator for conflict followed by the number of years without conflict before t										
Conflict in t-2, no conflict in t-1	-7.126					0.014				
	(8.192)					(0.031)				
Conflict in t-3, no conflict in t-2 & t-1		-8.544					0.011			
		(7.873)					(0.035)			
Conflict in t-4, no conflict in t-3, t-2 & t-1			-1.785					0.003		
			(7.726)					(0.035)		
Conflict in t-5, no conflict in t-4, t-3, t-2 & t-1				-0.895					-0.043	
				(9.069)					(0.046)	
Conflict in t-6, no conflict in t-5, t-4, t-3, t-2 & t-1					-0.137					-0.038
					(8.493)					(0.040)
Observations	2,951	2,951	2,951	2,951	2,951	2,951	2,951	2,951	2,951	2,951
Panel B. As Panel A, but using indicator for conflict followed by the number of years without conflict including t										
Conflict in t-1, no conflict in t	-2.562					0.014				
	(8.455)					(0.029)				
Conflict in t-2, no conflict in t-1 & t		-8.027					-0.009			
		(7.828)					(0.040)			
Conflict in t-3, no conflict in t-2, t-1 & t			-6.666					0.011		
			(8.048)					(0.037)		
Conflict in t-4, no conflict in t-3, t-2, t-1 & t				-1.573					-0.017	
				(7.822)					(0.031)	
Conflict in t-5, no conflict in t-4, t-3, t-2, t-1 & t					-0.415					-0.050
					(9.290)					(0.048)
Observations	2,951	2,951	2,951	2,951	2,951	2,951	2,951	2,951	2,951	2,951

Notes: This table reports the association of oil explorations and the lull period of conflict in a panel of country-year observations. The panel includes 63 countries and uses data from 1946 - 2003 respectively. All regressions include country and year fixed effects. Wildcats drilled, a direct measure of oil exploration effort, are constructed using Cotet and Tsui (2013) online published dataset. Robust standard errors in parentheses are clustered by country.

Appendix Table A3: Effect of Giant Discoveries on Internal Armed Conflicts: Comparing with Cotet and Tsui (2013)

