Petro Rents, Political Institutions, and Hidden Wealth: Evidence from Offshore Bank Accounts*

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Abstract

Do political institutions limit rent-seeking by politicians? We study the transformation of petroleum rents, almost universally under direct government control, into hidden wealth using unique data on bank deposits in offshore financial centers that specialize in secrecy and asset protection. Our main finding is that plausibly exogenous shocks to petroleum income are associated with significant increases in hidden wealth, but only when institutional checks and balances are weak. The results suggest that around 15% of the windfall gains accruing to petroleum-producing countries with autocratic rulers is diverted to secret accounts. We find very limited evidence that shocks to other types of income not directly controlled by governments affect hidden wealth.

JEL codes: D72; O13; P51; Q32

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1 Introduction

Political elites can abuse public office, or connections to those in office, for private gain and the struggle for state resources can have severe consequences in terms of political and economic instability. While modern theory in political economy generally starts from the premise that politicians are motivated by rents,[1] little is known about how and to what extent economic rents are captured by political elites and whether political institutions effectively constrain the elites. The key methodological challenge is that political rents, notably those deriving from corruption and embezzlement, are notoriously difficult to measure.

In this paper, we take a novel approach to studying whether political institutions limit political rents by exploiting a restricted dataset on cross-border banking from the Bank for International Settlements (BIS).[2] The dataset includes country-level information about foreign-owned deposits in all significant financial centers including a number of important *havens*: jurisdictions that specialize in secrecy and asset protection such as Switzerland, Luxembourg, Cayman Islands and Singapore. It constitutes a unique source of information on hidden wealth, which has been used by recent papers in international macroeconomics (Zucman, 2013) and public finance (Johannesen and Zucman, 2014), but never in the context of political economy.

The basic premise of our analysis is that bank deposits in havens are informative about political rents. This is strongly supported by journalistic accounts and case studies describing how heads of states and other members of political elites use foreign accounts to appropriate and launder public funds. For instance, a recent report by the Financial Action Task Force includes 32 case studies of grand corruption, of which 27 involved foreign bank accounts and 21 involved bank accounts in havens (FATF, 2011). In a typical case, Sani Abacha, the autocratic ruler of Nigeria during the period 1993-1998, embezzled between USD 2-4 billion and hid the funds on bank accounts in at least twelve jurisdictions including several well-known havens.

As a laboratory for testing whether political institutions have the potential to reduce political rents, we use the petroleum industry, which is arguably more prone to rent seeking than

[1] E.g., Persson and Tabellini (2000), Besley and Persson (2011), Bueno de Mesquita et al. (2003) and Acemoglu, Robinson and Verdier (2004). Recent in-depth studies of autocracies, e.g. Blaydes (2011) on Mubarak's Egypt, confirms the central role of such rents in explaining leader behavior.

[2] The full dataset is not publicly available, but restricted to central banks and external researchers working under a confidentiality agreement with the BIS.

other industries. First, petroleum production creates large economic rents, both relative to the total output and in absolute terms: at the peak of the most recent commodity price boom in 2008, petroleum rents amounted to around 5% of world GDP. Second, politicians commonly have direct access to these rents because petroleum production is under government control: around 75% of the global oil production is currently controlled by national oil companies (World Bank, 2011), reflecting a cumulative process of nationalizations through the second half of the twentieth century (Guriev et al., 2011), and even when production is controlled by international oil companies, around 50% of the marginal income accrues to governments under a typical contract (Stroebel and van Benthem, 2013). Third, the petroleum industry is generally characterized by a lack of transparency (Ross, 2012), which facilitates the expropriation of rents by political elites through indirect channels: numerous politicians are known to have received kick-backs from international oil companies on secret bank accounts in return for profitable contracts, for instance in the context of the so-called Elf scandal in Western Africa.[3]

Our analytical framework exploits that changes in the world market price of oil create plausibly exogenous variation in petroleum rents. By contrast, production volumes are typically controlled by the same political elites whose political rents we are analyzing and therefore inherently endogenous. Our empirical strategy therefore aims to isolate the component of petroleum income that derives from oil price variation and relate it to changes in hidden wealth. In the spirit of a difference-in-difference model, we effectively compare the hidden savings made by petroleum-rich countries when the oil price changes to those made by petroleum-poor countries with a similar political regime and measure how this difference correlates with the political regime.

Our key finding is that petroleum windfalls translate into significant increases in hidden wealth, but only when institutional checks and balances are weak. Specifically, we estimate

[3]The Elf Scandal revolves around the operations of the French oil company Elf Aquitaine in Western Africa. Shaxson (2007, p. 91) describes how political leaders in Gabon, Angola, Cameroon, and Congo-Brazzaville received between 20 and 60 cents for each barrel of oil produced by Elf in their countries. The funds were funneled through the French Intercontinental Bank for Africa (Fiba), set up for this purpose by Gabon's president Omar Bongo, and on to personal accounts in havens. Only Fiba's official lending was known to the public whereas the documentation of illicit transfers was systematically destroyed. In another well-documented case, Kazakhstan's national oil company Karachaganak Petroleum Operating Company awarded a contract to the Texas oil services company Baker Hughes Services International Inc. under the condition that a supplementary fee of 3% of the company's revenues was paid to secret accounts on the Isle of Man controlled by high-ranking government officials (U.S. District Court for the Southern District of Texas, 2007).

that a doubling of the oil price causes a 22% increase in haven deposits owned by petroleum-rich autocracies, corresponding to almost 1.5% of GDP at the sample mean, while there is no such effect on haven deposits owned by petroleum-rich non-autocracies. Since a doubling of the oil price is associated with an estimated 10% increase in the GDP of petroleum-rich countries, the result suggests that around 15% of the windfall gains accruing to countries with autocratic rulers is diverted to offshore accounts.

Our results are robust to controls for common unobserved factors, such as the global business cycle, as well as country-specific determinants of foreign portfolio investment such as legal restrictions on capital movements, high inflation and the development of the domestic financial sector. They also hold when we control for countries' general tendency to invest windfalls in foreign portfolios: not only do petroleum rents increase the value of bank deposits in havens, but they increase them significantly more than they increase the value of bank deposits in non-havens. Finally, they extend to detailed and objective measures of political institutions such as the existence of a legislature, legality and actual presence of multiple political parties and selection of the executive. Together, these results provide support for the theoretical work in political economy that stresses the importance of political institutions in serving as constraints on political elites' behavior.

Interestingly, while the association between petroleum rents and haven deposits varies systematically with political institutions, it does not vary with standard measures of corruption. Specifically, we find no relationship between the longest running corruption perceptions index, the ICRG corruption measure, and the tendency of petroleum rents to be transformed into haven deposits suggesting that we identify a novel and distinct measure of political rent diversion. Possibly, corruption perception indices are less well suited for capturing high level corruption, which is hard to observe and make inferences about.

While the petroleum sector is unique in its ownership structure and lack of transparency, it is not the only sector to generate economic rents. Using the same empirical framework as we developed to study petroleum rents, we find some evidence that economic rents from the mineral sector are transformed into political rents. As a placebo exercise we investigate whether broader commodity incomes, which are typically not under government control, also generate haven deposits – and we find no evidence of such patterns.

To establish the link between hidden wealth and political elites more firmly, we study how haven deposits evolve in periods of increased political uncertainty. We find that haven deposits owned by autocracies start increasing significantly a few quarters before elections suggesting that political elites anticipate the political risk inherent to elections and respond by hiding wealth in havens.[4] The anticipation effect is more pronounced in autocracies with significant petroleum production suggesting that the increases in hidden wealth derive from the political elites who control the petroleum sector, rather than households and local firms. We find similar effects prior to coups d'état although the limited number of incidents does not allow us to distinguish autocracies from non-autocracies.

A key challenge for our analysis is the fact that many haven deposits are nominally owned by *sham corporations*: legal entities that have no real functions, but serve as an additional layer of secrecy between individuals and their hidden wealth. In the BIS statistics, such deposits are assigned to the countries where the sham corporations are registered, often the British Virgin Islands, Panama or other havens, although this is rarely where the owners reside. Since we cannot trace the origin of assets held through sham corporations, we exclude haven deposits assigned to other havens from the main analysis. However, in a separate analysis we show that these deposits respond to oil price changes in a way that is consistent with our main results: when the oil price increases, deposits assigned to jurisdictions such as the British Virgin Islands or Panama increase more in havens used relatively often by petroleum-rich autocracies than in havens used relatively seldom by petroleum-rich autocracies.

Finally, we discuss alternative explanations for the observed empirical patterns including tax avoidance and cash management by multinational petroleum firms, tax evasion by domestic households, capture of oil petroleum by terrorist groups and lack of local absorptive capacity in petroleum-producing countries. We argue that these interpretations are much less plausible than our preferred interpretation.

Our paper contributes to a number of different literatures. First, a strand of the resource curse literature emphasizes the interaction with political institutions (e.g. Mehlum et al., 2006). While we find that petroleum rents are an important source of hidden wealth in au-

[4] The literature on electoral authoritarianism stresses that elections are inherently risky even for autocratic rulers (e.g. Cox, 2009; Gandhi and Lust-Okar, 2009) because they can play a role in mobilizing the opposition or the masses (Geddes, 2006; Magaloni and Kricheli, 2010) and because rulers may unexpectedly lose them (Przeworski et al., 2000).

tocracies, this is not the case for other commodity rents, suggesting that appropriable natural resources are, indeed, at the heart of the problem with excessive political rents. Second, departing from the observation that natural resources do not seem to benefit the general population in autocracies, several papers try to identify the final uses of the resource rents. Our finding that windfall gains are partly used for self-enrichment by political elites complements recent evidence that windfall gains increase the elite's investment in self-preservation (Caselli and Tesei, 2015) through activities such as patronage and vote buying (Caselli and Michaels, 2013). Third, a nascent empirical literature investigates how political institutions shape the rent seeking of politicians. While the existing papers focus on diversion of state resources to provide public goods in the leader's home region (Hodler and Raschky, 2014) or in districts that share the leader's ethnicity (Burgess et al, 2015), we study how rents are diverted for the personal use of political elites. Finally, we add to a broader literature that attempts to detect and quantify political corruption using indirect methods (e.g. Fisman, 2001; Olken and Pande, 2012), partly arising out of concerns with indices of perceived corruption (Treisman, 2007; Olken, 2009).

The rest of the paper proceeds in the following way. Section 2 describes the data and Section 3 develops the empirical strategy. Section 4 and 5 present the results, graphical evidence and regression results respectively, Section 6 discusses alternative explanations for our findings and Section 7 concludes.

2 Data and measurement

2.1 Bank deposits

We obtain information on cross-border bank deposits from the Locational Banking Statistics of the Bank for International Settlements ("BIS"). Based on reports from individual banks on their foreign positions, this data source contains information at the bilateral level on the value of bank deposits in currently 43 financial centers owned by residents of around 200 countries.[5] The dataset presumably accounts for the vast majority of cross-border bank

[5] The Locational Banking Statistics did not contain a breakdown of total liabilities on deposits and other liabilities before 1995. We therefore use total liabilities as a measure of deposits. The bulk of total foreign liabilities are indeed deposits: at the end of the sample period banks in BIS reporting countries had liabilities against foreign non-banks of around USD 7,000 billion of which more than 95% were in the form of deposits.

deposits: it covers all significant banking centers and within these centers typically covers 100% and very rarely below 90% of the banking sector (BIS, 2011). Because the data derives from the balance sheets of highly regulated banks, it is generally believed to be accurate and is widely used by central banks for the purposes of constructing capital accounts and by researchers in international macroeconomics (e.g. Lane and Milesi-Ferretti, 2007; Zucman, 2013).

The Locational Banking Statistics include banking information from the following 17 jurisdictions that we classify as havens: Bahamas, Bermuda, Cayman Islands, Netherlands Antilles, Panama, Bahrain, Hong Kong, Macao, Singapore, Austria, Belgium, Guernsey, Isle of Man, Jersey, Liechtenstein, Luxembourg and Switzerland.[6] Havens generally share institutional characteristics that make them attractive destinations for illicit funds: bank secrecy rules that ensure almost impenetrable confidentiality and legal provisions that enable investors to protect their assets by nominally transferring the ownership to a third party while retaining ultimate control.[7] These features are also likely to appeal to corrupt political elites: while political rents invested or consumed domestically are conspicuous and may therefore provoke resistance against the regime, banks accounts in havens are invisible and largely protected against appropriation by new political elites in case of regime change.

Based on the Locational Banking Statistics, we define $haven_{it}$ as deposits held by residents of country i in the 17 havens at time t and, similarly, $nonhaven_{it}$ as deposits held by residents of country i in the non-haven countries at time t. We can compute these variables for every country in the world for every quarter between 1977 and 2010 with observations

[6] There is no authoritative list of havens. Compared to the set of havens blacklisted by the OECD (2008) for not sharing bank information with foreign governments, we add Macao and Hong Kong, which were omitted from the OECD list due to political pressure from China (Guardian, 2009). Compared to the list of tax havens used by Hines (2010), we exclude Ireland, which has a low corporate tax rate, but never had an institutional environment conducive to secrecy, and include Austria and Belgium, which have bank secrecy rules comparable to the other havens in our sample. We do not account for the considerable changes in the institutional environment that have occurred after the end of our sample period (see Johannesen and Zucman, 2014).

[7] A well-known example is the trust, which exists in most common law countries, whereby wealthy individuals can transfer assets to a trustee, who administers the assets in accordance with a trust deed and in the interest of the designated beneficiaries. In recent decades, many havens have developed trust laws that allow the individual who sets up a trust to also be its sole beneficiary. With this legal innovation, trusts in havens combine *secrecy*, because the only legal document linking the assets to the creator of the trust is the confidential deed, *asset protection*, since creditors with claims on the creator cannot address these claims to the trustee, and *effective control*, because the deed can contain detailed instructions on how the trustee should manage the funds without any of the restrictions that are present in classical trust law (Sterk, 2000). Legal arrangements to the same effect have emerged in havens with a civil law tradition, for instance the fiduciary in Switzerland and the foundation in Liechtenstein.

being directly comparable across countries because the underlying information derives from the same international banking centers. This constitutes important advantages over other measures of rent diversion. Such measures are usually observed only once per year, which makes them ill-suited to study sharp responses to resource windfalls and changes in the political environment, and are, furthermore, typically plagued by missing observations and limited cross-country comparability.

The main limitation of the BIS data is the fact that deposits are assigned to counterpart countries on the basis of immediate ownership rather than ultimate ownership. If a resident of Nigeria owns a corporation in Panama, which in turn holds a bank account in Switzerland, the BIS statistics wrongly record the Swiss account as belonging to a resident of Panama. It is well-known that shell corporations, trusts and other similar arrangements are frequently used by owners of hidden wealth to add an additional layer of secrecy between themselves and their assets (e.g. FATF, 2011).

In our main regressions, we address this issue by excluding deposits recorded as belonging to havens because such deposits are by far the most likely to reflect sham structures. For instance, the Locational Banking Statistics assign foreign deposits of around $250 billion to a group of tiny Caribbean islands comprising well-known havens like the British Virgin Islands, Anguilla and Montserrat with a total population of less than 200.000. It is entirely unlikely that more than a small fraction of these deposits ultimately belong to residents of the islands; the vast majority belongs to residents of other countries, which cannot be identified.[8] In a separate analysis, we address the issue of haven deposits held through sham entities more directly by studying how deposits in havens nominally owned by other havens respond to oil price changes.

Three additional features of the deposit data deserve mention. First, it is possible to distinguish between deposits held by banks and deposits held by non-banks such as households, firms and governments. Since interbank deposits are less likely to play a role in the laundering of political rents, our analysis is only concerned with deposits held by non-banks.

[8] We acknowledge that excluding deposits nominally owned by havens does not fully solve the issue, because hidden wealth may also be funneled through countries that are not havens. Indeed, Sharman (2010) shows that providers of incorporation services in the U.S. and the U.K. enforce anti-money laundering rules more leniently than their colleagues in traditional havens. To the extent that political elites in petroleum-rich countries own foreign bank accounts through corporations and trusts in petroleum-poor countries, we could potentially find spurious effects of oil price changes on the foreign deposits of petroleum-poor countries.

Second, while the BIS dataset provides a measure of one form of hidden wealth, bank deposits, it contains no information about other forms, most importantly securities. Bank deposits most likely account for roughly 25% of the total wealth managed in havens (Zucman, 2013). Third, countries sometimes modify their reporting practices and new countries occasionally start reporting banking information to the BIS. The resulting noise in our deposit variables is generally quite negligible.[9]

2.2 Other variables

We measure the economic importance of petroleum production in a given country as the average ratio of petroleum rents to GDP over the sample period where petroleum rents are defined as the market value of the estimated oil and gas production net of the estimated production costs.[10] The oil price, which is the source of exogenous variation in petroleum rents in our empirical framework, is measured as the average quarterly spot price of West Texas Intermediate, a standard benchmark in oil pricing.[11]

To study whether the effect of petroleum rents on haven deposits depends on political institutions, we use the Polity index, which combines ratings of the competitiveness and openness of executive recruitment, the constraints on the chief executive, and the competitiveness of political participation in a single index where the lowest score -10 indicates "strongly autocratic" and the highest score 10 indicates "strongly democratic" (Marshall, 2013).[12] In most regressions, we capture the institutional variation with two political regime variables: $autocracy_{it}$ coded one in country-quarters with a Polity score below or equal to -5 and $nonautocracy_{it}$ coded one in country-quarters with a Polity score above -5. We also employ an alternative institutional measure originally developed by Przeworski et al. (2000), which classifies regimes as democracies if a number of objective criteria are met - that the executive and the legislature

[9] The main exceptions are the following three quarters: when Switzerland included fiduciary deposits in their reports in 1989q4; when the Cayman Islands, Bahamas, Hong Kong, Singapore, Bahrain and the Netherlands Antilles started reporting in 1983q4; and when Jersey, Guernsey and the Isle of Man started reporting in 2001q4. We exclude these three quarters throughout all the regressions.

[10] Information on petroleum rents is taken from the Adjusted Net Savings dataset of the World Bank. This dataset is currently the most frequently used source of data on oil and gas rents. For an overview of different oil and gas variables, their strengths and weaknesses, and how they have been employed in the resource curse literature, see van der Ploeg (2011).

[11] The oil price information is taken from the Federal Reserve Economic Data (http://research.stlouisfed.org/fred2/).

