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Do Natural Resource Revenues Hinder Financial Development? The Role of Political Institutions*

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Abstract

We theoretically and empirically examine the relationship between natural resource revenues and financial development. In the theoretical part, we present a politico-economic model in which contract enforcement is low and decreasing in resource revenues when political institutions are poor, but high otherwise. As poor contract enforcement leads to low financial development, the model predicts that resource revenues hinder financial development in countries with poor political institutions, but not in countries with comparatively better political institutions. We test our theoretical predictions systematically using panel data covering the period 1970 to 2005 and 133 countries. Our estimates confirm our theoretical predictions. Our main results hold when we control country fixed effects, time varying common shocks, income and various additional covariates. They are also robust to alternative estimation techniques, various alternative measures of financial development and political institutions, as well as across different samples and data frequencies. We present further evidence using panel data covering the period 1870 to 1940 and 31 countries.

JEL classification: D7, O1

Key words: Natural resources; political institutions; financial development

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1 Introduction

Are natural resource revenues a curse or a blessing for financial development? An incumbent government endowed with natural resource revenues may find it easier to invest in contract enforcement and the rule of law, which may be important for both economic and financial development. But, on the other hand, an incumbent government does not need a prospering manufacturing sector to enrich itself if it has easy access to resource rents. Thus it may put less emphasis on improving contract enforcement, such that financial development may end up being lower. In this paper, we take a closer look at the relationship between natural resource revenues and financial development. In particular, we investigate both theoretically and empirically whether and how the quality of political institutions affects this relationship.

In the theoretical part, we present a stylized politico-economic model of an economy with an incumbent government, many citizens, and a firm. The firm hires labor and borrows capital from the citizens in order to produce final goods. After production and wage payments, it decides whether or not to pay back the citizens' capital and its interest debt. If it fails to pay back capital and interest debt, then a share of the firm's profit net of wage payments is confiscated. This share measures the level of contract enforcement or, more generally, the quality of contracting institutions. Citizens prefer lending less capital to the firm if the level of contract enforcement is low. The incumbent government chooses the level of contract enforcement as well as the corruption level. We assume that a trade-off between the two exists, e.g., because establishing and promoting contract enforcement requires resources that could otherwise be appropriated.[1] After the incumbent government's policy choice and the production of final goods, the citizens can try to oust the incumbent government in midterm elections. If they try, they are successful only with a

[1]There is a similar mechanism in the model of Caselli (2006) where the government can use resources for private consumption purposes or for public investments that may trigger industrialization. Further mechanisms leading to a trade-off between contract enforcement and corruption are discussed in section 2.

certain probability, which increases in the quality of political institutions. The incumbent government gets the official salary and corruption revenues if and only if it remains in office. Citizens are best off with zero corruption and strong contract enforcement.

In equilibrium, the incumbent government chooses high corruption and low contract enforcement in the presence of high natural resource revenues and weak political institutions. As a result citizens lend less capital to the firm and the economy experiences low financial development. But when political institutions are strong, the incumbent government chooses strong contract enforcement, independently of resource revenues, which leads to high financial development. Our model thus predicts that natural resource revenues hinder financial development in countries with poor political institutions, but not in countries with comparatively better political institutions.

In the empirical part, we test our theoretical prediction systematically using a reduced form model and panel data covering the periods 1970 to 2005 and 1870 to 1940, and 133 and 31 countries, respectively. Our fixed effect and instrumental variables estimates confirm that the relationship between natural resource revenues and financial development depends on the quality of political institutions. In particular, we find that resource revenues are negatively associated with financial development in countries that have an average POLITY2 score of around 8 or less over the period 1970 to 2005. Our main results hold when we control for the effects of log income, time varying common shocks and various additional covariates. We notice that the effect is a demonstrable empirical fact even after controlling for possible Dutch Disease effects by using terms of trade and trends in commodity prices. It is also robust to various alternative measures of financial development and political institutions, as well as across different samples and data frequencies. Evidence for the 1870 to 1940 period is weaker as we get statistically significant estimates only when a democracy dummy from Polity IV is used. Using cross-sectional data we further present evidence that is consistent with our theoretical model according to which natural resources

rents hinder financial development in the presence of weak political institutions by lowering contract enforcement and the quality of contracting institutions.

We make the following contributions in this paper. First, we present a theoretical model that demonstrates why we should expect the effect of natural resource revenues on financial development to depend on the quality of political institutions. Second, using a reduced form econometric model and panel data for the period 1970 to 2005 covering 133 countries, we show that the effect of natural resource revenues on financial development indeed depends on the quality of political institutions. It is noteworthy that the use of panel data is a significant departure from most existing studies on natural resources or financial development, as they typically present results driven by cross-country variation. Third, we also find support (even though not robust) for our model prediction using panel data for the period 1870 to 1940 and 31 countries. To the best of our knowledge, no other empirical studies on natural resources or financial development use panel data for this early period.

There is a large literature on the causes of financial development. However, the literature that focuses on the effect of natural resources on financial development is rather small. Beck et al. (2003) are perhaps the first to establish an explicit link between natural resources and financial development. Their endowment theory of financial development runs as follows: Resource endowment and disease environment encountered by the colonizers influenced the quality and nature of the colonial institutions they erected. In natural resource abundant countries the initial distribution of wealth favored the elite and they erected extractive institutions (see Engerman and Sokoloff, 1997). In countries with unfavorable disease environment the colonizers decided not to settle and erected extractive institutions (see Acemoglu et al., 2001). These extractive institutions characterized by weak property rights and contract enforcement persisted over time and continue to negatively influence financial development and economic development. Beck et al. (2003) find

that the endowment theory explains the majority of the cross-country variation in financial development using a cross-section sample of 70 former colonies. Acemoglu and Johnson (2005) show that endowment impacts on financial development through property rights institutions (which protect citizens from expropriation by those in power) and not through contracting institutions (which regulate transactions among private citizens). In contrast, we focus on the effects of *current* natural resource rents on financial development and how the quality of political institutions influences this relationship. We show that resource rents coupled with weak political institutions are a hindrance to financial development.

Initial endowment, initial property rights institutions, and initial political institutions are likely to be correlated (Engerman et al. 1998). They are also likely to be persistent. Therefore, a valid question would be whether we are picking up the effects of initial endowment and property rights institutions on financial development, and not the effects of political institutions. As we use country fixed effects, it is clear that our results cannot be driven by initial endowment. Further we test the robustness of our results by explicitly controlling for property rights institutions, as measured by expropriation risk and executive constraints. Our results remain robust. Therefore the effect that we identify is over and above any effect that resource endowment may have on financial development through property rights institutions.