Outcome in year:	t+2	t+4	t+6	t+8	t+10	t+2	t+4	t+6	t+8	t+10
Panel A. As in Panel A of Table 3, but using only observations for which wildcat data from Cotet and Tsui (2013) are available										
Discovery	0.012	**0.068**	**0.089**	**0.060**	0.037	0.002	**0.059**	**0.083**	**0.057**	0.036
	(0.025)	(0.024)	(0.030)	(0.030)	(0.029)	(0.021)	(0.019)	(0.026)	(0.025)	(0.028)
Years with discoveries from t-10 to t-1						0.021	0.018	0.011	0.007	0.003
						(0.013)	(0.012)	(0.011)	(0.010)	(0.009)
Observations	2,948	2,944	2,880	2,755	2,629	2,948	2,944	2,880	2,755	2,629
Panel B. As Panel A, but controlling for the number of wildcats drilled										
Discovery	0.012	**0.068**	**0.089**	**0.060**	0.037	0.002	**0.059**	**0.083**	**0.057**	0.036
	(0.025)	(0.024)	(0.030)	(0.030)	(0.029)	(0.021)	(0.019)	(0.026)	(0.025)	(0.028)
Wildcats drilled (in thousands)	**0.014**	0.012	0.005	0.000	-0.005	0.002	0.001	-0.002	-0.005	-0.007
	(0.006)	(0.007)	(0.006)	(0.006)	(0.007)	(0.010)	(0.011)	(0.011)	(0.012)	(0.012)
Years with discoveries from t-10 to t-1						0.021	0.018	0.011	0.007	0.003
						(0.013)	(0.012)	(0.011)	(0.010)	(0.010)
Observations	2,948	2,944	2,880	2,755	2,629	2,948	2,944	2,880	2,755	2,629
Panel C. As Panel B, but using an indicator for years with giant-equivalent discoveries using Cotet and Tsui (2013) data										
Giant-equivalent discovery (Cotet and Tsui 2013)	0.022	0.043	**0.057**	0.049	0.034	0.018	0.036	**0.051**	0.045	0.032
	(0.035)	(0.029)	(0.026)	(0.031)	(0.027)	(0.032)	(0.025)	(0.021)	(0.026)	(0.025)
Wildcats drilled (in thousands)	0.012	0.008	0.000	-0.003	-0.006	0.011	0.006	-0.002	-0.004	-0.006
	(0.007)	(0.008)	(0.007)	(0.008)	(0.008)	(0.008)	(0.009)	(0.008)	(0.009)	(0.008)
Years with giant-equivalent discovery from t-10 to t-1						0.004	0.007	0.006	0.004	0.002
						(0.010)	(0.009)	(0.010)	(0.008)	(0.008)
Observations	2,948	2,944	2,880	2,755	2,629	2,948	2,944	2,880	2,755	2,629
Panel D. As Panel C, but controlling for non-giant oil discoveries from Cotet and Tsui (2013)										
Giant-equivalent discovery (Cotet and Tsui 2013)	0.019	0.054	**0.065**	0.056	0.024	0.015	0.046	**0.058**	0.052	0.022
	(0.039)	(0.032)	(0.030)	(0.039)	(0.034)	(0.036)	(0.027)	(0.024)	(0.033)	(0.032)
Non-giant discovery (Cotet and Tsui 2013)	-0.004	0.016	0.012	0.010	-0.014	-0.004	0.015	0.011	0.009	-0.015
	(0.018)	(0.016)	(0.017)	(0.017)	(0.020)	(0.018)	(0.016)	(0.017)	(0.017)	(0.020)
Wildcats drilled (in thousands)	0.012	0.006	-0.001	-0.004	-0.005	0.011	0.004	-0.003	-0.004	-0.005
	(0.007)	(0.008)	(0.008)	(0.009)	(0.008)	(0.008)	(0.009)	(0.009)	(0.009)	(0.009)
Years with giant-equivalent discovery from t-10 to t-1						0.004	0.007	0.006	0.004	0.002
						(0.010)	(0.009)	(0.010)	(0.008)	(0.008)
Observations	2,948	2,944	2,880	2,755	2,629	2,948	2,944	2,880	2,755	2,629

Notes: This table reports the reconciliation between our findings and Cotet and Tsui (2013) in a panel of country-year observations. The panel includes 63 countries and uses data from 1946 - 2003 respectively. All regressions include country and year fixed effects. Giant oilfields are those having an estimated ultimate recoverable reserves of oil, including gas and condensate equivalent, of at least 500 million barrels (Horn 2004). Giant-equivalent discovery and non-giant discovery are constructed using Cotet and Tsui (2013) data. Details can be found in section 4. Robust standard errors in parentheses are clustered by country.