[12] We have used information on the date of regime changes from the "polity-case" version of the same source to construct a polity score at the quarterly frequency.

are elected, that multiple political parties are allowed and that there is alternation in power - and as non-democracies if not. We exploit the institutional heterogeneity within the group of autocracies where some regimes meet none of the criteria for being a democracy and others meet all but one. Finally, we measure perceptions of corruption using the monthly measure "corruption" from the International Country Risk Guide (PRS Group 2014), a sub-index of their aggregate Political Risk Index, aggregated to quarterly frequency.

We investigate whether other types of windfall gains have effects similar to petroleum rents and thus collect information on rents and prices for 9 different non-fuel minerals, for instance copper, aluminium and gold.[13] For other commodities, information on rents is not available and we therefore measure the economic importance in a given country with export shares. We use information on export shares and world prices for 36 different non-mineral commodities, for instance wool, rubber and rice.[14]

To study how political risk translates into hidden savings, we compile a dataset on elections and coups d'état.[15] The advantage of these two variables compared to other measures of political risk is that they correspond to events that can be precisely dated, which makes it possible to leverage the quarterly frequency of the deposit data. We thus construct dummy variables at the country-quarter level for direct elections of a national executive or a national legislative body and on successful coups.

In most specifications, we use a number of control variables that capture the opportunities and incentives for placing savings on foreign bank accounts facing agents not belonging to the political elite: an index of *de jure* capital account openness capturing restrictions on cross-border financial transactions (Chinn and Ito, 2008); liquid liabilities in the domestic banking sector as a share of GDP as a proxy for the development and sophistication of the domestic banking sector (Levine, 1997); a dummy for inflation rates above 40% as an indicator of a high-inflation environment (Bruno and Easterly, 1998); and tax revenue as a share of GDP as a crude measure of the tax rate and thus the incentive to place savings on foreign bank accounts for tax evasion purposes.

[13] Information on mineral rents is taken from the Adjusted Net Savings dataset of the World Bank.

[14] Commodity export shares are from Spatafora and Tytell (2009) whereas commodity prices from the IMF primary commodity prices dataset (1980-2014) and the IMF International Financial Statistics (1977-1979).

[15] The election data originates from National Elections Across Democracy and Autocracy dataset (Hyde and Marinov, 2012) whereas the coup data is constructed on the dated list of coups d'état in Marshall and Marshall (2013).

Table 1 provides summary statistics for all the variables used in our empirical analysis. Further, a list of how political regime and petroleum intensity are coded for each country in the sample is available in the Online Appendix (Table A1).

– Table 1 here –

2.3 Patterns in cross-border deposits and petroleum rents

Bank deposits in havens have increased rapidly, and more rapidly than GDP, over the sample period. In 1977, our measure of total deposits in havens amounted to around $12 billion or less than 0.2% of world GDP whereas in 2010 the corresponding figure was around $2,600 billion or around 4% of world GDP. The spectacular growth in haven deposits only partly reflects a general increase in cross-border banking: over the same period bank deposits in non-havens increased from $70 billion or 1.1% of world GDP to $4,400 billion or 7% of world GDP.

Table 2 provides information on the distribution of cross-border deposits across country groups. As shown in Columns (1)-(3), a considerable share of deposits in both havens and non-havens, around 20%, is nominally owned by other havens. We argued above that these deposits largely reflect the use of shell companies, trusts and other similar arrangements by individuals in non-havens rather than wealth actually belonging to residents of havens. The argument is supported by Column (4), which shows that the ratio of foreign deposits to GDP in havens is almost 30%, much higher than any other country group and almost 6 times the global average. Since we cannot credibly identify the true ultimate owner of deposits nominally owned by havens, we exclude them from the main analysis and consider them separately in Section 5.4.

The distribution of the remaining deposits reveals several interesting patterns. While petroleum-rich countries generally hold large stocks of foreign deposits relative to the size of their economy, as evidenced by Column (4), there is a striking correlation between political institutions and the allocation of deposits across havens and non-havens, as shown in Columns (5)-(6): in autocracies more than 50% of the deposits are held in havens, whereas this share is less than 25% in non-autocracies. Petroleum-poor countries generally own much less foreign deposits, but the correlation between political institutions and the share of total foreign

deposits held in havens is qualitatively the same as in petroleum-rich countries. These patterns in the aggregate data are consistent with our main regression result that petroleum rents are partly transformed into haven deposits in autocracies but not in other regime types.

– Table 2 here –

While the global stock of cross-border deposits has increased more or less steadily relative to world GDP since the 1970s, global petroleum rents have exhibited pronounced swings over this period: they peaked at 7% of world GDP in 1980, reached a bottom of 1% in 1998 and then peaked again at 5% in 2008. These swings were largely caused by movements in the real oil price: the peaks in 1980 and 2008 both coincided with record-high real oil prices of around $100 per barrel and the bottom in 1998 coincided with a record-low real oil price under $20 per barrel (real oil prices in 2014 dollars).[16] Changes in petroleum production explain much less of the variation in world petroleum rents: total oil production has increased at a steady pace over the sample period from around 60 to around 85 million barrels per day.[17] This is reassuring given that our empirical strategy only levers the variation in resource rents that derives from price changes. In our sample period, 102 countries reported positive petroleum rents in at least one year. In many of these countries, the average ratio of petroleum rents to GDP was negligible, but in many others it was very considerable, for instance 12% in Norway, 30% in Venezuela and 50% in Kuwait.

3 Empirical strategy

To guide our empirical specifications, we emphasize the following features of the international oil market. Oil and gas prices are determined on the world market, hence the variation in petroleum income that derives from price changes is plausibly exogenous to political elites in individual countries.[18,19] Moreover, oil prices are volatile and essentially unpredictable in

[16] Figures available at http://www.eia.gov/forecasts/steo/realprices/

[17] Figures available at http://www.eia.gov/

[18] While changes in the volume of petroleum production also creates variation in petroleum rents, the production volume is under government control and therefore endogenous to a host of factors. If, for instance, low levels of liquid assets cause rulers to increase petroleum production in order to raise revenue, it would tend to create a negative correlation between liquid assets (including haven deposits) and petroleum rents.

[19] There is typically not a one-to-one correspondence between the changes in resource revenue and changes in resource rents following a price shock because part of the price-induced variation in revenue is absorbed by

the short run (Hamilton, 2008), which means that the best estimate of the oil price in the next quarter is the oil price in the current quarter. These two features imply that changes in petroleum income deriving from price changes can be treated as unanticipated income shocks.

How should we expect political elites who have a personal stake in the proceeds from petroleum production to respond to such income shocks? While we do not observe the preferences guiding their savings behavior, the permanent income hypothesis predicts that they should save a large fraction of the unanticipated income, notably if they consider it to be temporary because they incorporate a risk of losing political power or because they, consistent with the market expectations revealed by futures markets (Anderson et al., 2014), expect an oil price hike to be followed by a gradual oil price decline.[20]

The empirical strategy thus involves, first, isolating the component of petroleum income that derives from exogenous and unanticipated changes in oil prices; second, correlating this income component with our measure of hidden savings (i.e. the change in deposit balances in havens); and third, testing whether this correlation differs systematically between countries with different political institutions.

In the simplest specification, we split the sample on the basis of political institutions and petroleum richness to obtain four subsamples: petroleum-rich autocracies, petroleum-poor autocracies, petroleum-rich non-autocracies and petroleum-poor non-autocracies. For each subsample, we estimate the correlation between percentage changes in the oil price and percentage changes in the stock of haven deposits:

$$\Delta \log(haven_{it}) = \alpha + \beta \Delta \log(oilprice_t) + \varepsilon_{it} \tag{1}$$

where Δ is the difference-operator. By defining petroleum-richness in terms of a country's *average* ratio of petroleum rents to GDP over the sample period, we ensure that the composition of the subsamples is not endogenous to changes in petroleum production. The basic intuition for this specification is that oil price changes create significant income shocks in petroleum-rich countries but not in petroleum-poor countries. If this income is appropriated

owners of specialized capital in inelastic supply such as oil rigs (Anderson et al., 2014) and workers bargaining for wages (e.g. Aragon and Rud, 2013).

[20] In the literature, oil price shocks are usually assumed - or found - to be long-lasting (e.g., Cashin et al., 2000; Kim et al., 2003; Bruckner and Ciccone, 2010), somehow contrasting the evidence in Anderson et al. (2014).

by political elites and deposited on haven accounts, β should be positive. Under the hypothesis that political institutions are successful at curbing the transformation of petroleum rents into political rents, we should expect a positive β only in oil-rich autocracies.

While equation (1) is a natural starting point for the analysis, it has the important limitation that the oil price coefficient, β, cannot be identified together with time dummies. This is problematic because β may then pick up the effect of other factors, observed or unobserved, that shape trends in haven deposits and correlate with oil prices. One such factor could be the global business cycle since both oil prices and cross-border banking tend to be pro-cyclical.

To identify the effect of shocks to petroleum income on hidden savings in a framework that allows for time dummies, we exploit that oil price changes, while being common to all countries, change petroleum rents more for petroleum-rich countries than for petroleum-poor countries. We therefore introduce the *interaction* between oil price changes and petroleum richness as well as a set of time dummies into the model:

$$\Delta \log(haven_{it}) = \alpha + \beta_1 petro_i + \beta_2 petro_i \times \Delta \log(oilprice_t) + X'_{it}\gamma + \mu_t + \varepsilon_{it} \qquad (2)$$

where $petro_i$ is a time-invariant measure of petroleum richness and X_{it} represents a set of controls. The interaction term measures the temporary petroleum income created by exogenous oil price movements while the left-hand side measures hidden savings. Since the model effectively compares changes in hidden savings in petroleum-rich countries (treated by oil price changes) and petroleum-poor countries (not treated by oil price changes beyond what is captured by the time dummies), β_2 has the flavor of a difference-in-difference estimator.

The vector of covariates, X, includes the percentage change in GDP, which implies that we are effectively testing whether petroleum rents are *more likely* to be transformed into haven deposits than other types of income because petroleum income is itself part of GDP. Moreover, it includes variables aiming to capture the opportunities and incentives of agents not belonging to the political elite to place savings on foreign bank accounts as described in the previous section. In addition to these time-varying covariates, the model can be augmented with country fixed effects. Since the model is expressed in log-differences, country fixed effects effectively imply that the effect of oil prices is identified off deviations from country-specific exponential trends in haven deposits.

We estimate equation (2) for autocracies and non-autocracies separately and thus obtain estimates of how petroleum income translates into hidden savings in each of the two political regime types. Ultimately, we want to investigate whether the transformation of petroleum income into hidden savings is affected by political institutions. We therefore interact all the terms in equation (2) with regime indicators and estimate the resulting model on the full sample of countries. This allows us to ascertain whether the coefficient on unanticipated petroleum income differs significantly between autocracies and non-autocracies. By adding the regime dimension to equation (2), the resulting estimator gets the flavor of a difference-in-difference-in-difference estimator.

A potential concern with the interpretation of the models estimated above is that any effect we find on deposits in havens could reflect a more general effect on foreign deposits. If we interpret a positive effect of petroleum rents on haven deposits as evidence that the rents are partly diverted by political elites, we have implicitly assumed that petroleum rents not diverted by political elites do not wind up on in havens. This assumption is violated if petroleum producing countries even in the absence of any motive to conceal savings allocate part of their petroleum income to havens, for instance, because deposits in haven banks form part of a globally well-diversified asset portfolio. To address this concern, we estimate the models with $\Delta \log(haven) - \Delta \log(nonhaven)$ as dependent variable. In effect, we control for general effects on foreign deposits by considering the percentage change in haven deposits over and above the percentage change in non-haven deposits. This strategy correctly identifies the effect of petroleum income on diverted rents under the assumption that savings out of diverted petroleum income are allocated to havens but not to non-havens, whereas savings out of non-diverted petroleum income are allocated proportionately to havens and non-havens. If diverted petroleum income is partly allocated to non-havens, as suggested by anecdotal evidence, or if savings out of non-diverted resource income are allocated disproportionately to non-havens, this strategy will tend to bias our core estimate towards zero.

While diversion of other types of commodity rents are analyzed in a framework very similar to (2), we develop a slightly different model to study the relation between political risk and hidden savings. We consider two types of political events, elections and coups, which are both associated with increased political risk for the incumbent elite. For each event class and each

of the four subsamples defined by political regime and petroleum richness, we estimate the following model:

$$\Delta \log(haven_{it}) = \alpha + \beta_1 pre\text{-}event_{it} + \beta_2 event_{it} + \beta_1 post\text{-}event_{it} + X'_{it}\gamma + \mu_t + \varepsilon_{it} \qquad (3)$$

where $event_{it}$ is a dummy variable indicating that an event takes place in the current quarter, $pre\text{-}event_{it}$ is a dummy indicating that an event will take place in one of the three following quarters and $post\text{-}event_{it}$ is a dummy indicating that an event has taken place in of the three preceding quarters. The coefficients β_1, β_2 and β_3 can all straightforwardly be interpreted as difference-in-difference estimators in the sense that they capture the hidden savings made by a country with a recent, current, or upcoming event relative to the average hidden savings by similar countries in the same quarter (as captured by the time dummies).

A potential concern with our deposit variable is that it aggregates deposits in different currencies into a single U.S. dollar equivalent measure using current exchange rates. This implies that changes in exchange rates mechanically lead to changes in deposits: an appreciation of the U.S. dollar causes a decrease in the observed value of deposits and *vice versa*. To the extent that the currency composition of foreign deposits differs across countries, exchange rate-driven changes in deposits are not perfectly captured by time dummies and may give rise to a bias. Fortunately, the deposit data at our disposal includes a currency decomposition of deposits for the later part of the sample period. We use this information to compute average currency shares of haven deposits for each country. We then use these shares together with exchange rate information to construct a variable, $exchange\ rate_{it}$, that expresses the percentage change in haven deposits caused by exchange changes alone and include this variable as controls in all our models.

4 Graphical evidence

Before proceeding to the regression analysis, we provide two types of graphical evidence on the correlation between petroleum rents, political institutions and hidden savings.

We first show trends in haven deposits around the two major oil price shocks in our sample period: 1979-1980 and 2006-2009. We are mainly interested in petroleum-rich countries,

for which oil price shocks translate directly into unanticipated income shocks. To discern any effect of political institutions on the propensity that petroleum income is diverted by political elites, we therefore compare haven deposits owned by petroleum-rich autocracies and petroleum-rich non-autocracies over the course of the two narrow time windows. Countries are defined as petroleum-rich (petroleum-poor) if the average ratio of petroleum rents to GDP over the sample period is above (below) 5% and as autocracies (non-autocracies) if the polity score is below (above) -5.

Figure 1a zooms in on the period 1979-1980 where the oil price more than doubled from around $16 to around $40. It shows that the stock of haven deposits owned by the average petroleum-rich autocracy (bold red line) increased by around 80% during the boom and then levelled off. By comparison, haven deposits owned by the average petroleum-rich non-autocracy (bold blue line) increased by around 40% over the same period, which is similar to the trajectory followed by petroleum-poor countries (dashed lines). Figure 1b focuses on the period 2006-2009 where the oil price first doubled from around $60 to around $120 and then dropped by almost two thirds to a level close to $40. Again, petroleum-rich autocracies (bold red line) exhibit a more pronounced increase in haven deposits during the boom than petroleum-rich non-autocracies (bold blue line) and, moreover, show signs of a modest decrease during the bust.

– Figure 1 around here –

These patterns are suggestive that petroleum rents are partly diverted by political elites and hidden on bank accounts in havens when institutions are weak, but the evidence is far from conclusive. Besides the general limitations of graphical and case-based evidence, the oil price shocks studied here, while having the advantage of being large enough to induce responses that are potentially detectable with visual inspection, were also accompanied by serious disruptions of the world economy that may confound the analysis.

Figure 2 extends the graphical evidence beyond the episodes with exceptionally large oil price movements by plotting quarterly growth rates in haven deposits against quarterly growth rates in the oil price for each of the four subsamples defined on the basis of political regime and petroleum richness. The plots show that haven deposits belonging to petroleum-rich autocracies generally tend to grow more in quarters where the growth in the oil price is

relatively high (Panel A), while no such correlation can be observed for other countries (Panel B-D).

– Figure 2 around here –

5 Regression results

5.1 Petroleum rents

We start the regression analysis by estimating Eq. (1) for each of the four country groups representing combinations of political regime and petroleum richness. While this specification investigates how quarterly growth rates in haven deposits correlate with quarterly growth rates in the oil price, it differs from the graphical analysis in Figure 2 by using individual countries rather than country groups as the unit of observation and by controlling for the mechanical change in deposits due to exchange rate changes, which is particularly important in models without time dummies. As reported in Table 3, the correlation between oil prices and haven deposits is statistically significant in petroleum-rich autocracies (Column 1), but not in petroleum-rich non-autocracies (Column 2) nor in petroleum-poor countries (Columns 3-4).

– Table 3 around here –

We then turn to Eq. (2) where the effect of petroleum income shocks on hidden savings is identified by comparing how oil prices affect the haven deposits of countries with the same political regime but different petroleum intensity. We take two approaches to measuring petroleum intensity: a continuous variable capturing the average ratio of petroleum rents to GDP over the sample period and a dummy variable indicating that this ratio exceeds 5%. As reported in Table 4, the interaction between the oil price change and petroleum intensity is statistically significant in autocracies (Column 1), but not in other countries (Column 2) when petroleum intensity is measured with a dummy variable. The point estimate of 0.22 in the former sample implies that doubling the oil price is associated with a 22% increase in haven deposits owned by petroleum-rich autocracies over and above the change in haven deposits owned by petroleum-poor autocracies. The same pattern prevails when petroleum

intensity is measured with the continuous variable (Columns 4-5). Controls for GDP growth, high inflation, high tax rates, capital account openness and financial sector deepness (point estimates not reported) are never statistically significant.[21]

To test whether the effect of oil prices on haven deposits differs significantly between autocracies and other countries, we allow the petroleum-related terms in the model to vary by political regime and estimate this augmented model on the full sample (Columns 3 and 6). In both specifications, the interaction of $petro\ intensity \times \Delta \log(oilprice)$ with the indicator for autocracy is statistically significant whereas its interaction with the indicator for non-autocracy is far from statistical significance. An F-test rejects that the two coefficients are identical with a p-value of less than 5% in the first, but not in the second specification.

To disentangle the effect on savings hidden in havens from any general effect on foreign savings, we estimate the same six specifications using the percentage change in haven deposits over and above the percentage change in non-haven deposits as the dependent variable. The results are strikingly similar to the main results. When the sample is split on political regime, there is persistently a significant positive effect of petroleum income in autocracies (Columns 7 and 10), but no such effect in other countries (Columns 8 and 11). When the petroleum terms are allowed to vary by political regime within a single model, the same qualitative pattern prevails (Columns 9 and 12).

