

**Profit Sharing Between Governments and Multinationals in  
Natural Resource Extraction: Evidence from a Firm-Level Panel**

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## **Abstract**

The “fairness” of negotiations between countries and resource extracting firms is subject to many accusations and counter-accusations and may be argued, in many instances, to impact the subsequent economic benefit to a host country from extraction. This paper examines the role of host country governance on the share of government take from extraction revenue. We attempt to disentangle a number of competing hypotheses regarding the relationship between governance and government take using panel data for US resource extracting multinational corporations (MNCs) operating abroad from the Bureau of Economic Analysis of the US Department of Commerce over 1982-1999. Using fixed effects regression, we find a statistically significant positive impact of institutional quality on government take. The nature of this relationship—whether this represents the result of a “corruption premium” paid by US MNCs or the exploitation of poor governance in negotiating government take—is not completely clear. The evidence presented does, however, indicate that potential forms of bargaining power other than institutional quality (e.g., outside options to the deal) do increase government take, indicating that bargaining power may nonetheless be an important factor.

*In matters of mining taxation, governments rarely believe that companies pay too much tax; companies rarely believe that they pay too little tax; and citizens rarely believe that they actually see tangible benefits from the taxes that are paid.*

—Otto et al. 2006

At the beginning of the last century, Venezuela, with its rudimentary agricultural economy, had the reputation as being one of the most backward nations in the Western Hemisphere. The country was run by Juan Vicente Gómez, put into power in 1908 by a U.S.-backed coup d'état, and the first in a line of *caudillo*, military-style dictators. Seven years after the coup, the Mene Grande oil field was discovered and in 1917 Venezuela began exporting petroleum. The “understanding” that Gómez had with the U.S. oil companies and government allowed him to use revenues to equip the first national army, expand the bureaucracy, and expand his repressive regime in exchange for cheap oil concessions and accommodating legislation (Karl, 1987).

Yet, from the beginning, the Venezuelan authorities and the oil companies were engaged in a “tug-of-war” over the terms of profit-sharing. By the 1950s, Venezuela enjoyed greater bargaining power than its Middle Eastern competitors (Mommer 1998). In 1958, the government increased the tax rate on oil extraction ten percentage points over the U.S. rate shattering its amiable business relationship with the U.S.. This precipitated the formation of OPEC in 1960, with Venezuela playing a lead role. With the up-tick in oil prices, the Venezuelans were again able to increase their share of economic rents through contract renegotiation. On the tails of OPEC came the establishment of the national Venezuelan oil company (*Corporación Venezolana de*

*Petróleo*). By developing technical ability and expertise in oil extraction, the Venezuelans were able to play a bigger role in upstream negotiations and put extra leverage on negotiations.<sup>3</sup> In 1973, the *Acción Democrática* government of Carlos Andrés Pérez nationalized the petroleum sector after taking power.

Chad has not been as successful as Venezuela at protecting the rents associated with natural resource extraction. It is a landlocked Saharan country with one of the lowest per capita income levels in Africa. It suffers major security problems from incursion on its borders with Sudan and Libya and substantial refugee influxes from the Darfur region. The country is universally considered a failed state with consistently some of the highest levels of corruption in the world. Nevertheless, the World Bank undertook an effort with a petroleum consortium in 1995 to begin to take advantage of the country's oil resources in an effort to reduce the drastic levels of poverty in the country.

Construction began in 2000, with oil flows beginning in 2004. The revenues accruing to the government were set up in such a way as to promote transparency and poverty reduction.<sup>4</sup> According to an article in the Guardian newspaper the government's original take was 28% of the total oil value, far smaller than that of other oil-producing countries in the region with comparable levels of low governance: Equatorial Guinea, Angola, Congo-Brazzaville, and Gabon.<sup>5</sup> In addition, the consortium of foreign petroleum companies seems to have been able to negotiate contracts such that when national laws conflicted with any contracts, the contracts would supersede. In an attempt

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<sup>3</sup> This was later followed by the 1967 Hydrocarbon Law, which also allowed the government to get improved concessions (Mommer 1998).

<sup>4</sup> The issue of how and to what extent these petrodollars will promote development of Chad is an interesting issue, but one beyond the scope of this paper. Here we will be concerned with the question of how bargaining over economic rents proceeded.