In a related paper Rajan and Zingales (2003) propose the interest group theory of financial development. Their theory predicts that incumbent financiers are likely to use their market power to oppose financial development in order to avoid competition. Further, they predict that incumbent financiers opposition will be weaker in the presence of trade and financial openness. They find evidence in support of their theory using data from 24 countries and selected years from the period 1913 to 1999. Baltagi et al. (2009) provide further evidence that trade and financial openness promote financial development.[2] Our

[2]Moreover Chinn and Ito (2006) find evidence that financial openness promotes equity market devel-

theory is related to Rajan and Zingales', but in ours it is the incumbent government rather than incumbent financiers who are responsible for depressed financial markets in certain circumstances. Moreover we show that our empirical results hold when we control for trade and financial openness.

Our paper is also related to further contributions on the determinants of financial development.[3] La Porta et al. (1998) show that legal origin is a good predictor of the efficiency of the legal system in protecting private property rights and enforcing contracts. They find that on the average British common law countries are likely to have a better developed legal system which promotes financial development. Guiso et al. (2004) in contrast argue that social capital and informal rules that govern social interaction plays a crucial role in financial development. By using country fixed effects, we indirectly control for the legal origin theory and the social capital theory of financial development.

Further, our paper is related to the resource curse literature,[4] in particular to those studies that look at how the effects of natural resource revenues on corruption, rent seeking and economic development depend on (economic or political) institutions (e.g., Hodler, 2006; Mehlum et al., 2006; Robinson et al., 2006; Olsson, 2007; Andersen and Aslaksen, 2008; Bhattacharyya and Hodler, 2010). More broadly, our paper is also related to the large literatures on finance and development,[5] and institutions and development (e.g., Acemoglu et al., 2001; Rodrik et al., 2004; Acemoglu and Johnson, 2005; Bhattacharyya, 2009).

The remainder of the paper is structured as follows: Section 2 presents the theoretical model, and section 3 derives the equilibrium and some comparative static results. Section 4 discusses our empirical strategy and the data. Section 5 presents the empirical evidence and various robustness tests. Section 6 concludes.

opment in countries with a sound legal systems.

[3]See Beck and Levine (2005) for a survey of this literature.

[4]See van der Ploeg (2008) for a survey of this literature.

[5]See Levine (1997) for a survey of this literature.

2 The Model

There is an economy inhabited by a measure-one continuum of citizens, a firm, and an incumbent government.

We first introduce the economic part of the model: Each citizen is endowed with one capital unit and one labor unit. A subset of citizens own the firm.[6] The firm hires workers and borrows capital from the citizens to produce final goods Y with the Cobb-Douglas production technology $Y = L^{\alpha}K^{1-\alpha}$, where $\alpha \in (0, 1)$. Citizens supply their labor unit inelastically, such that $L = 1$; and the labor market is perfectly competitive. We take the amount of capital K that citizens lend to the firm as our measure of financial development (which is consistent with standard empirical measures of financial development based on credits to the private sector). After having produced goods Y and having paid wages w, the firm decides whether or not to pay back capital K and its interest debt rK. If it fails to pay back capital and interest debt, the share λ of the firm's profit net of wage payment is confiscated, where λ is a measure of contract enforcement. Aggregate income in the economy is the sum of domestic production Y and the exogenous natural resource rents Ω.

We now turn to the political part of the model: The incumbent government can choose the level of contract enforcement $\lambda \in [0, 1]$ as well as the level of corruption $\theta \in [0, 1 - \tau]$, where τ is an exogenous tax rate used to finance government salaries. The government's total revenues are $(\tau + \theta)(Y + \Omega)$. We assume that there is a trade-off between contract enforcement and corruption. Such a trade-off may exist for various reasons: First, establishing and promoting the rule of law, in general, and contract enforcement, in particular, may be costly. Hence better contract enforcement may leave fewer resources that can potentially be appropriated by the government. Second, appropriating resources may become more difficult and costly when the rule of law is established. Third, different politicians

[6] Our results do not depend on how large this subset is. They even hold if the firm is owned by one or all citizens.

may be good in fostering contract enforcement and engaging in corruption, respectively, such that a head of government who primarily appoints ministers that are good in fostering contract enforcement may end up with a cabinet that does poorly in appropriating resources. Fourth, governments might be time constrained, such that more time devoted to fostering contract enforcement leaves less time for corrupt activities. For simplicity we model this trade-off between contract enforcement and corruption by assuming that the incumbent government is time constrained, and that its choices of λ and θ must satisfy $\lambda + \theta \leq 1$.[7]

After the incumbent government's policy choices and the production of final goods, the citizens can try to oust the incumbent government in midterm elections.[8] If they try, they are successful with probability p, where p is a measure of the quality of political institutions. Hence, the better the political institutions are, the more likely it is that the incumbent government gets ousted in midterm elections when the citizens want to oust it. If the citizens are successful, a caretaker government takes over and pays the corruption revenues back to the citizens.[9] With probability $1-p$ the incumbent government can stay in office even if the citizens try to replace it. We assume that small transaction costs may accrue if a caretaker government takes over, such that citizens prefer to keep the incumbent government when (otherwise) indifferent between the two outcomes.

Payoffs are as follows: The incumbent government gets the official salary and the corruption revenues if and only if it remains in office. Hence its payoff is $(\tau + \theta)(Y + \Omega)$ if it remains in office, and zero otherwise. The citizens' payoff consists of up to four different components, which can all be converted into consumption. First, each citizen receives

[7] While the trade-off between contract enforcement and corruption is crucial for our results, they do not hinge on the particular way in which this trade-off is modeled. Also our results would be similar for any time endowment less than $2 - \tau$.

[8] Midterm elections are a simple way to introduce (potential) accountability into a one period model; see, e.g., Mukand and Rodrik (2005).

[9] Results would be unchanged if the caretaker government paid back only some (strictly positive) share of the corruption revenues, or if it paid back corruption revenues only with some (strictly positive) probability.

the wage w. Second, each citizen gets a share of the resource rents which is equal to $(1-\tau-\theta)(Y+\Omega)$ if the incumbent government stays in power, and to $(1-\tau)\Omega$ otherwise. Third, each citizen ends up with capital $1+rK$ if the firm repays all capital and interest debt, and with $1-K$ otherwise. Fourth, some citizens may get additional revenues if the firm is profitable.