– Table 4 around here –

As a robustness tests, we estimate all of the above models with country fixed effects, which in the context of our models expressed in log-differences represent country-specific exponential trends and show the results in the Online Appendix (Table A2). Generally, the country fixed effects are not jointly significant and have little bearing on other parameter estimates.[22] For

[21] While the covariates have a reasonable good coverage overall, this is not always the case for the petroleum-rich autocracies, which are at the heart of our study. For instance, information on liabilities in the domestic banking sector and tax revenue is missing for Libya, Yemen, Oman, Qatar and the United Arab Emirates. To avoid that missing covariates affect our results through sample attrition, we follow the approach of Goldin and Rouse (2000) and recode missing covariates as zero while for each covariate introducing a dummy coded one when that particular covariate is missing. This allows us to retain all observations in the sample while controlling for the effect of covariates where the information is available and controlling for unobserved characteristics of observations where the information is unavailable.

[22] To understand why country fixed effects are statistically insignificant, note that with quarterly observations and a long sample period, even small fixed differences in deposit growth rates lead to large divergence in deposit levels. For instance, consider two countries A and B starting with USD 1 billion of haven deposits in 1977; country A has USD 2 billion in 2010 while country B has USD 4 billion. This is a very strong

instance, when country fixed effects are added to the specification reported in Column (3), an F-test that all the fixed effects are zero yields a p-value of 0.28.[23]

Further investigating the shape of the relationship between institutional quality and rent diversion by political elites, we estimate a model where the correlation between petroleum income and haven deposits is allowed to vary flexibly across the continuum of polity scores. In principle, we would like to construct a dummy variable for each of the 21 possible polity scores (-10 to 10) and include these institutional dummies in the model in the same way as the cruder institutional categories, autocracy and non-autocracy, were included in Column (3) of Table 4. At certain polity scores, however, there are very few observations of petroleum-rich countries; hence we consolidate into 8 slightly broader polity categories that include roughly the same number of petroleum-rich country-quarters. Figure 3 displays point estimates and confidence intervals for the 8 three-way interactions: the interaction terms are statistically significant for the two most autocratic polity categories and insignificant for all other countries. This suggests that the average effect for autocracies reported in Table 4 is driven by the very worst autocracies and that there is no institutional gradient in rent diversion above a fairly low threshold level of institutional quality.

– Figure 3 around here –

To learn more about the institutional characteristics that make petroleum income more likely to be transformed into haven deposits, we use four institutional measures from Przeworski et al. (2000) updated with data from Cheibub et al. (2010). Each institutional dimension has three possible outcomes where 0 and 1 are autocratic and 2 is democratic. For instance, the *de jure* measure of political parties takes the value 0 if all parties are legally banned, 1 if a single party is legal and 2 if multiple parties are legal. We estimate four models, each corresponding to an institutional dimension, that include dummy variables for the three institutional outcomes in the same way as autocracy and non-autocracy were included in Column (3) of Table 4. The results are reported in Table 5 and suggest that petroleum

divergence, but only requires a difference in the average quarterly growth rate of 0.5 percentage points. Our results suggest that such cross-country differences in long-term average deposit growth rates are too small to be detected statistically given the presence of considerable short-term volatility in deposit stocks.

[23] The test-statistic is computed under the assumption of uncorrelated standard errors. An F-test of joint significance of fixed effects cannot be conducted under the assumption of correlated standard errors (Cameron and Miller, 2015).

windfalls lead to a (borderline significant) surge in savings on haven accounts in countries with no legislature while there is no such effect in countries with a legislature regardless of whether it holds only the regime party or multiple parties (Column 1). There is a larger and more significant effect of petroleum windfalls in countries where all parties are *de jure* banned (Column 2) and where no parties *de facto* exist (Column 3), but no effect in other countries. Finally, there is a significant effect of petroleum windfalls in countries where the executive is not elected (Column 4), but not in other countries. In all cases but the first, the difference between the most autocratic category and the democratic category is statistically significant at the 5% level. As shown in the Online Appendix, these results are qualitatively unchanged when we employ the continuous measure of petroleum intensity (Table A4) and when we purge the effect on haven deposits from any general effect on foreign deposits (Table A5).

– Table 5 around here –

Finally, we investigate whether the results can be explained by known patterns of corruption. While corruption is itself an outcome of complex economic, social and political processes, and therefore not the fundamental *cause* of rent extraction by political elites, it is nevertheless of interest to examine the correspondence between a standard perception-based measure of corruption and our measure of the extent to which petroleum rents are diverted to bank accounts in havens. We therefore estimate a model where the correlation between petroleum income and haven deposits is allowed to vary with corruption instead of institutional quality. As shown in Figure 4, we find no systematic relation: the correlation between petroleum income and haven deposits appears to be strongest when corruption is high (low score) and low (high score), but is not statistically significant for any of the four groups. One plausible explanation for this finding is that the diversion of petroleum rents to secret accounts in havens is so well hidden that it does not enter standard perception-based measures of corruption.

– Figure 4 around here –

The results reported in this section demonstrate a robust correlation between petroleum rents, the value of bank accounts in havens and political institutions: when the oil price

goes up, the value of haven deposits owned by petroleum-rich countries also goes up, both in absolute terms, relative to the haven deposits of petroleum-poor countries and relative to the countries' own non-haven deposits, but only when political institutions are sufficiently poor. Since petroleum rents are overwhelmingly controlled by governments, we interpret this as evidence of rent diversion by political elites: when political institutions do not create sufficient constraints on the ruling elites, part of the petroleum income created by an oil price increase is appropriated, saved and hidden on bank accounts in havens.

5.2 Rents from minerals and other commodities

Is petroleum special or do the results extend to other forms of minerals and commodities? To address this question, we employ our empirical framework to minerals instead of petroleum, but face two challenges: first, information on mineral rents is often missing; second, where information exists, rents are often relatively small. Both of these points are illustrated in the summary statistics on mineral rents reported in the Online Appendix (Table A7). Data coverage is best for copper rents where information exists for 67 countries; for all other minerals the coverage is considerably lower. Average rents are highest for aluminium (around 1% of GDP) and copper (0.8% of GDP) and for both of these minerals, four countries have rents exceeding 5% of GDP; for all other minerals, average rents are much lower (less than 0.5% of GDP) and at most two countries have rents above 5% of GDP.

Our empirical framework requires that a reasonable number of countries have rents above 5% of GDP and can therefore only be employed directly to copper and aluminium. As shown in Table 6, the interaction between copper production and the change in copper prices is statistically significant in the sample of autocracies (Column 1) and insignificant in the sample of non-autocracies (Column 2), however, an F-test based on estimation on the full sample (Column 3) cannot reject that the effect of copper income is the same in the two regimes. Aluminum rents do not appear to affect haven deposits neither in autocracies (Column 4) nor in other countries (Column 5).

– Table 6 around here –

To overcome the challenge that rents from individual minerals are typically small, we adapt the model slightly to exploit the variation in rents from all minerals at the same time.

Following Arezki and Brückner (2012), we construct the following variable:[24]

$$commodity_{it} = \sum_j \theta_{ij} \Delta \log(price_{jt})$$

where θ_{ij} captures the average ratio of rents from mineral j to GDP in country i over the sample period and $price_{jt}$ is the world market price of commodity j at time t. Analogous to the interaction between petroleum intensity and oil price changes in the main specifications, this variable measures the income component from minerals that is unanticipated and exogenous because it derives exclusively from short-term price variation on global commodity markets. As shown in Table 6, this specification produces no evidence that windfall gains from minerals correlate with hidden savings neither in autocracies (Column 7) nor in other countries (Column 8).

These results represent mixed evidence on the ability of political elites to divert rents from minerals: while we find that copper rents have a significant effect on the value of haven deposits, this does not appear to be the case for aluminium rents, just like there are no detectable effects of total minerals rents. A plausible reason why mineral rents correlate less strongly with hidden savings than petroleum rents is that governments, for geological, political or other reasons, are less able to control them. Globally, governments control around 25% of extraction of minerals (Raw Materials Group, 2011) as opposed to at least 75% for petroleum (World Bank, 2011).

Finally, we conduct a similar analysis for non-mineral commodities. *A priori*, it is much less likely that rents deriving from commodities such as rice, plywood, wool and rubber can be diverted by political elites for the simple reason that governments rarely have direct control over these commodities in the way that they do over petroleum. This exercise can therefore be considered as a placebo test of the main mechanism studied in the paper: if increases in world commodity prices create rents that do not accrue directly to the government, we should not expect to see increases in haven deposits through rent diversion by political elites. The results indicate that rents from non-mineral commodities have no significant effect on haven deposits neither in autocracies (Column 10) nor in other countries (Column 11).

[24] Under this approach, we need to assume that rents are zero when no information is available; without this assumption our sample would only consist of the few countries for which information is non-missing for all mineral rents.

5.3 Political risk

Next, we estimate Eq. (3) to study how elections and coups, both events that involve a measure of risk for the incumbent political elite, affect savings in havens. The results for elections are reported in Table 8. In petroleum-rich autocracies, there is a statistically significant increase in haven deposits during the three quarters prior to the election while there are no significant changes in the election quarter itself and the three following quarters (Panel A, Column 1). The point estimate on the pre-election dummy suggests that haven deposits on average increase by around 2% relative to other petroleum-rich autocracies in each of the three quarters preceding the election quarter. In other petroleum-rich countries (Column 2) and in petroleum-poor countries (Columns 4-5), there are no significant deviations (at the 5% level) from the general time trend before, during or after the election quarter. To test whether the change in haven deposits in pre-election quarters differs significantly between political regimes, we estimate Eq. (3) on the full sample of petroleum-rich countries (Column 3) and petroleum-poor countries (Column 6) while interacting the pre-election dummy with regime indicators. An F-test cannot reject that the pre-election effect is identical in petroleum-rich autocracies and non-autocracies, but comes close with a p-value of 14 %.

– Table 7 around here –

A potential concern with these results is that elections could be endogenous to diversion of political rents. For instance, if periods of excessive rent extraction cause political unrest that ultimately leads to elections, it could produce the exact same patterns in the data as politicians and elites anticipating (and fearing) elections. We address this concern by limiting the analysis to elections that follow a regular electoral cycle. We find that in petroleum-rich autocracies, haven deposits increase by around 4% in each of the three quarters preceding an on-schedule election whereas there is no effect during the election quarter itself or the three following quarters (Panel B, Column 1). There are no significant deviations from the general time trend before, during or after quarters where on-schedule elections take place in other petroleum-rich countries (Column 2). An F-test rejects that the pre-election effects are identical in petroleum-rich autocracies and non-autocracies with a p-value of 7 % (Column 3). In petroleum-poor countries, there is also some evidence of pre-election effects, which do not, however, differ in magnitude between political regimes (Columns 4-6).

We employ the same regression framework to successful coups d'état except that the relatively small number of coups makes it impossible to estimate obtain separate estimates by political regime. As documented in the Online Appendix, our sample includes 15 coups in petroleum-rich countries (Table A8). Four of those took place in Bolivia in 1978-1980 and cannot be used in our regression framework because the short period between the coups makes it impossible to identify their leaded and lagged effects. This effectively leaves us with just 11 coups in petroleum-rich countries, of which only 2 occurred in countries that were not autocratic immediately prior to the coup.

We therefore estimate how haven deposits change around coups for petroleum-rich and petroleum-poor countries separately without conditioning on political regime. The results are reported in Table 8. In petroleum-rich countries, haven deposits on average increase by around 8% relative to the general time trend during each of the three quarters preceding the coup whereas there is no significant deviation from the general trend during the quarter in which a coup takes place and during subsequent quarters (Column 1). In petroleum-poor countries, there is a border-line significant negative effect on haven deposits during the quarter in which a coup takes place (Column 2). As shown in the Online Appendix, the pre-coup increase in havens in petroleum-rich countries is even stronger when purging the effect on haven deposits from any general effect on foreign deposits (Table A9).

– Table 8 around here –

The results in this section suggest that ruling elites anticipate the political instability associated with elections and coups and respond to the increased risk of losing power by transferring funds to safe havens. This is consistent with the literature on electoral authoritarianism stressing that elections are inherently risky even for autocratic rulers (e.g. Cox, 2009; Gandhi and Lust-Okar, 2009) because they can play a role in mobilizing the opposition or the masses (Geddes, 2006; Magaloni and Kricheli, 2010) and because rulers may unexpectedly lose them (Przeworski et al., 2000). The finding that rulers appear to successfully predict coups is less surprising if one considers that private insurance companies expend considerable resources forecasting future political violence (Jensen and Young, 2009). Assuming that rulers and political elites have access to at least as much information as insurance companies, they should be expected to detect and act upon adverse signals about the probability of regime

survival.

5.4 Indirectly held deposits

Finally, we investigate how haven deposits owned through corporations or trusts in the British Virgin Islands or other similar jurisdictions respond to changes in petroleum income. We therefore turn the attention to the roughly 20% of haven deposits that are assigned to other havens in the BIS statistics and are excluded from the analysis above because we do not observe the home country of their ultimate owners. We refer to these as "indirectly held" haven deposits as opposed to deposits assigned to non-havens in the BIS statistics, which we label "directly held".

In a first simple step, we estimate Eq. (1) for the sample of indirectly held deposits and, as shown in Table 9, find that they correlate strongly with oil prices (Column 1). While this is suggestive of petroleum rents being funneled to bank accounts in havens through sham structures involving other havens, identification is weak because we cannot distinguish deposits ultimately owned by petroleum-rich and petroleum-poor countries. Moreover, the specification does not allow for time dummies and the oil price variable may therefore pick up the effect of other determinants of haven deposits correlating with oil prices.

– Table 9 around here –

To improve identification, we rely on the observed ownership patterns of directly held deposits to make inference about the unobserved ownership patterns of indirectly deposits. The basic idea is that a country's underlying preferences for some havens over others are revealed by the allocation of its directly held deposits and that these same preferences plausibly also govern the allocation of indirectly held deposits. We implement this idea by assuming that the share of indirectly held deposits in a given haven that is ultimately owned by a given non-haven is the same as the share of directly held deposits in the haven owned by the non-haven.[25]

[25] While this procedure surely introduces some measurement error, it is reassuring that the observed allocation of directly held deposits implies a very significant cross-country heterogeneity in haven preferences. For instance, the share of directly held deposits belonging to petroleum-rich autocracies is more than 10 times larger in Swiss banks than in Cayman banks. Even if haven preferences are not precisely the same for directly and indirectly held deposits, it seems unlikely that the difference could neutralize or reverse such a stark pattern.

For each BIS-reporting haven, we thus obtain a measure of the share of indirectly held deposits that ultimately belongs to each of the four country groups defined by political regime and petroleum rent. This allows us to test whether haven deposits indirectly held by petroleum-rich countries respond more to changes in the oil price as one should expect if petroleum rents are diverted and hidden by political elites. We also test whether this correlation is strongest for autocracies, as one should expect if political institutions successfully limit the amount of diversion.[26]

Concretely, we estimate variants of Eq. (2) where the deposit variable on the left-hand side is at the haven-haven level, for instance the percentage change in deposits in Swiss banks nominally owned by the British Virgin Islands, and the oil price variable on the right-hand side is interacted with the estimated deposit share owned by a country group, for instance the share of deposits in Swiss banks owned by petroleum-rich autocracies. The simplest specification with a single interaction shows that in havens where a larger share of deposits is owned by petroleum-rich autocracies, indirectly held deposits exhibit a significantly stronger correlation with the oil price (Column 2). The coefficient on the interaction term suggests that a doubling of the oil price is associated with an increase in indirectly held deposits owned by petroleum-rich autocracies of around 75%, which compares to the 22% increase in directly held deposits estimated in section 5.1.

The finding that deposits owned indirectly by petroleum-rich autocracies are more sensitive to oil price changes than those owned directly lends itself to different interpretations. One distinct possibility is that the political elites who divert petroleum rents are more likely to employ sophisticated holding structures than other individuals in the same countries who own bank accounts in havens. This could be because members of the political elites are more concerned about expropriation, for instance in the context of a regime change, and therefore willing to invest more in concealment, or because indirect ownership is necessary to circumvent the somewhat stricter anti-money laundering rules that apply to individuals involved in politics (FATF, 2011). In any case, if the political elites who benefit from petroleum rents own a larger share of indirectly held deposits than of directly held deposits, it would explain

[26] We are able to include information only from the following eight BIS-reporting havens: Cayman Islands, Austria, Belgium, Guernsey, Isle of Man, Jersey, Luxembourg and Switzerland (including Liechtenstein) in this analysis. This is because the data at our disposal lump together deposits in the remaining BIS-reporting havens in the category "offshore financial centers."

why the former appear to be more oil price sensitive than the latter.

Finally, in a more comprehensive specification that also includes interaction terms between the oil price variable and the deposit shares of petroleum-poor autocracies and petroleum-rich non-autocracies respectively (and thus includes petroleum-poor non-autocracies as a reference group), we again find a significant effect of political institutions on the likelihood that petroleum rents increase hidden savings (Column 3). An F-test rejects that the interaction terms relating to petroleum-rich autocracies and non-autocracies are identical with a p-value of less than 1 %.

6 Discussion

The main patterns emerging from the data are the following: When petroleum-rich autocracies experience a plausibly exogenous increase in rents from oil and gas production, owing to short-term price changes, haven deposits increase, both in absolute terms and relative to deposits in non-havens. No similar effects are observed in petroleum-rich non-autocracies.

Our interpretation of the patterns is that the changes in haven deposits observed around oil price shocks and political shocks in autocracies reflect hidden political rents: Unanticipated increases in petroleum rents are partly captured by political elites and transferred to private bank accounts in havens, either directly or through sham corporations based in other havens; and in the face of political instability, before scheduled elections and coups d'état, political elites transfer part of the wealth they have amassed domestically to havens.

This interpretation is consistent with the fact that oil and gas production is typically directly or indirectly controlled by governments and with the abundant anecdotal evidence on corrupt rulers in oil-rich autocracies like Nigeria, Libya and Equatorial Guinea accumulating vast private fortunes abroad. It is also in line with the political incentives facing self-interested elites: moving captured petroleum rents to secret accounts in havens provides protection against expropriation in case they, or people to which they are politically connected, are ousted from power; and the perceived risk of expropriation is likely to increase in election years and periods of domestic conflict, which strengthens the incentive to hide funds in havens.[27] Finally, our interpretation is consistent with the lack of correlation between

[27] In recent years, international cooperation over freezing and potentially recovering stolen assets has in-

exogenous increases in petroleum rents, political events and haven deposits in non-autocratic regimes: a distinguishing feature of autocracies is the lack of political constraints and electoral accountability, which facilitates the conversion of petroleum rents into personal wealth of political elites.