<sup>5</sup> Rice, X. "Fuels to Ourselves." *The Guardian*. September 1, 2006.

to renegotiate its contracts, the government spent \$1.6 million on lawyers and consultants with the result being a mere 2% increase in the terms of the second contract.<sup>6</sup>

As of late, Chad has not been the only case of extremely generous extraction concessions. A recent op-ed piece in the *Boston Globe* notes that “for a minimal return, [The Democratic Republic of the Congo] has signed away millions—if not billions—of dollars' worth of copper and cobalt for 35 years.”<sup>7</sup> Even a leaked World Bank document cited in the article admits that “to allow the contracts to proceed without comment would put us in the difficult position of perceived complicity and/or tacit approval of them.”<sup>8</sup>

The evidence presented in this paper suggests that the terms of profit sharing vary widely across countries and over time. Between 1982 and 1999, the share of rents going to host country governments in the natural resource extraction industries fell from 52.1% to 28.1% (see Tables 1b and 1c). This decline is driven by a reduction in tax collections and is consistent with the reforms in the mining sector reported by the World Bank (2006). According to the World Bank (2006), competition to attract exploration and mining investment has intensified resulting in more generous terms for investors. However, we also find that the share of rents paid to developed country governments averaged 40.1% while the share of rents paid to developing country governments averaged 31.9%. This differential is unlikely to be entirely explained by country risk. According to industry analysts, international financial institutions and third-party

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<sup>6</sup> Katsours, C. “Chad: Growing Oil Revenues, Growing Instability.” *Energy Compass*. June 10, 2004.

<sup>7</sup> Le Carre, John and Jason Stearns. “Getting Congo’s Wealth to its People.” *The Boston Globe*. December 22, 2006.

<sup>8</sup> This is also not to imply that developed countries do not, sometimes, offer consortium concessions that are perceived to be inequitable. A recent *New York Times* article explains, “The United States offers some of the most lucrative incentives in the world to companies that drill for oil in publicly owned coastal waters.” Furthermore, “a newly released study suggests that the government is getting very little for its money” (Andrews, E. “Incentives on Oil Barely Help U.S., Study Suggests.” *The New York Times*. December 22, 2006).

governments lessen the likelihood of expropriation and have significantly reduced the importance of country risk.<sup>9</sup> Anecdotal evidence suggests that some of the cross-country variation in the distribution of rents is also likely to be a function of the host country's bargaining power vis-à-vis the multinational corporation.

To quantify the importance of bargaining strength on rent-sharing, we develop an empirical framework based on Nash bargaining. Our economic measures of bargaining power include sunk costs, technical expertise of the host country, number of competitors and oil prices. We also seek to understand how the quality of governance and the development of institutions impact the negotiation process and, in turn, the outcome. Conventional wisdom holds that good governance produces desirable economic outcomes. For example, numerous studies document the link between the amount of foreign direct investment received by a country and the quality of governance infrastructure.<sup>10</sup> However, in the case of natural resource extraction, it may be that poor governance leads to higher corporate profitability and a smaller share of rents for the host country. For this we draw on the large literature on institutions from the past several decades using country-level governance measures to assess their impact on economic outcomes.

We find that the bargaining power of host governments and extraction companies does impact the relative distribution of rents. Moreover, our evidence indicates that the higher the quality of institutions and the more democratic a government is, the better its deal ends up being. While this may not seem like a highly surprising

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<sup>9</sup> Boulous, Alfred. "Assessing Political Risk." Independent Petroleum Association of America – International Primer, 5

<sup>10</sup> Globerman, Steven, and Shapiro, Daniel. "Global Foreign Direct Investment Flows: The Role of Governance Infrastructure" World Development Volume 30, Issue 11 (2002)

result, and anecdotal evidence has indicated this for some time, it is—to our knowledge—the first econometric attempt to investigate the relationship.

The importance of political and economic considerations for the outcome of the bargaining process is widely recognized but has not been systematically studied in this context.<sup>11</sup> Examining profit sharing between producing countries and oil companies in the Middle East, Edith Penrose (1959, 1960) notes that “the superior economic power of the oil companies arising from their ability to inflict a disastrous economic loss on the producing country does give them a bargaining position which holds down the share of the profits the producing country can obtain in the oil agreement.” However, she argues that reducing the monopoly power of oil companies would not likely be welfare improving, even for oil-exporting countries, given the increasing returns of the market.

More theoretical work has explored the structure and determinants of government take—that is the share of economic rent from extraction that goes to the government of the country in which the resource is extracted. The Van Meurs (1981) text on petroleum economics lays some theory for defining government take, which is developed further in Adelman et al. (1991), who seek to model investment and returns along with risks over long-term oil investments. Newbery’s (1981, 1992) work on industrial organization within the petroleum industry was, in part, motivated by a desire to understand the dynamics behind cartelization, but also sketched out some ideas for understanding the nature of government take within this imperfectly competitive market.

Shang-Jin Wei has done considerable work looking at the “corruption premium” firms pay to do business in countries with poor governance (Wei 2002). Using a matrix of

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<sup>11</sup> An exception would be Theodore Moran’s 1974 study on bargaining over rents between copper companies and the Chilean government.

FDI data linking 15 source countries to roughly 40 host countries, Wei (2000a) demonstrates the taxing effect of corruption on FDI flows (as compared to taxes themselves). The implication of this finding is that corruption will, in a sense, offset revenue collection as FDI flows adapt to corruption in much the same way as they would to a distortionary tax. In two follow-up papers, Wei (2000b) (using the same dataset) and Smarzynska and Wei (2002) (using firm-level data) demonstrate how corruption changes the composition and volume of FDI flows entering countries with poor governance. This research presents a relatively strong case for a negative correlation between government take and corruption, but there is no clear focus on what the relationship may be in natural resource extracting industries (nor is it evident whether these industries are included in the FDI or firm-level data). Given the more extensive (over time) and intensive nature of rent-sharing negotiations in resource extraction, the nature of the trade-off between corruption and revenues warrants further investigation.