The timing of the game is as follows: First, the incumbent government chooses λ and θ. Second, the firm hires labor and capital to produce Y. Third, the firm decides whether to pay back capital and interest debt. Fourth, the citizens decide whether to make an attempt to replace the incumbent government.

3 Equilibrium Analysis

We derive our results in three steps. First we derive the equilibrium of the economy and financial development for any λ and θ. Second we derive the subgame perfect Nash equilibrium of the political game using backward induction. We then discuss how a change in resource rents affects financial development in the politico-economic equilibrium.

As the labor market is perfectly competitive, and the citizens supply their labor inelastically, it holds in equilibrium that $L=1$ and $w=(1-\tau-\theta)\alpha K^{1-\alpha}$. The firm's post wage payment profit is therefore $\Pi=(1-\tau-\theta)(1-\alpha)K^{1-\alpha}$.

The capital market outcomes, i.e., interest rate r and the amount of capital borrowed K both depend on contract enforcement λ. In particular, citizens never lend so much capital that the firm may decide not to repay the capital and its interest debt. Hence, $(1+r)K \leq \lambda\Pi$ or, equivalently, $K \leq \Phi(\lambda,\theta,r) \equiv \left(\frac{\lambda(1-\tau-\theta)(1-\alpha)}{1+r}\right)^{\frac{1}{\alpha}}$. Observe that $\Phi(\lambda,\theta,r)$ increases in λ, but decreases in θ and r, and that $\Phi(\lambda,\theta,r)<1$ for any λ, θ and $r\geq 0$. Hence citizens will never lend all capital, and competition between citizens drives the interest rate down to zero. Given λ and θ, financial development is thus $K=\Phi(\lambda,\theta,0)$,

and domestic production is $Y = \Phi(\lambda, \theta, 0)^{\alpha}$. Consequently, K and Y are both increasing in contract enforcement λ and decreasing in corruption θ.

We now turn to the political game. Having observed the incumbent government's choices of λ and θ, and the resulting market outcomes, the citizens try to oust the incumbent government if and only if the incumbent government is corrupt, i.e., if and only if $\theta > 0$. The reason is that it is too late for them to undo poor market outcomes due to low λ, but not too late to get corruption revenues back when $\theta > 0$.

Knowing the effect of its policy choices on market outcomes and the citizens' political decision, the incumbent government either chooses the best uncorrupt strategy, i.e., $\lambda = 1$ and $\theta = 0$, or it maximizes total revenues $(\tau + \theta)[\Phi(\lambda, \theta, 0)^{\alpha} + \Omega]$. These strategies yield payoffs of $m^u = \tau[\Phi(1, 0, 0)^{\alpha} + \Omega]$ and $m^c = \max_{\theta}(\tau + \theta)[\Phi(1 - \theta, \theta, 0)^{\alpha} + \Omega]$, respectively. The incumbent government prefers the best uncorrupt strategy if $m^u \geq (1 - p)m^c$ or, equivalently, if $p \geq p' \equiv \frac{m^c - m^u}{m^c}$, and the total revenue maximizing strategy otherwise. Note that $p' \in [0, 1)$ as $m^c \geq m^u > 0$. Hence the incumbent government chooses maximal contract enforcement if political institutions are sufficiently strong. Otherwise it maximizes total revenues because it is likely to remain in office even when engaging in corruption and choosing low contract enforcement.

We now turn to the effect of higher resource rents Ω on financial development in the politico-economic equilibrium:

Proposition 1 *A marginal increase in resource rents Ω reduces financial development K if $p < p'$, i.e., if political institutions are relatively weak, but has no effect on K otherwise.*

Proof: If $p \geq p'$, then $K = \Phi(1, 0, 0)$ for any Ω. Hence a marginal change in Ω has no effect on K. If $p < p'$, then θ maximizes $(\tau + \theta)[\Phi(1 - \theta, \theta, 0)^{\alpha} + \Omega]$ subject to $\theta \in (0, 1 - \tau)$. In case of a border solution, a marginal change in Ω has no effect on θ and, hence, $K = \Phi(1 - \theta, \theta, 0)$. In case of an interior solution, the optimal θ must satisfy the first-order condition $\kappa \equiv (1 - \alpha)[(1 - \theta)(1 - \theta - \tau) - (2 - 2\theta - \tau)(\tau + \theta)] + \Omega = 0$, and it must hold

that $\frac{\partial \kappa}{\partial \theta} < 0$. As $\frac{\partial \kappa}{\partial \Omega} > 0$, the implicit function theorem then implies that $\frac{\partial \theta}{\partial \Omega} > 0$. Since $\frac{\partial \Phi(1-\theta,\theta,0)}{\partial \theta} < 0$, the chain rule then implies that $\frac{\partial K}{\partial \Omega} < 0$. ■

The intuition for Proposition 1 is as follows: If political institutions are strong, the incumbent government chooses high contract enforcement, which leads to high financial development, independently of the resource rents. But if political institutions are weak, then the incumbent trades off the benefit of better contract enforcement, which is higher domestic production, against the cost of less time available for corrupt activities. As resource rents increase, domestic production becomes relatively less important and the incumbent government thus increases corruption and lowers contract enforcement, which translates into lower financial development.

4 Empirical Strategy and Data

We use two different panel datasets covering the periods 1970 to 2005 and 1870 to 1940, and 133 and 31 countries, respectively.[10] Our main specification uses five year averages of our measures of financial development, resource rents, political institutions and income. However we also test the robustness of our results using annual data, three year averages, and decadal averages. To estimate whether the relationship between financial development and resource rents depends systematically on the quality of political institutions, we use the following model:

$$FD_{it} = \alpha_i + \beta_t + \gamma_1 RR_{it} + \gamma_2 D_{it-5} + \gamma_3 D_{it-5} \times RR_{it} + \phi y_{it} + X'_{it}\Lambda + \varepsilon_{it}, \qquad (1)$$

where FD_{it} is the level of financial development in country i averaged over years $t-4$ to t, α_i is a country dummy variable which indicates the use of country fixed effects, β_t

[10]Due to data limitations, not all specifications cover exactly 133 countries and in most specifications, the panel is unbalanced. Appendix A2 presents a list of countries included in the sample.

is a year dummy variable controlling for time varying common shocks, RR_{it} are natural resource rents in country i averaged over years $t-4$ to t,[11] D_{it-5} is a measure of the quality of political institutions or democracy, respectively, in country i averaged over the period $t-9$ to $t-5$, y_{it} is log income per capita in country i averaged over years $t-4$ to t, and X'_{it} is a vector of other control variables.

