ISSN 2279-9362

Collegio Carlo Alberto

Effects of Economic Growth on Political Risk: The Role of Ethnic Polarization

Markus Brückner
Mark Gradstein

No. 285
December 2012

Carlo Alberto Notebooks

www.carloalberto.org/research/working-papers

Effects of Economic Growth on Political Risk:

The Role of Ethnic Polarization

Markus Brückner* and Mark Gradstein**

Abstract

This paper studies the effects of within-country variation in national income on political risk. To address causality, we use annual variation in the international oil prices weighted with countries' average oil net-export GDP shares as an instrument for income growth. Our instrumental variables analysis yields two main results: (i) higher income growth is on average significantly negatively correlated with countries' political risk; (ii) the marginal effect of income growth on political risk is significantly decreasing in cross-country differences in ethnic polarization, so much so that at high levels of ethnic polarization income growth increases political risk while at low levels of ethnic polarization income growth reduces political risk.

* Department of Economics, National University of Singapore, Singapore.

**Ben Gurion University, Israel.

Very useful comments by seminar participants (Bar Ilan, Collegio Carlo Alberto, Haifa, Indiana University, National University of Singapore, University of Melbourne) and Ian King are gratefully acknowledged.

1. Introduction

There are high correlations in the cross-country data, typically of above 0.7, between the level of economic development – as measured, for example, by national income per capita – and a country's quality of the political environment, suggesting a positive relationship between them. This is illustrated in Figure 1, where income per capita is plotted against the International Country Risk Guide's (2010) political risk index for a cross-section of countries.

These correlations can obviously be interpreted in a number of ways. Several papers, some employing ingenious sources of exogenous variation to alleviate concerns about reverse causality, uncover causal effects of political risk of expropriation on investment and income growth (e.g. Knack and Keefer, 1995; Hall and Jones, 1999; Acemoglu et al., 2001, 2002). Economic prosperity could, however, also affect the quality of the political environment in a variety of ways. It, for example, could promote the development of democracy, in accordance with Lipset's, 1959, modernization hypothesis, and thereby reduce political risks. Or, it could foster the building of state capabilities – as emphasized in recent work by Besley and Persson, 2011. Another literature, on the political "resource curse", qualifies these understandings by suggesting that the conclusion may ultimately depend on the exact channel through which prosperity accrues. Focusing on income windfalls from mineral commodities, in particular oil, this line of work has generated a lively debate on the benefits of prosperity materializing through this channel.[1]

1 Karl, 1997 and Ross, 2001 are some leading contributions in this regard. For some recent empirical papers that examine the link between mineral wealth and institutions see Alexeev and Conrad, 2009, Brueckner et al., 2012, Caselli and Michaels, 2011, Caselli and Tesei, 2011, Haber and Menaldo, 2011, Mehlum et al., 2006, Tsui, 2010, and Wacziarg, 2012.

As is well recognized by the literature, one major difficulty in disentangling the causal effect of income on political risk is the endogeneity of income to the quality of the political environment. In this paper, therefore, we employ oil price shocks (defined as the change in the log of the international oil price multiplied by countries' average net-export oil GDP share) as an instrument for countries' national income to identify the causal effects of income growth on political risk. Most of the countries in our sample are price takers on the international oil market, so that variations in the international oil prices constitute a plausibly exogenous source of within-country variation in countries' national income.

Our econometric analysis indicates that income per capita, as instrumented by oil price shocks, has a significant moderating average effect on political risk. Controlling for country and time fixed effects, we obtain that a one standard deviation increase in GDP per capita growth reduces political risk by around 0.2 standard deviations. This first result should be interpreted as suggesting that economic prosperity, even when it accrues through the benefits of oil, is on average beneficial to the quality of the political environment. This finding concurs with the recent work of Haber and Menaldo, 2011, Brueckner et al. 2012, and Wacziarg, 2012, who fail to uncover adverse effects of oil windfalls on political institutions. While there is an overlap between political institutions and the quality of the political environment, we view the two as distinct and separate issues. In particular, the focus in this paper on political risk does not require taking a stand on whether or not democratic

institutions should necessarily be associated with reduced risk of expropriation.[2] Indeed, when we control in our regressions for measures of democracy we continue to find a significant mediating effect of income growth on political risk.

We then go a step further and explore how cross-country differences in ethnic polarization affect the impact that income growth has on political risk. Our main finding there is that ethnic polarization is a significant mediating factor through which income growth affects political risk. Specifically, we find that the larger polarization the more adverse is the effect that income growth has on political risk. Beyond being highly statistically significant, the mediating effect of ethnic polarization is also quantitatively large: at sample minimum ethnic polarization, the instrumental variables estimates predict that a one standard deviation increase in GDP per capita growth reduces political risk by up to 0.7 standard deviations; at sample maximum ethnic polarization, the estimates predict that a one standard deviation increase in GDP per capita growth increases political risk by around 0.35 standard deviations.

There are a number of telling country-episodes that fit the pattern documented by our panel fixed effects regressions. During the period 1997 to 2007, when the international oil price increased four-fold, Ecuador's political risk index deteriorated by over 10 percentage points. Venezuela, where oil exports also constitute a significant source of export revenue,

2 For example, while the cross-country correlation between the political risk index and the Polity2 score is about one-half, the within-country correlation is around zero. For recent papers that have examined the link between income and democracy see, for example, Acemoglu et al. (2008, 2009), Burke and Leigh (2010), and Brueckner and Ciccone (2011).

experienced a similar deterioration in its political risk rating during the oil price booms. Both, Ecuador and Venezuela are highly ethnically polarized countries: the ethnic polarization index for Ecuador is 0.84 and for Venezuela it is 0.74. On the other hand, for other oil exporting countries such as Algeria and Egypt -- which are characterized by intermediate levels of ethnic polarization (0.51 and 0.43, respectively) -- the increase in the international oil price did not lead to a significant increase in political risk during the 1997-2007 period.

On the empirical front, existing literature (e.g. Alesina et al., 1999, Easterly and Levine, 1997, Montalvo and Reynal-Querol, 2005a,b) has found that measures of ethnic heterogeneity are detrimental for public policies and development. There exists also a theoretical literature, see, for example, the voracity models of Lane and Tornell, 1998, 1999, or the public good provision model of Alesina et al., 1999, that suggests adverse effects of ethnic fragmentation on policies. Our paper is related to this literature; however, a key aspect that distinguishes our paper, beyond our focus on a different outcome, political risk, is that here the adverse effects of ethnic polarization are not direct -- instead, they act as an interfering factor. The finding that ethnic polarization acts as a mediating factor is important because it suggests that the political risk effect of income growth is conditional on countries' ethnic composition. In fact, our estimates and model predict that for highly polarized countries increases in income lead to a higher political risk.

The rest of the paper proceeds as follows. We begin, in Section 2, with a motivation. Section 3 describes the data and Section 4 contains discussion of our estimation strategy. In Section 5 we present the main empirical results. Section 6 then concludes with brief remarks.

2. Motivation

While Lipset's modernization hypothesis would generally suggest that economic development should lead to a better and more stable institutional environment, thereby decreasing political risk, voracity theories in Lane and Tornell, 1998, 1999, stipulate that a windfall may result in intensified struggle among population groups over its control. Further, the resource curse literature, see above, likewise suggests the possibility that, in the context of a natural resource windfall, political risks may be enhanced. Indeed, there seem to be anecdotal examples that support each of these speculations. This controversy is the motivation behind the first part of our empirical analysis, whose goal is to explore the average effect of income growth on political risk. Our panel data analysis of within country changes indicates that, on average income growth reduces political risk.

There is also related but different work on the consequences of ethnic polarization. Alesina et al., 1999, and Easterly and Levine, 1997, argue that these are primarily adverse, the latter paper doing so in particular with regard to economic policies. We, too, are interested in exploring the effect of ethnic polarization (in this context, on political risk). But

our goal in the second part of the paper is to submit that, beyond this independent effect, ethnic polarization acts as a mediating factor with regards to the marginal effect of income growth on political risk. Indeed, introducing the potential for expropriation by a policymaker in otherwise standard model in Alesina et al., 1999 (see the Appendix), shows the plausibility of such a relationship. Specifically, the empirically testable stipulation that comes out of the model is that, while income growth has on average a moderating effect on political risk, the magnitude of this effect is reduced in ethnically polarized societies. In other words, depending on the extent of ethnic polarization, oil induced income growth can ultimately be a curse or a blessing.