Appendix Table A4: Effect of Oil Discovery Size on Internal Armed Conflicts

Outcome in year:	t+2	t+4	t+6	t+8	t+10	t+2	t+4	t+6	t+8	t+10
Panel A. As in Panel A of Table 3, but including indicators for each quartile of discoveries size in a given country-year observations										
Discovery size in quartile 4	-0.017	-0.016	**0.057**	0.050	0.026	-0.036	-0.032	**0.046**	**0.045**	0.026
	(0.030)	(0.034)	(0.026)	(0.028)	(0.047)	(0.030)	(0.036)	(0.020)	(0.022)	(0.046)
Discovery size in quartile 3	0.041	**0.114**	**0.116**	0.065	0.009	0.021	**0.097**	**0.105**	**0.061**	0.009
	(0.033)	(0.031)	(0.036)	(0.033)	(0.033)	(0.030)	(0.026)	(0.029)	(0.028)	(0.030)
Discovery size in quartile 2	0.002	0.058	**0.097**	**0.079**	0.071	-0.004	0.053	**0.094**	**0.078**	**0.071**
	(0.039)	(0.037)	(0.036)	(0.033)	(0.037)	(0.036)	(0.035)	(0.033)	(0.031)	(0.036)
Discovery size in quartile 1	0.028	**0.069**	0.043	0.044	0.011	0.020	**0.062**	0.038	0.042	0.011
	(0.031)	(0.028)	(0.029)	(0.034)	(0.031)	(0.029)	(0.025)	(0.026)	(0.031)	(0.030)
Years with discoveries from t-10 to t-1						0.021	0.018	0.011	0.005	0.000
						(0.012)	(0.011)	(0.010)	(0.010)	(0.010)
Observations	10,135	10,129	9,933	9,547	9,161	10,135	10,129	9,933	9,547	9,161
Panel B. As Panel A, but controlling for non-giant oil discovery dummy from Oil and Gas Journal Databook										
Discovery size in quartile 4	-0.011	-0.016	**0.056**	0.051	0.024	-0.033	-0.035	**0.043**	**0.045**	0.024
	(0.031)	(0.035)	(0.027)	(0.029)	(0.047)	(0.029)	(0.037)	(0.020)	(0.023)	(0.047)
Discovery size in quartile 3	0.048	**0.113**	**0.114**	0.066	0.008	0.026	**0.094**	**0.102**	**0.060**	0.007
	(0.036)	(0.033)	(0.037)	(0.034)	(0.032)	(0.032)	(0.027)	(0.029)	(0.028)	(0.029)
Discovery size in quartile 2	0.008	0.058	**0.095**	**0.080**	0.070	0.000	0.050	**0.090**	**0.077**	**0.069**
	(0.039)	(0.038)	(0.036)	(0.034)	(0.036)	(0.036)	(0.035)	(0.033)	(0.031)	(0.034)
Discovery size in quartile 1	0.034	**0.068**	0.041	0.044	0.010	0.024	**0.060**	0.035	0.041	0.010
	(0.032)	(0.028)	(0.030)	(0.034)	(0.031)	(0.029)	(0.025)	(0.026)	(0.030)	(0.030)
Non-giant discovery	0.018	-0.002	-0.005	0.001	-0.004	0.010	-0.008	-0.009	-0.001	-0.004
	(0.016)	(0.015)	(0.017)	(0.016)	(0.017)	(0.015)	(0.015)	(0.017)	(0.016)	(0.018)
Years with discoveries from t-10 to t-1						0.020	0.018	0.012	0.005	0.000
						(0.012)	(0.011)	(0.011)	(0.010)	(0.010)
Observations	10,135	10,129	9,933	9,547	9,161	10,135	10,129	9,933	9,547	9,161

Notes: This table reports the effect of discovering oilfield in size in a panel of country-year observations. The panel includes 193 countries and uses data from 1946-2008. All regressions include country and year fixed effects. Giant oilfields are those having an estimated ultimate recoverable reserves of oil, including gas and condensate equivalent, of at least 500 million barrels (Horn 2004). Discovery size in each quartile is constucted based on the estimated Ultimate Recoverable Reserves (URR, in million barrels) of all giant discoveries in a given year and each quartile has the following range of URR: URR in quartile 1 ϵ [500, 658], URR in quartile 2 ϵ (658, 1180], URR in quartile 3 ϵ (1180, 2733], and URR in quartile 4 ϵ (2733, 160673]. Robust standard errors in parentheses are clustered by country.

Appendix Table A5: Effect of Onshore and Offshore Giant Oil Discoveries on Internal Armed Conflicts