The motive behind including country fixed effects is to control for time invariant country specific fixed factors such as legal origin and social capital.

We are mainly interest in the effect of a change in RR_{it} on FD_{it}. The point estimate of this effect is $\gamma_1+\gamma_3 D_{it-5}$. Therefore we focus on the coefficients γ_1 and γ_3. We expect γ_1 to be significantly negative and γ_3 to be significantly positive. This would imply that there is a threshold level of D_{it-5} below which the effect of resource rents on financial development is negative, and above which the effect is positive.

We use the log of private credit to GDP ratio from Beck et al. (2000) as our measure of financial development (FD_{it}) for the period 1970 to 2005. This measure is an assessment of credit availability in a country relative to the size of its economy. It takes into account credit to the private sector from banks and other financial institutions. According to this measure a country is financially underdeveloped if there is little credit available for the private sector. The advantages of using this measure are threefold. First, it suits our purpose as it captures our notion of financial development in the theoretical model, where financial development is defined as the availability of credit to the private sector, i.e., the firm. Second, it covers the time period 1970 to 2005 and the largest number of countries.[12] This allows us to use panel data and minimizes the sample selection bias both across countries and over time. Third, it is also widely used in the literature as a proxy

[11] Given the unavailability of direct measures of resource rents for the period 1870 to 1940, we use the share of primary product exports to GDP instead of RR_{it} for this period.

[12] The original dataset covers the period 1960 to 2007. We are only able to cover 1970 to 2005 because other variables used are not available for the remaining years.

for financial development.[13] Nevertheless, we also use log money and quasi-money (M2) to GDP ratio, log bank assets to GDP ratio, log bank deposits to GDP ratio, log financial deposits to GDP ratio, log stock market capitalization to GDP ratio, and log bank returns on assets to GDP ratio as alternative measures of financial development.

Log of private credit to GDP ratio varies between -7.4 in Sudan in 2005 and 1.14 in the Netherlands in 1995, corresponding to ratios of close to zero and around 310 percent, respectively. The standard deviation in financial development between 1970 and 2004 increased from 0.9 to 1.2, suggesting that the finance gap has increased across countries over this period. The mean increased from -1.6 to -1.3 suggesting an overall improvement in credit availability on the average.

For the 1870 to 1940 period, we use log of commercial and savings bank deposits to GDP as a measure of financial development. This data is obtained from Mitchell (1995) International Historical Statistics. Three separate volumes on Europe; the Americas; and Africa, Asia and Oceania are utilized. Note that Mitchell (1995) reports deposits and GDP data in local currency. The ratios are calculated by dividing local currency value of deposits with GDP measured in local currency. One could argue that deposits are not the best indicator of financial development as deposits may not necessarily get translated into credit for investments. However it is not unreasonable to assume that deposits and credit are likely to be correlated. In any case this is the best that we could do to cover the period 1870 to 1940 and 31 countries.[14]

Our main natural resource measure (RR_{it}) is the log of rents from natural resources (which include energy, minerals, and forestry) to GDP ratio and is from the World Bank's adjusted net savings dataset. It covers the period 1970 to 2005. The rent from a particular

[13]See, e.g., Beck et al. (2003), Rajan and Zingales (2003), Acemoglu and Johnson (2005), and Poelhekke and van der Ploeg (2009).

[14]Rajan and Zingales (2003) provide some alternatives with numbers on stock market capitalization, fixed capital formation raised via equity, number of listed companies per million people for 24 countries for 1913, 1929, 1938 and some later years. However their data is replete with gaps and would reduce our sample size significantly which would make meaningful estimation of the model almost impossible.

commodity is defined as the difference between its world price and average extraction costs both expressed in current US dollars.[15] The world price of a particular commodity is global and only varies over time. The extraction costs however are variable over time and across countries. We calculate total rents accruing from a variety of natural resources by following a three step procedure. First, we multiply the natural resource rent per unit of output of a particular commodity by the total volume extracted of that commodity. Second, we aggregate them across commodities for a country and a particular year. Third, we divide them by GDP and average them for five year periods and take natural logs to smooth out any noise in the data. Our data shows Switzerland is the least resource intensive country in 1995 with a value of RR_{it} at -14.8, and Iraq is the most resource intensive country in 2005 with a value of at 0.8. The corresponding ratios of resource rents to GDP are close to zero and around 220 percent, respectively.

RR_{it} is our preferred measure of natural resource revenues for the following reasons. First, it is best able to capture our notion of natural resource revenues in the theoretical model, where these revenues are defined as rents from natural resources. Second, it is fairly wide in terms of country coverage. Therefore we are able to minimize the risk of sample selection bias. It also provides a reasonably long time dimension. Third, this variable is now been used by a number of recent studies (see for example, Ross, 2006; Collier and Hoeffler, 2009; Bhattacharyya and Hodler, 2010). Fourth, it may be best able to bypass endogeneity related concerns as it is unlikely that current financial development in a country will affect resource rents as the latter predominantly depend on the stock of natural resources and exogenous world prices of natural resources. Nevertheless, we also use lagged RR_{it} to allay concerns of endogeneity. Normalizing resource rent with GDP may also bring in endogeneity concerns as FD_{it} may affect GDP. To circumvent that problem we also estimate our model using resource rents and financial development

[15]Hamilton and Clemens (1999) provide a detailed description of this dataset.

when they are both normalized by population instead of GDP. Furthermore, we also use GMM estimation method using lagged RR_{it} and lagged D_{it-5} as instruments to address endogeneity and omitted variable concerns.

For the 1870 to 1940 period, we use the log of the primary product exports to GDP ratio (sxp_{it}) from Clemens and Williamson (2004). They use categories I, II and III of the Brussels 1913 Commodity Classification. These categories are, respectively, live animals, food and drink, and raw materials or simply-prepared products. The share varies between 0.11 in the United Kingdom in 1870 to 1 in Argentina in 1885. Resource rents are likely to be positively correlated with a country's reliance on primary products exports. However we acknowledge that at best this is only an indirect measure of resource rents. Nevertheless, given the unavailability of direct measures, it is perhaps the best the we could do to capture resource rents Ω.