Other interpretations of the results are, of course, possible but, as we argue in the following, less plausible. First, it may be suspected that the correlation between petroleum rents and haven deposits is related to the presence of multinational firms in the petroleum industry. Hines (2010) argues that developing countries are particularly vulnerable to tax avoidance by multinational firms whereby taxable profits are shifted to havens through transfer pricing or thin capitalization. This, seemingly, suggests an alternative explanation for our empirical findings according to which the oil and gas rents transferred to havens belong to multinational firms rather than domestic elites. This interpretation can, however, largely be ruled out because of the way the deposit data are constructed. For instance, if a UK oil company uses transfer pricing to shift profits from a Nigerian affiliate to a Cayman affiliate in order to reduce tax payments in Nigeria, the funds would be legally owned by the Cayman affiliate and therefore assigned to the Cayman Islands and not Nigeria in the BIS statistics.

A second and related interpretation highlights the role of cash management by multinational firms. In terms of the example above, if the Nigerian affiliate of the UK oil company holds its surplus cash on a Jersey bank account, the funds would be assigned to Nigeria in the BIS statistics, which could induce a correlation between oil prices and Nigeria's haven deposits. This is likely to be a small issue for a number of reasons. Most importantly, the majority of the global petroleum rents is controlled by governments so the argument only applies to a minor part of rents. Furthermore, cash management can only contribute to the correlation between oil prices and haven deposits under a specific legal set-up. In terms of the example above, it requires that the UK oil company operates through a Nigerian subsidiary; if it operates in its own name, or through a branch or a partnership, which is common in the

creased; for example, The Stolen Asset Recovery Initiative launched in September 2007 by the World Bank and the United Nations Office on Drugs and Crime aims at assisting developing countries in recovering assets held abroad, typically by former rulers and their political connections. If successful, such initiatives may make hiding wealth in tax havens a less attractive option for kleptocratic rulers and political elites. So far, however, results have been meager: only USD 5 billion in total have been recovered out of an estimated annual loss of between USD 20 and 40 billion (OECD and the World Bank, 2011); The Basel Institute of Governance (2007) details the formidable legal challenges in repatriating Nigerian funds saved in havens during the Abacha regime.

petroleum industry, any cash it chooses to hold on a Jersey account would not be assigned to Nigeria but to the UK in the BIS statistics. Finally, there is no compelling reason for multinational firms to carry out fully legitimate cash management operations through banks in haven rather than non-haven financial centers, hence cash management cannot explain that oil prices correlate with deposits in havens like Switzerland and Jersey, but not in other international banking centers like the UK and France.

Third, petro rents may lead to higher incomes more widely in the domestic economy: local suppliers to the petro industry benefit directly from an oil boom whereas other local firms may benefit from increases in aggregate demand stimulated by increased government spending and demand multipliers. Could the observed increase in haven deposits following increases in oil and gas rents reflect that other domestic groups than political elites transfer funds to havens in order to evade income taxes? We do not find this explanation plausible. Significant oil producers such as Saudi Arabia, Kuwait, United Arab Emirates and Qatar have no income taxes, hence tax evasion is clearly not an issue. Most of the other autocracies in our sample are developing countries where tax enforcement is typically lax suggesting that much simpler tax evasion techniques are available than those involving foreign bank accounts. At the same time, controlling for changes in income tax levels, which themselves are insignificant, makes no difference to our results; and income shocks from non-government controlled sources, including commodities, do not seem to matter for haven deposits.

Fourth, it could be asserted that our results may partly owe themselves to rebels and terrorists who control oil fields and use offshore accounts for transactions with traders of arms and other equipment. There is recent anecdotal evidence that rebels in a number of countries, including Syria, Iraq and Sudan, finance their warfare with funds deriving from petroleum production. We have tested the ability of this mechanism to explain our main results by re-estimating the baseline model on a sample that excludes country-years where regions endowed with petroleum are affected by violent conflict.[28] As shown in the Online Appendix, the results remain largely unchanged when we drop these observations that account for roughly 10% of the sample (Table A10).

Finally, our empirical results could potentially reflect differences in absorptive capacity across different categories of countries. In particular, investment opportunities may generally

[28] The conflict data come from Buhaug et al. (2009).

be lower in developing countries, which dominate our sample of autocracies, than in developed countries, which could explain why a larger share of petro rents in the former countries is invested abroad. This does not, however, account for the finding that shocks to oil and gas rents are more likely to translate into foreign deposits than other types of income, including from most minerals and commodities. Moreover, it is inconsistent with the finding that higher oil and gas rents in autocracies lead to more deposits in havens over and above deposits in non-havens. If windfall petro rents would be invested abroad due to lack of domestic investment opportunities, it is not clear why investments would primarily take place in havens.

Under the premise that the correlation between petroleum rents and haven deposits reflects diversion of rents by political elites, it is of great practical interest to use the estimated parameters to address the question: how large a share of the petroleum windfall gains accruing to petroleum-rich autocracies is diverted to secret bank accounts in havens? We proceed to address this question in three simple steps. First, the central estimate implies that a doubling of oil prices increases haven deposits by around 22%. At the sample average where the ratio of haven deposits to GDP in petroleum-rich autocracies is around 7%, an increase in haven deposits of 22% corresponds to around 1.5% of GDP. Second, we estimate a simple panel regression model with country fixed effects where the GDP growth rate on the left-hand side and the oil price growth rate on the right-hand side. As shown in the Online Appendix, the short-term elasticity of GDP with respect to the oil price is around 0.1 and highly statistically significant in the sample of petroleum-rich countries (Table A11). Hence, doubling the oil price increases GDP by around 10%. Putting the pieces together, if doubling the oil price causes GDP to increase by around 10% and haven deposits to increase by around 1.5% of GDP, it follows that around 15% of the income created by an oil price increase ends up on haven accounts.

7 Conclusion

We employ new data on bank deposits in havens to investigate the diversion of resource rents by political elites. The main finding is that plausibly exogenous changes in petroleum income are associated with significant changes in personalized hidden wealth in autocracies, but not in other political regimes. The estimates suggest that around 15% of the windfall gains accruing

to petroleum-rich countries with autocratic rulers is diverted to secret accounts in havens. This finding provides empirical support for the theoretical argument that rulers and political elites in countries with weak political constraints and lack of competitive elections transform petroleum rents into political rents.

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Figure 1a: Haven deposits during the 1979 oil boom

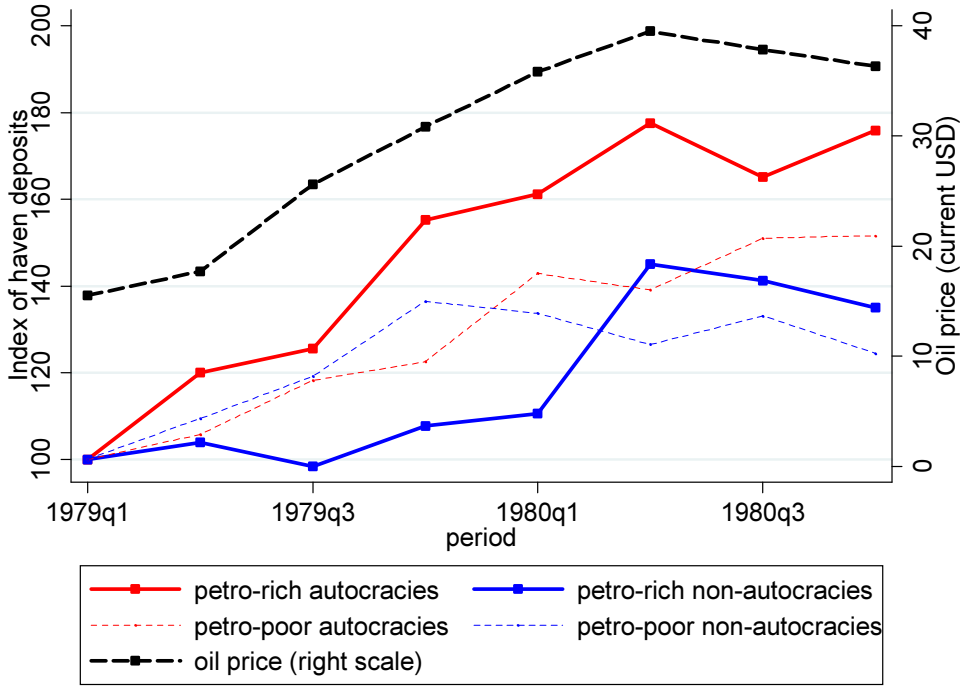
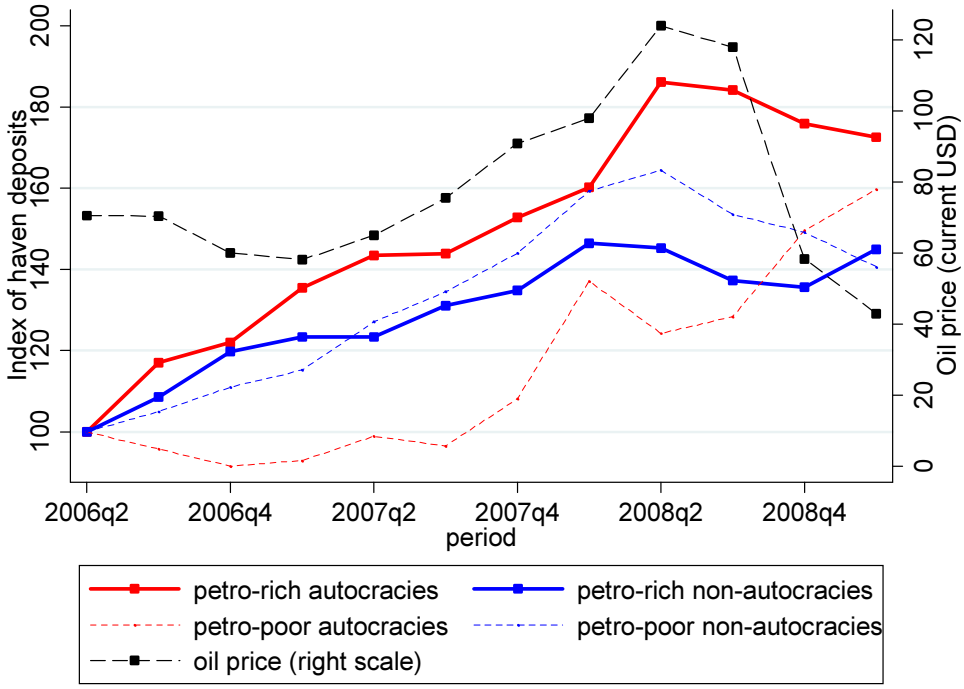
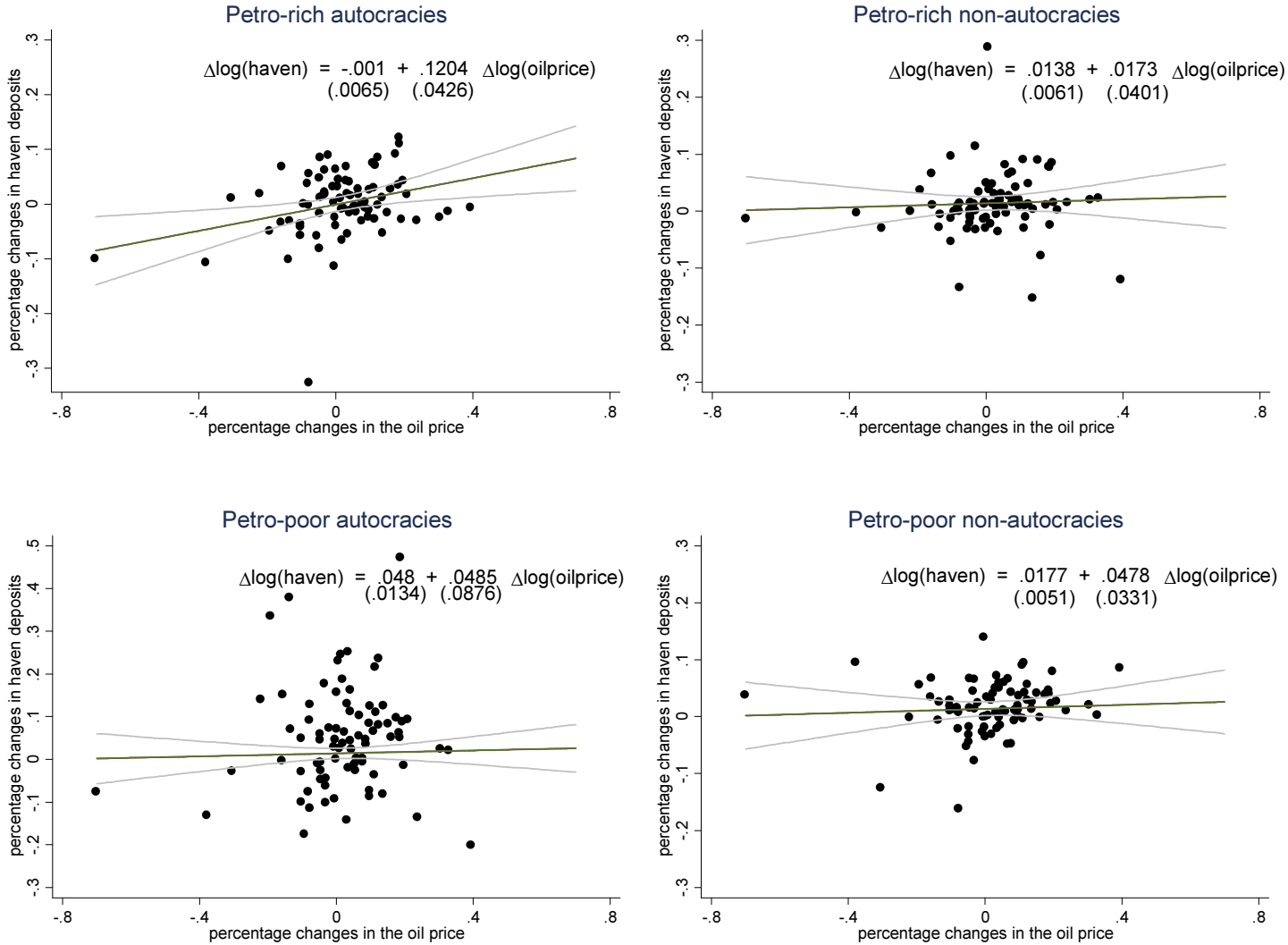


Figure 1b: Haven deposits during the 2007-09 oil boom and bust



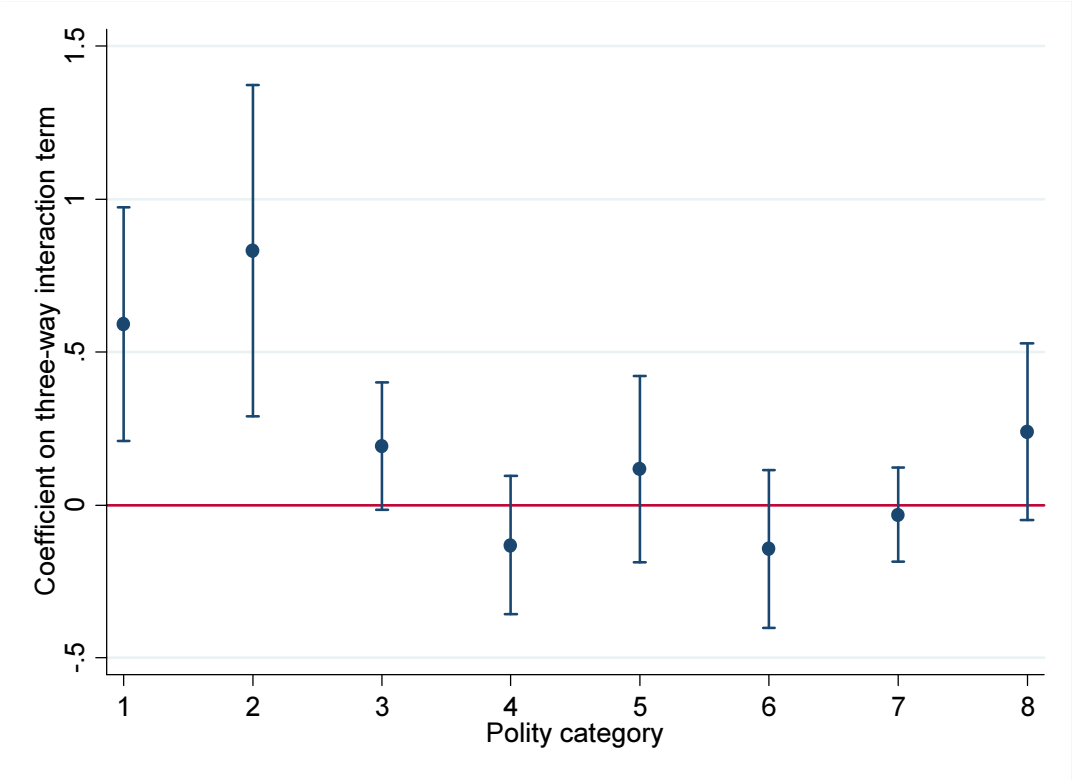
Note: The figures show the trends in haven deposits for country groups with different political regimes and petroleum endowments over two narrow time windows with large variation in the oil price: the 1979 oil boom and the 2007-2009 oil boom and bust. Countries are defined as autocracies if the polity score at the beginning of the time window is -5 or smaller and as non-autocracies otherwise. Countries are defined as petro-rich if the average ratio of petroleum rents to GDP over the entire sample period exceeds 5%, and as petro-poor otherwise. The sample excludes observations where the deposit owner is a haven. The index of haven deposits is calculated by normalizing bank deposits in havens to 1 at the beginning of the time window for each country and taking simple averages of these indexes across countries within each country group. The oil price is the average quarterly spot price of West Texas Intermediate.