The outline of this paper is as follows. Section 2 formalizes Penrose's ideas into an empirical strategy based on a Nash bargaining framework. Section 3 describes the BEA data and our measures of rents and bargaining power. Section 4 provides the cross-section and time-series evidence. Section 5 discusses some of the limitations of the analysis and directions for further research. Section 6 provides concluding remarks. Our appendix describes our data sources and construction in greater detail.

## **2. Bargaining Over Rents**

### **3.**

We formalize the bargaining process between multinationals and host country governments using a Nash bargaining framework. Total rents are given by:

$$\pi = P^{oil} Q^{oil} - C(Q) \quad (1)$$

Where  $Q$  is the quantity of oil produced,  $P^{oil}$  is the world price of oil and  $C(Q)$  is the cost of producing a given quantity of oil. In our empirical work, we make the distinction between operating costs and sunk costs which consist primarily of research and development expenditures. Let the outside options for multinationals and host country governments be given by  $\pi_G^*$  and  $\pi_{MNC}^*$ . The outside options for multinationals are defined by opportunities in other countries while the outside options for the government is what the government can earn if it operates the company itself. The bargaining strengths of the two parties are denoted by  $\alpha$  and  $(1-\alpha)$  for the government and the multinational respectively. While the two parties' respective bargaining strengths are partially determined by outside options, they may also be influenced by institutional factors not specific to the particular project at hand. For example, Penrose talks about the importance of popular opinion in shaping a government's ultimate bargaining position.

The outcome of this bargaining process is determined as the solution to maximizing—over  $\pi_G$  and  $\pi_{MNC}$ —the following:

$$[(\pi_G - \pi_G^*)^\alpha (\pi_{MNC} - \pi_{MNC}^*)^{1-\alpha}] \text{ s.t. } \pi_G + \pi_{MNC} = \pi \quad (2)$$

This yields the following solution for government rents:

$$\pi_G = \alpha(\pi - \pi_{MNC}^*) + (1 - \alpha)\pi_G^* \quad (3)$$

which, for the purposes of the empirical work, we rewrite in the following way:

$$\frac{\pi_G}{\pi} = \alpha \left[ 1 - \frac{\pi_{MNC}^*}{\pi} \right] + (1 - \alpha) \frac{\pi_G^*}{\pi} \quad (4).$$

Three factors influence the share of rents going to the host country: (i) the relative bargaining strength of the government  $\alpha$ , (ii) the outside options available to the government  $\pi_G^*$  and (iii) the outside options available to the multinational  $\pi_{MNC}^*$ .

Our empirical investigation is guided by the solution to the bargaining game. In particular, we estimate the following equation:

$$R_{G_{it}} = \beta_0 + \beta_1 \alpha_{it} + \beta_2 R_{MNC^*_{it}} + \beta_3 R_{G^*_{it}} + \varepsilon_{it} \quad (5).$$

The dependent variable is the share of rents going to the government and is sometimes referred to as the “government take”. We are able to measure this variable directly as the ratio of taxes, royalties and government profits over total profits generated by the project.  $\beta_1$  measures the impact of the government’s bargaining strength relative to the multinational on the share of rents going to the government and we expect it to be positive.  $\beta_2$  measures the impact of the multinational’s outside options and its expected sign is negative. And  $\beta_3$  measures the impact of the government’s outside options on the share of rents going to the government and its expected sign is positive.

We turn now to a description of the data and our proxies for bargaining power and outside options.

### 3. The BEA Data

We analyze the firm-level surveys on US direct investment abroad, collected each year by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce. The BEA requires that US-based multinationals disclose (confidentially) balance sheet-type data about their overseas activities annually. Here a US-based multinational is defined as the combination of a single US entity that has made the direct investment, called the parent, and at least one foreign business enterprise, called the foreign affiliate. We use the data collected on majority-owned, non-bank foreign affiliates and non-bank US parents for the benchmark years between 1982 and 1999. The benchmark years are

1982, 1989, 1994 and 1999 and include more comprehensive information than the annual surveys.

While our choice of benchmark years has been dependent on the availability of BEA's survey data, it seems important to note that the beginning of our panel data series follows five years after the enactment of the US Foreign Corrupt Practices Act (FCPA), which requires any company that has publicly traded stock to "maintain records that accurately and fairly represent its transactions," and which make it "unlawful for a U.S. person to make payment to a foreign official for the purpose of obtaining or retaining business for or with any person" (US Department of Justice website). In effect, our data is, therefore, coming from the era of FCPA enactment and may reflect less corruption than a sample taken from the period before (or shortly after) 1977.