Outcome in year:	t+2	t+4	t+6	t+8	t+10	t+2	t+4	t+6	t+8	t+10
Panel A. As in Panel A of Table 3, but using separate indicators for at least one onshore or offshore discoveries in a given country-year observation										
Onshore discovery	0.009	**0.070**	**0.083**	**0.069**	0.030	-0.003	**0.061**	**0.077**	**0.066**	0.030
	(0.021)	(0.026)	(0.025)	(0.026)	(0.024)	(0.021)	(0.024)	(0.023)	(0.024)	(0.023)
Offshore discovery	0.031	0.034	0.065	0.028	0.004	0.017	0.022	0.057	0.024	0.004
	(0.030)	(0.028)	(0.038)	(0.042)	(0.048)	(0.024)	(0.023)	(0.032)	(0.037)	(0.047)
Years with discoveries from t-10 to t-1						0.020	0.018	0.011	0.005	0.000
						(0.012)	(0.011)	(0.010)	(0.010)	(0.010)
Observations	10,135	10,129	9,933	9,547	9,161	10,135	10,129	9,933	9,547	9,161
H0: Onshore discovery = Offshore discovery (p-value) H1: Onshore discovery > Offshore discovery	0.242	0.166	0.336	0.206	0.323	0.262	0.144	0.316	0.196	0.322
Panel B. As Panel A, but controlling for the number of years with onshore and offshore discoveries from t-10 to t-1 separately										
Onshore discovery						-0.003	**0.060**	**0.077**	**0.067**	0.031
						(0.019)	(0.023)	(0.022)	(0.023)	(0.022)
Offshore discovery						0.022	0.027	**0.063**	0.027	0.004
						(0.022)	(0.018)	(0.028)	(0.032)	(0.043)
Years with onshore discoveries from t-10 to t-1						0.021	0.018	0.012	0.004	-0.002
						(0.016)	(0.013)	(0.013)	(0.012)	(0.012)
Years with offshore discoveries from t-10 to t-1						0.007	0.006	0.000	0.000	0.000
						(0.021)	(0.022)	(0.021)	(0.019)	(0.013)
Observations						10,135	10,129	9,933	9,547	9,161
H0: Onshore discovery = Offshore discovery (p-value) H1: Onshore discovery > Offshore discovery						0.143	0.126	0.332	0.159	0.300

Notes: This table reports the effect of discovering at least one giant onshore or offshore oilfield in a panel of country-year observations. The panel includes 193 countries and uses data from 1946-2008. All regressions include country and year fixed effects. Giant oilfields are those having an estimated ultimate recoverable reserves of oil, including gas and condensate equivalent, of at least 500 million barrels (Horn 2004). Robust standard errors in parentheses are clustered by country.