3. Data

Oil Price Shocks. The data on our oil price shock instrument are from Bruckner et al. (2012). The oil price shock instrument is constructed as follows:

(1) $$\text{OilPriceShock}_{ct} = \Delta\ln(\text{OilPrice})_t * \theta_c$$

where data on the international oil price are from UNCTAD Commodity Statistics and data on oil exports and imports from the NBER-United Nations Trade Database. For the 1984-2007 period, the AR(1) coefficient on the international oil price, when detrended with a linear time trend, is 0.999 (standard error 0.09); for the change in the international oil price the AR(1) coefficient is -0.025 (standard error 0.22). The augmented Dickey Fuller test does not

reject the null hypothesis of a unit root in the level of the oil price (p-value 0.86), but rejects at the 1% level the null hypothesis of a unit root in the first-differenced oil price (p-value 0.0001). Given this unit root behavior of the international oil price during the sample period, oil price shocks are identified by the change in the log of the international oil price.[3]

We note that equation (1) takes into account that the impact of the oil price shock is larger for countries that are very dependent on oil exports (imports), by weighting the oil price by the average (i.e. time-invariant) share of net oil exports in GDP θ_c.[4] The average share of net oil exports in GDP is computed as the period average value of oil exports minus imports divided by GDP. The sample maximum (minimum) value of θ_c is 0.18 (-0.03); the mean (median) is 0.009 (-0.001); and the interquartile range is [-0.005, 0.002]. As a robustness check, we will also present estimates where θ_c is the initial (1980) net-export share of oil in GDP.

We furthermore note that in our empirical analysis we are interested in exploiting variations in the international oil price as a plausibly exogenous shock to income growth. In particular, our instrumental variables analysis, under the assumption that variations in the international oil price are exogenous, does not require distinguishing between demand and

3 For evidence on the unit root behavior of the international oil price based on longer time periods or higher frequency data see, for example, Bruckner et al. 2012 or Hamilton (2009).

4 This functional form of the oil price shock is motivated by log-linearizing output around steady-state and taking the total differential with respect to output, $y_{c,t}$, and the oil price, P_t. This yields that $\Delta\log(y_{c,t})=\theta_c\Delta\log(P_t)$, where θ_c is the steady-state share of net oil exports in output of country *c*. Also note that the constructed oil price shock variable does not use within-country changes in the amount of oil produced to identify the oil price shock, because within-country changes in the amount of oil produced could be endogenous to within-country changes in output.

supply-side driven changes in the international oil price. We are simply interested in the average marginal response of income growth to variations in the international oil price, and how this response varies depending on whether countries are oil importers or exporters. This stands in contrast to the monetary economic literature (e.g. Kilian, 2009). In this literature, for purposes of monetary policy reaction to the oil price shocks, it is key to distinguish between demand and supply side shocks. Optimal monetary policy reaction to oil price shocks is not the focus of our paper's analysis though.

Political Risk. Political risk data are from the International Country Risk Guide (2010). These data are available on a monthly basis from 1984 onwards. We aggregate these monthly data to the annual level using a simple linear average.

Our main indicator of political risk is the ICRG political risk index. This index captures countries' overall political risk. The index combines scores on countries' government stability (measuring the government's ability to carry out its declared program(s) and its ability to stay in office); socio-economic conditions (measuring the socioeconomic pressures at work in society that could constrain government action or fuel social dissatisfaction); the investment profile (measuring contract viability and expropriation, profits and repatriation, and payment delays), internal conflict (measuring political violence in the country and its actual or potential impact on governance); external conflict (measuring the risk to the incumbent government from foreign action, ranging from non-violent external pressure to violent external pressure); military in politics (measuring the degree of military participation

in politics); religious tensions (measuring the domination of society and/or governance by a single religious group); ethnic tensions (measuring the degree of tension within a country attributable to racial, nationality, or language divisions); democratic accountability (measuring the responsiveness of government to its people); bureaucracy quality (measuring the strength and expertise to govern without drastic changes in policy or interruptions in government services); corruption (measuring demands for special payments and bribes, form of excessive patronage, nepotism, job reservations, 'favor-for-favors', secret party funding, and suspiciously close ties between politics and business); and law and order (measuring the strength and impartiality of the legal system and the popular observance of the law).

In order to focus on political risk that is specifically related to (the absence of) law and order, which is a key channel in the theoretical model of the Appendix, we will also present results that use the ICRG law and order index as dependent variable. While the political risk index ranges from 0 to 100, the law and order index ranges between 0 and 6. We thus re-scale these variables so that they range between 0 and 1. The correlation of the within-country change of these indices is 0.18.

As noted by Glaeser et al. (2004), the ICRG variables measure institutional outcomes, not institutional constraints. Thus, variations in the ICRG variables should not be viewed as pertaining to constraints on government, but rather as reflecting the fact that dictators, too, can potentially pursue growth promoting policies. The ICRG political risk index thus appears particularly suitable for studying how economic growth affects political risk.

Ethnic Fragmentation Data. Data on ethnic polarization are from Reynal-Querol (2001). The Reynal-Querol ethnic polarization index is constructed as follows:

$$EthPol_c = 1 - 4\sum_{r=1}^{N} (0.5 - \pi_{cr})^2 \pi_{cr}$$

where π_{cr} is the proportion of people who belong in country c to ethnic group r. This ethnic polarization index measures the normalized distance of a particular distribution of ethnic groups from a bimodal distribution. The index is maximized when there are two ethnic groups which are of equal size. The polarization index therefore emphasizes that conflict tensions are greatest when there are two equally powerful groups.

Note that the polarization index differs from the well-known fractionalization index, defined as:

$$EthFrac_c = 1 - \sum_{r=1}^{N} \pi_{cr}^2$$

A key property of the fractionalization index is that, in contrast to the polarization index, it is strictly increasing in the number of ethnic groups. Intuitively, the fractionalization index measures the probability that two randomly selected individuals in a country will not belong to the same ethnic group. For further discussion on ethnic fractionalization vs. polarization with an application to conflict, see Montalvo and Reynal-Querol (2005a,b).

GDP Data. Data on annual real per capita GDP are from the Penn World Table, version 6.3 (Heston et al. 2009). Table 1 reports some summary statistics on the above variables.

4. Estimation Framework

We use the following econometric model to estimate the average within-country effect that changes in income per capita have on changes in countries' political risk:

$$\Delta PR_{ct} = a_c + b_t + \beta \Delta \ln(GDP)_{ct} + z_{ct} \quad (2)$$

where a_c and b_t are country and year fixed effects; $\Delta\ln(GDP)$ is the annual change of the log of real GDP per capita; ΔPR_{ct} is a measure for the within-country change in political risk; $z_{c,t}$ is an error term that is clustered at the country level.[5]

Our main method of estimation is two-stage least squares. In the two-stage least squares estimation we instrument real GDP per capita growth by our oil price shock variable. By doing so, we use a plausibly exogenous source of variation in countries' GDP per capita growth to examine the link between income growth and political risk. Because year-to-year variations in the international oil prices are very persistent (see the discussion in Section 3), it is important to note that in the two-stage least squares estimation we identify the effects that permanent shocks to GDP per capita have on political risk. The exclusion restriction for the two-stage least squares estimation is that oil price shocks should have no systematic effects on countries' political risk beyond their effects on GDP. We will discuss and examine this exclusion restriction in detail in the next Section.

5 Note that equation (14) has a level form specification of the form $PR_{ct} = r_c + a'_c t + b'_t + \beta \ln(GDP)_{ct} + z'_{ct}$. Because the level of the international oil price contains a unit root we relate in the instrumental variables estimation the change in the PR score to the change in GDP to ensure that the error terms are stationary.

We then explore how the effect of income growth on political risk varies as a function of cross-country differences in ethnic polarization by estimating the following interaction model:

$$\Delta PR_{ct} = e_c + f_t + g\Delta\ln(GDP)_{ct} + h\Delta\ln(GDP)_{ct} * EthPol_c + u_{ct} \quad (3)$$

where $EthPol_c$ is an index of cross-country differences in ethnic polarization. We note that the ethnic polarization index is a time-invariant variable. The direct effect of ethnic polarization on political risk is, therefore, captured by the country fixed effect, e_c.

5. Empirical Results

5.1. Average Effect of Income Growth on Political Risk

5.1.1 Baseline Estimates

Columns (1)-(3) of Table 2 present our baseline two-stage least squares estimates of the average effect that GDP per capita growth has on political risk.[6] The estimates are for the largest possible sample, covering more than 115 countries from 1984 to 2007. Column (1) shows estimates from a static panel data model that controls for year fixed effects but not for country fixed effects; column (2) shows estimates when controlling in addition to year fixed effects for country fixed effects. The main finding is that GDP per capita growth has a significant positive effect on (the absence of) political risk. The estimated coefficient is

6 The countries comprising the baseline sample are listed in Appendix Table 1.

around 0.1 and has a standard error of 0.04. Quantitatively, the estimates suggest that a one percentage point increase in GDP per capita growth decreases the political risk index by around 0.1 percentage points. This is a sizable effect given that the sample standard deviation of the within-country change of the political risk index is 0.045 and the standard deviation of economic growth is 0.08. (The point estimate of 0.1 thus suggests that a one standard deviation increase in GDP per capita growth reduces political risk by around 0.2 standard deviations.)

In column (3) we document that the baseline two-stage least squares estimates are robust to controlling for the lagged level of the political risk index. The coefficient on the lagged political risk index is -0.25 and has a standard error of 0.02, which in turn suggests significant mean reversion in the political risk index (the index is bounded on the [0, 1] interval). The point estimate on GDP per capita growth in this dynamic panel regression is 0.09; its standard error 0.04. Hence, taking into account dynamics in the political risk index barely changes the estimated effect that economic growth has on the dependent variable.