Creating a panel using the benchmark years of the BEA survey data requires a number of adjustments. First, not all firms are required to report to the BEA and reporting requirements vary across years. Second, because we are interested in understanding what is happening at the industry level, we must consider the implications of the changes to the Standard Industrial Classification (SIC) codes in 1972 and 1987 and the switch from SIC codes to the North American Industrial Classification System (NAICS) codes in 1999. And finally, the fact that parents are allowed to consolidate information for several affiliates in one country on a single form calls for special care in the aggregation and interpretation of affiliate level data.

All foreign affiliates with sales, assets or net income in excess of a certain amount in absolute value must report to the BEA. This amount was \$3 million dollars in 1982, 1989 and 1994 and jumped to \$7 million dollars in 1999. In addition, a new reporting

requirement was imposed on parents in 1999. Parents whose sales, assets or net income exceeded \$100 million (in absolute value) were required to provide more extensive information than parents whose sales, assets or net income fell below \$100 million. To determine whether the changes in reporting requirements biased our sample toward small firms in the early years, we imposed a double filter on the data using the uniform cutoff for affiliates (based on the strictest reporting requirement of \$100 million in 1999) of \$5.59 million in 1982 US dollars and \$79.87 1982 US dollars for parents. As it turns out, the reporting requirements were large enough that imposing the filter on the data makes little difference.

Finally, to focus our analysis in on the subset of resource extracting, foreign affiliates, our sample only includes affiliates classified prior to 1999 as Mining or Oil and Gas Extraction (SIC87 codes 10-14) and for 1999 as Oil and Gas Extraction (NAICS97 code 211) and Mining (NAICS97 code 212).

### **Key Variables:**

#### ***Government Share of Rents***

We define this variable as the sum of all direct payments to the government as a result of the project divided by income net of operating costs. In practice, government take on extraction projects can take a number of different forms. Very generally, the systems can be divided into royalty payment, taxation, and profit sharing. Any given investment may be subject to one or more of these transfers as stipulated by contract, and the government's revenue profile and share of risk will certainly depend on what type(s) of system(s) is in place.

For our purposes, we define payments to the government as including taxes (income and other), royalty payments and profits earned by the government as a result of profit sharing agreements. The dataset does not make a clear distinction between payments to the national government (versus regional or local governments), but given the national importance that most oil investments have, in addition to the scale of revenues coming out, it seems reasonable to assume that they accrue to the national government. Our measurement of profit sharing is an admittedly imperfect one, but profit-sharing is often a major share of government take in extraction contracts, so it is important to include even an imperfect control. The BEA's survey of US Direct Investment Abroad provides information on what share of a foreign affiliate's equity is held by a foreign owner. Assuming that this foreign owner is, at least in most instances, the host country's government, we then multiply this percentage by the affiliate's net income to get a rough estimate of profits accruing to the host country.

Table 1 reports the trends in the government share of rents across regions and over time. We also report separately the share of rents earned from taxes, royalty payments and profit sharing. A number of things stand out: for all regions, and as a whole, the share of total rents going to the host country has decreased over 1982-1999. The decline has been most dramatic in Europe/Central Asia and Sub-Saharan Africa. This stylistic fact poses an intriguing entry point for our discussion: why did government take fall so dramatically over 1982-1999 in two of the world's most politically tumultuous regions? Also, why in 1999 was government take in developed countries almost twice that in Sub-Saharan Africa? Finally, looking at the breakdown of different types of transfers, we can see that taxes comprise the largest chunk of government take, but that

the relative size of profit-sharing and royalty payments compared to taxes varies from region to region.

**[Insert Table 1]**

### ***Bargaining Power***

The bargaining power of the government is affected by a host of country-specific institutional factors. A government's accountability to its people is likely to influence its bargaining power. In a country where the outcome of negotiations are more transparent, the government will feel more pressure to push for a better deal. In an extreme case, the government's threat point is determined by the possibility of civil unrest and plant closure. Thus, the country must balance the revenue it stands to lose if it takes too tough a stance with the possibility of political upheaval. We measure the level of accountability to the people using democracy, and voice and accountability. Political risk increases the likelihood of disruption of a project, increasing risk and decreasing the government's bargaining power. Thus it may not be surprising that firms require a higher share of a project's total benefits in developing countries, where political risks are greater. We measure political risk using the ICRG composite index since it is the only measure available that dates back to 1982.

As noted by Penrose, the government's accountability to its people is also likely to affect its bargaining stance. In country's where citizens can more readily learn the terms of a particular contract it will be more difficult for governments to strike deals that are especially favorable to multinationals. Our measure of government accountability to the people is democracy taken from Freedom House. Freedom House publishes information on civil liberties and political rights separately. Since these two variables are highly correlated, we follow Helliwell [1994] and combine the two ratings into a single index that varies from 0 to 1 with higher values indicating greater democracy. Civlib and prights vary between 1 and 7 - we transform these to a variable that ranges between 0 and 1 (with higher values indicating greater democracy) using the transformation [14-

civlib-prights]/12. This variable is available since 1970. As a robustness check, we also use the sub-component of the ICRG index democratic accountability.

