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TRADE, AND CHINA'S OIL SECURITY QUEST**

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Geopolitics, Global Patterns of Oil Trade, and China's Oil Security Quest

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Abstract

Does China's quest for oil raise tensions with the United States? This paper examines the effect of international relations on global oil trade patterns. Using voting records for the United Nations General Assembly to measure the state of international relations, we estimate a modified gravity model in a panel data framework over the period 1962-2000. Our presumption is that a divergence in voting patterns reflects misalignment in political interests among pairs of states, and hence an increase in "political distance." Controlling for oil exporters' endowment, potential supply disruption due to civil conflict, other standard gravity controls, as well as exporter and year fixed effects, we first show that private energy companies based in the United States import significantly less crude oil from US political opponents. The result is robust to controlling for economic sanctions and militarized interstate disputes, suggesting that the political oil import diversification is more than a wartime phenomenon. A similar oil import pattern is observed in China, in which case only a few national oil companies control the oil sector. While the incentives to diversify are stronger for both the United States and China when

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the exporters are nondemocratic, import sanctions have opposite effects on oil imports into the United States and China. Finally, we document that there is no such oil import pattern in other non-major power oil importing countries.

Keywords: Energy Security, International Relations, Oil Trade Diversification

JEL Classification: F13, F51, F59, Q34

1. Introduction

The round trip voyage from Venezuela to China is almost five times longer than that to the US Gulf ports, and hence any effort to diversify Venezuelan oil sales away from the United States to China appears to be cost ineffective. After all, isn't it more than political rhetoric, when China deposits \$8 billion in an infrastructure development fund in exchange for Venezuelan oil? Safety and certainty in oil, according to Winston Churchill, lie in variety. If the key to energy security is import diversification, in order to reduce geopolitical risk, how exactly?

Understanding the political determinants of oil trade is important, especially in a time of concern about sustainable economic development and energy security. Churchill's logic suggests that while geographical distance raises trade barriers, "political distance" (i.e. misalignment in political interests) might also limit the extent of bilateral trade. In this paper, we ask the following question: Do countries with conflicting political interests trade less in crude oil, which is widely thought to be a strategic commodity?

Unlike many policymakers, some economists maintain that the world oil market is "one great pool," because crude oil is fungible (Adelman, 1984). According to this view, the composition of global oil trade is irrelevant because the price and the total quantity transacted will be determined only by global demand and supply. If the oil market is a single integrated world market, special arrangements from oil-importing governments to "secure supply" and exporters' attempts to find a "secure outlet" for their crude oil make no economic sense. In practice, however, there are three main reasons why oil may be only partially fungible, especially in the short run. First, oil has to be refined, and refineries are built to handle specific types of oil. Second, the oil sector is monopolized by state-owned companies in many oil-rich countries. Thus, it is common for bilateral oil trade, especially between nondemocratic countries, to be subject to state influence with relationship-specific investment in exploration, refining capacity, and pipelines. Third, while oil is sold under a variety of contract arrangements as well as in spot transactions, term contracts cover most oil transactions. Unfortunately, existing evidence on the integrated-market view is based on movement of prices of different crudes traded in the spot market (e.g. Weiner, 1992; and more recently, Nordhaus, 2010).¹ To the extent that the world oil market is fragmented, a policy of diversifying oil suppliers can be optimal even when diversification is costly.

Using voting records for the United Nations General Assembly to measure the degree of misalignment in political interests (and hence a measure of political distance), we test the hypothesis that major powers diversify their sources of oil imports away from their political opponents. In particular, we estimate a modified gravity model in a panel data framework over almost four decades (1962-2000). Our political distance data confirm the famous quote that "a week is a long time in politics." The substantial time-series variation in political distance within a country-pair allows us to exploit the panel

¹ Although these spot and contract markets sell the same physical commodity, because of the many stipulations on the magnitude, price, and quality of the product delivered under long-term contractual arrangements, no arbitrage relation necessarily holds between spot and contract market magnitudes similar to those which hold between futures and spot

structure of our data to control for country-pair specific historical factors that affect both political distance and oil trade. Our oil data reveal that only a small fraction of countries are oil exporters, because the distribution of oil endowment is highly skewed. Moreover, an oil-importing country can impose sanctions on an exporter when the political tension between the two countries is intensified. In our main specification, therefore, we use the Poisson pseudo-maximum-likelihood (PPML) estimator proposed by Santos Silva and Tenreyro (2006) to deal with zero values of the dependent variable, so that we can capture the effect of international politics on oil imports on both the intensive and extensive margins.

Controlling for oil exporters' endowment, potential supply disruption due to civil conflict, other standard gravity controls, as well as country and year fixed effects, we find that the United States imports significantly less crude oil than her political opponents. In our baseline specification, we find that a one standard deviation increase in political distance (approximately the increase in political distance between the US and Venezuela during the Chávez administration) reduces US oil imports by more than 0.5 log points. The result is robust to controlling for economic sanctions and militarized interstate disputes, and hence the political oil import diversification is more than a wartime phenomenon.

Political scientists believe that joint democracy increases bilateral trade (e.g. Morro, Siverson, and Tabares, 1998), and hence one may wonder if a similar oil trade pattern is observed in other nondemocratic oil importers, such as China. It is also interesting to note that unlike the United States, import decisions are much less decentralized in China. According to the EIA, for example, there were more than 40 companies importing crude oil from almost 30 countries into the United States in January 2011, whereas only a few national oil companies control the oil sector in China. Despite this difference in market structure, we show a similar oil import pattern in China. Interestingly, we also find that while the incentives to diversify are stronger for both the United States and China when the oil exporting countries are nondemocratic, import sanctions have opposite effects on oil imports to the United States and China.

There is a growing body of empirical literature that examines the effects of international politics on trade. Summary (1989), an early contribution, identifies several political factors, such as arms transfers and the number of foreign agents registered in the United States, affecting bilateral trade flows between the United States and other countries by estimating a gravity type model. Blomberg and Hess (2006) show that political violence (e.g. interstate violence) has a negative effect on trade. More importantly, Blomberg and Hess conclude that world peace is perhaps a more important trade-creating factor than bilateral trade pacts, because the violence effect is larger than the tariff-equivalent reduction through generalized systems of preference and WTO participation, as well as estimated tariff-equivalent costs of border and language barriers. Using a rich historical dataset, Glick and Taylor (2010) show that, although wars are rare events, the war impacts on international trade (as well as national income and global economic welfare) are large and persistent. We show that for import of

market magnitudes. In the case of the US steam coal market, Wolak (1996) finds that there is a fairly large price premium on contract versus spot transactions.

crude oil to major powers, conflict in political interests is an important impediment to trade even during peacetime.