The two-stage least squares estimates use the international oil price shock instrument to generate plausibly exogenous variation in countries' GDP per capita growth. In columns (3)-(6) we report results from other within-country estimation strategies that do not instrument GDP per capita growth. Column (4) reports estimates from a fixed effects least squares estimation. The least squares coefficient on GDP per capita growth is 0.06 and has a

standard error of 0.01. Hence, the least squares coefficient on GDP per capita growth is about two-thirds the size of the IV coefficient.

In column (5) we report system-GMM estimates to correct for any bias that arises due to the inclusion of the lagged dependent variable in the country fixed effects regression. We note that the average T in our panel is around 20; thus it is fairly large and the Nickel bias should be relatively small (e.g. Wooldridge, 2002). Indeed, the system-GMM estimates that correct for the fixed effects bias in the dynamic panel regression are very similar to the least squares estimates.[7] Furthermore a left- and right-censored Tobit regression also produces estimates that, after rounding at the second digit, are essentially identical to the least squares estimates. Our conclusion from these estimates is that instrumenting GDP per capita growth with plausibly exogenous variations in the international oil prices is important for obtaining a quantitatively larger effect of income growth on political risk; the inclusion of country fixed effects, or the alternative estimation approaches that correct for the Nickel bias and the bounded nature of the dependent variable are of more minor importance in our data.[8] We now

7 In the system-GMM estimation we use the first and second lag as instruments for the lagged dependent variable in order to keep the number of moments low. The p-value from the Hansen test is 0.44.

8 There could be a number of reasons for the larger effects of income growth on political risk in the two-stage least squares estimation. An obvious candidate is measurement error in GDP per capita growth. Classical measurement error would attenuate the estimates in columns (4)-(6) but not the two-stage least squares estimates. On the other hand, reverse causality running from less political risk to higher income growth is unlikely to be the cause of the difference in estimates: this type of endogeneity bias would introduce an upward bias in the estimates reported in columns (4)-(6) but not in the two-stage least squares estimates. We also note that time-invariant variables such as, for example, the colonial experience of countries (e.g. Acemoglu et al., 2008, 2009) are already accounted for by the country fixed effects.

discuss the quality of the two-stage least squares estimates, followed by a discussion of further robustness checks.

5.1.2 Discussion of Instrument Quality

The quality of the oil price shock variable in terms of its first-stage fit with GDP per capita growth is reasonable: oil price shocks have a highly significant positive effect on income per capita growth during the 1984-2007 period with an F-statistic that exceeds 80. Hence, in terms of first-stage fit, the F-statistic on the excluded instrument is well above the Staiger and Stock (1997) rule-of-thumb criteria of 10 for instruments to be declared weak.

The second important criteria for two-stage least squares estimation to yield consistent estimates is that the oil price shock instrument should only affect political risk through GDP per capita growth. This restriction would, for example, be violated if (i) oil price shocks have a significant effect on income inequality; and (ii) beyond average income, there is a significant direct effect of income inequality on political risk.

To examine empirically whether oil price shocks are a valid instrument, we follow two alternative but complementary approaches. In column (1) of Table 3 we first report the reduced-form effect that the oil price shock instrument has on political risk. Not surprisingly, in light of the significant positive first-stage effect and the significant positive 2SLS coefficient on GDP per capita growth, the reduced-form effect of the oil price shock variable

on political risk is positive and significant. The estimated reduced-form coefficient is 0.22 and has a standard error of 0.09.[9]

It may be useful at this stage to recall that the exclusion restriction states that, conditional on GDP per capita growth, the oil price shock instrument should have no significant (direct) effects on political risk. In column (2) we test this by reporting the estimated effect of oil price shocks on political risk in a regression that controls for GDP per capita growth. The main result is that the coefficient on oil price shocks is in that regression 0.07 and has a standard error of 0.11. Hence, the conditional effect of the oil price shock instrument on political risk is quantitatively small (it is less than one-third the size of the unconditional, reduced-form effect) and not significantly different from zero while in this regression the effect of economic growth on political risk is quantitatively large and statistically significant. In other words, column (2) shows that conditional on GDP per capita growth, the oil price shock instrument exhibits no systematic effects on political risk.

The second approach to examine the exclusion restriction is to search for an additional instrument for GDP per capita growth. This approach allows to formally test the instrument validity based on the Hansen J-test. We follow Acemoglu et al. (2008) and use the lagged savings rate as an additional instrument for GDP per capita growth. Column (3) of Table 3 reports the two-stage least squares estimates that are generated from using both the oil price shock variable and the savings rate as excluded instruments. The main result is that

9 Appendix Table 2 documents that the reduced-form lags and leads of the oil price shock instrument are insignificant.

the 2SLS estimate on GDP per capita growth is positive and significant; and the Hansen J-test fails to find evidence that the instruments violate the exclusion restriction: the p-value of the joint hypothesis that the instruments are uncorrelated with the second stage error term is above 0.6. We also note that the first-stage F-statistic is well above 10. Hence, low power due to weak instruments is unlikely to be the reason why the Hansen J-test fails to find evidence that the instruments violate the exclusion restriction.

5.1.3 Extensions and Robustness

Our oil price shock instrument is constructed as the change in the log of the international oil price multiplied with countries' sample average net-export shares of oil in GDP. One concern with our instrument could be that the sample net-export shares of oil in GDP are endogenous to within-country changes in politico-economic conditions. However, note that we are not using time-varying net-export shares for constructing the oil price shock instrument. Instead, we are using the sample average net export shares. Feedback effects of politico-economic conditions should thus be relatively small (of order 1/T). In order to provide further support for this argument we report in column (1) of Table 4 instrumental variables estimates where the oil price shock instrument is constructed as the change in the log of the international oil price multiplied with countries' initial (1980) net-export shares of oil in GDP. The main finding is that in this specification GDP per capita growth continues to have a positive and significant effect on the absence of countries' political risk.

Another important identifying assumption for the two-stage least squares estimation is that, because the majority of the countries in our sample are price takers on the international oil market, variations in the international oil price are a plausibly exogenous source of variation in countries' permanent income. To demonstrate that our results are robust to excluding those countries from our sample where changes in politico-economic conditions might have an effect on year-to-year variation in the international oil price, we report in columns (2) of Table 4 instrumental variables estimates that exclude potentially large oil importing countries, such as, China and the United States. We find that in this case the coefficient on GDP per capita growth is 0.09 and significant at the 5 percent level.

In column (3) of Table 4 we report estimates when both large oil importing and exporting countries are excluded. In this regression the Kleibergen Paap F-statistic is around 14 and thus quite a bit smaller than in our baseline. Resonating with the weaker first-stage F-statistic, the standard error in the second stage is larger (nearly twice as large as in our baseline specification). Nevertheless, the estimated coefficient on GDP per capita growth, 0.12, is still significantly different from zero at the 10 percent significance level when both large oil importing and exporting countries are excluded. The drop in significance in column (3) thus arises due to a larger standard error and not because of a decrease in the estimated second-stage coefficient.

A commonly held view in the popular press is that increases in the international oil price are a curse for economic and political development for oil exporting countries (e.g.

Friedman, 2006, 2008). Column (4) of Table 4 shows that, with respect to political risk, this view is a fallacy: restricting the number of observations to only those countries that are net oil exporters continues to yield a significant positive effect of income growth on (the absence of) political risk. The coefficient on GDP per capita growth, 0.1, is also very similar in size to our baseline 2SLS estimates that are based on the largest possible sample. Hence, the estimates in column (4) of Table 4 indicate that higher oil prices, due to their positive effect on income per capita, reduce political risk in oil exporting countries.

Our baseline estimates are also robust to excluding large oil price shock observations. In column (5) of Table 4 we report two-stage least squares estimates that exclude the top 1st percentile of the oil price shock variable. The 2SLS coefficient is in this sub-sample 0.09 and has a standard error of 0.05. In column (6), where we exclude the top 5th percentile, the 2SLS coefficient is 0.14 and has a standard error of 0.08. Hence, excluding large oil price shocks continues to yield a significant positive average effect of GDP per capita growth on (the absence of) political risk.

In Table 5 we explore how results differ if we use instead of annual GDP per capita growth GDP per capita growth rates over five years. Growth rates over five years smooth out business-cycle variations and reflect more long-run differences in economic growth. The main finding is that the 2SLS estimates on the longer-run GDP per capita growth rates are also positive and significantly different from zero in the majority of specifications.

Quantitatively, they are smaller though (about half the size of the estimates that are based on annual GDP per capita growth).