Figure 2: Oil price changes and changes in haven deposits



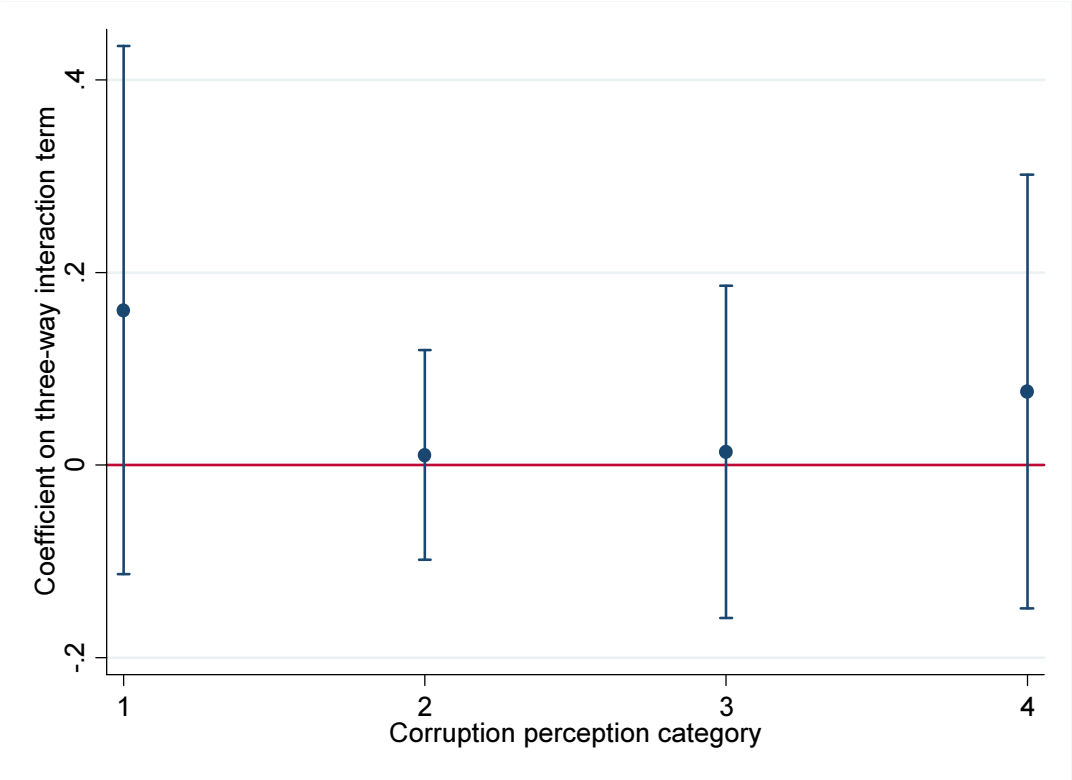
Note: The figure shows the correlation between oil price changes and changes in haven deposits for country groups with different political regimes and petroleum endowments over the period 1990q1-2010q3. The sample excludes observations where the deposit owner is a haven. Countries are defined as autocracies if the polity score is -5 or smaller and as non-autocracies otherwise. Countries are defined as petro-rich if the average ratio of petroleum rents to GDP over the entire sample period exceeds 5%, and as petro-poor otherwise. Variables: *haven* is the stock of bank deposits in havens; *oil price* is the average quarterly spot price of West Texas Intermediate. The operator log indicates the natural logarithm. The operator Δ indicates the first difference.

Figure 3: Narrow institutional categories



Note: This graph plots point estimates and confidence intervals for three-way interactions between polity category, a dummy for petroleum richness and Δlog(oil prices). The sample period is 1978q1-2010q3 and observations are at the country-quarter level. The polity categories are constructed such that each category has at least as many observations of petroleum-rich countries as the most autocratic category. The polity categories are defined as follows: "1" if polity=-10; "2" if polity = -9; "3" if polity=-8 or -7; "4" if polity=-6 or -5; "5" if polity=-3 or -4; "6" if polity≥-2 and polity≤4; "7" if polity≥5 and polity≤8; "8" if polity = 9 or 10. Countries are defined as petro-rich if the average ratio of petroleum rents to GDP over the sample period exceeds 5%, and petro-poor otherwise. Oil price is the average quarterly spot price of West Texas Intermediate. The full regression output is shown in Table A3 of the Online Appendix. The operator log indicates the natural logarithm. The regression includes the usual set of controls (see footnote to Table 4).

Figure 4: Corruption



Note: This graph plots point estimates and confidence intervals for three-way interactions between corruption perception category, a dummy for petroleum richness and Δlog(oil prices). The sample period is 1978q1-2010q3 and observations are at the country-quarter level. The corruption perception categories are constructed based on ICRG corruption scores such that each category has at least as many high-petro intensity observations as the high-corruption category (category 1). Countries are defined as petro-rich if the average ratio of petroleum rents to GDP over the sample period exceeds 5%, and petro-poor otherwise. Oil price is the average quarterly spot price of West Texas Intermediate. The full regression output is shown in Table A6 of the Online Appendix. The operator log indicates the natural logarithm. The regression includes the usual set of controls (see footnote to Table 4).

Table 1: Descriptive Statistics

	All observations				Autocracies			Non-autocracies		
Variable name	Mean	SD	Obs	N of countries	Mean	SD	Obs	Mean	SD	Obs
Deposit variables, non-haven sample										
Δlog(haven)	0.038	0.410	17810	170	0.045	0.456	5595	0.036	0.357	10785
Δlog(nonhaven)	0.028	0.302	18825	170	0.033	0.303	6130	0.025	0.260	11090
Δlog(haven / nonhaven)	0.011	0.518	17651	170	0.015	0.551	5549	0.010	0.465	10745
Price variables (here and thereafter, non-haven sample)										
Δlog(oil price)	0.012	0.144	22401	171						
Δlog(copper price)	0.014	0.125	22401	171						
Δlog(aluminum price)	0.004	0.101	22401	171						
Δlog(all minerals price index)	0.006	0.077	22401	171						
Δlog(non-fuel non-mineral commodity price index)	0.004	0.072	18502	142						
Regime variables										
Polity	0.927	7.263	18042	153	-7.415	1.359	6554	5.686	4.410	11488
Party composition of legislature	1.506	0.762	17491	151	0.884	0.771	6096	1.877	0.459	10455
De jure legal parties	1.685	0.647	17491	151	1.207	0.826	6096	1.956	0.281	10455
De facto existing parties	1.680	0.629	17491	151	1.188	0.784	6096	1.971	0.222	10455
Mode of executive selection	1.140	0.784	17491	151	0.770	0.896	6096	1.374	0.618	10455
Resource intensities										
Petro rents to GDP	0.083	0.176	20064	152	0.151	0.233	6047	0.045	0.097	11253
Copper rents to GDP	0.007	0.021	8052	61	0.008	0.019	1931	0.007	0.022	5836
Aluminum rents to GDP	0.009	0.023	4224	32	0.014	0.028	900	0.007	0.021	3211
All mineral rents to GDP	0.010	0.026	13860	105	0.009	0.020	4035	0.011	0.028	8988
Non-fuel_non-mineral commodity exports to GDP	0.030	0.035	19219	146	0.028	0.032	5692	0.030	0.032	11139
Political risk variables, dummy										
All elections	0.069	0.253	19471	150	0.050	0.219	6407	0.087	0.282	11204
On-time elections	0.040	0.197	20052	155	0.030	0.170	6550	0.052	0.223	11448
Successful coups	0.004	0.066	18299	153	0.007	0.084	6552	0.003	0.052	11483
Covariates										
exchange rate effect	0.000	0.026	17654	166	0.000	0.025	5446	0.000	0.025	10762
Δlog(GDP)	0.064	0.154	17977	159	0.062	0.166	5351	0.066	0.148	11102
Δhigh inflation	-0.010	0.234	21888	171	-0.012	0.282	6219	-0.009	0.218	11318
Δcapital account openness	0.027	0.376	16099	147	-0.005	0.319	5086	0.043	0.388	10436
Δliquid liabilities	0.861	4.639	13481	144	0.799	5.124	3418	0.869	4.394	9635
Δtax	0.028	1.674	5618	121	0.033	1.706	927	0.028	1.670	4600

Note: *haven* is the stock of bank deposits in havens; *non-haven* is the stock of bank deposits in non-havens; *oil price* is the average quarterly spot price of West Texas Intermediate; *copper price* and *aluminium price* are quarterly prices of copper and aliminium based on monthly data from GEM Commodities, WB; *Δlog(all mineral price index)* is a weighted sum of change in log of mineral prices, with weights given by the average rent share of respective mineral in GDP of country i, minerals included are: aluminium (bauxite), copper, gold, lead, nickel, phosphate, tin, zinc and silver; mineral prices are also from GEM Commodities, WB; *Δlog(non-fuel non-mineral commodity price index)* is a weighted sum of change in log of commodity prices, with weights given by the average share of respective commodity in exports of each country, non-fuel commodities include bananas, barley, beef, chicken, cocoa, coconut oil, coffee, corn, cotton, fish, fishmeal, groundnuts, hard log, hard sawnwood, hides, lamb, lead, rubber, olive oil, orange, palm oil, pork, rapeseed oil, rice, shrimp, soft log, soft sawnwood, soybean meal, soybean oil, soybeans, sugar, sunflower oil, tea, uranium, wheat, wool, data is from IMF primary commodity prices dataset (1980-2014) and the IMF International Financial Statistics (1977-1979); *polity* is the quarterly score for the type of political regime ranging between -10 and 10 with -10 being the most autocratic and 10 being the most democratic regime, based on (Marshall, 2013) "polity-case" database (so-called Polity-IVd) and revised by converting the instances of irregular authority scores (such as "interregnum" or "transition") into the conventional polity score range; *party composition of legislature* is a categorical variable with value of 0 if there is no legislature or non-partisan legislature, 1 if legislature only includes regime party, and 2 if legislature has multiple parties; *de jure legal parties* is a categorical variable with value of 0 if all parties legally banned, 1 if a single party is legal, and 2 if multiple parties are legal; *de facto existing parties* is a categorical variable with value of 0 if no parties exist, 1 if a single party exists, and 2 if multiple parties exist; *mode of executive selection* is a categorical variable with the value of 0 if there are no elections for executive, 1 if there executive elections are indirect, and 2 if they are direct; last four variables are of annual frequency and come from Przeworski et al. (2000) and Chebub et al. (2010); *petro rents to GDP, copper rents to GDP, aliminium rents to GDP and all mineral rents to GDP* are all ratios of respective commodity rents to GDP calculated based on Adjusted Net Savings dataset, WDI, WB; *non-fuel_non-mineral commodity exports to GDP* are based on Spatafora and Tytell (2009), primary commodity prices dataset (1980-2014) and International Financial Statistics (1977-1979), IMF; *all elections* is a dummy variable equal to 1 in quarters with direct elections of a national executive or a national legislative body, and zero otherwise; *on-time elections* is a dummy variable equal to 1 in quarters with elections that were planned and on time, two last variables are based on NELDA dataset (Hyde and Marinov, 2012); *successful coups* is a dummy variable equal to 1 in quarters with at least one successful coup détat event, based on Marshall and Marshall (2013); *exchange rate effect* is the percentage change in haven deposits caused by exchange rate changes computed on the basis of currency-specific stocks of deposits from BIS Locational banking Statistics, *GDP* is the gross domestic product, from WDI, WB; *high inflation* is a dummy indicating that inflation exceeds 40%, from WDI, WB; *capital account openness* is the index of de jure capital account openness developed by Chinn and Ito (2008); *liquid liabilities* is the liquid liabilities of the domestic banking sector as a share of GDP from International Financial Statistics, IMF; *tax* is total tax revenue as a share of GDP, from WDI, WB. The operator log indicates the natural logarithm. The operator Δ indicates the first difference except that variables at an annual frequency are differenced over 4 quarters.

Table 2. Cross-border deposits by petroleum production and political regime

	(1)	(2)	(3)	(4)	(5)	(6)
	Share of world cross-border deposits			Cross-border deposits as share of GDP		
	All deposits	Deposits in havens	Deposits in non-havens	All deposits	Deposits in havens	Deposits in non-havens
Havens	18.4%	17.1%	19.6%	29.6%	11.1%	18.5%
Petroleum-rich						
- autocracies	6.0%	6.6%	5.3%	13.2%	7.0%	6.2%
- non-autocracies	3.1%	2.1%	4.0%	7.9%	1.8%	6.1%
Petroleum-poor						
- autocracies	0.8%	1.0%	0.7%	1.0%	0.5%	0.5%
- non-autocracies	71.6%	73.2%	70.4%	4.6%	1.9%	2.7%
World	100.0%	100.0%	100.0%	5.5%	2.3%	3.2%

Note: Countries are defined as autocracies if the average polity score over the sample period is -5 or smaller and as non-autocracies otherwise. Countries are defined as petro-rich if the average ratio of petroleum rents to GDP over the sample period exceeds 5%, and as petro-poor otherwise. The sample is restricted to countries where information on deposits and regime type is available for the entire period 1977q4-2010q3. The figures are obtained by first computing the relevant ratio within a given country group in each year and then averaging these ratios over the sample period.

Table 3: Basic relation between the oil price and haven deposits

	(1)	(2)	(3)	(4)
	Dependent variable: Δlog(haven)			
	Autocracies		Non-autocracies	
	Petroleum rich	Petroleum poor	Petroleum rich	Petroleum poor
Δlog(oilprice)	0.08**	-0.13*	0.01	0.01
	(0.03)	(0.07)	(0.05)	(0.02)
Constant	0.02***	0.03***	0.02***	0.02***
	(0.00)	(0.00)	(0.00)	(0.00)
Observations	2,226	2,713	2,137	8,151
R-squared	0.01	0.00	0.00	0.01
Exchange rate control	YES	YES	YES	YES
Time dummies	NO	NO	NO	NO
Covariates	NO	NO	NO	NO

Note: The table shows results from OLS regressions for the period 1978q1-2010q3 with observations at the country-quarter level. The sample always excludes observations where the deposit owner is a haven. Countries are defined as autocracies if the polity score is -5 or smaller, and as non-autocracies otherwise. Countries are defined as petro-rich if the average ratio of petroleum rents to GDP over the sample period exceeds 5%, and as petro-poor otherwise. The sample is restricted to observations where the deposit owner is an autocracy in Columns (1) and (2), and observations where the deposit owner is a non-autocracy in Columns (3) and (4). Variables: *haven* is the stock of bank deposits in havens; *oil price* is the average quarterly spot price of West Texas Intermediate. The regressions control for the mechanical exchange rate effect reflecting the percentage change in haven deposits caused by exchange rate changes (not reported). The operator log indicates the natural logarithm. The operator Δ indicates the first difference except that variables at an annual frequency are differenced over 4 quarters. Robust standard errors clustered at the country level are reported in parenthesis. Significance levels are indicated with: *** p<0.01; ** p<0.05; and * p<0.1.

Table 4: Core results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Dependent variable: Δlog(haven)						**Dependent variable: Δlog(haven/nonhaven)**					
	Petro intensity: dummy for rents > 5% of GDP			Petro intensity: rents / GDP			Petro intensity: dummy for rents > 5% of GDP			Petro intensity: rents / GDP		
	Autocracies	Non-autocracies	All	Autocracies	Non-autocracies	All	Autocracies	Non-autocracies	All	Autocracies	Non-autocracies	All
petro intensity	-0.00	-0.00		-0.00	-0.02		-0.00	-0.00		-0.01	-0.02	
	(0.01)	(0.00)		(0.01)	(0.01)		(0.01)	(0.01)		(0.02)	(0.01)	
petro intensity × Δlog(oilprice)	0.22**	0.01		0.37**	0.15		0.24**	0.03		0.39**	0.11	
	(0.09)	(0.05)		(0.18)	(0.18)		(0.10)	(0.07)		(0.19)	(0.23)	
petro intensity × autocracy × Δlog(oilprice)			0.20**			0.32*			0.21**			0.31*
			(0.08)			(0.16)			(0.09)			(0.17)
petro intensity × nonautocracy × Δlog(oilprice)			0.01			0.16			0.03			0.12
			(0.05)			(0.18)			(0.07)			(0.23)
nonautocracy × Δlog(oilprice)			0.14*			0.10			0.21**			0.17**
			(0.08)			(0.07)			(0.09)			(0.08)
nonautocracy			-0.00			0.00			-0.00			-0.00
			(0.01)			(0.01)			(0.01)			(0.01)
petro intensity × autocracy			-0.00			-0.00			-0.00			-0.01
			(0.01)			(0.01)			(0.01)			(0.02)
petro intensity × nonautocracy			-0.00			-0.02			-0.00			-0.02
			(0.00)			(0.01)			(0.00)			(0.01)
Observations	4,939	10,288	15,227	4,939	10,288	15,227	4,895	10,249	15,144	4,895	10,249	15,144
R-squared	0.04	0.03	0.02	0.04	0.03	0.02	0.04	0.02	0.02	0.04	0.02	0.02
Exchange rate control	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Time dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Covariates	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
F-test: petro intensity × autocracy × Δlog(oilprice) = petro intensity × nonautocracy × Δlog(oilprice)			0.0407			0.487			0.120			0.511

Note: The table shows results from OLS regressions for the period 1978q1-2010q3 with observations at the country-quarter level. The sample always excludes observations where the deposit owner is a haven. Countries are defined as autocracies if the polity score is -5 or smaller, and as non-autocracies otherwise. The sample is restricted to observations where the deposit owner is an autocracy in Columns (1), (4), (7) and (10) and observations where the deposit owner is a non-autocracy in Columns (2), (5), (8) and (11). Variables: *haven* is the stock of bank deposits in havens; *petro intensity* is the average ratio of petroleum rents to GDP over the sample period in Columns (4)-(6) and (10)-(12) and a dummy indicating whether this ratio exceeds 5% in Columns (1)-(3) and (7)-(9); *oil price* is the average quarterly spot price of West Texas Intermediate; *autocracy* is a dummy indicating that the composite polity score is -5 or smaller; *nonautocracy* is a dummy indicating that the composite polity score is -4 or larger. The regressions control for the mechanical exchange rate effect, log-changes in the gross domestic product; changes in the index of capital account openness; changes in the liquid liabilities of the domestic banking sector as a share of GDP; changes in a dummy indicating that inflation exceeds 40%; changes in total tax revenue as a share of GDP (not reported). Missing values of the control variables are replaced with zeroes; dummies indicating replacement with zero are included in the regression (not reported). The operator log indicates the natural logarithm. The operator Δ indicates the first difference except that variables at an annual frequency are differenced over 4 quarters. Robust standard errors clustered at the country level are reported in parenthesis. Significance levels are indicated with: *** p<0.01; ** p<0.05; and * p<0.1.