More recently, Berger et al. (2010) exploit the declassification of CIA documents to examine whether the United States uses political power and influence to affect countries' decisions regarding trade and trade policy. In another interesting paper, Acemoglu and Yared (2010) find that two countries jointly experiencing greater increases in militarism have lower growth in bilateral trade. None of these studies, however, examine the relationship between international politics and oil trade. In the case of coal, Wolak and Kolstak (1991) observe that over 1983-1987 Japan imported a significant amount of coal from the United States even though the price of US coal was above that of all other suppliers, whereas the Soviet Union consistently had the smallest market share despite that their coal was the cheapest.² Wolak and Kolstak consider a pure economic reason of price-risk diversification to explain Japan's coal import strategy, although the trade pattern is also consistent with the close Japan-US security ties during the Cold War.

The paper proceeds as follows. Section 2 describes the data and illustrates several stylized examples. Our baseline specification and results using the US oil import data are presented in Section 3. Section 4 examines oil imports into China and other countries. Section 5 concludes.

2. The Data and Some Stylized Examples

We combine data from different sources for our analysis. First, our disaggregated bilateral trade data are taken from the NBER-UN world trade data, compiled by Feenstra et al. (2005). The NBER-UN dataset provides bilateral trade data by commodity (4-digit SITC code) over the 1962-2000 period. In particular, our main dependent variable, crude oil imports, is classified as "petroleum oils and oils obtained from bituminous minerals, crude" (SITC code = 3330).

Data on international relations between country pairs are obtained from the Affinity of Nations Index (Gartzke, 2006). The Affinity of Nations index provides a metric that reflects the similarity of state preferences based on voting positions of pairs of countries in the United Nations General Assembly since 1946. In particular, our political distance the index, which lies between 0 and 1, is calculated as d/d_{\max} , where d is the sum of metric distances between votes by a country-pair in a given year and d_{\max} is the largest possible metric distance for those votes.³ Unlike indices based on alliance portfolios, UN voting-based indices provides significant time-series variation in political distance.

Figure 1 depicts the time-series of the political distance between the United States and Iran and the fraction of US oil imports from Iran. Iran had been a formal alliance with the US before 1979. However,

² Japan also consistently imported significantly more coal from Australia than from South Africa, even though their prices were similar.

³ Votes are coded as either 1 ("yes" or approval for an issue), 2 (abstain), or 3 ("no" or disapproval for an issue).

US dependence on Iranian oil has declined dramatically since the late 1970s, when Ruhollah Khomeini led the Iranian Revolution.

The examples of Iran illustrates that sharp variations in international relations driven by political events are associated with adjustments on the extensive margin of oil trade (enforced by trade sanctions). Figure 2 shows that, even in the absence of any sanction against Venezuela, misalignment in political interests appears to influence the intensive margin of US oil imports. For example, US dependence on Venezuelan oil has been declining while their political distance has been increasing during the past decade under the presidency of Hugo Chávez. By contrast, according to Figure 3, China's dependence on Venezuelan oil has been increasing over the same period.

To test whether international politics affect oil trade predominantly at the extensive margin because of trade sanctions, we obtain sanctions data from Hufbauer et al. (2007). Data on other standard gravity controls are taken from various sources. The CEPII provides data on bilateral distance, colonial historical links, GATT/WTO membership, and regional trade agreement. Linguistic dissimilarity and religious distance data are provided by Hanson and Xiang (2011), whereas genetic distance data are taken from Spolaore and Wacziarg (2009). GDP and population data are taken from the Penn World Table. Our oil reserves data for are obtained from Dr. Colin Campbell at the Association for the Study of Peak Oil (ASPO), a non-profit organization that is devoted to gathering industrial data to study the dates and impact of the peak and decline of world oil. The ASPO dataset covers most oil countries. We obtain additional information on oil reserves for other countries from three public databases: BP Statistical Review of World Energy (BP), Oil and Gas Journal (OGJ), and CIA factbook.

Political scientists believe that joint democracy increases bilateral trade (e.g. Morro, Siverson, and Tabares, 1998) and that joint democracy makes peace (e.g. Oneal and Russett, 2001). Democracy data are taken from the Polity IV dataset. Civil conflict and interstate violence and warfare may also disrupt trade. The Correlates of War Project provides data on civil war and militarized interstate disputes.⁴ In some specifications, we also include data on tariff duties on US oil imports. These data are obtained from various issues of Harmonized Tariff Schedule of the United States and Tariff Schedule of the United States Annotated.

Our baseline sample, which focuses on US oil imports, consists of all country-years in which these countries have positive oil reserves, so that they are potential oil exporters to the United States. We present in Table 1 the summary statistics for the variables we use in our regressions. Several remarks are in order. First, the first row shows that even when we restrict our sample to oil countries, the variation in the size of oil imports to the United States is enormous, because the distribution of oil endowment is highly skewed. Second, the next row shows that there is also significant variation in political distance, our variable of interest. Third, trade sanctions are rare, especially export sanctions

⁴ The raw data of the militarized disputes variable can take five values, depending on the hostility level of dispute: 1 = no militarized action, 2 = threat to use force, 3 = display of force, 4 = use of force, and 5 = war. Since the potential impact of hostility level on oil imports needs not be linear, in our regressions, we generate dummies variables based on these different levels of hostility. There are also four types of civil war: 1 = civil war for central control, 2 = civil war over local

imposed by other countries to the United States. Finally, civil war in potential oil-exporting countries is not common, and militarized disputes between the United States and potential oil exporting countries are even more rare. For instance, militarized disputes between the United States and potential oil exporting countries only occur at a rate of less than 4 percent (92 out of 2432) of our sample.

The next table summarizes the pairwise correlations between different measures of distances. Consistent with intuition, political distance is positively correlated with import sanctions, geographical distance, linguistic distance, religious distance, genetic distance, and militarized disputes, and negatively correlated with international and regional trade agreements as well as colonial-tie, although none of the correlation is particularly strong (with magnitude never exceeding 0.4). GATT/WTO membership is negatively correlated with militarized disputes. Import sanctions and militarized disputes are positively correlated. Finally, geographical and various measures of cultural distances are also positively correlated.

3. Political Diversification of Oil Import Sources: The Case of the United States

This section examines empirically the effect of international politics (measured by political distance) on US oil imports. We begin our investigation with estimating the traditional gravity model of trade, which emphasizes fixed-factors (such as geography and history) as determinants of trade, using the US crude oil imports data over the 1962-2000 period.