We also expect the level of corruption to influence the outcome of the bargain – in more corrupt environments, multinationals may be able to strike a better deal. We measure this using the ICRG’s corruption. And finally, the government’s bargaining power is directly a function of the technical expertise of its bureaucrats. We measure this using the ICRG’s bureaucratic quality.

We measure the bargaining power of the multinational vis-à-vis the host government in two ways. We assume that the amount of competition from other similar firms in that same market reduces a given multinationals bargaining power. If there are more firms in the consortium, the host government may be more able to bid up its own take, despite any collusion that may occur. Therefore, we measure the bargaining power of the multinational as  $n$ , the number of US multinationals in the market in a given country and year. An increase in  $n$  weakens the bargaining power of any given multinational in the country. Following Vernon’s (1971) obsolescing bargaining model, we also include as a measure of the multinational’s bargaining power, the ratio of sunk to total costs of production. The greater share of sunk costs a firm has paid the more it is “stuck” with its investment, the more costly expropriation would be, and the more likely it is to concede to terms that are less profitable for itself. We define sunk costs as the firm’s expenditure on exploration and development—namely how much it has spent in a country’s oil fields to find oil plus the cost of investment in property plant and equipment and normalize this variable by total costs of production to obtain the ratio of sunk to total costs.. Both an increased share of sunk costs and a greater  $n$  are associated with lower bargaining power for US MNCs.

### ***Outside Options***

The host country’s alternative to agreeing to a deal with the consortium of extraction firms are largely determined by the government’s capacity to run the oil company without the multinational. This in turn is a function of the technical knowledge of its labor force. We proxy for this aspect of bargaining power by using the share of employees working in the foreign affiliate that are local citizens. We justify the proxy

with the following logic: The ultimate threat point for a national government in negotiations with a consortium of extraction firms is nationalization—seizure of the means of production, and therefore the entire investment. In so doing, the country must balance the increased revenues it gains from complete ownership (of production and assets) with the decrease in revenues from being a less efficient operator of the extraction process than the private companies. In extremely underdeveloped countries, it may be the case that almost all of the skilled employees of the operation are foreign, in which case, the national government will not be able to run the operation at all, and therefore it has a relatively low threat point and limited outside options.<sup>12</sup>

For the multinational, the alternative to investing in a particular country are what the firm could make if it shut down operations and relocated to another country. The costs associated with doing this are – to some extent – already captured in the ratio of sunk to total costs of production. The potential benefits of relocating to another country are the profits the multinational could make in another country relative to the profits it stands to make if it stays put. To measure this, we first compute the firm's profit margin as the ratio of net income to costs of production. The profit margin is then normalized by the average profit margin across all firms operating in the same sector in a given year by subtracting from the firm's profit margin the industry average. Increases in this variable can be interpreted as lowering the multinationals threat point in a bargaining situation.

### ***The Price of Oil***

We include as a regressor the real price of crude oil. This is meant to capture the fact that tax and royalty payments are often tied to prices. For example, following the first oil shock in the 1970s, the government of Alberta, Canada refined its royalty formula to make it sensitive to price changes (Alberta Royalty Review, 2007 – Royalty Information Series<sup>13</sup>). This type of provision is also common in the mining industry (Otto, J. et al, 2006). For the sake of completeness, we should also include in our regressions the prices of all other minerals. With the exception of oil, data limitations

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<sup>12</sup> Granted not all of the foreign, skilled employees running the operations of a US multinational abroad may be US citizens—they could be skilled citizens of other nations—but we believe this, nonetheless, to be a reasonable estimate.

<sup>13</sup> Source: <http://www.energy.gov.ab.ca/docs/aboutus/pdfs/InfoSeries-Report3-Formulas.pdf>.

make it impossible for us to know exactly which mineral is being extracted by the firms in our sample. However, to the extent that oil prices are demand driven, movements in the price of oil will capture movements in other minerals prices.

#### **4. Results**

Table 2 presents summary statistics of the variables used in our analysis. As discussed earlier, the first four variables are measures of government take, and thus vary between 0 and 1. The standard deviations for all four of these variables are comparably large (especially royalties and profits, which, on average, make up a small amount of total government take). This provides us with a great deal of variation in our dependent variable (i.e., noise), which is less than desirable. We also previously described the ratio of sunk to total costs and competition, which are proxies for MNC bargaining power, and the government's ability to run the business (i.e., the inverse of the share of U.S. citizens employed), which is a proxy for the host government's bargaining power. Non-operational takes a value of one if the plant was strictly in the exploration stage and so not extracting material: 6.5% of the observations are classified as non-operational.