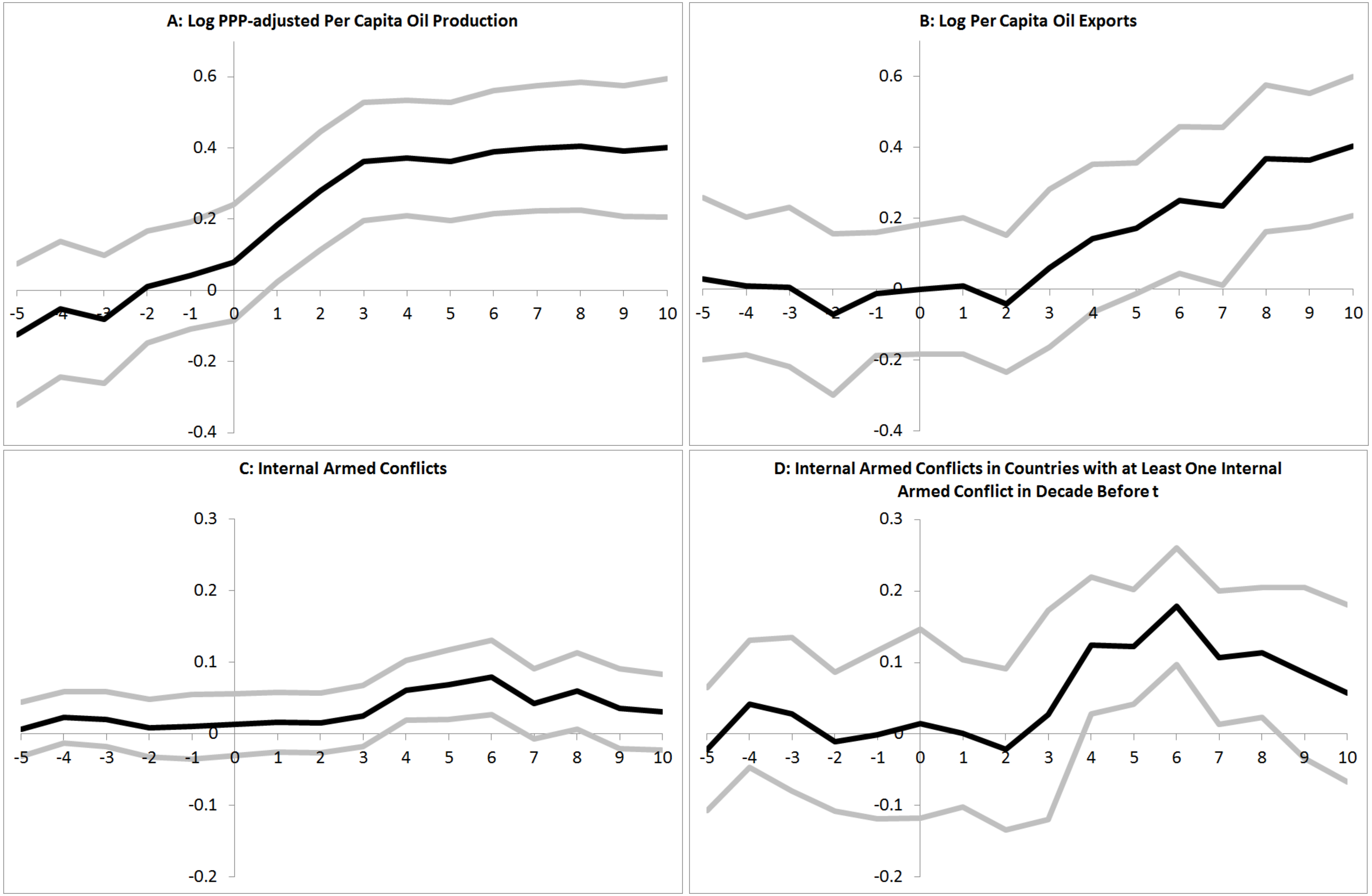

Figure 1: Effect of giant oilfield discovery on oil production, oil export, and internal armed conflicts. Sub-figure A shows the effect of giant oil discovery on PPP-adjusted per capita oil production in US$2005. Sub-figure B shows the effect of giant oil discovery on per capita oil export in US$2005. Sub-figure C shows the effect of giant oil discovery on internal armed conflicts. Sub-figure D is as sub-figure C but only with those having at least one or more years experienced internal armed conflict from t-10 to t-1. The x-axes report the number of years before or after t, ranging from t-5 to t+10. The black lines show the estimated coefficients and the grey lines show the 95% confidence intervals based on robust standard errors, which are clustered by country. All regressions include country and year fixed effects. Details on variable construction can be found in the data section of the paper.