3.1 Distances and Oil Imports: Cross-Country Evidence from the Traditional Gravity Model

In its multiplicative constant-elasticity form, the gravity equation for trade states that the value of oil imports from country i to the United States at year t , denoted by $M_{i,t}^{US}$ is inversely proportional to their distance $D_{i,t}^{US}$ (which typically includes all factors that might create trade resistance), and proportional to the product of the two countries' GDPs, denoted by $Y_{i,t}$ and Y_t^{US} :

$$M_{i,t}^{US} = e^{\alpha} \times (D_{i,t})^{\beta} \times (Y_{i,t})^{\gamma} \times (Y_t^{US})^{\delta} \times e^{\eta_{i,t}^{US}} \quad (1)$$

where α , β , γ , and δ are unknown parameters, and $\eta_{i,t}^{US}$ is an error term. Provided $M_{i,t}^{US}$ is strictly positive, we can log-linearize the above equation to obtain the standard representation of gravity equation: $\ln M_{i,t}^{US} = \alpha + \beta \ln D_{i,t} + \gamma \ln Y_{i,t} + \delta \ln Y_t^{US} + \eta_{i,t}^{US}$. Our point of departure from the traditional gravity model is our focus on international politics, and hence $D_{i,t}^{US}$ measures the political

issues, 3 = regional internal, and 4 = intercommunal. Again, we generate dummies for each type of civil war in our regressions.

distance between the United States and country i at year t . The coefficient of interest is β , the estimated impact of US foreign relations on the log of oil imports to the United States. Because crude oil exports depend on oil endowment as well as production capacity, we control for oil reserves and civil war, which may interrupt supply. To examine the incentives to diversify at the intensive margin, we also control for trade sanctions, which accounts for the extensive margin. In our first specification, we also control for year fixed effects, country i 's population, as well as other standard trade resistance measures, including international and regional trade agreements, geographical distance and various measures of cultural distance. Given that our sample includes only US oil imports, adding year fixed effects captures all time-specific characteristics (e.g., global oil price, as well as US GDP, oil reserves, etc.). Exploiting cross-country variation, in other words, our first specification, compares the trade effect of political distance with that of other measures of resistance to trade.

One consequence of the log-linearization is that zero trade observations are dropped from the sample. Because our focus is on oil imports and the distribution of oil endowment is highly uneven across countries, the number of observations dropped is indeed quite large (1,196 of 2,317 potential observations). To fully capture the effects of international politics on oil imports on both the extensive and intensive margins, following Santos Silva and Tenreyro (2006), we also estimate the multiplicative form (1) using the Poisson pseudo-maximum-likelihood (PPML) estimator.⁵ The main advantages of the PPML estimator are that while it provides a natural way to deal with zero values of the dependent variable, and it is also consistent in the presence of heteroskedasticity.

Table 3 compares the effect of various measures of resistance to trade on US oil imports, using different estimations. The first row reports the estimates of the political distance coefficient, our variable of interest. First, using probit estimation to focus on the extensive margin, column (1) shows that political distance has a negative impact on the extensive oil import margin, although the estimate is rather imprecise. Once controlling for trade sanctions, however, the effect is essentially zero (column (2)). Instead, the coefficient of the import sanctions dummy is highly significant, which suggests that the effect of political distance is enforced by sanctions. By contrast, when we restrict to the subsample of positive imports, using simple OLS estimation, column (3) shows that political distance significantly impedes oil imports on the intensive margin.

Our preferred estimation, which retains zero observations by directly estimating the constant-elasticity model, suggests that a two standard deviation increase in political distance (roughly the difference in the US political distance with Canada and Iran in 1980) reduces US oil imports by more than 0.5 log points (column (4)). Economically, the effect is similar to imposing import sanctions by the United States, or losing her WTO membership by an oil-exporting country. A similar result is obtained when we control for oil import tariffs. In particular, column (5) suggests that the estimated effect of political

⁵ In a highly influential paper, Helpman, Melitz, and Rubinstein (2008) develop an international trade model with heterogeneous firms, and based on the model they propose a two-stage estimation procedure that uses an equation for selection into trade partners in the first stage and a trade flow equation in the second. The identification relies on the assumption of homoskedasticity. More importantly, their monopolistic competition model hinges on productivity differences across firms in the same country, an assumption which is not suitable for our application because the oil sector is monopolized by the state in most major oil-exporting countries.

distance is also similar to an increase in tariff by almost 5 cents per barrel, approximately the tariff duty imposed on most countries without signing a preferential trade agreement with the US.

One main advantage of exploiting cross-country variation in political distance is that it allows us to compare the effect of political distance with the effect of geographical or cultural distance, which is fixed over time. Our estimation suggests that a two standard deviation increase in political distance is equivalent to an increase in geographical distance by about 0.5 log points. In terms of historical and cultural factors, while the lack of a colonial-tie appears to reduce oil trade, cultural distance in many cases is found to increase oil imports.

3.2 Political Distance and Oil Imports: Panel Evidence from Fixed Effects Estimates

The positive cross-country correlation between cultural distance and oil imports may suggest the possibility of omitted variable bias.⁶ In our analysis, the key question is: How is the unobserved heterogeneity in the determinants of oil imports associated with political distance? First, it has been argued recently that institutions are in part determined by culture (e.g. Gorodnichenko and Roland, 2010; Tabellini, 2008). Second, institution quality is believed to shape political selection (Besley, 2005), which in turn may affect foreign policy. On the other hand, poor institution is shown to slow oil extraction rates (Bohn and Deacon, 2000), and hence weaken the country's oil export capacity. Because institution is influenced by many unobserved country-specific historical and cultural factors (Acemoglu et al. 2008), a simple cross-country correlation between political distance and oil trade can be an artifact of omitted variable bias.

Unlike geographical or cultural distance, political distance fluctuates over time. For example, recall from Figure 1 that the US-Iran political distance was doubled from less than 0.4 in the 1960s to more than 0.7 in the 1980s, an increase which is of the same order of magnitude as the difference in the US political distance with Canada and Iran in 1980. Substantial within-country variation in political distance over time allows us to control for omitted factors that simultaneously affect both political distance and oil trade. Including country fixed effects in our analysis is also equivalent to country-pair fixed effects, which capture many of the standard country-pair specific measures that are standard in gravity regressions. The log-linear form of our baseline specification, therefore, can be written as:

$$\ln M_{i,t}^{US} = \alpha_t + \alpha_i + \beta \ln D_{i,t} + \gamma \ln Y_{i,t} + X_{i,t} \Gamma + \eta_{i,t}^{US} \quad (2)$$

where the vector $X_{i,t}$ includes a set of additional controls that vary across countries and years. In the full specification, $X_{i,t}$ also includes country i 's democracy score and militarized dispute between country i and the US. We note that some of these low frequency political events, such as regime transitions and militarized disputes, are potentially endogenous to international relations. The purpose

⁶ Baier and Bergstrand (2007), for example, show that standard cross-sectional techniques do not provide stable estimates of the effect of free trade agreements on international trade.

of this more stringent and demanding specification is to test whether international politics still matter for oil trade even after controlling for them.