**[Insert Table 2]**

#### ***Fixed Effects Regressions***

We estimate equation (3) using a fixed effects regression to remove time-invariant, firm-specific characteristics that would bias our estimation of the role of our institutional variables on government take. This decreases the variation in our institutional variables considerably, but does not appear to dramatically change our results relative to the OLS regressions we have run. Regression (1) shows us that an increase in the ratio of sunk to total costs results in an increase in government take of 0.056. The other limitation to oil company bargaining power, competition, results in a 0.019 increase in government take. A .01 increase in the share of nationals employed by the multinational, that is government ability to run the business, results in a .001 increase in the government take. A one dollar increase in crude oil prices results in an increase of

government take of 0.6 confirming the prevalence of contracts that tie host country benefits to prices. An increase in the profit margin of a project relative to projects in other countries increases government take by 0.278. We interpret this as evidence that the multinational is more willing to concede to generous terms when a project is exceptionally profitable. Finally, an affiliate that is non-operational decreases government take by 0.096. This latter result is consistent with the fact that firms do not pay taxes until they are operational. All of the estimated coefficients are significant at the 1% level and the regression R squared is 0.23 and indication that our regressors have significant explanatory power.

**[Insert Table 3]**

When we add political risk to the regression, the coefficient is 0.014 and statistically significant at the 1% level. Since political risk varies from 0 to 6 with 6 being the least risky, this result implies that government take varies one for one with political risk. The ICRG measures of institutional quality (Democratic Accountability, Bureaucratic Quality, and Level of Corruption) all have roughly half the same positive effect on government take and are all statistically significant at the 1% level. When these institutional variables are added, the coefficients and standard errors on the other regressors are largely unaffected. The coefficient on democracy is positive but statistically insignificant so that – at least as measured – there does not appear to be a strong association between political rights, civil liberties and government take. The fact that democratic accountability and democracy yield different results suggests that the two variables are measuring different things. Indeed, democratic accountability as measured by ICRG appears to capture political stability rather than accountability to the people. per se.

Turning to Table 4, which uses government take from taxes as the dependent variable, we see that the results are largely the same as with total benefits, but with slightly different magnitudes. Government ability doubles in magnitude compared to the previous regressions while the magnitudes on the multinationals relative profitability falls by a third. One explanation for these changes is that government ability is known ahead

of time and so impacts the overall tax deal a firm gets while the firm's profitability relative to other projects only becomes known over time. Thus, some of the concessions associated with relative profitability may be more closely tied to royalties and/or profit-sharing. The magnitudes and significance of the institutional variables are largely unchanged with the exception of democracy which is now positive and significant at the 5% level. This may be because tax rates are typically public knowledge while royalties and profit sharing agreements tend to be private knowledge. The results in Table 5 support this hypothesis - democracy is not a significant predictor of host country share of benefits from profits.

**[Insert Table 4]**

When we look at the results for government take from profit sharing regressed on our set of explanatory variables, the coefficients are generally of smaller magnitude and less statistically significant. The impact of share of sunk costs on government take is much smaller at 0.016, and only marginally significant. Competition, MNCs relative profits, the non-operational dummy, and all of our institutional variables are also never statistically significant. Government ability remains statistically significant but only at the 5% level and with a miniscule coefficient. The sign on the price of oil changes indicating that a one dollar increase in the price of oil reduces the host country share of benefits from profits by 0.10. Since taxes and royalties tend to rise with oil prices, this result implies that profit sharing agreements have become less favorable to host countries as oil prices have increased. However, the R-squared for these regressions are far smaller than for those in Tables 3 and 4. The relatively small share of government take from profits and the smaller variance that we observed in the summary statistics may result in their being dramatically less “signal” for all the “noise” in our data, and may disguise any actual significant results. Moreover, it seems a bit ill-advised to conclude from these results that these standard explanations do not affect profit sharing behavior. This relationship requires further exploration beyond the model presented here.

**[Insert Table 5]**

## 5. Discussion & Conclusion

The basic multivariate regressions presented here demonstrate preliminary evidence that the bargaining power of host governments and extraction companies can impact the relative distribution of rents. Moreover, our results suggests that the higher the quality of institutions and the more democratic a government is, the better its deal ends up being. While this may not seem like a highly surprising result, and anecdotal evidence has indicated this for sometime, it is—to our knowledge—the first econometric attempt to investigate the relationship. The implication of our findings is that – on average – poor countries keep a smaller share of the rents from natural resource extraction than rich countries. Although the World Bank has been extensively involved in some of these negotiations, the cases of Chad and the Democratic Republic of the Congo suggest that it has not been very effective at protecting host country rents. In addition, this paper provides systematic empirical evidence in support of Vernon’s classic theory of the obsolescing bargain. As the ratio of sunk to total costs increase, the multinational’s share of rents declines.

Whether the relationship between governance and government take we have uncovered is attributable to better governance meaning lower political risk (and thus a smaller demanded risk premium for firms), or whether this is a result of more capable governments being able (or willing) to negotiate better deals for their citizens, is unclear and warrants further investigation. We know from Wei (2000) and others that risk matters, but could bargaining power matter as much too?