In Table 6 we show that there continues to be a significant positive average effect of economic growth on political risk when controlling on the right-hand side of the regression for a commonly used measure of political institutions, the Polity2 score.[10] Except for column (7) where only oil exporting countries are included in the sample, the Polity2 score is positively correlated with (the absence of) political risk. Hence, much in accordance with the institutions literature, stronger democratic institutions are on average associated with less political risk. It is interesting to note, however, that the inclusion of the Polity2 score on the right-hand side of the regression leads to only very small changes in the estimated coefficients on GDP per capita growth (see Table 4 as well as column (3) of Table 2 for comparison). This in turn suggests that beyond its effect on political institutions income growth has a substantial direct effect on countries' political risk.

5.2. The Role of Ethnic Polarization

5.2.1 Baseline Estimates

10 The Polity2 score is from the Polity IV database. See http://www.systemicpeace.org/polity/polity4.htm. The Polity2 score captures political constraints and political competition as well as executive recruitment. We re-scale the score so that it ranges between 0 and 1 (higher values denote more democratic institutions).

We now explore the role of ethnic polarization (see equation (3) for the econometric model specification). Table 7 shows that the estimated coefficients on the interaction between GDP per capita growth and ethnic polarization are negative. The heterogeneity in the marginal effect is so strong that in countries with low levels of ethnic polarization increases in GDP per capita growth are predicted to lead to a reduction in political risk while in countries with high levels of ethnic polarization increases in GDP per capita growth are predicted to lead to an increase in political risk.[11]

Figure 2 illustrates the heterogeneity of the marginal effect graphically, based on estimates in column (1) of Table 7. The figure shows that the marginal effect of income on (the absence of) political risk is significantly negative for those countries' with ethnic polarization above 0.7. For intermediate values of ethnic polarization (0.4 to 0.7) the marginal effect of income growth on political risk is insignificant, while for low values of ethnic polarization (below 0.4) it is significantly positive.

In quantitative terms, the heterogeneity in the marginal effect of income growth on political risk is also sizable. For example, the estimates in column (1) of Table 7 imply that at sample minimum ethnic polarization a one standard deviation increase in GDP per capita growth reduces political risk by around 0.7 standard deviations. At sample maximum ethnic

11 Appendix Table 3 shows that we obtain a similar result if using as an instrument, instead of the oil price shock variable, a general commodity export price index. The commodity export price index is from Arezki and Brueckner (2012) and comprises a broad set of commodities, including both mineral and fuel commodities (aluminum, copper, gold, iron, and oil) as well as agricultural commodities (beef, coffee, cocoa, maize, rice, rubber, sugar, tea, tobacco, wheat and wood).

polarization, the estimates imply that a one standard deviation increase in GDP per capita growth increases political risk by around 0.35 standard deviations.

Table 8 illustrates the interaction results in a slightly different way by splitting the sample into different groups based on countries' ethnic polarization. Column (1) reports estimates for the group of countries with very low ethnic polarization (the bottom 25th percentile); column (2) reports estimates for countries that have a below-median ethnic polarization index; column (3) reports estimates for countries that have an above-median ethnic polarization index; and column (4) reports estimates for countries that have very high levels of ethnic polarization (the top 25th percentile). The main result from this exercise is that the coefficient on GDP per capita growth decreases as one goes from low levels of ethnic polarization to high levels of ethnic polarization: in column (1) the coefficient on GDP per capita growth is 0.23; in column (2) it is 0.09; in column (3) it is -0.11; and in column (4) the coefficient is -0.19. The sample split exercise thus confirms the main message from the interaction estimates that we presented in Table 7.

5.2.2. Specific Aspects of Political Risk: Absence of Law and Order

In the theoretical model presented in the Appendix one of the main mechanisms through which income affects political risk of expropriation is through expenditures on law and order. In order to examine empirically this mechanism, we show in Table 9 regression results based

on the ICRG law and order score. We re-scale it, so that it ranges in the [0, 1] interval (higher values denote stronger law and order).

The estimates in Table 9 show that only at low levels of ethnic polarization do increases in economic growth significantly increase law and order. On the other hand, if ethnic polarization is high the prediction from the interaction estimates is that increases in economic growth weaken law and order. Importantly, the interaction between national income growth and ethnic polarization is negative and significant at the 5 percent level. Hence, ethnic polarization acts as an interfering factor. This result holds in the largest possible sample of countries and is robust to using initial net export shares, excluding large oil importers and exporters, excluding large oil price shocks, and using only the sample of oil exporting countries.

5.2.3 Fractionalization and Other Interactions

A related measure of ethnic diversity is the fractionalization index. In contrast to the polarization index, the fractionalization index strictly increases in the number of groups (Montalvo and Reynal-Querol, 2005). To see the model implications of these two alternative measures, suppose that population preferences are distributed uniformly, and, further, that the population consists of three distinct groups (the size of each being, therefore, 1/3). For concreteness, suppose that 0, ½, and 1 are the bliss points of each of the three groups, respectively, so that m=½ is both the mean and the median. Consider now a mean preserving

spread, whereby the size of the middle group is $1/\eta$, and the size of each of the extreme groups is $(\eta-1)/2\eta$, $\eta>3$; larger values of η correspond, therefore, to a larger spread. An increase in η decreases the fractionalization index (which is, essentially, one minus the Herfindahl index), but it increases the polarization index, see Section 3 for their respective formal definitions. Going back to the theoretical model presented in the Appendix, note that an increase in η increases the distance $l(M,m) = (\eta-1)/2\eta$, which is consistent with the polarization index, but not with the fractionalization index (see Montalvo and Reynal-Querol, 2005a, b, for a further discussion of the relationship between the two indices).[12]

To explore this alternative -- but conceptually different – measure, we repeat the exercise interacting GDP per capita growth with ethnic fractionalization. The estimates are presented in column (1) of Table 10. The interaction between GDP growth and ethnic fractionalization is positive but not significantly different from zero; in contrast, the interaction between ethnic polarization and GDP growth is negative and significantly different from zero at the 1 percent significance level. Hence, when using ethnic fractionalization – a measure that, in contrast to the polarization measure, is not closely tailored to the theoretical model – there is no significant effect.

In columns (2) and (3) of Table 10 we, furthermore, show that there is no significant heterogeneity in the marginal effect of changes in income on changes in institutional quality in terms of cross-country differences in the lagged institutional quality score or cross-country

12 This analysis generalizes to any number of groups, provided that the distribution of preferences is unimodal.

differences in average income per capita. Moreover the interaction between GDP growth and ethnic polarization remains negative and highly significant when controlling for these alternative interactions.

The only indication that institutional differences play a role in shaping the marginal effect of income growth on political risk comes from column (4). There we report estimates from an interaction model that also includes an interaction between GDP growth and the Polity2 score. The positive interaction between GDP growth and countries' average Polity2 scores suggests that the effects of income windfalls from international oil price shocks on political risk are more benign in countries with stronger political institutions. While this result is not implausible, it does not invalidate our key finding, namely, that the interaction between GDP growth and ethnic polarization is negative, statistically significant, and quantitatively large.

6. Conclusion

The extent to which the economic environment affects political risk is an important question. In this paper we explored the effects that growth in income per capita has on political risk for a panel of over 115 countries. To focus on causal effects, we constructed instrumental variables estimates that exploited the significant effect of exogenous oil price shocks on countries' GDP per capita growth. Our main finding was that, on average, increases in GDP

per capita growth reduce political risk. However, for countries characterized by high degrees of ethnic polarization an increase in GDP per capita growth is detrimental, in the sense, that it increases political risk. These findings, which we motivated by a simple political economy model, therefore, render only qualified support for the hypothesis that growth in income per capita reduces political risk.

References

Acemoglu, D., S. Johnson, and J. Robinson, 2001, "The Colonial Origins of Comparative Development: An Empirical Investigation," *American Economic Review* 91: 1369-1401.

Acemoglu, D., S. Johnson, and J. Robinson, 2002, "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution," *Quarterly Journal of Economics* 117: 1231-1294.

Acemoglu, D., S. Johnson, J. Robinson, and P. Yared, 2008, "Income and Democracy," *American Economic Review* 98: 808-842.

Acemoglu, D., S. Johnson, J. Robinson, and P. Yared, 2009, "Reevaluating the Modernization Hypothesis," *Journal of Monetary Economics* 59: 1043-1058.

Alesina, A., Baqir, R., Easterly, W., 1999, "Public goods and ethnic divisions." *Quarterly Journal of Economics*, 114 (4), 1243–1284.

Alexeev, M. and R. Conrad, 2009, "The Elusive Curse of Oil," *Review of Economics and Statistics* 91: 586-598.

Arezki, R. and M. Brueckner, 2012, "Commodity Price Shocks, Democracy, and External Debt," *Economic Journal* 122: 848-866.

Besley, T. and T. Persson, 2011, *Pillars of Prosperity: The Political Economics of Development Clusters*, Princeton University Press.

Burke, P. and A. Leigh, 2010, "Do Output Contractions Trigger Democratic Change?" *American Economic Journal Macroeconomics* 2: 124–57.

Brueckner, M., A. Ciccone, and A. Tesei, 2012, "Oil Price Shocks, Income, and Democracy," *Review of Economics and Statistics*, 94: 389-399.