Table 4 presents our fixed effects estimates. In the first five columns, we include in the regressions our baseline set of control variables. In the next five columns, we also control for exporter's democracy status and dummies for interstate militarized disputes. Similar to the cross-country regression, column (1) shows that political distance has a negative but imprecisely estimated effect on oil imports on the extensive margin. Once controlling for sanctions, the effect disappears (column (2)). Controlling for sanctions, in our fixed-effects specification, the estimates from the log-linear form and the multiplicative constant-elasticity form are very similar (columns (3) and (4)). Including tariff in the regression barely changes anything, although the coefficient of oil import tariff is not significant in the fixed effect regression.

Our results are robust to adding more controls for political events. In particular, using PPML estimation, a coefficient of -2.776 (with standard error = 1.263, and hence significant at the 5% level) implies that a one standard deviation increase in political distance (approximately the increase in political distance between the US and Venezuela during the Chávez administration) reduces US oil imports by more than 0.5 log points (column (9)), an effect larger than one implied by the cross-country estimates.

The estimates of other coefficients are reported for the rest of the table. In our preferred PPML estimation, both import and export sanctions significantly reduce oil trade. However, trade agreements and import tariff are no longer important determinants of oil imports once we control for country fixed effects. The result is not too surprising, given that there is little time-series variation in these measures of economic trade barriers.

3.3 Different Subperiods and Subsamples

We examine in this section whether the effect of political distance on US oil imports is more prominent over some periods or subsamples of countries.

The first row of Table 5 replicates the results of the US imports over the entire sample period 1962-2000. Excluding the years when the US government implemented the Mandatory Oil Import Quota program (1959-1973),⁷ the next row shows that similar results are obtained. The third row shows that the magnitudes of the estimates are again similar when we focus on the Cold War period (1962-1990), although they are less precisely estimated in this subsample.

We have argued in the introduction that one reason that the world oil market may be only partially fungible is because it is common for oil trade to be subject to state influence, given that the oil sector

⁷ The quota system restricted the amount of crude oil and refined products imported into the United States and gave preferential treatment to oil imports from Canada, Mexico, and, somewhat later, Venezuela.

is monopolized by state-owned companies in many oil-rich nondemocratic countries. Moreover, the doctrine of democratic peace claims that democratic countries rarely fight one another. The next two rows show that the result is significantly stronger when we restrict the sample to nondemocratic exporters only.⁸ Indeed, the estimated effects become statistically insignificant in the subsample of democratic exporters. For the rest of the table, we show that similar results are obtained when we restrict the samples by excluding observations under sanctions or interstate war.⁹

4. Political Diversification of Oil Import Sources: The Cases of China and Other Countries

We have documented a significant correlation between political distance and oil imports into the United States. Moreover, this correlation is robust to controlling for exporter fixed effects, economic sanctions, and interstate militarized disputes. To the extent that we can interpret this correlation as evidence supporting our hypothesis that major power countries diversify their sources of oil imports away from their political opponents, we expect the incentives to diversify oil imports to non-major power countries to be weaker or even non-existent.

4.1 China's Quest for Oil

Since 2003 China has become the world's second largest consumer of oil behind the United States. The case of China is of particular interest because unlike most other major oil importers, China is a nondemocratic country.

Table 6 presents cross-country evidence that China does import more oil from her political allies. Indeed, the negative association between political distance and China's oil imports is significant on both the intensive and extensive margins. Moreover, the sizes of the estimated coefficients are larger than those we found in the United States. Unlike the case of the United States, however, import sanctions do not discourage oil imports into China. One possible interpretation of the significant positive association between import sanctions and China's oil imports is that when the United Nations imposes import sanctions to an oil-exporting country, the country shifts her exports towards China. Similar results are obtained from the fixed effects estimation (Table 7). One interesting finding from the fixed effects estimates is that China imports less oil from countries with GATT/WTO membership.

We saw in Table 5 that in the case of the United States the incentives to diversify oil imports away from her political opponents are stronger when the exporters are nondemocratic. If joint democracy increases bilateral trade and makes peace, one might expect the incentives to diversify are different for the case of China. Table 8 shows that like the United States, China's incentives to diversify are stronger when the exporting countries are nondemocratic.

⁸ A country at a given year is defined as nondemocratic when her polity score is less than or equal to -2, which is about the mean of the whole sample.

⁹ Interstate war occurred when the hostility level is greater than or equal to 4.

4.2 The Case of Other Countries

Political scientists believe that major powers play a decisive role in international conflicts. To the extent that their stakes are higher, major powers should have higher incentives to diversify their trading partners. To test this hypothesis, we repeat our exercise using oil imports data from the top 10 oil importing countries in 1980, which include both the United States and China.

Table 9 reports the fixed effects estimates of the impact of political distance on oil imports into these 10 countries. To show the most conservative estimates in all regressions, we include country fixed effects as well as the full set of controls (except import tariffs, where data are unavailable for other countries) in our estimations. For each country, the estimates from the probit, OLS, and PPML estimations are reported. The first five rows report the estimated coefficients for the countries classified as major powers according to the Correlates of War Project. Row (1) and (2) replicate the results of the US oil imports and China oil imports. Row (3) reports the significant effect for the United Kingdom. The next two rows show that while the effect is only marginally significant for the extensive margin in France, the effect is quite strong in Japan according to the PPML estimates. Indeed, the probit estimates suggest that political distance also impedes oil imports into Japan on the extensive margin.

The next five rows report the effect for other major oil importing countries that are not major powers. According to our preferred PPML estimator, a significant negative effect is observed only in the case of Netherlands. While the estimated coefficients are indeed positive for Italy, Spain, South Korea, and India, only the one for India is marginally significant at the 10% level. On the other hand, the probit estimates suggest that political distance impedes oil imports into Spain and India on the extensive margin.

5. Interpretations and Concluding Remarks

We have documented a significant negative association between political distance and oil imports to the United States, China, and other major powers. Furthermore, this negative association is robust to controlling for economic sanctions and militarized interstate disputes. To the extent that we can interpret this as a causal effect, we have identified a political cost of oil dependence in the absence of any interstate war or even foreign intervention. Moreover, we find that for both democratic and nondemocratic importers, the incentives to diversify the sources of oil imports away from their political opponents are stronger when the exporters are nondemocratic.

Our results come with a caveat because oil trade and political distance can simultaneously affect each other. While our fixed effects estimates give us some assurance that our results are unlikely to be driven by omitted variable bias, we cannot completely rule out the possibility of reverse causality: the expression of oil diplomacy refers to using oil in foreign relations to pursue a country's international interests. Whether international relations affect oil trade, or the other way around, our findings suggest

that oil trade and international politics are intimately related. In the case of the United States where import decisions are highly decentralized, it is natural to interpret our results as oil companies respond to changes in geopolitical risk (e.g. expropriation risk and risk of kidnapping foreign oil workers) driven by changes in international politics. Our stylized examples also suggest that international relations affect oil trade (see also Mityakov, Tang, and Tsui (2011) for further analysis of the causality issues).