Table 5: Objective measures of political institutions

	(1)	(2)	(3)	(4)
		Dependent variable Δlog(haven)		
	Legislative parties	De jure parties	De facto parties	Executive selection
	0 = No, or non-partisan legislature; 1 = Legislature with regime party; 2 = Legislature with multiple parties	0 = All parties legally banned; 1 = Single party legal; 2 = Multiple parties legal	0 = No parties exist; 1 = Single party exists; 2 = Multiple parties exist	0 = No elections; 1 = Indirect election; 2 = Direct election
Petro intensity x Institution = 0 x Δlog(oilprice)	0.23*	0.39**	0.52***	0.22**
	(0.13)	(0.15)	(0.20)	(0.10)
Petro intensity x Institution = 1 x Δlog(oilprice)	0.08	0.13	0.17	0.17
	(0.14)	(0.24)	(0.15)	(0.10)
Petro intensity x Institution = 2 x Δlog(oilprice)	0.07	0.05	0.04	-0.01
	(0.05)	(0.04)	(0.04)	(0.05)
Institution = 1	0.00	0.03***	0.02	-0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Institution = 2	0.01	0.02***	0.01	0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Petro intensity x Institution = 0	-0.01	0.01	-0.00	-0.02**
	(0.01)	(0.01)	(0.01)	(0.01)
Petro intensity x Institution = 1	-0.01	-0.02**	-0.01	0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Petro intensity x Institution = 2	-0.00	-0.00	-0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.01)
Institution = 1 x Δlog(oilprice)	-0.06	-0.03	0.18	0.08
	(0.16)	(0.22)	(0.22)	(0.11)
Institution = 2 x Δlog(oilprice)	0.09	0.24	0.33	0.12
	(0.13)	(0.15)	(0.20)	(0.11)
Observations	14,259	14,259	14,259	14,259
R-squared	0.02	0.02	0.02	0.02
Exchange rate control	YES	YES	YES	YES
Time dummies	YES	YES	YES	YES
Covariates	YES	YES	YES	YES
F-test: Petro intensity x Institution = 0 x Δlog(oilprice) = Petro intensity x Institution = 2 x Δlog(oilprice)	0.217	0.0266	0.0169	0.0484

Note: The table shows results from OLS regressions for the period 1978q1-2010q3 with observations at the country-quarter level. The sample always excludes observations where the deposit owner is a haven. Columns correspond to different institutional variables based on Przeworski et al. (2000) and Chebub et al. (2010): legislative parties (Column1), de jure parties (Column 2), de facto parties (Column 3), and executive selection (Column 4); each of them has 3 categories explained in the column title. Variables: *haven* is the stock of bank deposits in havens; *petro intensity* is a dummy indicating whether the average ratio of petroleum rents to GDP exceeds 5%; *oilprice* is the average quarterly spot price of West Texas Intermediate. The regressions control for the mechanical exchange rate effect, log-changes in the gross domestic product; changes in the index of capital account openness; changes in the liquid liabilities of the domestic banking sector as a share of GDP; changes in a dummy indicating that inflation exceeds 40%; changes in total tax revenue as a share of GDP (not reported). Missing values of the control variables are replaced with zeroes; dummies indicating replacement with zero are included in the regression (not reported). The operator log indicates the natural logarithm. The operator Δ indicates the first difference except that variables at an annual frequency are differenced over 4 quarters. Robust standard errors clustered at the country level are reported in parenthesis. Significance levels are indicated with: *** p<0.01; ** p<0.05; and * p<0.1.

Table 6: Minerals and commodities

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Dependent variable is Δlog(haven)											
	Copper			Aluminum			All Minerals			Non-fuel, non-mineral commodities		
	Autocracies	Non-autocracies	All regimes	Autocracies	Non-autocracies	All regimes	Autocracies	Non-autocracies	All regimes	Autocracies	Non-autocracies	All regimes
Δlog(commodity price)							-0.01	-0.06		0.19	-0.10	
							(0.09)	(0.05)		(0.12)	(0.07)	
commodity intensity	-0.00	0.00		-0.04	0.01		-0.01	0.01		-0.02***	0.01	
	(0.01)	(0.01)		(0.03)	(0.01)		(0.01)	(0.01)		(0.01)	(0.00)	
commodity intensity × Δlog(commodity price)	0.51**	0.12		-0.28	-0.05		0.05	-0.03		-0.25	0.04	
	(0.21)	(0.21)		(0.56)	(0.11)		(0.22)	(0.19)		(0.18)	(0.13)	
comm. intensity × autocracy × Δlog(comm. price)			0.50**			-0.17			0.06			-0.18
			(0.23)			(0.47)			(0.22)			(0.17)
comm. intensity × nonautocracy × Δlog(comm. price)			0.12			-0.03			-0.03			0.02
			(0.21)			(0.12)			(0.18)			(0.13)
nonautocracy			0.00			-0.02*			0.00			-0.00
			(0.01)			(0.01)			(0.00)			(0.00)
Δlog(commodity price) × autocracy									0.00			0.15
									(0.07)			(0.10)
Δlog(commodity price) × nonautocracy			0.01			-0.20			-0.07			-0.08
			(0.08)			(0.18)			(0.05)			(0.07)
comm. intensity × autocracy			-0.01			-0.03			-0.01			-0.02**
			(0.01)			(0.03)			(0.01)			(0.01)
comm. intensity × nonautocracy			0.01			0.00			0.01**			0.01
			(0.01)			(0.01)			(0.01)			(0.00)
Observations	1,693	5,478	7,171	749	3,013	3,762	4,939	10,288	15,227	4,492	10,143	14,635
R-squared	0.07	0.04	0.03	0.14	0.07	0.06	0.04	0.03	0.02	0.04	0.03	0.02
Exchange rate control	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Time dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Covariates	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
F-test: comm.intensity × autocracy × Δlog(comm.price) = comm.intensity × nonautocracy × Δlog(comm.price)			0.232			0.797			0.745			0.342

Note: The table shows results from OLS regressions for the period 1978q1-2010q3 with observations at the country-quarter level. The sample always excludes observations where the deposit owner is a haven. Countries are defined as autocracies if the polity score is -5 or smaller, and as non-autocracies otherwise. The sample is restricted to observations where the deposit owner is an autocracy in Columns (1), (4), (7) and (10), and observations where the deposit owner is a non-autocracy in Columns (2), (5), (8) and (11). Minerals include aluminium (bauxite), copper, gold, lead, nickel, phosphate, tin, zinc and silver. Non-fuel commodities include bananas, barley, beef, chicken, cocoa, coconut oil, coffee, corn, cotton, fish, fishmeal, groundnuts, hard log, hard sawnwood, hides, lamb, lead, rubber, olive oil, orange, palm oil, pork, rapeseed oil, rice, shrimp, soft log, soft sawnwood, soybean meal, soybean oil, soybeans, sugar, sunflower oil, tea, uranium, wheat and wool. Variables: *haven* is the stock of bank deposits in havens; *commodity intensity* for columns (1) – (9) is the dummy indicating whether the average ratio of commodity (group of commodities) rents to GDP over the sample period exceeds 5%, while for columns (10)-(12) it is a dummy indicating whether the average ratio of export value of non-fuel non-mineral commodities to GDP over the sample period exceeds 5%; *commodity price* for copper and aluminum are quarterly prices based on data from GEM Commodities, WB; *Δlog(all mineral price index)* is a weighted sum of change in log of mineral prices, with weights given by the average rent shares of minerals in country's GDP, mineral prices are from GEM Commodities, WB; *Δlog(non-fuel non-mineral commodity price index)* is a weighted sum of change in log of commodity prices, with weights given by the average share of respective commodity in exports of country i, data is from IMF; autocracy is a dummy indicating that the composite polity score is -5 or smaller; nonautocracy is a dummy indicating that the composite polity score is -4 or larger. The regressions control for the mechanical exchange rate effect, log-changes in the gross domestic product; changes in the index of capital account openness; changes in the liquid liabilities of the domestic banking sector as a share of GDP; changes in a dummy indicating that inflation exceeds 40%; changes in total tax revenue as a share of GDP (not reported). Missing values of the mineral prices, mineral rents and control variables are replaced with zeroes; dummies indicating replacement with zero are included in the regression (not reported). The operator log indicates the natural logarithm. The operator Δ indicates the first difference except that variables at an annual frequency are differenced over 4 quarters. Robust standard errors clustered at the country level are reported in parenthesis. Significance levels are indicated with: *** p<0.01; ** p<0.05; and * p<0.1.

Table 7: Elections

	(1)	(2)	(3)	(4)	(5)	(6)
			Dependent variable is Δlog(haven)			
		Petroleum rich			**Petroleum poor**	
	Autocracies	Non-autocracies	All	Autocracies	Non-autocracies	All
PANEL A:						
All elections						
pre-election	0.02**	0.01		0.01	0.01*	
	(0.01)	(0.01)		(0.02)	(0.01)	
pre-election × nonautocracy			0.00			0.01*
			(0.01)			(0.01)
pre-election × autocracy			0.03**			0.02
			(0.01)			(0.02)
election	0.03	-0.00	0.01	-0.04	-0.01	-0.01
	(0.02)	(0.02)	(0.02)	(0.04)	(0.01)	(0.01)
post-election	0.00	0.01	0.00	-0.02	-0.01	-0.01
	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)	(0.01)
autocracy			-0.00			-0.00
			(0.01)			(0.01)
Observations	2,226	2,137	4,363	2,660	7,964	10,624
R-squared	0.08	0.08	0.04	0.07	0.03	0.03
F-test: pre-election x nonautocracy= pre-election x autocracy			0.142			0.704
PANEL B:						
On-time elections						
pre-election	0.04**	-0.00		0.04	0.02**	
	(0.01)	(0.02)		(0.02)	(0.01)	
pre-election × nonautocracy			-0.00			0.02**
			(0.02)			(0.01)
pre-election × autocracy			0.04**			0.05*
			(0.02)			(0.03)
election	0.02	0.00	0.01	-0.08	-0.00	-0.01
	(0.03)	(0.03)	(0.02)	(0.06)	(0.01)	(0.01)
post-election	-0.01	-0.01	-0.01	-0.03	-0.01	-0.01
	(0.02)	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)
autocracy			-0.00			-0.00
			(0.01)			(0.01)
Observations	2,226	2,137	4,363	2,660	7,964	10,624
R-squared	0.08	0.08	0.04	0.07	0.03	0.03
F-test: pre-election x nonautocracy= pre-election x autocracy			0.0708			0.275
Exchange rate control	YES	YES	YES	YES	YES	YES
Time dummies	YES	YES	YES	YES	YES	YES
Covariates	YES	YES	YES	YES	YES	YES

Note: The table shows results from OLS regressions for the period 1978q1-2010q3 with observations at the country-quarter level. The sample always excludes observations where the deposit owner is a haven. Countries are defined as autocracies if the polity score is -5 or smaller and as non-autocracies otherwise. Countries are defined as petro-rich if the average ratio of petroleum rents to GDP over the sample period exceeds 5%, and as petro-poor otherwise. The sample only is restricted to observations where the deposit owner is an autocracy in Columns (1) and (4) and observations where the deposit owner is a non-autocracy in Columns (2) and (5). Variables: *haven* is the stock of bank deposits in havens; *autocracy* is a dummy indicating that the composite polity score is -5 or smaller; *nonautocracy* is a dummy indicating that the composite polity score is -4 or larger. For Panel A: *pre-election* is a dummy equal to 1 if there are direct elections of a national executive or a national legislative body in at least one of the three subsequent quarters, and zero otherwise; *election* is a dummy equal to 1 if there are such elections in the current quarter, and zero otherwise; *post-election* is a dummy equal to 1 if there are such elections in at least one of the three preceding quarters, and zero otherwise. For Panel B: *pre-election* is a dummy equal to 1 if there are planned and on-time elections in at least one of the three subsequent quarters, and zero otherwise; *election* is a dummy equal to 1 if there are such elections in the current quarter, and zero otherwise; *post-election* is a dummy equal to 1 if there are such elections in at least one of the three preceding quarters, and zero otherwise. The regressions control for the mechanical exchange rate effect, log-changes in the gross domestic product; changes in the index of capital account openness; changes in the liquid liabilities of the domestic banking sector as a share of GDP; changes in a dummy indicating that inflation exceeds 40%; changes in total tax revenue as a share of GDP (not reported). Missing values of the control variables are replaced with zeroes; dummies indicating replacement with zero are included in the regression (not reported). The operator log indicates the natural logarithm. The operator Δ indicates the first difference except that variables at an annual frequency are differenced over 4 quarters. Robust standard errors clustered at the country level are reported in parenthesis. Significance levels are indicated with: *** p<0.01; ** p<0.05; and * p<0.1.

Table 8: Coups

	(1)	(2)	(3)
	Dependent variable: dlog(haven)		
	Petroleum rich	Petroleum poor	All oil intensities
	All regimes	All regimes	All regimes
pre-coup	0.08**	-0.00	
	(0.03)	(0.03)	
coup	0.02	-0.07*	-0.05
	(0.12)	(0.04)	(0.04)
post-coup	-0.03	0.04	0.03
	(0.05)	(0.04)	(0.04)
pre-coup x petro-rich			0.07**
			(0.03)
pre-coup x petro-poor			-0.00
			(0.03)
Observations	4,237	10,420	14,657
R-squared	0.04	0.03	0.02
Exchange rate control	YES	YES	YES
Time dummies	YES	YES	YES
Covariates	YES	YES	YES
F-test: pre-coup x petro rich= pre-coup x petro poor			0.125

Note: The table shows results from OLS regressions for the period 1978q1-2010q3 with observations at the country-quarter level. The sample always excludes observations where the deposit owner is a haven. Countries are defined as petro-rich if the average ratio of petroleum rents to GDP over the sample period exceeds 5%, and as petro-poor otherwise. Variables: *haven* is the stock of bank deposits in havens; *pre-coup* is a dummy variable equal to 1 if there is at least one successful coup d état event in the three subsequent quarters; *coup* is a dummy variable equal to 1 in quarters with at least one successful coup d état event; *post-coup* is a dummy variable equal to 1 if there is at least one successful coup d état event in three preceding quarters; The regressions control for the mechanical exchange rate effect, log-changes in the gross domestic product; changes in the index of capital account openness; changes in the liquid liabilities of the domestic banking sector as a share of GDP; changes in a dummy indicating that inflation exceeds 40%; changes in total tax revenue as a share of GDP (not reported). Missing values of the control variables are replaced with zeroes; dummies indicating replacement with zero are included in the regression (not reported). The operator log indicates the natural logarithm. The operator Δ indicates the first difference except that variables at an annual frequency are differenced over 4 quarters. Robust standard errors clustered at the country level are reported in parenthesis. Significance levels are indicated with: *** p<0.01; ** p<0.05; and * p<0.1.

Table 9: Indirectly held deposits

	(1)	(2)	(3)
	Dependent variable: Δlog(deposits)		
	Havens	Havens	Havens
Δlog(oilprice)	0.12***		
	(0.02)		
deposit share of petro-rich autocracies		0.02	-0.02
		(0.03)	(0.05)
deposit share of petro-rich autocracies x Δlog(oilprice)		0.75**	1.93***
		(0.36)	(0.58)
deposit share of petro-rich non-autocracies			0.08
			(0.06)
deposit share of petro-rich non-autocracies x Δlog(oilprice)			-1.78***
			(0.49)
deposit share of petro-poor autocracies			0.08
			(0.16)
deposit share of petro-poor autocracies x Δlog(oilprice)			1.80
			(2.01)
Observations	19,226	19,226	19,226
R-squared	0.00	0.02	0.02
Time dummies	NO	YES	YES
F-test: deposit share of petro-rich autocracies x Δlog(oilprice) = deposit share of petro-rich non-autocracies x Δlog(oilprice)			0.0003

Note: The table shows results from OLS regressions for the period 1978q1-2010q3. Observations are at the "owner country" - "bank country" - "quarter" level. The sample is restricted to observations where the "owner country" is a haven. There are observations for eight "bank countries": Austria, Belgium, Switzerland, Guernsey, Isle of Man, Jersey, Cayman Islands, Luxembourg. Variables: *deposits* is the stock of bank deposits; *oil price* is the average quarterly spot price of West Texas Intermediate; *deposit share of petro-rich autocracies* is the share of deposits in the "bank country" directly owned by petro-rich non-haven autocracies; *deposit share of petro-poor autocracies, deposit share of petro-rich non-autocracies* and *deposit share of petro-poor non-autocracies* are defined analogously. Countries are defined as autocracies if the polity score is -5 or smaller and as non-autocracies otherwise. Countries are defined as petro-rich if the average ratio of petroleum rents to GDP over the sample period exceeds 5%, and as petro-poor otherwise. The operator log indicates the natural logarithm. The operator Δ indicates the first difference except that variables at an annual frequency are differenced over 4 quarters. Robust standard errors clustered at the country-recipient haven level are reported in parenthesis. Significance levels are indicated with: *** p<0.01; ** p<0.05; and * p<0.1.