Brueckner, M. and A. Ciccone, 2011, "Rain and the Democratic Window of Opportunity," *Econometrica* 79: 923-947.

Caselli, F. and G. Michaels, 2011, "Do Oil Windfalls Improve Living Standards? Evidence from Brazil," *American Economic Journal: Applied Economics*, forthcoming.

Caselli, F. and A. Tesei, 2011, "Resource Windfalls, Political Regimes, and Political Stability," mimeo.

Easterly, B., Levine, R., 1997, "Africa's growth tragedy: policies and ethnic divisions," *Quarterly Journal of Economics,* 12, 1203–1250.

Friedman, T., 2006, "The First Law of Petropolitics," *Foreign Policy,* 154, 28-39.

Friedman, T., 2008, *Hot, Flat and Crowded.* New York: Farrar, Straus and Giroux.

Glaeser, E., R. La Porta, F. Lopez-de-Silanes, and A. Shleifer, 2004, "Do Institutions Cause Growth?" *Journal of Economic Growth,* 9, 271-303.

Haber, S. and V. Menaldo, 2011, "Do Natural Resources Fuel Authoritarianism?" *American*

Political Science Review, 105, 1-26.

Hall, R. and Jones, C., 1999, "Why do some countries produce so much more output per worker than others?" *Quarterly Journal of Economics*, 114, 83–116.

Hamilton, J., 2009, "Understanding Crude Oil Prices," *Energy Journal*, 30, 179-206.

Heston, A., R. Summers, and B. Aten, 2009, Penn World Table Version 6.3. Center for International Comparisons of Production, Income and Prices. University of Pennsylvania, http://pwt.econ.upenn.edu.

International Country Risk Guide, 2010, "Political Risk Scores", Online Database.

Karl, T., 1997, *The Paradox of Plenty: Oil Booms and Petro-States*. Berkeley, CA: University of California Press.

Kilian, L., 2009, "Not All Oil Price Shocks are Alike: Disentangling Demand and Supply Shocks in the Crude Oil Market." *American Economic Review* 99: 1053-1069.

Knack, S. and P. Keefer, 1995, "Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures." *Economics and Politics* 7: 207-27.

Lane, P.R. and A. Tornell, 1998, "Are Windfalls a Curse? A Non-Representative Agent Model of the Current Account", *Journal of International Economics*, 83-112.

Lane, P.R. and A. Tornell, 1999, "The Voracity Effect" *American Economic Review*, 89, 22-46.

Lipset, S.M., 1959, "Some Social Requisites of Democracy: Economic Development and Political Legitimacy," *American Political Science Review*, 53, 69-105.

Mehlum, Halvor, Karl Moene, and Ragnar Torvik. 2006. Institutions and the Resource

Curse. Economic Journal 116:1-20.

Montalvo, J.G. and M. Reynal-Querol, 2005a, "Ethnic Polarization, Potential Conflict, and Civil War," *American Economic Review*, 95, 796-816.

Montalvo, J.G. and M. Reynal-Querol, 2005b, "Ethnic Diversity and Economic Development," *Journal of Development Economics* 76: 293-323.

Polity IV, 2010, "Political Regime Characteristics and Transitions, 1800-2010," Online Database.

Reynal-Querol, M., 2001, "Ethnicity, Political Systems, and Civil War," *Journal of Conflict Resolution* 46, 29-54.

Ross, M. L, 2001, "Does Oil Hinder Democracy?" *World Politics*, 53, 325-361.

Staiger, D. and J. Stock, 1997, "Instrumental Variables Regression with Weak Instruments," *Econometrica* 65, 557-586.

Tsui, K., 2010, "More Oil, Less Democracy: Evidence from Worldwide Crude Oil Discoveries," *Economic Journal* 121, 89-115.

Wacziarg, R., 2012, "The first law of petropolitics," *Economica*, forthcoming.

WDI, 2011, "The World Development Indicators", Online Database, World Bank.

Appendix: A Model of Ethnic Polarization as a Mediating Factor

Here we present a simple political economy model to rationalize why income may affect political risk and, in particular, why ethnic polarization acts as a mediating factor. The model builds on the public good provision framework developed in Alesina et al., 1999. We extend the Alesina et al. framework by allowing for: (i) expropriation by the government (political risk); (ii) a policy mix of public good provision that includes spending on the judiciary and law enforcement.

The model stipulates an economy populated by a measure one of individuals and a policymaker. As in Alesina et al., 1999, all individuals have the same income y, and uniform taxation T is imposed to finance public spending G, while satisfying the constraint T=G. State capacity, in particular, judiciary and law enforcement being one of the components of public spending, it will be assumed to affect the expected cost of a theft by the policymaker; we denote L, $0<L<1$, the exogenous share of spending on these components. The policymaker is assumed to implement policies favored by a majority of individuals in regard to the public good provision and engage in expropriation of individuals' income, and we let r denote its amount.

The individual budget constraint is $y = c + T + r$. Individual preferences are as in Alesina et al., 1999:

(A1) $U_i = (1-l_i)\ln(G) + c = (1-l_i)\ln(T) + (y-T-r)$

where l_i is the distance between the most preferred mix of public goods for individual i and the actual mix, and we assume that feasible mixes belong to the unit interval.

The politician can expropriate income. We denote by e the amount of expropriation time effort chosen by the politician. Assuming a linear expropriation technology, the total amount of expropriated income, r, is simply ey. Expropriating income has however also an expected cost, R (such as dismissal from office, or a salary cut following the detection of expropriation), which we assume to be linear in expropriation and expenditures on law and order, so that, R=eyLT. In addition when the politician devotes time to expropriation activity he forgoes leisure, z. The politician thus chooses expropriation effort, e, to maximize his utility:

(A2) $u(ey)-eyLT+z$

subject to the time constraint e+z=1. In what follows, to allow for closed form solutions, we will assume a quadratic utility function for expropriated income, $u(ey)=ey-(ey)^2/2$.

The individuals first vote on taxes T, then on the type of public goods. Then the policymaker determines the amount of expropriation. We consider the subgame perfect voting equilibrium, whose analysis proceeds backwards.

In the last stage, the policymaker chooses e to maximize utility (A2). Assuming an internal solution, the first order condition is

(A3) $y - ey^2 - LTy -1 = 0$; or $e = (1-LT)-1/y$ and $ey = (1-LT)y-1$

and differentiation reveals that the amount of expropriation effort, e, decreases in T, de/dT = -L, more so the larger is the share of public spending allocated to law enforcement, d(de/dT)/dL = -1.

In the second stage, given T, the chosen type of public goods will be determined by the median voter; and we write (using A3):

(A4) $U_i = (1-l(i,m))\ln(T) + y-T- ((1-LT)y-1)$

where l(i,m) is the distance between the types preferred by individual i and the median voter. In the first stage, the first order condition determining the individual i's preferred amount of public spending is:

(A5) $(1-l(i,m))/T -1 + Ly = 0$

Its total differentiation reveals that the preferred amount decreases in the distance l(i,m); hence, the voting equilibrium is determined by the median distance from the median voter's preferred type, l(M,m), and we write:

(A6) $(1-l(M,m))/T -1+Ly = 0$

Rearranging (A6) yields

(A6') $T= (1-l(M,m))/(1-Ly)$

As pointed out in Alesina et al., 1999, l(M,m) can be interpreted as the measure of polarization in preferences in the population. Differentiating (A6') we obtain:

(A7) $dT/dl(M,m) = -1/(1-Ly) < 0$

Also, the equilibrium level of public spending increases in income because of the standard income effect:

(A8) $dT/dy = L(1-l(M,m))/(1-Ly)^2 > 0$

and, further,

(A9) $d^2T/dy\ dl(M,m) = -L/(1-Ly)^2 < 0$

implying that the positive income effect on public spending decreases in polarization.

It follows from (A3) that

(A10) $de/dy = -LdT/dy + 1/y^2$

From (A8) we know that $dT/dy>0$. Hence, de/dy can be either positive or negative, so that the marginal effect of a change in income on political risk of expropriation can generally be either positive or negative depending on parameters, such as, polarization. Note that $de/dy>0$ iff $l(M,m)>(1-2Ly)/y^2L^2$. In other words, increases in income increase political risk when polarization is sufficiently large.