To the extent that oil companies in major powers do not minimize their transportation cost of oil imports, we have identified an economic cost of oil dependence even in the absence of foreign intervention or interstate war. Quantifying this cost of oil dependence provides a useful step towards a better understanding of the relationship between energy policy and foreign policy. However, we should emphasize that it is not our contention that such a political oil import diversification is necessary inefficient, especially when import decisions are decentralized. An evaluation of the efficiency implications for energy policy in any major power requires (a) a careful distinction between cases in which import decisions are decentralized and those where imports are controlled by the government; (b) a general equilibrium framework that specifies the alternative trading pattern and in particular the cost of substitution when oil importers do not minimize transportation costs; and (c) estimates of the direct benefit as well as other possible political side payments of import diversification.

Finally, when major powers import more oil from their political allies, China's quest for oil raises tensions with the United States for two reasons. On the one hand, if China is allied with the political opponents of the United States (e.g. Iran and Sudan), political tension is created because according to the United States some of these states are sponsors of terrorism. Our analysis suggests that Chinese companies defy sanctions imposed by the United Nations, because import sanctions have opposite effects on oil imports into the United States and China. On the other, if China is allied with the political allies of the United States, economic tension is created because both major powers are competing for the same pool of crude oil. If oil trade and political distance simultaneously affect each other, in the long run, the economic tension may translate into a political one.

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Table 1. Summary Statistics for US Oil Imports, Distances, and Other Exporters' Characteristics

<u>Variable</u>	Mean	Std. Dev.	Min	Max	Observations
Oil Import	472710	1451321	0	14800000	2432
Political distance	0.534	0.187	0	1	2432
Import sanctions	0.022	0.147	0	1	2432
Export sanctions	0.011	0.103	0	1	2432
GATT/WTO membership	0.637	0.481	0	1	2432
Regional trade agreement	0.014	0.117	0	1	2432
Oil import tariff	5.873	3.496	0.000	21.000	1728
Log geographical distance	8.975	0.528	6.307	9.692	2318
Colonial-tie	0.061	0.239	0	1	2318
Linguistic distance	0.854	0.152	0.520	1.000	2318
Religious distance	0.725	0.260	0.324	1.000	2318
Genetic distance	0.070	0.071	0.000	0.229	2318
Log exporter's GDP	8.714	1.064	5.744	11.489	2432
Log exporter's population	9.653	1.598	4.824	14.054	2432
Log exporter's oil reserves	-0.015	3.003	-9.498	5.591	2432
Exporter's democracy	-0.181	7.801	-10	10	2432
Civil war	1.568	0.706	1	4	294
Militarized interstate disputes	3.739	0.489	2	4	92

Notes: The raw data of the militarized disputes variable can take 5 values, depended on the hostility level of dispute: 1 = no militarized action, 2 = threat to use force, 3 = display of force, 4 = use of force, and 5 = war. There are also 4 types of civil war: 1 = civil war for central control, 2 = civil war over local issues, 3 = regional internal, and 4 = intercommunal.

Table 2. Pairwise Correlations between Various Distances

	Political distance	Import sanctions	Export sanctions	GATT/WTO membership	Regional trade agreement	Log geographical distance	Colonial-tie	Linguistic distance	Religious distance	Genetic distance	Militarized disputes
Political distance	1.000										
Import sanctions	0.141	1.000									
Export sanctions	-0.011	-0.016	1.000								
GATT/WTO membership	-0.170	-0.065	-0.103	1.000							
Regional trade agreement	-0.105	-0.019	-0.013	0.090	1.000						
Log geographical distance	0.181	-0.040	0.022	-0.056	-0.244	1.000					
Colonial-tie	-0.229	-0.039	-0.026	0.169	-0.031	-0.075	1.000				
Linguistic distance	0.363	0.001	0.074	-0.309	-0.024	0.425	-0.219	1.000			
Religious distance	0.302	0.040	0.105	-0.284	-0.024	0.480	-0.300	0.609	1.000		
Genetic distance	0.233	-0.006	-0.065	0.082	-0.059	0.218	-0.175	0.505	0.059	1.000	
Militarized disputes	0.074	0.245	0.046	-0.157	0.043	-0.081	-0.046	0.030	0.065	-0.063	1.000

Table 3. Distances and US Oil Imports: Cross-Country Comparison

Dependent Variable	Probit $1\{M_{i,t}^{US} > 0\}$ (1)	Probit $1\{M_{i,t}^{US} > 0\}$ (2)	OLS $\ln M_{i,t}^{US}$ (3)	PPML $M_{i,t}^{US}$ (4)	PPML $M_{i,t}^{US}$ (5)
<u>Political Distance</u>					
Political distance (UNGA voting)	-0.133 (0.132)	-0.033 (0.135)	-2.169*** (0.708)	-1.376** (0.546)	-1.266** (0.583)
Import sanctions dummy		-0.378*** (0.034)	-0.218 (0.615)	-0.500** (0.212)	-0.753*** (0.263)
Export sanctions dummy		0.117 (0.156)	0.035 (0.677)	-0.940** (0.435)	
<u>Economic Distance</u>					
GATT/WTO membership dummy	0.152*** (0.031)	0.135*** (0.032)	0.075 (0.132)	0.592*** (0.089)	0.565*** (0.092)
Regional trade agreement dummy	-0.109** (0.053)	-0.111** (0.052)	0.509*** (0.191)	0.050 (0.113)	-0.081 (0.112)
Oil import tariff					-0.122*** (0.019)
<u>Geographical Distance</u>					
Log geographical distance	-0.361*** (0.037)	-0.383*** (0.039)	-1.068*** (0.101)	-1.095*** (0.084)	-0.930*** (0.091)
<u>Historical Relations</u>					
Colonial-tie dummy	0.073 (0.060)	0.071 (0.060)	0.686** (0.298)	1.413*** (0.276)	1.349*** (0.284)
<u>Cultural Distance</u>					
Linguistic distance	0.160 (0.144)	0.050 (0.143)	0.364 (0.646)	3.025*** (0.809)	2.765*** (0.856)
Religious distance	0.169** (0.074)	0.207*** (0.075)	-0.174 (0.287)	-0.338 (0.254)	-0.486* (0.271)
Genetic distance	2.696*** (0.248)	2.875*** (0.255)	11.678*** (0.881)	9.645*** (1.024)	9.648*** (1.083)
<u>Other Exporter's Characteristics</u>					
Log exporter's GDP	0.089*** (0.021)	0.095*** (0.021)	-0.086 (0.086)	-0.038 (0.067)	-0.023 (0.070)
Log exporter's population	0.016 (0.011)	0.026** (0.011)	-0.055 (0.041)	-0.060* (0.034)	-0.028 (0.034)
Log exporter's oil reserves	0.145*** (0.006)	0.148*** (0.007)	0.849*** (0.030)	1.035*** (0.036)	1.024*** (0.037)
<u>Additional Controls</u>					
Civil war dummies	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes
Observations	2,317	2,317	1,121	2,318	1,645
R ²	0.355	0.366	0.673	0.808	0.793