In addition, any correlation between countries that have nationalized a resource extraction industry and the country’s level of governance could bias our estimates. A more thorough investigation of nationalized industries and country governance would be useful for further understanding the relationship between bargaining power and rent-sharing. In particular, a more thorough inquiry into the nature and variation of rent sharing methods (taxes, production sharing, profit sharing, and royalties) and the distinction between costs of doing business related to rent sharing versus those related to corruption would advance this field of research substantially. While the relation between rates of return and governance has been better understood in manufacturing industries and in aggregate, the more complicated relationship that occurs in the resource extraction

industries certainly warrants as much, if not more understanding, if only because of its profound effect on how the natural wealth of nations is utilized.

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## Tables

**Table 1: Means of Key Variables by Region**

Table 1a: Means Over All Years

Region	Host Country Share of Total Benefits	Host Country Share of Benefits from:		
		Taxes	Royalties	Profits
Developed Economies	0.409	0.258	0.070	0.033
EAP	0.335	0.212	0.059	0.036
ECA	0.173	0.091	0.011	0.069
LAC	0.382	0.252	0.023	0.058
MENA	0.349	0.236	0.053	0.029
SSA	0.354	0.229	0.062	0.038
Total	0.378	0.242	0.056	0.039

Table 1b: Means in 1982

Region	Host Country Share of Total Benefits	Host Country Share of Benefits from:		
		Taxes	Royalties	Profits
Developed Economies	0.528	0.394	0.066	0.041
EAP	0.481	0.376	0.053	0.038
ECA	0.442	0.441	0.001	0.000
LAC	0.494	0.415	0.013	0.063
MENA	0.502	0.367	0.047	0.043
SSA	0.590	0.395	0.087	0.086
Total	0.521	0.394	0.056	0.049

Table 1c: Means in 1999

Region	Host Country Share of Total Benefits	Host Country Share of Benefits from:		
		Taxes	Royalties	Profits
Developed Economies	0.333	0.202	0.064	0.028
EAP	0.316	0.196	0.057	0.046
ECA	0.100	0.062	0.011	0.037
LAC	0.270	0.154	0.036	0.068
MENA	0.264	0.187	0.034	0.039
SSA	0.162	0.090	0.068	0.009
Total	0.281	0.169	0.052	0.039

Note: South Asia is included in the totals but not separately since it wasn't part of the sample in 1982 and currently represents only 0.28% of the observations.

**Table 2: Summary Statistics**

Variable Name	Observations	Mean	Standard Deviation
Host Country Share of Benefits	2046	0.378	0.278
Host Country Share of Benefits from Taxes	2046	0.242	0.219
Host Country Share of Benefits from Royalties	2046	0.056	0.181
Host Country Share of Benefits from Profits	2046	0.039	0.123
Ratio of Sunk to Total Costs	2046	0.564	0.367
Competition	2046	41.87	51.62
Government's Ability to Run Business	2046	0.075	0.176
Price of Oil (\$/barrel, real 2006 US\$)	2046	24.65	12.30
MNCs Relative Profitability	2046	0.017	0.460
Non-Operational	2046	0.065	0.246
Democracy	2046	0.607	0.385
Political Risk	2046	4.938	2.216
Democratic Accountability	2046	3.712	2.037
Bureaucratic Quality	2046	2.358	1.457
Corruption	2046	3.249	2.003

TABLE 3: FIXED EFFECTS REGRESSIONS					
DEPENDENT VARIABLE IS HOST COUNTRY SHARE OF TOTAL BENEFITS					
	(1)	(2)	(3)	(4)	(5)
Sunk/Total Costs	0.056	0.057	0.058	0.057	0.057
	(2.90)**	(2.91)**	(2.97)**	(2.93)**	(2.93)**
Competition	0.019	0.017	0.023	0.018	0.019
	(3.03)**	(2.44)*	(3.56)**	(2.82)**	(2.93)**
Govt. Ability	0.001	0.001	0.001	0.001	0.001
	(3.44)**	(3.77)**	(3.36)**	(3.63)**	(3.50)**
MNCs Rel. Profits	0.278	0.271	0.279	0.276	0.277
	(18.50)**	(17.75)**	(18.59)**	(18.15)**	(18.34)**
Real Oil Price	0.006	0.006	0.006	0.006	0.006
	(8.88)**	(8.72)**	(8.95)**	(8.69)**	(8.90)**
Non-Operational	-0.096	-0.085	-0.095	-0.090	-0.093
	(3.31)**	(2.95)**	(3.28)**	(3.12)**	(3.21)**
Political Risk	0.014				
	(4.19)**				
Democracy		0.010			
		(0.48)			
Dem. Account.			0.017		
			(4.67)**		
Bureaucratic Q.				0.011	
				(2.20)*	
Corruption					0.012
					(3.23)**
Observations	2042	2042	2042	2042	2042
Number of parent_id	289	289	289	289	289
R-squared	0.23	0.23	0.24	0.23	0.23
Absolute value of t statistics in parentheses					
* significant at 5%; ** significant at 1%					