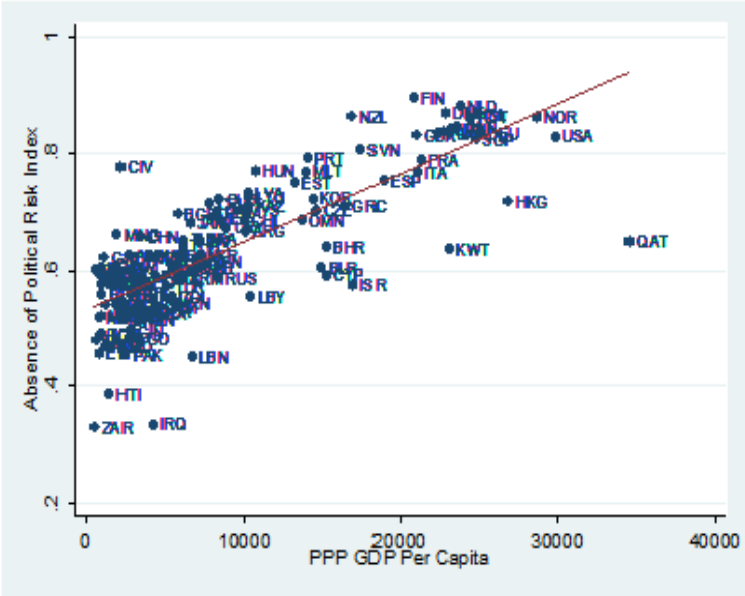
Differentiating (A10) with respect to the polarization measure we obtain:

(A10) $d^2e/dydl(M,m) = -L\ d^2T/dy\ dl(M,m) = L^2/(1-Ly)^2 > 0$

Hence, the marginal effect of a change in income on (the absence of) political risk of expropriation is (decreasing) increasing in polarization.[13]

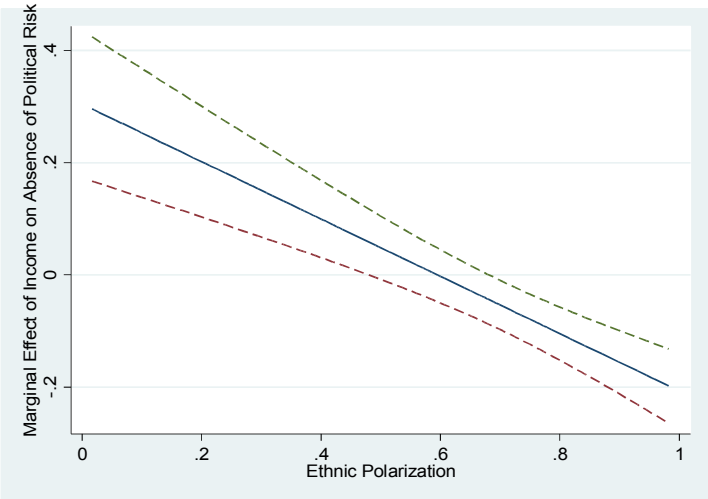
13 While this result is obtained in the context of majority voting, it can be extended as follows. Suppose that collective decisions are made via a reduced form political process that seeks to maximize the aggregate individual welfare. Further, suppose that the distributions of distances between individual i's favored mix of public goods and the mid-point of the unit interval, l(i, 0.5), is symmetric around 0.5. The rest of the assumptions are as above. Note that, with these assumptions, m=0.5 (also equal to the mean). Further, maximization of aggregate welfare in the second stage implies that, as in the earlier analysis, m=0.5 is the optimal choice, one that minimizes the average distance $\int l(i,m)di$. The rest of the analysis then is as above.

Figure 1. Cross-Country Scatter Plot: Income and Political Risk



Note: The scatter plots are for the 1984-2007 country average of GDP per capita and the ICRG political risk score.

Figure 2. Income Growth, Ethnic Polarization, and Political Risk



Note: The figures are based on the estimates reported in column (1) of Table 7. Dashed lines are 90 percent confidence bands.

Table 1. Descriptive Statistics

Variable	Source	Mean	Stdv.	Obs
Absence of Political Risk	ICRG	0.630	0.151	2346
ΔAbsence of Political Risk	ICRG	0.005	0.045	2346
Law and Order	ICRG	0.604	0.250	2346
ΔLaw and Order	ICRG	0.004	0.079	2346
GDP P.C.	PWT	9077	9709	2346
Δln(GDP P.C.)	PWT	0.043	0.080	2346
Ethnic Polarization	Reynal-Querol	0.488	0.252	1953
Ethnic Fractionalization	Reynal-Querol	0.445	0.295	1953

Table 2. Income Growth and Political Risk
(Baseline Estimates)

	ΔAbsence of Political Risk					
	(1)	(2)	(3)	(4)	(5)	(6)
	2SLS	2SLS	2SLS	LS	SYS-GMM	Tobit
Δln(GDP p.c.)	0.11**	0.10**	0.09**	0.06***	0.05***	0.06***
	(0.04)	(0.04)	(0.04)	(0.01)	(0.01)	(0.01)
Lagged PR			-0.24***	-0.24***	-0.24***	-0.24***
			(0.02)	(0.02)	(0.02)	(0.02)
Kleibergen Paap F-stat	84.16	82.41	82.31	.	.	.
			First Stage Δln(GDP)			
Oil Price Shock	2.35***	2.58***	2.58***	.	.	.
	(0.25)	(0.28)	(0.28)			
Country Fe	No	Yes	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2346	2346	2346	2346	2346	2346

Note: The method of estimation in columns (1)-(3) is two-stage least squares; column (4) least squares; column (5) system-GMM; column (6) left and right-censored Tobit. Standard errors shown in parentheses are Huber robust and clustered at the country level. The instrumental variable in the two-stage least squares estimation is the oil price shock. *Significantly different from zero at 10 percent significance, **5 percent significance, ***1 percent significance.

Table 3. Income Growth and Political Risk
(Test of Exclusion Restriction)

	ΔAbsence of Political Risk		
	(1)	(2)	(3)
	LS	LS	2SLS
Δln(GDP p.c.)		0.06***	0.06**
		(0.01)	(0.02)
Lagged PR	-0.24***	-0.24***	-0.24***
	(0.02)	(0.02)	(0.02)
Oil Price Shock	0.22**	0.07	
	(0.09)	(0.11)	
Kleibergen Paap F-stat	.	.	99.56
Hansen J, p-value	.	.	0.61
		First Stage: Δln(GDP p.c.)	
Oil Price Shock	.	.	2.50***
			(0.21)
Lagged Savings Rate	.	.	0.02***
			(0.005)
Country Fe	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes
Observations	2346	2346	2346

Note: The method of estimation in columns (1) and (2) is least squares; column (3) two-stage least squares. Standard errors shown in parentheses are Huber robust and clustered at the country level. The instrumental variables are the oil price shock and the lagged savings rate. *Significantly different from zero at 10 percent significance, **5 percent significance, ***1 percent significance.

Table 4. Income Growth and Political Risk
(Robustness to Using Initial Net Export Shares, Excluding Large Oil Importers and Exporters, Excluding Large Oil Price Shocks, Using Oil Exporting Countries Only)

	ΔAbsence of Political Risk					
	Initial Oil Net-Export Shares	Excluding Large Oil Importers	Excluding Large Oil Importers & Exporters	Oil Exporting Countries Only	Excluding Top 1st Pctl. Oil Price Shock	Excluding Top 5th Pctl. Oil Price Shock
	(1)	(2)	(3)	(4)	(5)	(6)
	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Δln(GDP p.c.)	0.07*	0.09**	0.12*	0.10*	0.09*	0.14*
	(0.04)	(0.04)	(0.07)	(0.06)	(0.05)	(0.08)
Lagged PR	-0.24***	-0.24***	-0.24***	-0.25***	-0.24***	-0.24***
	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)
Kleibergen Paap F-stat	73.12	81.04	14.33	62.97	67.31	53.25
			First Stage: Δln(GDP p.c.)			
Oil Price Shock	2.20***	2.58***	2.55***	2.42***	3.06***	3.48***
	(0.26)	(0.29)	(0.67)	(0.31)	(0.37)	(0.48)
Country Fe	Yes	Yes	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2301	2177	1927	782	2322	2224

Note: The method of estimation is two-stage least squares. Standard errors shown in parentheses are Huber robust and clustered at the country level. The instrumental variable is the oil price shock. In column (1) the oil price shock variable is constructed by multiplying the change in the log of the international oil price with countries' 1980 net-export share of oil in GDP. In the remaining columns the oil price shock variable is constructed by multiplying the change in the log of the international oil price with countries' sample average net-export share of oil in GDP. The excluded countries in column (2) are China, Germany, France, Italy, Japan, South Korea, United Kingdom, and United States. The excluded countries in column (3) are Algeria, Canada, China, Germany, France, Indonesia, Iran, Iraq, Italy, Japan, Kuwait, Libya, Mexico, Netherlands, Nigeria, Norway, Oman, Qatar, Russia, South Korea, United Kingdom, United States, and Venezuela. The sample of oil exporting countries in column (4) comprises Albania, Algeria, Angola, Argentina, Azerbaijan, Bahrain, Bolivia, Cameroon, Canada, Colombia, Democratic Republic of Congo, Ecuador, Egypt, Gabon, Indonesia, Iran, Iraq, Kazakhstan, Kuwait, Libya, Malaysia, Mexico, Niger, Nigeria, Norway, Oman, Papua New Guinea, Peru, Qatar, Republic of Congo, Russia, Singapore, Tunisia, United Kingdom, Venezuela, Vietnam, and Yemen. *Significantly different from zero at 10 percent significance, **5 percent significance, ***1 percent significance.