Notes: Column (5) uses data only from 1976-2000. Robust standard errors are reported in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4. Political Distance and US Oil Imports: Fixed Effects Estimates

Dependent Variable	Probit $1\{M_{i,t}^{US} > 0\}$ (1)	Probit $1\{M_{i,t}^{US} > 0\}$ (2)	OLS $\ln M_{i,t}^{US}$ (3)	PPML $M_{i,t}^{US}$ (4)	PPML $M_{i,t}^{US}$ (5)	Probit $1\{M_{i,t}^{US} > 0\}$ (6)	Probit $1\{M_{i,t}^{US} > 0\}$ (7)	OLS $\ln M_{i,t}^{US}$ (8)	PPML $M_{i,t}^{US}$ (9)	PPML $M_{i,t}^{US}$ (10)
Political distance (UNGA voting)	-0.243 (0.326)	-0.085 (0.305)	-2.711** (1.325)	-2.603* (1.340)	-2.729* (1.490)	-0.217 (0.318)	-0.080 (0.300)	-2.755** (1.342)	-2.776** (1.263)	-2.992** (1.333)
Import sanctions dummy		-0.432*** (0.029)	-0.826 (0.910)	-1.272*** (0.385)	-1.207** (0.479)		-0.425*** (0.030)	-0.893 (1.049)	-1.285*** (0.365)	-1.157** (0.457)
Export sanctions dummy		0.031 (0.223)	0.010 (0.737)	-0.915*** (0.298)			0.037 (0.222)	-0.011 (0.750)	-0.861*** (0.325)	
GATT/WTO membership dummy	0.039 (0.131)	0.023 (0.126)	-0.257 (0.376)	0.351 (0.271)	0.333 (0.325)	0.043 (0.130)	0.027 (0.126)	-0.235 (0.379)	0.354 (0.256)	0.341 (0.300)
Regional trade agreement dummy	-0.228 (0.162)	-0.219 (0.159)	0.310 (0.512)	-0.040 (0.150)	0.058 (0.167)	-0.223 (0.167)	-0.216 (0.163)	0.303 (0.537)	-0.019 (0.181)	0.139 (0.171)
Oil import tariff					0.006 (0.055)					0.016 (0.056)
Log exporter's GDP	0.422** (0.168)	0.381** (0.170)	0.001 (0.324)	0.390 (0.603)	0.431 (0.670)	0.402** (0.170)	0.371** (0.171)	0.011 (0.330)	0.446 (0.607)	0.492 (0.663)
Log exporter's population	0.169 (0.257)	0.190 (0.259)	-1.057 (0.978)	-0.150 (1.037)	-0.303 (1.158)	0.157 (0.260)	0.181 (0.263)	-1.064 (0.977)	-0.104 (1.041)	-0.258 (1.148)
Log exporter's oil reserves	0.169*** (0.032)	0.168*** (0.032)	0.831*** (0.171)	1.343*** (0.236)	1.289*** (0.277)	0.168*** (0.031)	0.168*** (0.031)	0.837*** (0.173)	1.351*** (0.228)	1.282*** (0.265)
Additional controls										
Civil war dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Exporter's democracy	no	no	no	no	no	yes	yes	yes	yes	yes
Militarized interstate disputes	no	no	no	no	no	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations (# of countries)	1,879 (57)	1,879 (57)	1,156 (65)	2,432 (82)	1,728 (81)	1,877 (57)	1,877 (57)	1,156 (65)	2,432 (82)	1,728 (81)
R ²	0.406	0.412	0.768			0.407	0.413	0.769		

Notes: Columns (5) and (10) use data only from 1976-2000. Robust standard errors clustered at the country level are reported in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5. Political Distance and US Oil Imports: Different Subsamples and Subperiods

	Probit (1)	OLS (2)	PPML (3)
<u>Baseline Specification</u>	-0.080 (0.300) [1,877, 57; 0.413]	-2.755** (1.342) [1,156, 65; 0.769]	-2.775** (1.263) [2,432, 82]
<u>Post-Oil Import Quota Era (1974-2000)</u>	-0.646 (0.571) [1,210, 50; 0.409]	-3.555* (1.916) [941, 64; 0.739]	-2.763** (1.269) [1,844, 81]
<u>Cold War Period (1962-1990)</u>	-0.183 (0.389) [1,220, 50; 0.428]	-2.981 (1.887) [750, 57; 0.804]	-2.765 (1.891) [1,614, 72]
<u>Nondemocratic Exporters</u>	-0.883* (0.506) [831, 34; 0.491]	-4.000*** (1.408) [605, 40; 0.768]	-4.123* (2.105) [1,277, 58]
<u>Democratic Exporters</u>	-0.254 (0.570) [891, 35; 0.422]	-1.474 (2.189) [551, 44; 0.817]	-1.140 (1.498) [1,155, 55]
<u>Excluding Observations with Sanctions</u>	-0.027 (0.301) [1,829, 57; 0.421]	-2.552* (1.360) [1,125, 65; 0.783]	-3.398** (1.440) [2,352, 81]
<u>Excluding Observations with Interstate War</u>	-0.045 (0.303) [1,821, 57; 0.420]	-2.687* (1.391) [1,122, 65; 0.770]	-2.653** (1.107) [2,362, 82]
<u>Excluding Exporters that Ever be at War with</u>	-0.195 (0.294) [1,524, 47; 0.417]	-2.969* (1.709) [900, 52; 0.784]	-2.216 (1.444) [1,952, 66]

Notes: Robust standard errors clustered at the country level are reported in parentheses. All regressions control for political distance, import and export sanctions dummies, GATT.WTO membership dummy, regional trade agreement dummy, log exporter's GDP, log exporter's population, civil war dummies, exporter's democracy, militarized interstate disputes, year and country fixed effects. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6. Distances and China Oil Imports: Cross-Country Comparison