Online Appendix for

Petro Rents, Political Institutions, and Hidden Wealth:
Evidence from Offshore Bank Accounts

Contents

Table A1: Sample countries with information on regime and petroleum richness

Country	Periods as autocracy	Periods as non-autocracy	Petroleum richness
Afghanistan	1977q4 - 1978q1, 1989q1 - 1992q1, 1996q3 - 2001q3	1978q2 - 1979q3, 1992q2 - 1996q2	Petro poor
Albania	1977q4 - 1990q3	1990q4 - 2010q3	Petro poor
Algeria	1977q4 - 1988q4, 1992q1 - 1995q3	1989q1 - 1991q4, 1995q4 - 2010q3	Petro rich
Angola	1977q4 - 1991q2	1991q3 - 2010q3	Petro rich
Argentina	1977q4 - 1983q3	1983q4 - 2010q3	Petro rich
Armenia	1996q3 - 1997q4	1991q3 - 1996q2, 1998q1 - 2010q3	Petro poor
Australia		1977q4 - 2010q3	Petro poor
Azerbaijan	1995q4 - 2010q3	1991q3 - 1995q3	Petro rich
Bangladesh	1977q4 - 1978q3, 1982q1 - 1991q2, 2007q1 - 2008q4	1978q4 - 1981q4, 1991q3 - 2006q4, 2009q1 - 2010q3	Petro poor
Belarus	1996q4 - 2010q3	1991q3 - 1996q3	Petro poor
Benin	1977q4 - 1989q4	1990q1 - 2010q3	Petro poor
Bhutan	1977q4 - 2008q1	2008q2 - 2010q3	Petro poor
Bolivia	1977q4 - 1978q3, 1980q3 - 1982q3	1978q4 - 1980q2, 1982q4 - 2010q3	Petro rich
Bosnia		1992q2 - 1995q3	Petro poor
Botswana		1977q4 - 2010q3	Petro poor
Brazil		1977q4 - 2010q3	Petro poor
Bulgaria	1977q4 - 1989q4	1990q1 - 2010q3	Petro poor
Burkina Faso	1980q4 - 1997q1	1977q4 - 1980q3, 1997q2 - 2010q3	Petro poor
Burundi	1977q4 - 1992q2, 1996q3 - 1998q1	1992q3 - 1996q2, 1998q2 - 2010q3	Petro poor
Cambodia	1977q4 - 1978q4, 1997q3 - 1998q3	1988q4 - 1997q2, 1998q4 - 2010q3	Petro poor
Cameroon	1977q4 - 1991q4	1992q1 - 2010q3	Petro rich
Canada		1977q4 - 2010q3	Petro poor
Cape Verde		1977q4 - 2010q3	Petro poor
Central African Republic	1977q4 - 1993q2	1993q3 - 2010q3	Petro poor
Chad	1977q4 - 1978q3, 1985q2 - 1991q4	1978q4 - 1985q1, 1992q1 - 2010q3	Petro rich
Chile	1977q4 - 1988q3	1988q4 - 2010q3	Petro poor
China	1977q4 - 2010q3		Petro poor
Colombia		1977q4 - 2010q3	Petro rich
Comoros	1978q4 - 1989q4	1977q4 - 1978q3, 1990q1 - 2010q3	Petro poor
Congo Brazzaville	1977q4 - 1991q1, 1997q4 - 2002q2	1991q2 - 1997q3, 2002q3 - 2010q3	Petro rich
Congo Kinshasa	1977q4 - 1992q3	1992q4 - 2010q3	Petro poor
Croatia	1995q4 - 1999q3	1991q2 - 1995q3, 1999q4 - 2010q3	Petro poor
Cuba	1977q4 - 2010q3		Petro poor
Czech Republic		1993q1 - 2010q3	Petro poor
Czechoslovakia	1977q4 - 1990q1	1990q2 - 1992q4	Petro poor
Denmark		1977q4 - 2010q3	Petro poor
Dominican Rep		1977q4 - 2010q3	Petro poor
Ecuador	1977q4 - 1979q1	1979q2 - 2010q3	Petro rich
Egypt	1977q4 - 2004q4	2005q1 - 2010q3	Petro rich
El Salvador	1977q4 - 1980q1	1980q2 - 2010q3	Petro poor
Equatorial Guinea	1977q4 - 2010q3		Petro rich
Eritrea	1993q2 - 2010q3		Petro poor
Estonia		1991q3 - 2010q3	Petro rich
Ethiopia	1977q4 - 1991q1	1991q2 - 1992q4, 1993q2 - 2010q3	Petro poor
Fiji		1977q4 - 2010q3	Petro poor
Finland		1977q4 - 2010q3	Petro poor
France		1977q4 - 2010q3	Petro poor
Gabon	1977q4 - 1991q1	1991q2 - 2010q3	Petro rich
Gambia	1994q3 - 2010q3	1977q4 - 1994q2	Petro poor
Georgia		1991q2 - 2010q3	Petro poor
Germany		1977q4 - 2010q3	Petro poor
Ghana	1977q4 - 1978q2, 1982q1 - 1991q3	1978q3 - 1981q4, 1991q4 - 2010q3	Petro poor
Greece		1977q4 - 2010q3	Petro poor
Guatemala	1978q1 - 1985q1	1977q4 - 1985q2 - 2010q3	Petro poor
Guinea	1977q4 - 1995q2	1995q3 - 2010q3	Petro poor
Guinea-Bissau	1977q4 - 1994q2	1994q3 - 2010q3	Petro poor
Guyana	1980q4 - 1992q3	1977q4 - 1980q3, 1992q4 - 2010q3	Petro poor
Haiti	1977q4 - 1990q3, 1991q4 - 1994q3	1990q4 - 1991q3, 1994q4 - 2010q3	Petro poor
Honduras		1977q4 - 2010q3	Petro poor
Hungary	1977q4 - 1988q1	1988q2 - 2010q3	Petro poor
India		1977q4 - 2010q3	Petro poor
Indonesia	1977q4 - 1999q3	1999q4 - 2010q3	Petro rich
Iran	1977q4 - 1997q2, 2004q2 - 2010q3	1997q3 - 2004q1	Petro rich
Iraq	1977q4 - 2003q1		Petro rich
Israel		1977q4 - 2010q3	Petro poor
Italy		1977q4 - 2010q3	Petro poor
Japan		1977q4 - 2010q3	Petro poor
Jordan	1977q4 - 1989q3	1989q4 - 2010q3	Petro poor
Kazakhstan	2002q2 - 2010q3	1991q4 - 2002q1	Petro rich
Kenya	1977q4 - 1997q2	1997q3 - 2010q3	Petro poor
Korea South	1977q4 - 1987q1	1987q2 - 2010q3	Petro poor
Kuwait	1977q4 - 1990q1, 1991q2 - 2010q3		Petro rich
Kyrgyzstan		1991q3 - 2010q3	Petro poor

Country	Periods as autocracy	Periods as non-autocracy	Petroleum richness
Laos	1977q4 - 2010q3		Petro poor
Latvia		1991q3 - 2010q3	Petro poor
Lesotho	1977q4 - 1992q4	1993q1 - 2010q3	Petro poor
Libya	1977q4 - 2010q3		Petro rich
Lithuania		1991q3 - 2010q3	Petro poor
Macedonia		1991q3 - 2010q3	Petro poor
Madagascar	1977q4 - 1991q3	1991q4 - 2010q3	Petro poor
Malawi	1977q4 - 1994q1	1994q2 - 2010q3	Petro poor
Malaysia		1977q4 - 2010q3	Petro rich
Mali	1977q4 - 1991q1	1991q2 - 2010q3	Petro poor
Mauritania	1977q4 - 2006q1, 2008q3 - 2009q1	2006q2 - 2008q2, 2009q2 - 2010q3	Petro poor
Mexico		1977q4 - 2010q3	Petro rich
Moldova		1991q3 - 2010q3	Petro poor
Mongolia	1977q4 - 1990q2	1990q3 - 2010q3	Petro poor
Morocco	1977q4 - 2010q3		Petro poor
Mozambique	1977q4 - 1994q3	1994q4 - 2010q3	Petro poor
Namibia		1990q1 - 2010q3	Petro poor
Nepal	1977q4 - 1981q1, 2002q4 - 2006q1	1981q2 - 2002q3, 2006q2 - 2010q3	Petro poor
Netherlands		1977q4 - 2010q3	Petro poor
New Zealand		1977q4 - 2010q3	Petro poor
Nicaragua	1977q4 - 1979q2, 1981q1 - 1983q4	1979q3 - 1980q4, 1984q1 - 2010q3	Petro poor
Niger	1977q4 - 1991q2, 1996q1 - 1999q1	1991q3 - 1995q4, 1999q2 - 2010q3	Petro poor
Nigeria	1977q4 - 1978q3, 1984q1 - 1998q1	1978q4 - 1983q4, 1998q2 - 2010q3	Petro rich
Norway		1977q4 - 2010q3	Petro rich
Oman	1977q4 - 2010q3		Petro rich
Pakistan	1977q4 - 1984q4, 1999q4 - 2006q4	1985q1 - 1999q3, 2007q1 - 2010q3	Petro poor
Papua New Guinea		1977q4 - 2010q3	Petro rich
Paraguay	1977q4 - 1989q1	1989q2 - 2010q3	Petro poor
Peru	1977q4 - 1978q2	1978q3 - 2010q3	Petro poor
Philippines	1977q4 - 1985q4	1986q1 - 2010q3	Petro poor
Poland	1977q4 - 1988q4	1989q1 - 2010q3	Petro poor
Portugal		1977q4 - 2010q3	Petro poor
Qatar	1977q4 - 2010q3		Petro rich
Romania	1977q4 - 1989q3	1989q4 - 2010q3	Petro poor
Russia		1992q1 - 2010q3	Petro rich
Rwanda	1977q4 - 1994q1, 1994q3 - 2000q1	1994q2, 2000q2 - 2010q3	Petro poor
Saudi Arabia	1977q4 - 2010q3		Petro rich
Senegal	1977q4 - 1978q2	1978q3 - 2010q3	Petro poor
Sierra Leone	1977q4 - 1995q4	1996q1 - 2010q3	Petro poor
Slovak Republic		1993q1 - 2010q3	Petro poor
Slovenia		1991q2 - 2010q3	Petro poor
Solomon Islands		1978q3 - 2003q2, 2004q3 - 2010q3	Petro poor
South Africa		1977q4 - 2010q3	Petro poor
Spain		1977q4 - 2010q3	Petro poor
Sri Lanka		1977q4 - 2010q3	Petro poor
Sudan	1977q4 - 1985q1, 1989q3 - 2005q2	1985q2 - 1989q2, 2005q3 - 2010q3	Petro rich
Suriname	1982q1 - 1986q4	1977q4 - 1981q4, 1987q1 - 2010q3	Petro poor
Swaziland	1977q4 - 2010q3		Petro poor
Sweden		1977q4 - 2010q3	Petro poor
Syria	1977q4 - 2010q3		Petro rich
Tajikistan	1992q4 - 1998q3	1991q3 - 1992q3, 1998q4 - 2010q3	Petro poor
Tanzania	1977q4 - 1995q3	1995q4 - 2010q3	Petro poor
Thailand	1977q4 - 2006q3 - 2007q1	1978q1 - 2006q2, 2007q2 - 2010q3	Petro poor
Togo	1977q4 - 1992q2	1992q3 - 2010q3	Petro poor
Trinidad		1977q4 - 2010q3	Petro rich
Tunisia	1977q4 - 1993q2	1993q3 - 2010q3	Petro rich
Turkey	1980q3 - 1983q3	1977q4 - 1980q2, 1983q4 - 2010q3	Petro poor
Turkmenistan	1991q4 - 2010q3		Petro rich
UAE	1977q4 - 2010q3		Petro rich
Uganda	1977q4 - 1978q4, 1986q1 - 1992q4	1980q4 - 1985q4, 1993q1 - 2010q3	Petro poor
Ukraine		1991q4 - 2010q3	Petro poor
United Kingdom		1977q4 - 2010q3	Petro poor
United States		1977q4 - 2010q3	Petro poor
Uruguay	1977q4 - 1984q4	1985q1 - 2010q3	Petro poor
Uzbekistan	1991q3 - 2010q3		Petro rich
Venezuela		1977q4 - 2010q3	Petro rich
Vietnam	1977q4 - 2010q3		Petro rich
Yemen	1977q4 - 1989q4, 1990q2 - 1990q3	1990q4 - 2010q3	Petro rich
Zambia	1977q4 - 1991q3	1991q4 - 2010q3	Petro poor
Zimbabwe	1987q4 - 1999q2	1977q4 - 1987q3, 1999q3 - 2010q3	Petro poor

Note: Countries are defined as autocracies if the polity score is -5 or smaller, and as non-autocracies otherwise. Countries are defined as petro-rich if the average ratio of petroleum rents to GDP over the sample period exceeds 5%, and as petro-poor otherwise.

Table A2: Core oil results controlling for fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Dependent variable: Δlog(haven)						**Dependent variable: Δlog(haven/nonhaven)**					
	Petro intensity: dummy for rents > 5% of GDP			Petro intensity: rents / GDP			Petro intensity: dummy for rents > 5% of GDP			Petro intensity: rents / GDP		
	Autocracies	Non-autocracies	All	Autocracies	Non-autocracies	All	Autocracies	Non-autocracies	All	Autocracies	Non-autocracies	All
petro intensity × Δlog(oilprice)	0.22**	0.01		0.36*	0.15		0.25**	0.03		0.40**	0.11	
	(0.09)	(0.05)		(0.18)	(0.18)		(0.10)	(0.07)		(0.20)	(0.24)	
petro intensity × autocracy × Δlog(oilprice)			0.20**			0.31*			0.21**			0.31*
			(0.08)			(0.16)			(0.09)			(0.18)
petro intensity × nonautocracy × Δlog(oilprice)			0.01			0.16			0.03			0.12
			(0.05)			(0.18)			(0.07)			(0.23)
nonautocracy × Δlog(oilprice)			0.14*			0.10			0.21**			0.17**
			(0.08)			(0.07)			(0.09)			(0.08)
nonautocracy			0.00			-0.00			0.01			0.01
			(0.01)			(0.01)			(0.01)			(0.01)
petro intensity × autocracy			0.00			-0.01			0.01			0.04
			(0.01)			(0.03)			(0.01)			(0.03)
Observations	4,939	10,288	15,227	4,939	10,288	15,227	4,895	10,249	15,144	4,895	10,249	15,144
R-squared	0.04	0.03	0.02	0.04	0.03	0.02	0.04	0.02	0.02	0.04	0.02	0.02
Number of panelid	92	124	142	92	124	142	92	124	142	92	124	142
Exchange rate control	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Time dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Covariates	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
F-test: all fixed effects=0	0.275	0.301	0.281	0.273	0.301	0.281	0.242	0.193	0.181	0.241	0.193	0.180
F-test: petro intensity × autocracy × Δlog(oilprice) = petro intensity × nonautocracy × Δlog(oilprice)			0.0439			0.519			0.110			0.496

Note: The table shows results from OLS regressions for the period 1978q1-2010q3 with observations at the country-quarter level. The sample always excludes observations where the deposit owner is a haven. Countries are defined as autocracies if the polity score is -5 or smaller, and as non-autocracies otherwise. The sample is restricted to observations where the deposit owner is an autocracy in Columns (1), (4), (7) and (10) and observations where the deposit owner is a non-autocracy in Columns (2), (5), (8) and (11). Variables: *haven* is the stock of bank deposits in havens; *petro intensity* is the average ratio of petroleum rents to GDP over the sample period in Columns (4)-(6) and (10)-(12) and a dummy indicating whether this ratio exceeds 5% in Columns (1)-(3) and (7)-(9); *oil price* is the average quarterly spot price of West Texas Intermediate; *autocracy* is a dummy indicating that the composite polity score is -5 or smaller; *nonautocracy* is a dummy indicating that the composite polity score is -4 or larger. The regressions control for the mechanical exchange rate effect, log-changes in the gross domestic product; changes in the index of capital account openness; changes in the liquid liabilities of the domestic banking sector as a share of GDP; changes in a dummy indicating that inflation exceeds 40%; changes in total tax revenue as a share of GDP (not reported). Missing values of the control variables are replaced with zeroes; dummies indicating replacement with zero are included in the regression (not reported). The operator log indicates the natural logarithm. The operator Δ indicates the first difference except that variables at an annual frequency are differenced over 4 quarters. The F-test for joint non-significance of fixed effects is performed based on FE regression with non-clustered standard errors due to unavailability of such test for the regression with clustered standard errors. Robust standard errors clustered at the country level are reported in parenthesis. Significance levels are indicated with: *** p<0.01; ** p<0.05; and * p<0.1.

Table A3: Narrow institutional categories (illustrated in Figure 3).

Dependent variable: Δlog(haven)	
petro rich x polity category 1 x Δlog(oilprice)	0.59***
	(0.19)
petro rich x polity category 2 x Δlog(oilprice)	0.83***
	(0.27)
petro rich x polity category 3 x Δlog(oilprice)	0.19*
	(0.11)
petro rich x polity category 4 x Δlog(oilprice)	-0.13
	(0.11)
petro rich x polity category 5 x Δlog(oilprice)	0.12
	(0.15)
petro rich x polity category 6 x Δlog(oilprice)	-0.14
	(0.13)
petro rich x polity category 7 x Δlog(oilprice)	-0.03
	(0.08)
petro rich x polity category 9 x Δlog(oilprice)	0.24
	(0.15)
petro rich x polity category 1	-0.02
	(0.04)
petro rich x polity category 2	0.00
	(0.01)
petro rich x polity category 3	-0.01
	(0.01)
petro rich x polity category 4	0.00
	(0.01)
petro rich x polity category 5	0.00
	(0.01)
petro rich x polity category 6	0.01
	(0.01)
petro rich x polity category 7	0.00
	(0.01)
petro rich x polity category 8	-0.01***
	(0.00)
polity category 2	-0.01
	(0.04)
polity category 3	-0.01
	(0.04)
polity category 4	-0.01
	(0.04)
polity category 5	-0.02
	(0.04)
polity category 6	-0.02
	(0.04)
polity category 7	-0.01
	(0.04)
polity category 8	-0.01
	(0.04)
polity category 2 x Δlog(oilprice)	-0.35
	(0.31)
polity category 3 x Δlog(oilprice)	0.35
	(0.21)
polity category 4 x Δlog(oilprice)	0.55**
	(0.22)
polity category 5 x Δlog(oilprice)	0.45*
	(0.24)
polity category 6 x Δlog(oilprice)	0.37*
	(0.20)
polity category 7 x Δlog(oilprice)	0.49**
	(0.20)
polity category 8 x Δlog(oilprice)	0.45**
	(0.19)
Observations	15,227
R-squared	0.02
Exchange rate control	YES
time dummies	YES
covariates	YES

Note: The table shows results from a OLS regression for the period 1977q4-2010q2 with observations at the country-quarter level. The sample excludes observations where the deposit owner is a haven. Variables: *haven* is the stock of bank deposits in havens; *petro rich* is the dummy indicating whether the average ratio of petroleum rents to GDP exceeds 5%; *oil price* is the average quarterly spot price of West Texas Intermediate; the *polity categories* are constructed such that each category has at least as many observations of petroleum-rich countries as the most autocratic category (polity score of -10). In particular, *polity category 1* includes countries with polity score of -10, *polity category 2* - countries with polity -9, *polity category 3* - countries with polity -8 and -7, *polity category 4* - countries with polity -6 and -5, *polity category 5* - countries with polity -4 and -3, *polity category 6* - countries with polity -2 to 4, *polity category 7* - countries with polity 5 to 8, and *polity category 8* - countries with polity 9 and 10. The regressions control for the mechanical exchange rate effect, log-changes in the gross domestic product; changes in the index of capital account openness; changes in the liquid liabilities of the domestic banking sector as a share of GDP; changes in a dummy indicating that inflation exceeds 40%; changes in total tax revenue as a share of GDP (not reported). Missing values of the control variables are replaced with zeroes; dummies indicating replacement with zero are included in the regression (not reported). The operator log indicates the natural logarithm. The operator Δ indicates the first difference except that variables at an annual frequency are differenced over 4 quarters. Robust standard errors clustered at the country level are reported in parenthesis. Significance levels are indicated with: *** p<0.01; ** p<0.05; and * p<0.1.