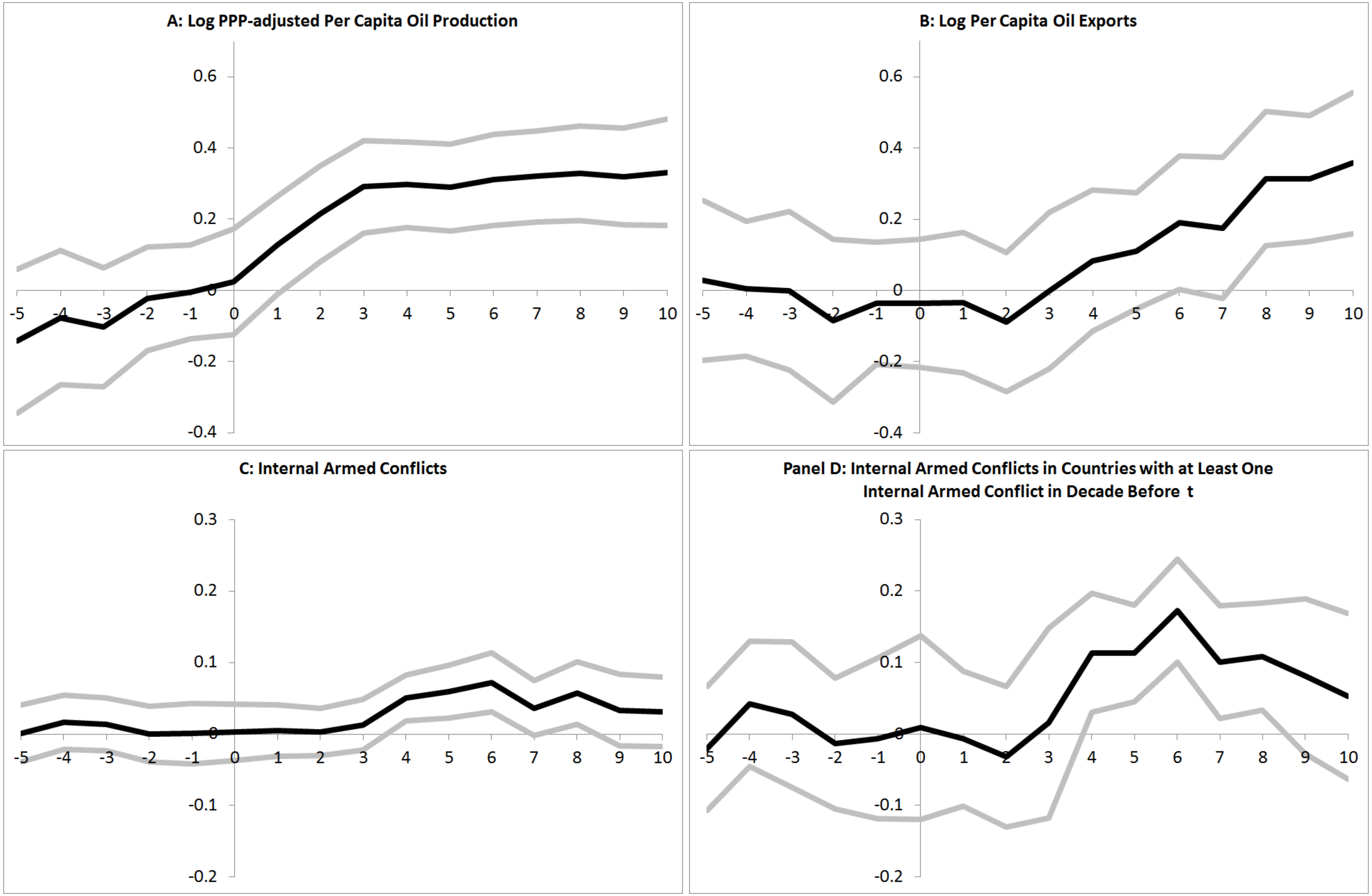

Figure 2: Effect of giant oilfield discovery on oil production, oil export, and internal armed conflicts with controls for the number of years with discoveries from t-10 to t-1. Sub-figure A shows the effect of giant oil discovery on PPP-adjusted per capita oil production in US$2005. Sub-figure B shows the effect of giant oil discovery on per capita oil export in US$2005. Sub-figure C shows the effect of giant oil discovery on internal armed conflicts. Sub-figure D is as sub-figure C but only with those having at least one or more years experienced internal armed conflict from t-10 to t-1. The x-axes report the number of years before or after t, ranging from t-5 to t+10. The black lines show the estimated coefficients and the grey lines show the 95% confidence intervals based on robust standard errors, which are clustered by country. All regressions include country and year fixed effects and control for the number of years with discoveries from t-10 to t-1. Details on variable construction can be found in the data section of the paper.