Our measure of democracy and political institutions (D_{it-5}) is calculated using the Polity IV database, which is described by Marshall and Jaggers (2002). D_{it-5} is the difference between the democracy and the autocracy scores in this database, averaged over the period $t-9$ and $t-5$ and rescaled such that it ranges from 0 to 1, with higher values implying better political institutions. It measures the competitiveness and regulation of political participation, the openness and competitiveness of executive recruitment, and the constraints on the executive. Averaged over the sample period, Qatar and Saudi Arabia are the least democratic countries with average values of $D_{it-5} = 0$. There are various countries with an average value of 1 including the resource-rich democracies of Australia and Norway.

This measure suits our purpose because of the following reasons. First, D_{it-5} well captures the notion of the quality of political institutions in the theoretical model, where this quality is defined as the probability that the citizens can successfully replace the incumbent government if they wish to do so. Related to this, D_{it-5} is ordinal and there-

fore allows us to distinguish between different shades of democracy and the quality of political institutions, respectively.[16] Nevertheless, we also use the fraction of years a country is democratic since 1950 lagged (d_{it-5}), the freedom house democracy index lagged (DFH_{it-5}), Boix and Rosato's (2001) democracy dummy lagged ($DDUM_{it-5}$), and the Polity IV democracy dummy lagged ($PIVD_{it-5}$) as alternative measures. Second, D_{it-5} and all these other lagged measures are perhaps able to address the endogeneity related concerns. Even though financially developed countries are likely to be more democratic, it is less likely that financial development in year t will affect political institutions in year $t-5$. Nevertheless, we also use democracy twice lagged (D_{it-10}) and $D_{it-10} \times RR_{it}$ as instruments for democracy and estimate the model using the Fuller version of Limited Information Maximum Likelihood (LIML) instrumental variable method. The advantage of using Fuller LIML over standard instrumental variable estimator is that the former works better even when the instruments are weak. Furthermore, we also estimate the model using GMM where lagged explanatory variables are used as instruments.

Log per capita income and several other additional control variables are also used in the study. Detailed definitions and sources of all variables are available in Appendix A1. Table 1 reports descriptive statistics of the major variables used.

Finally, there are concerns of multicollinearity and omitted variables that we need to address in our estimation. First, there is a possibility that a high correlation between RR_{it} and D_{it-5} could inflate the standard errors of our estimates. Ross (2001) documents that natural resource abundance and oil in particular have antidemocratic properties. This may bring in issues of multicollinearity in our specification. We find that the correlation between RR_{it} and D_{it-5} is -0.03 and the correlation between RR_{it} and $D_{it-5} \times RR_{it}$ is 0.24.

[16] Alternatively, there is also a strong view that a simple dichotomy between democracy and non-democracy is the most appropriate empirical definition (e.g., Przeworski et al., 2000). However, the latter certainly involves approximation and may bias estimates (Collier and Hoeffler, 2009). A related view is that democratic capital or longer-lived democratic experience is important (e.g., Treisman, 2000; and Persson and Tabellini, 2006).

The magnitudes of these correlations are not large enough to cause any serious problem of multicollinearity. Second, we tackle the issue of omitted variables by controlling for time varying common shocks, country fixed effects and additional covariates that are expected to influence the level of financial development.

5 Empirical Evidence

Table 2 presents our main results. In column 1 we look at the unconditional correlation between resource rents and financial development. We notice a statistically significant negative relationship. This suggests that resource rents are associated with low levels of financial development. But this association may be driven by omitted factors (such as income, political structure, legal structure, culture, geography, time varying common shocks etc.) influencing both resource rent and financial development. To tackle this issue in columns 2 and 3 we add log per capita income, country dummies and year dummies. We notice that the negative relationship survives however the magnitude of the coefficient falls. To estimate how the effect of natural resources on financial development depends on the quality of political institutions, in column 4 we add the interaction term $D_{it} \times RR_{it}$ and D_{it}. We notice that the negative coefficient on RR_{it} survives, and that the coefficient on the interaction term is positive and statistically significant. To address endogeneity concerns, in column 5 we use the lagged measure D_{it-5} to estimate equation (1). We find that coefficients are very similar. In an average country, resource rents inhibit financial development unless D_{it-5} is above the threshold level of 0.9, which corresponds to a POLITY2 score of around 8. In column 6, we use lagged resource rents RR_{it-5} to allay concerns of reverse causation between resource rents and financial development, as financial development today is unlikely to affect resource rents five years ago. Our main results remain unaffected both in terms of magnitude and sign.

To put the estimates of our main specification (column 5) into perspective, let us focus on Nigeria – a resource rich country ($RR_{NGA2005} = 3.86$, i.e., a resource rents to GDP ratio of almost 50 percent) with weak democratic institutions ($D_{NGA2000} = 0.65$, i.e., a POLITY2 score of 3) and a low level of financial development ($FD_{NGA2005} = 2.73$, i.e., a private credit to GDP ratio of around 15 percent). If *ceteris paribus* Nigeria's resource rents dropped to zero, then $FD_{NGA2005}$ would increase by 0.21, which is more than one fifth of a sample standard deviation in FD_{it}. If *ceteris paribus* Nigeria's political institutions improved to match the quality of Botswana's political institutions ($D_{BWA2000} = 0.95$, i.e. a POLITY2 score of 9), then $FD_{NGA2005}$ would increase by 0.44, which is almost half a standard deviation. These examples illustrate that resource rents tend to severely inhibit financial development unless political institutions are strong.

One potential concern is that our preferred measure of the quality of political institutions, D_{it-5}, could be endogenous. However, the endogeneity problem should not be too serious as D_{it-5} is a lagged measure and less likely to be endogenous than a current measure. Furthermore, Monte-Carlo evidence shows that the bias of OLS is reduced when an endogenous variable is interacted with a continuous exogenous variable (Harrison, 2008). Therefore, the bias of the coefficient on $D_{it-5} \times RR_{it}$ should be rather small even if D_{it-5} is endogenous as RR_{it} is a continuous variable that is likely to be exogenous. Moreover, as we discuss below, our results also hold when we use long-run measures of the quality of political institutions, which are even less likely to be endogenous. Nevertheless, we address the potential endogeneity of D_{it-5} and the interaction term $D_{it-5} \times RR_{it}$ by employing the instrumental variable approach. The instruments need to be correlated to D_{it-5} and $D_{it-5} \times RR_{it}$, respectively, and orthogonal to the error term. As it is often the case, finding strong and valid instruments is not an easy task. In column 7 we use the twice lagged democracy measure D_{it-10} and the interaction term $D_{it-10} \times RR_{it}$ as instruments. These instruments are highly correlated to D_{it-5} and $D_{it-5} \times RR_{it}$, and it is plausible that they

are orthogonal to the error term. They are also not weak instruments as they satisfy the Stock-Yogo criteria. We notice that the coefficients of interest remain highly significant when we use these instruments. In column 8, to further allay concerns of endogeneity, we estimate the model using D_{it-10}, RR_{it-5} and $D_{it-10} \times RR_{it-5}$ as instruments for D_{it-5}, RR_{it} and $D_{it-5} \times RR_{it}$, which corresponds to GMM estimation method, and our main results hold.[17]