TABLE 4: FIXED EFFECTS REGRESSIONS					
DEPENDENT VARIABLE IS HOST COUNTRY SHARE OF BENEFITS FROM TAXES					
	(1)	(2)	(3)	(4)	(5)
Sunk/Total Costs	0.055	0.056	0.056	0.056	0.055
	(3.05)**	(3.11)**	(3.10)**	(3.08)**	(3.07)**
Competition	0.014	0.008	0.016	0.013	0.013
	(2.42)*	(1.26)	(2.67)**	(2.23)*	(2.22)*
Govt. Ability	0.002	0.002	0.002	0.002	0.002
	(5.37)**	(5.86)**	(5.39)**	(5.54)**	(5.48)**
MNCs Rel. Profits	0.196	0.184	0.195	0.193	0.193
	(14.06)**	(13.05)**	(13.97)**	(13.76)**	(13.82)**
Real Oil Price	0.005	0.005	0.005	0.005	0.005
	(8.13)**	(7.94)**	(8.14)**	(7.96)**	(8.11)**
Non-Operational	-0.067	-0.057	-0.065	-0.063	-0.064
	(2.51)*	(2.13)*	(2.41)*	(2.34)*	(2.37)*
Political Risk	0.012				
	(3.93)**				
Democracy		0.027			
		(1.99)*			
Dem. Account.			0.012		
			(3.38)**		
Bureaucratic Q.				0.010	
				(2.07)*	
Corruption					0.008
					(2.38)*
Observations	2042	2042	2042	2042	2042
Number of parent_id	289	289	289	289	289
R-squared	0.18	0.17	0.18	0.18	0.18
Absolute value of t statistics in parentheses					
* significant at 5%; ** significant at 1%					

TABLE 5: FIXED EFFECTS REGRESSIONS					
DEPENDENT VARIABLE IS HOST COUNTRY SHARE OF BENEFITS FROM PROFITS					
	(1)	(2)	(3)	(4)	(5)
Sunk/Total Costs	0.016	0.016	0.016	0.016	0.016
	(1.95)	(1.99)*	(1.94)	(1.95)	(1.95)
Competition	-0.003	-0.001	-0.002	-0.003	-0.003
	(1.16)	(0.53)	(0.87)	(1.19)	(1.09)
Govt. Ability	0.000	0.000	0.000	0.000	0.000
	(2.25)*	(2.43)*	(2.36)*	(2.24)*	(2.29)*
MNCs Rel. Profits	0.005	0.007	0.006	0.005	0.005
	(0.80)	(1.14)	(0.95)	(0.76)	(0.86)
Real Oil Price	-0.001	-0.001	-0.001	-0.001	-0.001
	(2.10)*	(2.05)*	(2.05)*	(2.09)*	(2.08)*
Non-Operational	-0.014	-0.015	-0.015	-0.014	-0.014
	(1.16)	(1.22)	(1.24)	(1.14)	(1.19)
Political Risk	0.000				
	(0.22)				
Democracy		-0.013			
		(1.58)			
Dem. Account.			-0.001		
			(0.90)		
Bureaucratic Q.				0.001	
				(0.38)	
Corruption					-0.000
					(0.19)
Observations	2042	2042	2042	2042	2042
Number of parent_id	289	289	289	289	289
R-squared	0.05	0.06	0.05	0.05	0.06
Absolute value of t statistics in parentheses					
* significant at 5%; ** significant at 1%					

## Appendix

<b>Appendix Table A.1 : World Bank Country Classifications</b>	
Country Name	World Bank Classification
Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Dem. Rep. Korea, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Taiwan, United Kingdom	High Income: OECD
Aruba, The Bahamas, Bahrain, Bermuda, Cayman Islands, Cyprus, Hong Kong, China, Israel, Kuwait, Netherlands Antilles, Singapore, Slovenia, United Arab Emirates	High Income: nonOECD
Argentina, Barbados, Botswana, Brazil, Chile, Costa Rica, Czech Republic, Dominica, Estonia, Hungary, Latvia, Lebanon, Malaysia, Malta, Mexico, Panama, Poland, Saudi Arabia, Slovak Republic, Trinidad and Tobago, Uruguay, Venezuela, RB	Upper Middle Income
China, Colombia, Dominican Republic, Ecuador, Egypt, Arab Rep., El Salvador, Fiji, Guatemala, Guyana, Honduras, Jamaica, Kazakhstan, Morocco, Namibia, Peru, Philippines, Romania, Russian Federation, South Africa, Sri Lanka, Swaziland, Thailand, Tunisia, Turkey	Lower Middle Income
Dem. Rep. Congo, Eritrea, Ghana, Haiti, India, Indonesia, Kenya, Malawi, Mozambique, Nicaragua, Nigeria, Pakistan, Senegal, Tanzania, Ukraine, Uzbekistán, Vietnam, Rep. Yemen, Zambia, Zimbabwe	Low Income