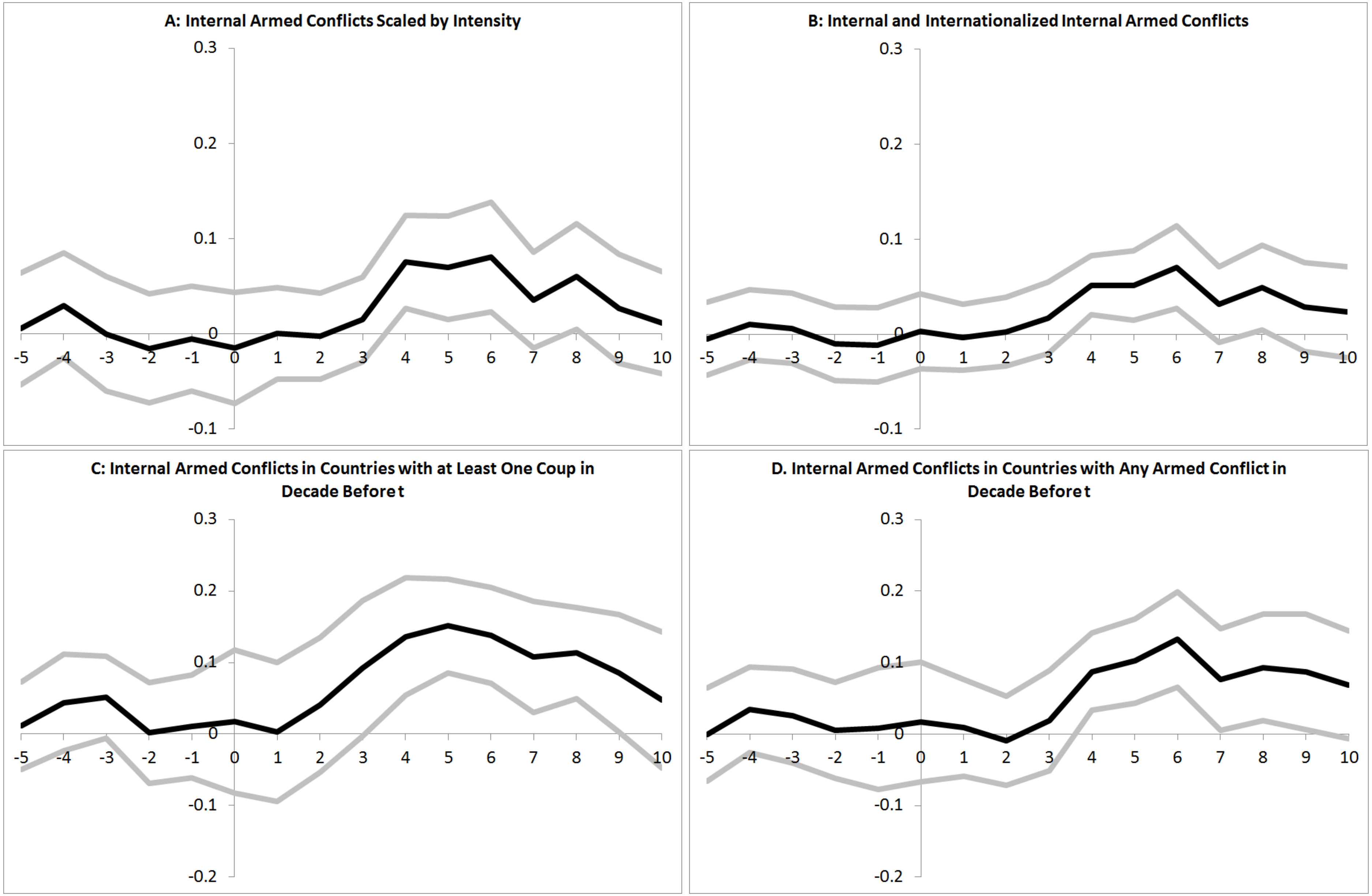

Figure 3: Effect of giant oilfield discovery on various measures of internal armed conflicts. Sub-figure A shows the effect of giant oil discovery on internal armed conflict scaled by intensity. Sub-figure B shows the effect of giant oil discovery on internal and internationalized internal armed conflicts. Sub-figure C shows the effect of giant oil discovery on internal armed conflicts but only for countries experienced at least one coup from t-10 to t-1. Sub-figure D shows the effect of giant oil discovery on internal armed conflicts but only for countries experienced any armed conflicts from t-10 to t-1. The x-axes report the number of years before or after t, ranging from t-5 to t+10. The black lines show the estimated coefficients and the grey lines show the 95% confidence intervals based on robust standard errors, which are clustered by country. All regressions include country and year fixed effects and control for the number of years with discoveries from t-10 to t-1. Details on variable construction can be found in the data section of the paper.