Table 3 checks whether we really pick up the effect of *political* institutions on financial development. Acemoglu et al. (2008) show that better property rights institutions led to subsequent expansion of franchise and better political institutions. Therefore it is plausible that political and property rights institutions are correlated and what we are picking up is in fact the effect of property rights institutions, not political institutions. To address this concern in column 2 we replace D_{it-5} by lagged expropriation risk ($EXPR_{it-5}$), which is a widely used measure of property rights (e.g., Knack and Keefer, 1995; Acemoglu et al., 2001; Acemoglu and Johnson, 2005; Bhattacharyya, 2009). We do not get the same results which indicates that our main specification, which is replicated in column 1, is indeed picking up the effect of political institutions. To convince ourselves further we use $EXPR_{it-5}$ as an additional control variable in column 3, and our main result survives. In column 4 we replace D_{it-5} with lagged constraints on the executive ($EXCONST_{it-5}$), which is another variable sometimes used to measure property rights. This measure however is not the best to capture North's notion of an extractive state (Acemoglu and Johnson, 2005). Moreover, $EXCONST_{it}$ is also from the Polity IV database, and it is one of the components of the democracy code used to derive POLITY2. Given this definitional overlap between D_{it} and $EXCONST_{it}$, it is not surprising that the estimates are similar as our main results. In column 5 we add $EXCONST_{it-5}$ as an additional control variable to our main specifica-

[17]Following Acemoglu et al. (2001) it has become popular to use settler mortality as instrument for property rights and, sometimes, political institutions. But since settler mortality is only available as a cross-section, it cannot be used as instrument in the presence of country fixed effects.

tion. We find that the coefficients on RR_{it} and $D_{it-5} \times RR_{it}$ remain significant, suggesting that the relationship between resource rents and financial development indeed depends on the quality of political institutions.

Table 4 asks the question where this nonlinear effect of resource rents on financial development is coming from. In column 1 we test whether the effect is driven by a particular year or a group of years. We do this by allowing the interaction term $D_{it-5} \times RR_{it}$ to be different across time, and we estimate separate year effects. We notice that the effect is uniform in terms of statistical significance over the period 1970 to 2005. The magnitude of the effect peaks in 1980 and declines afterwards. Overall, the effect is also jointly significant. Developed economies are likely to be democracies and also to have developed financial markets. In column 2, we allow the effect to vary across different country-income groups to test whether it is predominant among developed economies or any other group. We notice that the effect is uniform across all country-income groups and hence not driven by developed economies. In column 3 we show that the same holds true if we allow the interaction term to differ for OECD and non-OECD countries.

In table 5 we add additional covariates into our main specification to address the issue of omitted variables. In column 1 we add foreign aid as an additional control variable, as aid may lower the desire and need of governments to borrow from financial markets. In columns 2-4 we add foreign direct investments, a trade liberalization index, and trade shares, respectively. Rajan and Zingales (2003) argue that trade liberalization and foreign investments help easing the grip of the elite on the financial market, thus being beneficial for financial development. In columns 5-10 we control for schooling, investments, inequality measured by the Gini coefficient, terms of trade, commodity prices relative to the GDP deflator, and financial openness. Schooling should be beneficial for financial development as a better educated population will be better able to process complex financial information thereby increasing access and participation. Investments generally require credit. Therefore more

investments should be associated with higher financial development. Less inequality should increase access and participation thereby strengthening financial markets. Terms of trade and commodity prices relative to GDP deflator are expected to capture Dutch Disease effects.[18] Lastly, we control for the effect of financial openness using the index of capital account openness by Chinn and Ito (2006). Our main results survive in all instances.

Table 6 presents robustness results with alternative samples. Columns 1-5 checks whether our results are influenced by any particular continent. We take out Africa, Asia, Europe, the Americas, and Neo-Europe[19] one at a time from our base sample. In columns 6-8 we also omit influential observations using Cook's distance, DFITS, and Welsch distance formulas respectively. Our main results hold in all these alternative samples.

In table 7 we use alternative measures of financial development. In columns 1-4 we use log of M2 to GDP ratio, log deposit money bank assets to GDP ratio, log bank deposit to GDP ratio, and log financial system deposits to GDP ratio, and our main results survive. In columns 5 and 6, we use log stock market capitalization to GDP ratio and log bank returns on assets to GDP ratio. The coefficients of interest still show the predicted signs, but they are no longer statistically significant. This may be due to a significant reduction in sample size in these two specifications. Furthermore, in spite of stock market expansion globally, stock market exposure till date remains fairly limited in most countries in our sample. Therefore it is not surprising that we are not finding statistically significant effects in columns 5 and 6. Further, in column 7 we use our preferred measures of resource rents and financial development but on this occasion normalizing them with population instead on GDP. Our main results survive.

[18]The ratio of export to import prices is the standard measure of the terms of trade. However, in order to assess the Dutch Disease impact (or the impact of external price shocks on the economy as a whole), the price of tradables should also be related to the prices of non-tradables. That is, a commodity export price shock must be expressed relative to the price of GDP (GDP Deflator) in order to assess its Dutch Disease impact. Hence we use trends in price of commodities relative to price of GDP in addition to terms of trade.

[19]Neo-Europe includes all Anglo-Saxon countries outside Europe: Australia, Canada, New Zealand, and the United States.

In table 8 we test our results using alternative measures of the quality of political institutions. In column 1 we replace our net democracy measure D_{it-5} with the lagged fraction of years a country has been democratic since 1950 (d_{it-5}), which is a long run measure of democracy and could be seen as a measure of democratic capital.[20] In any year a country is deemed to be democratic if it registers a positive POLITY2 score. Our main results survive. In column 2 we replace D_{it-5} with the lagged freedom house democracy index (DFH_{it-5}). The coefficient on the interaction term is still positive and significant. The coefficient on RR_{it} remains negative but is no longer statistically significant. In columns 3 and 4 we use the Boix and Rosato Democracy dummy ($DDUM_{it-5}$) and the Polity IV democracy dummy ($PIVD_{it-5}$), which is equal to one if and only if the POLITY2 score is positive. Our results survive again. Therefore, it is fair to conclude that our main results are robust to the use of alternative measures of democracy and the quality of political institutions.