Table 5. Income Growth and Political Risk
(Robustness to Using 5-Year GDP Growth Rates)

	ΔAbsence of Political Risk						
	Largest Sample	Initial Oil Net-Export Shares	Excluding Large Oil Importers	Excluding Large Oil Importers & Exporters	Excluding Top 1st Pctl. Oil Price Shock	Excluding Top 5th Pctl. Oil Price Shock	Oil Exporting Countries Only
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Δln(GDP p.c.)	0.04**	0.05*	0.03*	0.04	0.03*	0.04*	0.06*
	(0.02)	(0.03)	(0.02)	(0.04)	(0.02)	(0.03)	(0.03)
Lagged PR	-0.26***	-0.26***	-0.26***	-0.25***	-0.25***	-0.26***	-0.30***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.06)
Kleibergen Paap F-stat	31.70	32.88	30.16	5.22	33.12	43.73	17.76
	First Stage: Δln(GDP p.c.)						
Oil Price Shock	3.23***	3.29***	3.16***	2.07**	3.41***	3.87***	2.77***
	(0.57)	(0.57)	(0.58)	(0.91)	(0.59)	(0.58)	(0.66)
Country Fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2334	2290	2165	1910	2310	2212	777

Note: The method of estimation is two-stage least squares. Standard errors shown in parentheses are Huber robust and clustered at the country level. The instrumental variable is the oil price shock. In column (2) the oil price shock variable is constructed by multiplying the change in the log of the international oil price with countries' 1980 net-export share of oil in GDP. In all other columns the oil price shock variable is constructed by multiplying the change in the log of the international oil price with countries' sample average net-export share of oil in GDP. The excluded countries in column (3) are China, Germany, France, Italy, Japan, South Korea, United Kingdom, and United States. The excluded countries in column (4) are Algeria, Canada, China, Germany, France, Indonesia, Iran, Iraq, Italy, Japan, Kuwait, Libya, Mexico, Netherlands, Nigeria, Norway, Oman, Qatar, Russia, South Korea, United Kingdom, United States, and Venezuela. The sample of oil exporting countries in column (7) comprises Albania, Algeria, Angola, Argentina, Azerbaijan, Bahrain, Bolivia, Cameroon, Canada, Colombia, Democratic Republic of Congo, Ecuador, Egypt, Gabon, Indonesia, Iran, Iraq, Kazakhstan, Kuwait, Libya, Malaysia, Mexico, Niger, Nigeria, Norway, Oman, Papua New Guinea, Peru, Qatar, Republic of Congo, Russia, Singapore, Tunisia, United Kingdom, Venezuela, Vietnam, and Yemen. *Significantly different from zero at 10 percent significance, **5 percent significance, ***1 percent significance.

Table 6. Income Growth and Political Risk
(Controlling for Political Institutions)

	ΔAbsence of Political Risk						
	Largest Sample	Initial Oil Net-Export Shares	Excluding Large Oil Importers	Excluding Large Oil Importers & Exporters	Excluding Top 1st Pctl. Oil Price Shock	Excluding Top 5th Pctl. Oil Price Shock	Oil Exporting Countries Only
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Δln(GDP p.c.)	0.09**	0.07*	0.09**	0.13*	0.09*	0.15*	0.10*
	(0.04)	(0.04)	(0.04)	(0.07)	(0.06)	(0.08)	(0.06)
Polity2	0.02**	0.02**	0.02**	0.02**	0.02**	0.02**	-0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Lagged PR	-0.24***	-0.24***	-0.24***	-0.24***	-0.24***	-0.25***	-0.26***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Kleibergen Paap F-stat	103.90	98.93	102.25	13.97	64.62	56.14	90.46
	First Stage: Δln(GDP p.c.)						
Oil Price Shock	2.64***	2.25***	2.64***	2.55***	3.05***	3.54***	2.51***
	(0.26)	(0.26)	(0.26)	(0.68)	(0.38)	(0.47)	(0.26)
Country Fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2261	2216	2092	1841	2238	2142	776

Note: The method of estimation is two-stage least squares. Standard errors shown in parentheses are Huber robust and clustered at the country level. The instrumental variable is the oil price shock. In column (2) the oil price shock variable is constructed by multiplying the change in the log of the international oil price with countries' 1980 net-export share of oil in GDP. In all other columns the oil price shock variable is constructed by multiplying the change in the log of the international oil price with countries' sample average net-export share of oil in GDP. The excluded countries in column (3) are China, Germany, France, Italy, Japan, South Korea, United Kingdom, and United States. The excluded countries in column (4) are Algeria, Canada, China, Germany, France, Indonesia, Iran, Iraq, Italy, Japan, Kuwait, Libya, Mexico, Netherlands, Nigeria, Norway, Oman, Qatar, Russia, South Korea, United Kingdom, United States, and Venezuela. The sample of oil exporting countries in column (7) comprises Albania, Algeria, Angola, Argentina, Azerbaijan, Bahrain, Bolivia, Cameroon, Canada, Colombia, Democratic Republic of Congo, Ecuador, Egypt, Gabon, Indonesia, Iran, Iraq, Kazakhstan, Kuwait, Libya, Malaysia, Mexico, Niger, Nigeria, Norway, Oman, Papua New Guinea, Peru, Qatar, Republic of Congo, Russia, Singapore, Tunisia, United Kingdom, Venezuela, Vietnam, and Yemen. *Significantly different from zero at 10 percent significance, **5 percent significance, ***1 percent significance.

Table 7. Income Growth, Ethnic Polarization, and Political Risk

	ΔAbsence of Political Risk						
	Largest Sample	Initial Oil Net-Export Shares	Excluding Large Oil Importers	Excluding Large Oil Importers & Exporters	Excluding Top 1st Pctl. Oil Price Shock	Excluding Top 5th Pctl. Oil Price Shock	Oil Exporting Countries Only
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Δln(GDP p.c.)	0.30*	0.27***	0.31***	0.12	0.64***	1.30*	0.09
	(0.08)	(0.07)	(0.08)	(0.18)	(0.23)	(0.70)	(0.10)
Δln(GDP)	-0.51**	-0.46***	-0.52***	-0.17	-1.19***	-2.35*	-0.36**
*Ethnic Polarization	(0.11)	(0.08)	(0.11)	(0.28)	(0.46)	(1.36)	(0.15)
Lagged PR	-0.24***	-0.24***	-0.24***	-0.24***	-0.24***	-0.25***	-0.26***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.04)
Kleibergen Paap F-stat	10.62	28.94	14.29	5.98	9.06	2.26	15.94
Country Fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1949	1905	1802	1603	1933	1859	607

Note: The method of estimation is two-stage least squares. Standard errors shown in parentheses are Huber robust and clustered at the country level. The instrumental variable is the oil price shock. In column (2) the oil price shock variable is constructed by multiplying the change in the log of the international oil price with countries' 1980 net-export share of oil in GDP. In all other columns the oil price shock variable is constructed by multiplying the change in the log of the international oil price with countries' sample average net-export share of oil in GDP. The excluded countries in column (3) are China, Germany, France, Italy, Japan, South Korea, United Kingdom, and United States. The excluded countries in column (4) are Algeria, Canada, China, Germany, France, Indonesia, Iran, Iraq, Italy, Japan, Kuwait, Libya, Mexico, Netherlands, Nigeria, Norway, Oman, Qatar, Russia, South Korea, United Kingdom, United States, and Venezuela. The sample of oil exporting countries in column (7) comprises Albania, Algeria, Angola, Argentina, Azerbaijan, Bahrain, Bolivia, Cameroon, Canada, Colombia, Democratic Republic of Congo, Ecuador, Egypt, Gabon, Indonesia, Iran, Iraq, Kazakhstan, Kuwait, Libya, Malaysia, Mexico, Niger, Nigeria, Norway, Oman, Papua New Guinea, Peru, Qatar, Republic of Congo, Russia, Singapore, Tunisia, United Kingdom, Venezuela, Vietnam, and Yemen. *Significantly different from zero at 10 percent significance, **5 percent significance, ***1 percent significance.

Table 8. Income Growth, Ethnic Polarization, and Political Risk
(Sample Split)

	ΔAbsence of Political Risk			
	Bottom 25th Pctl. Ethnic Polarization	Bottom 50th Pctl. Ethnic Polarization	Top 50th Pctl. Ethnic Polarization	Top 25th Pctl. Ethnic Polarization
	(1)	(2)	(3)	(4)
	2SLS	2SLS	2SLS	2SLS
Δln(GDP p.c.)	0.23	0.09**	-0.11	-0.19***
	(0.25)	(0.04)	(0.08)	(0.06)
Lagged PR	-0.23***	-0.23***	-0.25***	-0.23***
	(0.03)	(0.03)	(0.03)	(0.04)
Kleibergen Paap F-stat	3.41	53.94	14.58	40.24
	First Stage Δln(GDP p.c.)			
Oil Price Shock	0.91*	2.88***	2.66***	2.22***
	(0.49)	(0.39)	(0.69)	(0.35)
Country Fe	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes
Observations	491	966	983	503
Countries	23	45	45	23

Note: The method of estimation is two-stage least squares. Standard errors shown in parentheses are Huber robust and clustered at the country level. The instrumental variable is the oil price shock. *Significantly different from zero at 10 percent significance, **5 percent significance, ***1 percent significance.