<u>Dependent Variable</u>	Probit $1\{M_{i,t}^{US} > 0\}$ (1)	OLS $\ln M_{i,t}^{US}$ (2)	PPML $M_{i,t}^{US}$ (3)
<u>Political Distance</u>			
Political distance (UNGA voting)	-0.170 ^{***} (0.053)	-7.292 ^{**} (3.486)	-9.190 ^{***} (2.266)
Import sanctions dummy	0.025 (0.031)	0.882 ^{***} (0.332)	0.891 ^{***} (0.269)
<u>Economic Distance</u>			
GATT/WTO membership dummy	-0.001 (0.010)	-0.342 (0.347)	-0.159 (0.463)
<u>Geographical Distance</u>			
Log geographical distance	-0.057 ^{***} (0.012)	-0.395 (0.412)	-1.144 ^{***} (0.224)
<u>Cultural Distance</u>			
Linguistic distance	-0.128 ^{***} (0.040)	0.545 (1.687)	0.892 (1.434)
Religious distance	0.071 ^{***} (0.027)	-2.947 (2.049)	0.164 (0.593)
Genetic distance	0.458 ^{***} (0.093)	1.808 (3.652)	6.539 ^{**} (3.316)
<u>Other Exporter's Characteristics</u>			
Log exporter's GDP	0.020 ^{***} (0.006)	0.324 (0.236)	0.729 ^{***} (0.166)
Log exporter's population	0.006 [*] (0.003)	0.068 (0.142)	0.160 (0.134)
Log exporter's oil reserves	0.019 ^{***} (0.003)	0.158 (0.099)	0.289 ^{***} (0.082)
<u>Additional Controls</u>			
Civil war dummies	yes	yes	yes
Year fixed effects	yes	yes	yes
Observations	1,420	207	2,240
R ²	0.436	0.386	0.653

Notes: Robust standard errors are reported in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 7. Political Distance and China Oil Imports: Fixed Effects Estimates

Dependent Variable	Probit	OLS	PPML	Probit	OLS	PPML
	$1\{M_{i,t}^{US} > 0\}$	$\ln M_{i,t}^{US}$	$M_{i,t}^{US}$	$1\{M_{i,t}^{US} > 0\}$	$\ln M_{i,t}^{US}$	$M_{i,t}^{US}$
	(2)	(3)	(4)	(7)	(8)	(9)
Political distance (UNGA voting)	-1.238** (0.515)	-6.698 (4.450)	-6.831*** (1.964)	-1.183** (0.526)	-7.260* (4.256)	-6.046*** (2.084)
Import sanctions dummy	0.913*** (0.026)	2.094*** (0.664)	3.282*** (0.404)	0.915*** (0.035)	2.285*** (0.643)	3.126*** (0.259)
Export sanctions dummy	0.452 (0.317)	1.140 (6.833)	5.147*** (1.520)	0.464 (0.331)	2.197 (5.945)	4.455*** (1.706)
GATT/WTO membership dummy	-0.253* (0.142)	-0.570 (0.495)	-0.593*** (0.218)	-0.252* (0.140)	-0.636 (0.499)	-0.482** (0.198)
Log exporter's GDP	0.185 (0.125)	0.038 (1.566)	1.520** (0.624)	0.181 (0.119)	0.113 (1.580)	1.048* (0.615)
Log exporter's population	0.439 (0.276)	-2.516 (4.167)	2.131 (1.531)	0.447* (0.255)	-1.778 (3.654)	0.475 (0.749)
Log exporter's oil reserves	0.090 (0.062)	0.767 (0.644)	0.809** (0.387)	0.102* (0.062)	0.720 (0.624)	0.658** (0.285)
Additional controls						
Civil war dummies	yes	yes	yes	yes	yes	yes
Exporter's democracy	no	no	no	yes	yes	yes
Militarized interstate disputes	no	no	no	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes
Country fixed effects	yes	yes	yes	yes	yes	yes
Observations (# of countries)	746 (36)	221 (37)	2,393 (81)	743 (36)	221 (37)	2,393 (81)
R ²	0.549	0.783		0.552	0.791	

Notes: Robust standard errors clustered at the country level are reported in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 8. Political Distance and China Oil Imports: Democratic versus Nondemocratic Countries

	Probit (1)	OLS (2)	PPML (3)
<u>Baseline Specification</u>	-1.183** (0.526) [743, 36; 0.552]	-7.260* (4.256) [221, 37; 0.791]	-6.046*** (2.084) [2,393, 81]
<u>Nondemocratic Exporters</u>	-2.734 (1.873) [361, 21; 0.590]	-10.342* (4.960) [122, 21; 0.870]	-13.381*** (3.098) [1,213, 56];
<u>Democratic Exporters</u>	-0.705 (2.129) [215, 18; 0.560]	0.019 (4.565) [101, 22; 0.858]	-3.150 (2.414) [1,211, 58]

Notes: Robust standard errors clustered at the country level are reported in parentheses. All regressions control for political distance, import and export sanctions dummies, GATT.WTO membership dummy, regional trade agreement dummy, log exporter's GDP, log exporter's population, civil war dummies, exporter's democracy, militarized interstate disputes, year and country fixed effects. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 9. Political Distance and Oil Imports into Other Countries

	Probit (1)	OLS (2)	PPML (3)
<u>United States</u>	-0.080 (0.300) [1,877, 57; 0.413]	-2.755** (1.342) [1,156, 65; 0.769]	-2.776** (1.263) [2,432, 82]
<u>China</u>	-1.183** (0.526) [743, 36; 0.552]	-7.260* (4.256) [221, 37; 0.791]	-6.046*** (2.084) [2,393, 81]
<u>United Kingdom</u>	-0.607 (0.518) [1,445, 42; 0.413]	-3.925*** (1.364) [735, 48; 0.749]	-3.137*** (1.106) [2,432, 82]
<u>France</u>	-1.072* (0.564) [1,266, 41; 0.547]	1.679 (2.187) [744, 49; 0.804]	0.459 (1.574) [2,432, 82]
<u>Japan</u>	-1.095* (0.571) [1,231, 36; 0.388]	-0.715 (2.226) [620, 43; 0.825]	-3.215** (1.405) [2,432, 82]
<u>Italy</u>	-0.382 (0.260) [1,599, 53; 0.396]	0.774 (2.031) [744, 62; 0.845]	0.656 (1.186) [2,432, 82]
<u>Spain</u>	-0.964*** (0.310) [1,585, 49; 0.467]	0.089 (1.775) [644, 54; 0.823]	1.125 (1.207) [2,435, 82]
<u>Netherlands</u>	-0.046 (0.551) [1,272, 36; 0.441]	-0.504 (2.271) [643, 41; 0.737]	-2.874*** (0.971) [2,432, 82]
<u>South Korea</u>	-0.450 (0.605) [1,413, 44; 0.513]	2.332 (4.659) [457, 45; 0.834]	2.724 (3.001) [2,432, 82]
<u>India</u>	-1.135*** (0.373) [558, 22; 0.527]	11.318** (4.622) [179, 22; 0.910]	6.698* (3.857) [2,432, 82]

Notes: Robust standard errors clustered at the country level are reported in parentheses. All regressions control for political distance, import and export sanctions dummies, GATT.WTO membership dummy, regional trade agreement dummy, log exporter's GDP, log exporter's population, log exporter's oil reserve, civil war dummies, exporter's democracy, militarized interstate disputes, year and country fixed effects. * significant at 10%; ** significant at 5%; *** significant at 1%.