In table 9 we check what happens if we use different data frequency. In columns 1, 2, and 3 we use annual data, three year averages, and decadal averages, respectively. Results are very similar as with five year averages.

In table 10 we test our theoretical predictions using an historical sample of 31 countries covering the period 1870 to 1940. The dependent variable used here is the log of deposits in commercial and savings bank to GDP ratio as we are unable to find data on private credit for a large enough sample for this period. Also note that we only have data for log primary exports to GDP (sxp_{it}) for this period which at best is an indirect measure of resource rents. Nevertheless, it allows us to take a good crack at testing our theoretical predictions for this period even though the sample is considerably smaller than the 1970 to 2005 sample. In column 1 we use our standard measure of the quality of political institutions, D_{it-5}. We notice that the coefficients on sxp_{it} and $sxp_{it} \times D_{it-5}$ have the predicted signs, but are not

[20] 1950 is chosen as a reference year since many countries achieved independence around that time. Treisman (2000) also uses 1950 as a reference year.

statistically significant. A noticeable feature however is the significance and positive sign of D_{it-5}, which indicates that democratization and sound political institutions were good for financial development in this period. In column 2 we replace D_{it-5} by lagged Polity IV democracy dummy ($PIVD_{it-5}$), a cardinal measure of political institutions. We again find a direct positive effect of political institutions on financial development $PIVD_{it-5}$, and we notice that the coefficients on sxp_{it} and $sxp_{it} \times PIV_{it-5}$ have still the predicted signs and are now statistically significant.[21] These results suggest that already in the period 1870 to 1940 natural resource revenues may have hindered financial development in undemocratic countries, but not in democratic ones. However we acknowledge that there are shortcomings related to endogeneity and sample size which we are unable to address given data limitations. We leave these issues for future work.

Overall these empirical findings support our theoretical prediction that resource rents inhibit financial development in countries with poor political institutions, but not in countries with strong political institutions.

In our theoretical model, natural resource rents inhibit financial development in the presence of weak political institutions by lowering contract enforcement or, more generally, the quality of contracting institutions. We now make an attempt to test whether resource rents indeed affect financial development through the contracting institutions channel. Due to the unavailability of reliable measures of contracting institutions in a panel we thereby have to rely on cross-section data.[22] Following Acemoglu and Johnson (2003, 2005) we use two indices of legal formalism by Djankov et al. (2003) as measures of contracting institutions.[23] The first of these measures, called the check measure, describes procedural

[21] It is not surprising that the dummy works here whereas the continuous measure does not, because the dummy magnifies the variation in political institutions across countries in a small sample of countries with very little representation from Africa.

[22] The ICRG measure of repudiation of government contracts is sometimes used in the literature as a proxy for contracting institutions. This measure however is not appropriate for our purposes as it focuses on institutions that regulate the relationship between the state and its subjects and not on institutions that provide the legal framework for contracts between ordinary citizens.

[23] See Acemoglu and Johnson (2005, p. 955) for an explanation why indices of legal formalism are good

formalism to recover the money from a bounced check. The second, called the eviction measure, describes procedural formalism to evict a nonpaying tenant. These measures both run from 0 to 7, and higher values indicate an inefficiently high level of procedural formalism and weak contracting institutions.

In column 1 of table 11 we estimate our main specification using cross-section data. The results are qualitatively similar to our panel estimates. In column 2 and 3 we add our two measures of contracting institutions as independent variables. We notice that the coefficient estimates on RR_{i2000} and $RR_{i2000} \times D_{i1995}$ are no longer statistically significant. The measures of contracting institutions however are statistically significant, suggesting that weak contracting institutions tend to lower financial development. These results are consistent with our prediction that the effects of resource rents on financial development are working through the contracting institutions channel. To be more certain, in columns 4 and 5 we look at the relationship between resource rents and contracting institutions. We find that resource rents lead to weak contracting institutions if and only if the quality of political institutions is low. These results further support our prediction that the effects of resource rents on financial development work through the contracting institutions channel.

6 Conclusions

We study whether natural resource revenues hinder financial development, and what role political institutions are playing in this process. Using a politico-economic model we show that resource rents inhibit financial development if and only if the quality of the political institutions is relatively poor. To test this prediction, we use a reduced form model and panel data covering the periods 1970 to 2005 and 1870 to 1940, and 133 and 31 countries, respectively. We notice that our theoretical prediction is strongly supported by the data

measures of contracting institutions.

for the 1970 to 2005 period, while the evidence from the rather small sample for the 1870 to 1940 period is less robust. In particular, we find that resource rents are negatively associated with financial development in countries that have an average POLITY2 score of 8 or less over the period 1970 to 2005. Our main results hold when we control for the effects of log income, time varying common shocks, country fixed effects and various additional covariates. We are able to show that the effect is a demonstrable empirical fact even after controlling for conventional Dutch Disease effects. It is also robust to various alternative measures of financial development and the quality of political institutions, as well as across different samples and data frequencies.

These findings imply that resource-rich countries have a tendency to be financially underdeveloped, possibly because governments have less incentives to foster contract enforcement when getting large natural resource rents, and because the financial sector cannot prosper without strong contract enforcement. But this tendency can be checked if strong and democratic political institutions ensure that governments are accountable towards the people. Therefore, a major implication of our results is that democratization could help to foster financial development in resource-rich countries.

Appendices

A.1. Data description

Period 1970 to 2005:

Financial development (FD_{it}): Log of private credit by banks and other financial institutions to GDP ratio. Source: Beck et al. (2000).

Log of private credit to population: Log of private credit by banks and other financial institutions to population ratio. Source: Authors' calculation using Beck et al. (2000) and WDI Online.

Log of money and quasi-money (M2) to GDP: Log of money and quasi-money (M2) to GDP ratio. M2 includes currency, demand deposits, traveler's cheques and other chequeable deposits, retail money market mutual fund balances, saving deposits (including money market deposit accounts), and small time deposits. Source: WDI Online.

Log of deposit money bank assets to GDP: Log of deposit money bank assets to GDP ratio. Source: Beck et al. (2000).

Log of bank deposits to GDP: Log of bank deposits to GDP ratio. Source: Beck et al. (2000).