Table A4: Objective measures of political institutions (continuous petroleum intensity)

	(1)	(2)	(3)	(4)
	Dependent variable: Δlog(haven)			
	Legislative parties	De jure parties	De facto parties	Executive selection
	0 = No, or non-partisan legislature; 1 = Legislature with regime party; 2 = Legislature with multiple parties	0 = All parties legally banned; 1 = Single party legal; 2 = Multiple parties legal	0 = No parties exist; 1 = Single party exists; 2 = Multiple parties exist	0 = No elections; 1 = Indirect election; 2 = Direct election
Petro intensity x Institution = 0 x Δlog(oilprice)	0.65**	0.95***	1.33***	0.54**
	(0.29)	(0.33)	(0.46)	(0.24)
Petro intensity x Institution = 1 x Δlog(oilprice)	0.18	0.33	0.26	1.23**
	(0.19)	(0.60)	(0.18)	(0.48)
Petro intensity x Institution = 2 x Δlog(oilprice)	0.26*	0.16*	0.12	0.03
	(0.15)	(0.09)	(0.13)	(0.13)
Institution = 1	0.00	0.03***	0.02	0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Institution = 2	0.01	0.03***	0.01	0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Petro intensity x Institution = 0	-0.01	0.04*	0.00	-0.03*
	(0.02)	(0.02)	(0.03)	(0.02)
Petro intensity x Institution = 1	-0.00	-0.06**	0.00	-0.01
	(0.02)	(0.03)	(0.01)	(0.03)
Petro intensity x Institution = 2	0.00	0.00	-0.01	0.02
	(0.02)	(0.01)	(0.01)	(0.01)
Institution = 1 x Δlog(oilprice)	-0.06	-0.04	0.20	0.06
	(0.14)	(0.21)	(0.20)	(0.10)
Institution = 2 x Δlog(oilprice)	0.10	0.23*	0.33*	0.11
	(0.12)	(0.13)	(0.19)	(0.10)
Observations	14,259	14,259	14,259	14,259
R-squared	0.02	0.02	0.02	0.02
Exchange rate control	YES	YES	YES	YES
Time dummies	YES	YES	YES	YES
Covariates	YES	YES	YES	YES
F-test: Petro intensity x Institution = 0 x Δlog(oilprice) = Petro intensity x Institution = 2 x Δlog(oilprice)	0.218	0.0184	0.0117	0.0577

Note: The table shows results from OLS regressions for the period 1978q1-2010q3 with observations at the country-quarter level. The sample always excludes observations where the deposit owner is a haven. Columns correspond to different institutional variables based on Przeworski et al. (2000) and Chebub et al. (2010): legislative parties (Column1), de jure parties (Column 2), de facto parties (Column 3), and executive selection (Column 4); each of them has 3 categories explained in the column title. Variables: *haven* is the stock of bank deposits in havens; *petro intensity* is the average ratio of petroleum rents to GDP exceeds 5%; *oilprice* is the average quarterly spot price of West Texas Intermediate. The regressions control for the mechanical exchange rate effect, log-changes in the gross domestic product; changes in the index of capital account openness; changes in the liquid liabilities of the domestic banking sector as a share of GDP; changes in a dummy indicating that inflation exceeds 40%; changes in total tax revenue as a share of GDP (not reported). Missing values of the control variables are replaced with zeroes; dummies indicating replacement with zero are included in the regression (not reported). The operator log indicates the natural logarithm. The operator Δ indicates the first difference except that variables at an annual frequency are differenced over 4 quarters. Robust standard errors clustered at the country level are reported in parenthesis. Significance levels are indicated with: *** p<0.01; ** p<0.05; and * p<0.1.

Table A5: Objective measures of political institutions (control for general trend in foreign deposits)

	(1)	(2)	(3)	(4)
	Dependent variable: Δlog(haven/nonhaven)			
	Legislative parties	De jure parties	De facto parties	Executive selection
	0 = No, or non-partisan legislature; 1 = Legislature with regime party; 2 = Legislature with multiple parties	0 = All parties legally banned; 1 = Single party legal; 2 = Multiple parties legal	0 = No parties exist; 1 = Single party exists; 2 = Multiple parties exist	0 = No elections; 1 = Indirect election; 2 = Direct election
Petro intensity x Institution = 0 x Δlog(oilprice)	0.28*	0.41**	0.58**	0.23*
	(0.15)	(0.17)	(0.25)	(0.12)
Petro intensity x Institution = 1 x Δlog(oilprice)	0.04	0.14	0.16	0.22
	(0.15)	(0.25)	(0.16)	(0.17)
Petro intensity x Institution = 2 x Δlog(oilprice)	0.07	0.05	0.05	-0.03
	(0.08)	(0.07)	(0.07)	(0.07)
Institution = 1	-0.01	0.02	0.00	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Institution = 2	-0.00	0.01	-0.01	-0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Petro intensity x Institution = 0	-0.01	0.01	-0.01	-0.02*
	(0.01)	(0.01)	(0.01)	(0.01)
Petro intensity x Institution = 1	-0.01	-0.01	-0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Petro intensity x Institution = 2	-0.00	-0.00	-0.00	-0.01
	(0.01)	(0.00)	(0.00)	(0.00)
Institution = 1 x Δlog(oilprice)	0.03	-0.03	0.23	0.13
	(0.16)	(0.23)	(0.26)	(0.12)
Institution = 2 x Δlog(oilprice)	0.16	0.33**	0.46*	0.20
	(0.15)	(0.16)	(0.24)	(0.13)
Observations	14,176	14,176	14,176	14,176
R-squared	0.02	0.02	0.02	0.02
Exchange rate control	YES	YES	YES	YES
Time dummies	YES	YES	YES	YES
Covariates	YES	YES	YES	YES
F-test: Petro intensity x Institution = 0 x Δlog(oilprice) = Petro intensity x Institution = 2 x Δlog(oilprice)	0.207	0.0430	0.0361	0.0767

Note: The table shows results from OLS regressions for the period 1978q1-2010q3 with observations at the country-quarter level. The sample always excludes observations where the deposit owner is a haven. Columns correspond to different institutional variables based on Przeworski et al. (2000) and Chebub et al. (2010): legislative parties (Column1), de jure parties (Column 2), de facto parties (Column 3), and executive selection (Column 4); each of them has 3 categories explained in the column title. Variables: *haven* is the stock of bank deposits in havens; *non-haven* is the stock of bank deposits in non-havens; *petro intensity* is the average ratio of petroleum rents to GDP exceeds 5%; *oilprice* is the average quarterly spot price of West Texas Intermediate. The regressions control for the mechanical exchange rate effect, log-changes in the gross domestic product; changes in the index of capital account openness; changes in the liquid liabilities of the domestic banking sector as a share of GDP; changes in a dummy indicating that inflation exceeds 40%; changes in total tax revenue as a share of GDP (not reported). Missing values of the control variables are replaced with zeroes; dummies indicating replacement with zero are included in the regression (not reported). The operator log indicates the natural logarithm. The operator Δ indicates the first difference except that variables at an annual frequency are differenced over 4 quarters. Robust standard errors clustered at the country level are reported in parenthesis. Significance levels are indicated with: *** p<0.01; ** p<0.05; and * p<0.1.

Table A6: Corruption (illustrated in Figure 4)

Dependent variable is Δlog(haven)	
petro rich x corruption category 1 x Δlog(oilprice)	0.16
	(0.14)
petro rich x corruption category 2 x Δlog(oilprice)	0.01
	(0.06)
petro rich x corruption category 3 x Δlog(oilprice)	0.01
	(0.09)
petro rich x corruption category 4 x Δlog(oilprice)	0.08
	(0.11)
petro rich x corruption category 1	0.02
	(0.02)
petro rich x corruption category 2	-0.01***
	(0.00)
petro rich x corruption category 3	-0.02**
	(0.01)
petro rich x corruption category 4	-0.01
	(0.01)
corruption category 2	0.01
	(0.01)
corruption category 3	0.01
	(0.01)
corruption category 4	0.01
	(0.01)
corruption category 2 x Δlog(oilprice)	0.14
	(0.09)
corruption category 3 x Δlog(oilprice)	0.15
	(0.12)
corruption category 4 x Δlog(oilprice)	0.05
	(0.10)
Observations	10,864
R-squared	0.03
Exchange rate control	YES
time dummies	YES
covariates	YES

Note: The table shows results from an OLS regression for the period 1977q4-2010q2 with observations at the country-quarter level. The sample excludes observations where the deposit owner is a haven. Variables: *haven* is the stock of bank deposits in havens; *petro rich* is the dummy indicating whether the average ratio of petroleum rents to GDP exceeds 5%; *oil price* is the average quarterly spot price of West Texas Intermediate; the The *corruption categories* are constructed based on ICRG corruption score such that each category has at least as many observations of high-petroleum countries as the high-corruption category (category 1). In particular, *corruption category 1* includes countries with ICRG score in the interval [0,2), *corruption category 2* - countries with ICRG score in the interval [2,3), *corruption category 3* - countries with ICRG score in the interval [3,3.5), and *corruption category 4* - countries with ICRG score in the interval [3.5,6). The regressions control for the mechanical exchange rate effect, log-changes in the gross domestic product; changes in the index of capital account openness; changes in the liquid liabilities of the domestic banking sector as a share of GDP; changes in a dummy indicating that inflation exceeds 40%; changes in total tax revenue as a share of GDP (not reported). Missing values of the control variables are replaced with zeroes; dummies indicating replacement with zero are included in the regression (not reported). The operator log indicates the natural logarithm. The operator Δ indicates the first difference except that variables at an annual frequency are differenced over 4 quarters. Robust standard errors clustered at the country level are reported in parenthesis. Significance levels are indicated with: *** p<0.01; ** p<0.05; and * p<0.1.

Table A7: Descriptive statistics on mineral rents

Mineral type	Number of countries with information	Average number of (annual) observations per country	Average mineral rent, percent of GDP	Number of countries with average mineral rent > 5% of GDP
Aluminium (Bauxite)	35	27	1.08	4
Copper	67	26	0.81	4
Nickel	56	24	0.32	1
Gold	62	30	0.3	1
Phosphate	34	30	0.1	0
Zinc	56	28	0.04	0
Lead	55	27	0.03	0
Tin	37	27	0.04	0
Silver	55	29	0.01	0

Note: The table shows descriptive statistics on mineral rents for the nine major minerals based on Adjusted Net Savings dataset, WDI, WB

Table A8: Successful coup d'etats in petroleum-rich countries

Country	Year	Quarter	Regime
Bolivia	1978	3	Autocracy
Bolivia	1978	4	Non-autocracy
Bolivia	1979	4	Non-autocracy
Bolivia	1980	3	Autocracy
Chad	1982	2	Non-autocracy
Chad	1990	4	Autocracy
Congo, Rep.	1997	4	Autocracy
Equatorial Guinea	1979	3	Autocracy
Nigeria	1983	4	Non-autocracy
Nigeria	1985	3	Autocracy
Nigeria	1993	4	Autocracy
Qatar	1995	2	Autocracy
Sudan	1985	2	Non-autocracy
Sudan	1989	2	Non-autocracy
Tunisia	1987	4	Autocracy

Note: The table shows summary information for succesful coup d'etats in petroleum-rich countries based on Marshall and Marshall (2013). Countries are defined as autocracies if the polity score is -5 or smaller, and as non-autocracy otherwise.

Table A9: Coups with control for general effect on foreign deposits

	(1)	(2)	(3)
	Dependent variable: Δlog(haven/nonhaven)		
	Petroleum rich	Petroleum poor	All oil intensities
	All regimes	All regimes	All regimes
pre-coup	0.10***	0.02	
	(0.03)	(0.04)	
coup	0.05	-0.13**	-0.10**
	(0.14)	(0.06)	(0.05)
post-coup	-0.03	0.07	0.05
	(0.05)	(0.04)	(0.04)
pre-coup x petro-rich			0.09***
			(0.02)
pre-coup x petro-poor			0.02
			(0.04)
Observations	4,235	10,340	14,575
R-squared	0.04	0.02	0.02
Exchange rate control	YES	YES	YES
Time dummies	YES	YES	YES
Covariates	YES	YES	YES
F-test: pre-coup x petro rich= pre-coup x petro poor			0.139

Note: The table shows results from OLS regressions for the period 1978q1-2010q3 with observations at the country-quarter level. The sample always excludes observations where the deposit owner is a haven. Countries are defined as petro-rich if the average ratio of petroleum rents to GDP over the sample period exceeds 5%, and as petro-poor otherwise. Variables: *haven* is the stock of bank deposits in havens; *non-haven* is the stock of bank deposits in non-havens; *pre-coup* is a dummy variable equal to 1 if there is at least one successful coup d état event in the three subsequent quarters; *coup* is a dummy variable equal to 1 in quarters with at least one successful coup d état event; *post-coup* is a dummy variable equal to 1 if there is at least one successful coup d état event in three preceding quarters; The regressions control for the mechanical exchange rate effect, log-changes in the gross domestic product; changes in the index of capital account openness; changes in the liquid liabilities of the domestic banking sector as a share of GDP; changes in a dummy indicating that inflation exceeds 40%; changes in total tax revenue as a share of GDP (not reported). Missing values of the control variables are replaced with zeroes; dummies indicating replacement with zero are included in the regression (not reported). The operator log indicates the natural logarithm. The operator Δ indicates the first difference except that variables at an annual frequency are differenced over 4 quarters. Robust standard errors clustered at the country level are reported in parenthesis. Significance levels are indicated with: *** p<0.01; ** p<0.05; and * p<0.1.

Table A10: Core results excluding country-years with conflict in regions endowed with petroleum

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Dependent variable is Δlog(haven)						**Dependent variable is Δlog(haven/nonhaven)**					
	Petro intensity: dummy for rents > 5% of GDP			Petro intensity: rents / GDP			Petro intensity: dummy for rents > 5% of GDP			Petro intensity: rents / GDP		
	Autocracies	Non-autocracies	All	Autocracies	Non-autocracies	All	Autocracies	Non-autocracies	All	Autocracies	Non-autocracies	All
petro intensity	-0.00	-0.00		0.00	-0.02		-0.01	-0.00		-0.01	-0.02	
	(0.01)	(0.00)		(0.01)	(0.02)		(0.01)	(0.01)		(0.02)	(0.02)	
petro intensity × Δlog(oilprice)	0.21**	0.02		0.39*	0.16		0.23**	0.04		0.44**	0.08	
	(0.10)	(0.05)		(0.21)	(0.19)		(0.11)	(0.08)		(0.22)	(0.27)	
petro intensity × autocracy × Δlog(oilprice)			0.18**			0.31*			0.19*			0.31*
			(0.09)			(0.18)			(0.10)			(0.18)
petro intensity × nonautocracy × Δlog(oilprice)			0.02			0.15			0.04			0.08
			(0.05)			(0.19)			(0.08)			(0.27)
nonautocracy × Δlog(oilprice)			0.14			0.11			0.20**			0.18**
			(0.09)			(0.08)			(0.10)			(0.09)
nonautocracy			0.00			0.00			-0.00			-0.00
			(0.01)			(0.01)			(0.01)			(0.01)
petro intensity × autocracy			-0.00			0.00			-0.01			-0.01
			(0.01)			(0.01)			(0.01)			(0.02)
petro intensity × nonautocracy			-0.00			-0.02			-0.00			-0.01
			(0.00)			(0.02)			(0.01)			(0.02)
Observations	4,353	9,385	13,738	4,353	9,385	13,738	4,325	9,347	13,672	4,325	9,347	13,672
R-squared	0.05	0.03	0.02	0.05	0.03	0.02	0.05	0.02	0.02	0.05	0.02	0.02
Exchange rate control	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Time dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Covariates	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
F-test: petro intensity × autocracy × Δlog(oilprice) = petro intensity × nonautocracy × Δlog(oilprice)			0.0856			0.514			0.218			0.469

Note: The table shows results from OLS regressions for the period 1978q1-2010q3 with observations at the country-quarter level. The sample excludes country-years where/when there are petroleum resources (i.e., oil and gas) located in a conflict zone, since these resources may potentially be looted by rebels/terrorists and deposited (temporarily) in offshore financial centres. Data on hydrocarbon in conflict zones is collected from Buhaug, H., Gates, S., and Lujala, P. (2009). "Geography, Rebel Capability, and the Duration of Civil Conflict," *Journal of Conflict Resolution* (53), pp.544-569. The sample always excludes observations where the deposit owner is a haven. Countries are defined as autocracies if the polity score is -5 or smaller, and as non-autocracies otherwise. The sample is restricted to observations where the deposit owner is an autocracy in Columns (1), (4), (7) and (10) and observations where the deposit owner is a non-autocracy in Columns (2), (5), (8) and (11). Variables: *haven* is the stock of bank deposits in havens; *petro intensity* is the average ratio of petroleum rents to GDP over the sample period in Columns (4)-(6) and (10)-(12) and a dummy indicating whether this ratio exceeds 5% in Columns (1)-(3) and (7)-(9); *oil price* is the average quarterly spot price of West Texas Intermediate; *autocracy* is a dummy indicating that the composite polity score is -5 or smaller; *nonautocracy* is a dummy indicating that the composite polity score is -4 or larger. The regressions control for the mechanical exchange rate effect, log-changes in the gross domestic product; changes in the index of capital account openness; changes in the liquid liabilities of the domestic banking sector as a share of GDP; changes in a dummy indicating that inflation exceeds 40%; changes in total tax revenue as a share of GDP (not reported). Missing values of the control variables are replaced with zeroes; dummies indicating replacement with zero are included in the regression (not reported). The operator log indicates the natural logarithm. The operator Δ indicates the first difference except that variables at an annual frequency are differenced over 4 quarters. Robust standard errors clustered at the country level are reported in parenthesis. Significance levels are indicated with: *** p<0.01; ** p<0.05; and * p<0.1.

Table A11: The short-term elasticity of GDP with respect to oil prices

Dependent variable is Δlog(GDP)	
Δlog(oilprice)	0.10***
	(0.02)
Constant	0.07***
	(0.01)
Observations	1,167
Number of panelid	41
R-squared	0.04

Note: The table shows results from FE regression for the period 1978-2009 with observations at the country-year level. The sample only includes petroleum-rich countries, i.e., countries where the average ratio of petro rents to GDP over the sample period exceeding 5%, and further excludes havens. Variables: *oil price* is the average quarterly spot price of West Texas Intermediate; *gdp* is gross domestic product. The operator log indicates the natural logarithm. The operator Δ indicates the first difference. Robust standard errors clustered at the country level are reported in parenthesis. Significance levels are indicated with: *** p<0.01; ** p<0.05; and * p<0.1.