Figure 1. Political Distance and US Oil Imports from Iran

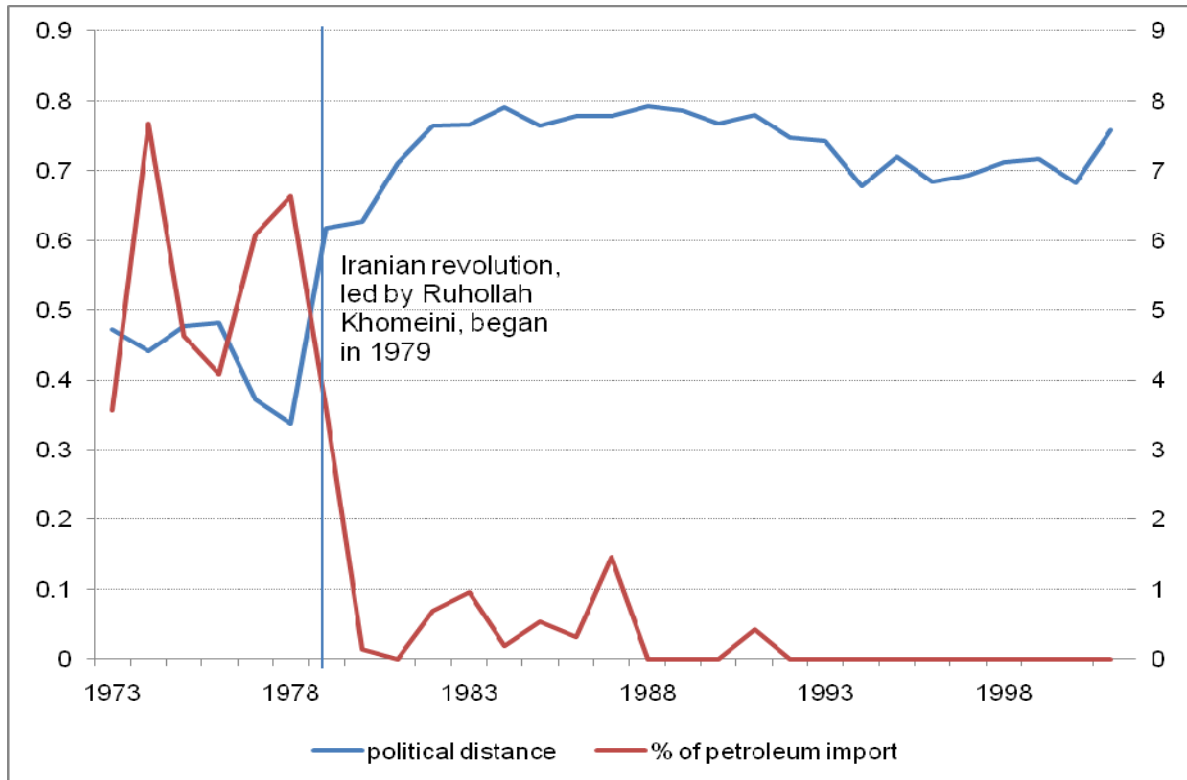


Figure 2. Political Distance and US Oil Imports from Venezuela

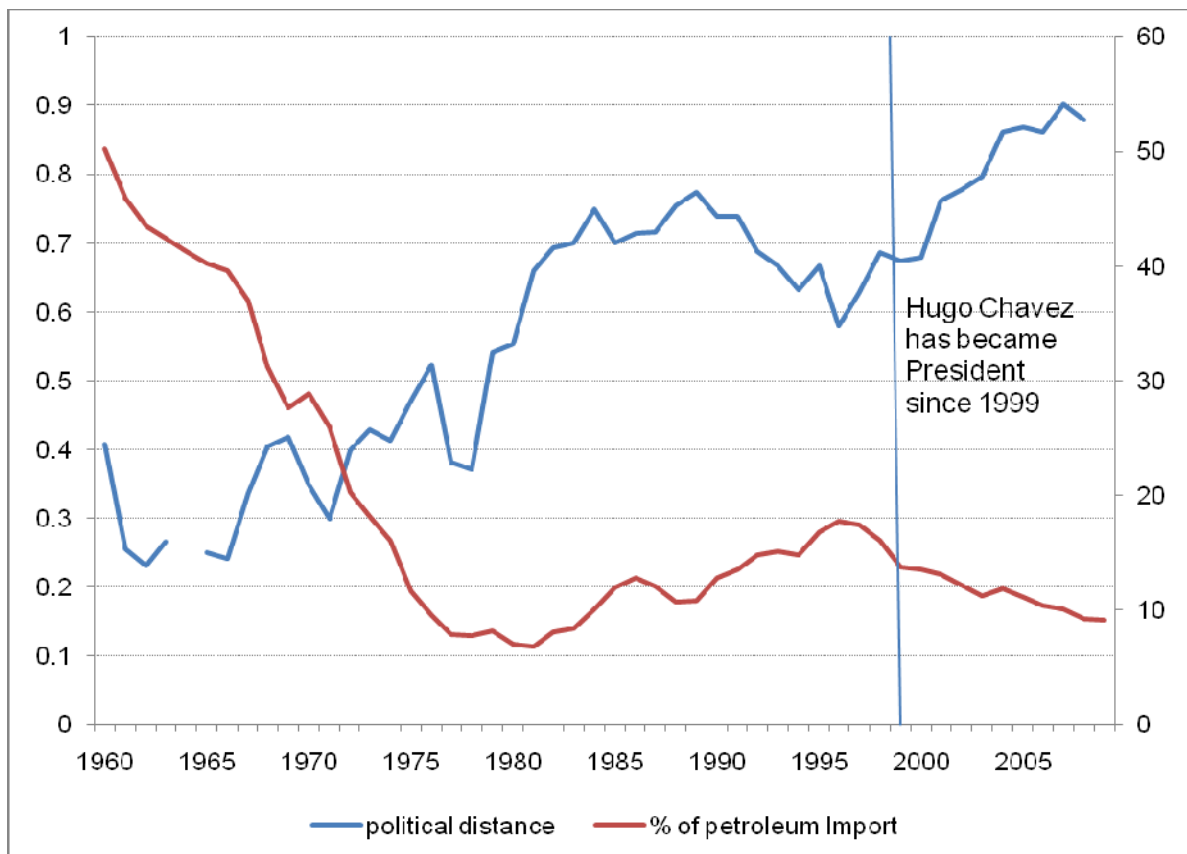


Figure 3. Political Distance and China Oil Imports from Venezuel