Table 9. Income Growth, Ethnic Polarization, and Political Risk
(Law and Order)

	ΔLaw and Order						
	Largest Sample	Initial Oil Net-Export Shares	Excluding Large Oil Importers	Excluding Large Oil Importers & Exporters	Excluding Top 1st Pctl. Oil Price Shock	Excluding Top 5th Pctl. Oil Price Shock	Oil Exporting Countries Only
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Δln(GDP p.c.)	0.37**	0.31**	0.34**	1.24**	0.57***	0.92**	0.19
	(0.17)	(0.14)	(0.16)	(0.50)	(0.21)	(0.40)	(0.13)
Δln(GDP) *Ethnic Polarization	-0.51**	-0.42**	-0.48**	-1.98**	-0.89***	-1.47**	-0.35**
	(0.21)	(0.17)	(0.21)	(0.86)	(0.32)	(0.74)	(0.15)
Lagged Law and Order	-0.21***	-0.21***	-0.21***	-0.21***	-0.21***	-0.21***	-0.21***
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Kleibergen Paap F-stat	10.95	28.69	14.54	5.85	9.06	2.24	16.16
Country Fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1949	1905	1802	1603	1933	1859	607

Note: The method of estimation is two-stage least squares. Standard errors shown in parentheses are Huber robust and clustered at the country level. The instrumental variable is the oil price shock. In column (2) the oil price shock variable is constructed by multiplying the change in the log of the international oil price with countries' 1980 net-export share of oil in GDP. In all other columns the oil price shock variable is constructed by multiplying the change in the log of the international oil price with countries' sample average net-export share of oil in GDP. The excluded countries in column (3) are China, Germany, France, Italy, Japan, South Korea, United Kingdom, and United States. The excluded countries in column (4) are Algeria, Canada, China, Germany, France, Indonesia, Iran, Iraq, Italy, Japan, Kuwait, Libya, Mexico, Netherlands, Nigeria, Norway, Oman, Qatar, Russia, South Korea, United Kingdom, United States, and Venezuela. The sample of oil exporting countries in column (7) comprises Albania, Algeria, Angola, Argentina, Azerbaijan, Bahrain, Bolivia, Cameroon, Canada, Colombia, Democratic Republic of Congo, Ecuador, Egypt, Gabon, Indonesia, Iran, Iraq, Kazakhstan, Kuwait, Libya, Malaysia, Mexico, Niger, Nigeria, Norway, Oman, Papua New Guinea, Peru, Qatar, Republic of Congo, Russia, Singapore, Tunisia, United Kingdom, Venezuela, Vietnam, and Yemen. *Significantly different from zero at 10 percent significance, **5 percent significance, ***1 percent significance.

Table 10. Income Growth, Ethnic Polarization and Political Risk
(Robustness to Control for Other Interactions)

	ΔAbsence of Political Risk			
	(1)	(2)	(3)	(4)
	2SLS	2SLS	2SLS	2SLS
Δln(GDP)	0.27**	-0.10	0.47**	0.33***
	(0.10)	(0.36)	(0.25)	(0.09)
Δln(GDP) *Ethnic Polarization	-0.52***	-0.52***	-0.46***	-0.45***
	(0.10)	(0.20)	(0.10)	(0.10)
Δln(GDP) *Ethnic Fractionalization	0.07			
	(0.13)			
Δln(GDP) *Lagged IQ		0.01		
		(0.01)		
Δln(GDP) *Average GDP Per Capita			-0.02	
			(0.03)	
Δln(GDP) *Average Polity2				0.22**
				(0.09)
Lagged PR	-0.24***	-0.26***	-0.24***	-0.24***
	(0.02)	(0.04)	(0.02)	(0.02)
Kleibergen Paap F-stat	2.65	6.42	3.12	8.80
Observations	1949	1949	1949	1885
Country Fe	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes

Note: The method of estimation is two-stage least squares. Standard errors shown in parentheses are Huber robust and clustered at the country level. The instrumental variables are the oil price shock, the interaction between the oil price shock and ethnic polarization, and in column (1) the interaction between the oil price shock and ethnic fractionalization; in column (2) the interaction between the oil price shock and the lagged institutional quality score; in column (3) the interaction between the oil price shock and countries average GDP per capita; column (4) the interaction between the oil price shock and the countries' average Polity2 score. *Significantly different from zero at 10 percent significance, **5 percent significance, ***1 percent significance.

Appendix Table 1. List of Countries

Albania	Cote d`Ivoire	Honduras	Malawi	Qatar
Algeria	Cuba	Hong Kong	Malaysia	Romania
Angola	Cyprus	Hungary	Mali	Russia
Argentina	Czech Rep.	Iceland	Malta	Senegal
Armenia	Denmark	India	Mexico	Singapore
Australia	Dominican Rep.	Indonesia	Mongolia	Slovenia
Austria	Ecuador	Iran	Morocco	South Africa
Azerbaijan	Egypt	Iraq	Mozambique	Spain
Bahrain	El Salvador	Ireland	Netherlands	Tanzania
Bangladesh	Estonia	Israel	New Zealand	Thailand
Belarus	Ethiopia	Italy	Nicaragua	Togo
Bolivia	Finland	Jamaica	Niger	Tunisia
Brazil	France	Japan	Nigeria	Turkey
Bulgaria	Gabon	Jordan	Norway	Uganda
Burkina Faso	Gambia, The	Kazakhstan	Oman	Ukraine
Cameroon	Germany	Kenya	Pakistan	United Kingdom
Canada	Ghana	Korea, Rep. of	Panama	United States
Chile	Greece	Kuwait	Papua New Guinea	Uruguay
China	Guatemala	Latvia	Paraguay	Venezuela
Colombia	Guinea	Lebanon	Peru	Vietnam
Congo, Dem. Rep.	Guinea-Bissau	Libya	Philippines	Yemen
Congo, Rep. of	Guyana	Lithuania	Poland	Zambia
Costa Rica	Haiti	Madagascar	Portugal	Zimbabwe

Appendix Table 2. Reduced-Form Effects of Oil Price Shock at Different Leads and Lags with and without Country Clustering

	ΔAbsence of Political Risk	
	(1)	(2)
	2SLS	2SLS
	With Country Clustering	Without Country Clustering
Oil Price Shock, t	0.28**	0.28**
	(0.10)	(0.13)
Oil Price Shock, t-1	0.00	0.00
	(0.20)	(0.15)
Oil Price Shock, t-2	0.19**	0.19
	(0.08)	(0.14)
Oil Price Shock, t+1	-0.07	-0.07
	(0.10)	(0.16)
Oil Price Shock, t+2	-0.13	-0.13
	(0.10)	(0.19)
Joint significance lags, p-value	0.03	0.43
Joint significance leads, p-value	0.21	0.78
Country Fe	Yes	Yes
Year Fe	Yes	Yes
Observations	2122	2122
Countries	115	115

Note: The method of estimation is least squares. In column (1) standard errors shown in parentheses are Huber robust and clustered at the country level. Column (2) standard errors shown in parentheses are Huber robust. *Significantly different from zero at 10 percent significance, **5 percent significance, ***1 percent significance.

Appendix Table 3. General Commodity Export Price Index as an Instrument

	ΔAbsence of Political Risk			
	(1)	(2)	(3)	(4)
	2SLS	2SLS	2SLS	2SLS
Δln(GDP p.c.)	0.10**	0.07*	0.33***	0.24***
	(0.04)	(0.04)	(0.13)	(0.08)
Δln(GDP p.c.)*Ethpol			-0.54**	-0.42***
			(0.22)	(0.13)
Lagged PR		-0.24***		-0.24***
		(0.02)		(0.02)
Kleibergen Paap F-statistic	69.54	69.26	17.42	18.10
		First Stage Δln(GDP p.c.)		
ΔlnComPI	2.45	2.45	2.83***	2.87***
	(0.29)	(0.30)	(0.99)	(1.00)
ΔlnComPI*Ethpol			-0.47	-0.52
			(1.43)	(1.45)
		First Stage Δln(GDP p.c.)*Ethpol		
ΔlnComPI			0.58*	0.61*
			(0.35)	(0.35)
ΔlnComPI*Ethpol			1.54**	1.51**
			(0.61)	(0.62)
Country Fe	Yes	Yes	Yes	Yes
Year Fe	Yes	Yes	Yes	Yes
Observations	2346	2346	1949	1949
Countries	115	115	90	90

Note: The method of estimation is two-stage least squares. Standard errors shown in parentheses are Huber robust and clustered at the country level. The instrumental variable is the change in the log of a general commodity export price index. The commodity export price index is from Arezki and Brueckner (2012). The commodities included in this index are aluminum, beef, coffee, cocoa, copper, cotton, gold, iron, maize, oil, rice, rubber, sugar, tea, tobacco, wheat, and wood. *Significantly different from zero at 10 percent significance, **5 percent significance, ***1 percent significance.