Log of financial system deposits to GDP: Log of financial system deposits to GDP ratio. Source: Beck et al. (2000).

Log of stock market capitalization to GDP: Log of stock market capitalization to GDP ratio. Source: Beck et al. (2000).

Log of bank return on assets to GDP: Log of bank return on assets to GDP ratio. Source: Beck et al. (2000).

Resource rents (RR_{it}): log of rents from natural resources as share of GDP. Natural resources include energy, minerals, and forestry. Rents are defined as the price minus the average extraction costs. The data are described in Hamilton and Clemens (1999). Source: World Bank Adjusted Net Savings Dataset.

Log of resource rents to population: Log of rents from natural resources divided by population size. Source: Authors' calculation using World Bank's Adjusted Net Savings Dataset and WDI

Online.

Democracy lagged (D_{it-5}): Lagged average POLITY2 coding (5 year averages) from the Polity IV dataset. POLITY2 is defined as the difference between democracy and autocracy scores. The original variable varies between -10 and 10. Here we rescale it to 0 and 1 with 1 being the most democratic. This variable is also used for 1870 to 1940 period. Source: Polity IV.

Fraction of years democratic since 1950 lagged (d_{it-5}): Fraction of years a country has a positive POLITY2 scores over the period from 1950 to $t-5$. Source: Authors' calculation using Polity IV.

Freedom House Democracy Index lagged (DFH_{it-5}). Source: Freedom House.

Boix and Rosato Democracy Dummy lagged ($DDUM_{it-5}$): Source: Boix and Rosato (2001).

Polity IV democracy dummy lagged ($PIVD_{it-5}$): Dummy variable equal to 1 if POLITY2 score is positive in year $t-5$, and 0 otherwise. This variable is also used for the 1870 to 1940 period. Source: Polity IV.

Log per capita income (y_{it}): Log GDP per capita PPP (in current international dollars). Source: WDI Online.

Executive Constraints lagged ($EXCONST_{it-5}$): Measure of institutionalized constraints on the power of chief executives, ranging from 1 to 7 with higher values representing greater constraints. Source: Polity IV.

Expropriation Risk lagged ($EXPR_{it-5}$): Expropriation risk is defined as the risk of "outright confiscation and forced nationalization" of property. This variable ranges from 0 to 10 with higher values representing lower probability of expropriation. Source: International Country Risk Guide (ICRG).

Trade Share: Total volume of trade as a share of GDP. Source: WDI Online.

Foreign Direct Investments: Net inflow of foreign direct investment as a share of GDP. Source: WDI Online.

Foreign Aid: Official development assistance. Source: WDI Online.

Sachs and Warner Trade Liberalization Index: Fraction of years open between years $t-4$ and t. Source: Wacziarg and Welch (2003).

Schooling: Average schooling years of the aged over 25 in the total population, measured at five year intervals from 1970 to 2000. Source: Barro and Lee (2000).

Investments: Investments to GDP ratio. Source: Penn World Table 6.2.

Gini Coefficient: Inequality measured by Gini Coefficient in percentage points as calculated by UNU-WIDER. Source: World Income Inequality Database version 2 (WIID2).

Terms of Trade: Net Barter Terms of Trade. Source: WDI Online.

Commodity Price relative to GDP Deflator: Commodity Price Index divided by GDP Deflator. Source: Authors calculation using UN sources and WDI Online.

Financial Openness: Index of capital account openness constructed from four dummy variables that codify restrictions on cross-border financial transactions as reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions. Higher values of the index represent fewer capital account restrictions. Source: Chinn and Ito (2006).

Legal Formalism (Check Measure): Index of formality in legal procedures for collecting on a bounced check, from 1 to 7. Source: Djankov et al. (2003).

Legal Formalism (Eviction Measure): Index of formality in legal procedures for evicting a tenant for nonpayment of rent, from 1 to 7. Source: Djankov et al. (2003).

Period 1870 to 1940:

Log Deposits in Commercial and Savings Banks to GDP: Log deposits in commercial and savings banks to GDP ratio. Deposits are reported in local currency and therefore divided by GDP measured in local currency. Source: Mitchell (1995) several volumes.

Log Primary Product Exports to GDP (sxp_{it}): Log of primary products exports to GDP ratio. Primary products are defined as categories I, II, and III of the Brussels 1913 Commodity Classification (recorded in Conference Internationale de Statistique Commerciale, Bruxelles, 1913: Documents et Proces-Verbaux, Establissements Generaux D'Imprimerie, Brussels, 1914). These

categories are live animals, food and drink, and raw materials or simply-prepared products respectively. Source: Clemens and Williamson (2004).

A.2 Sample

Period 1970 to 2005:[24] Albania, Algeria, Angola, Argentina, Armenia, Australia, Austria, Bahrain, Bangladesh, Belgium, Benin, Bhutan, Bolivia, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cameroon, Cambodia, Canada, Central African Rep., Chad, Chile, Colombia, Congo Dem. Rep., Congo Rep., Costa Rica, Cote d'Ivoire, Croatia, Cyprus, Czech Rep., Denmark, Dominican Rep., Ecuador, Egypt, El Salvador, Equatorial Guinea, Estonia, Ethiopia, Fiji, Finland, France, Gabon, Gambia, Georgia, Germany, Ghana, Greece, Guatemala, Guyana, Haiti, Honduras, Hungary, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Korea Rep., Kuwait, Kyrgyz Rep., Lao P.D.R, Latvia, Lesotho, Libya, Lithuania, Macedonia, Madagascar, Malawi, Malaysia, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Morocco, Mozambique, Nepal, Netherlands Antilles, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Papua New Guinea, Peru, The Philippines, Poland, Portugal, Qatar, Romania, Russia Fed., Rwanda, Saudi Arabia, Senegal, Serbia and Montenegro, Sierra Leone, Slovak Rep., Slovenia, Solomon Islands, South Africa, Spain, Sri Lanka, Sudan, Swaziland, Sweden, Switzerland, Syria, Tanzania, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, United Kingdom, United States, Uruguay, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe.

Period 1870 to 1940: Argentina, Australia, Austria, Brazil, Canada, Chile, China, Colombia, Cuba, Denmark, Egypt, France, Germany, Greece, Italy, Japan, Mexico, New Zealand, Norway, Peru, the Philippines, Portugal, Russia, Serbia, Spain, Sweden, Thailand, Turkey, United Kingdom, United States, Uruguay.

[24] This sample corresponds to our preferred specification reported in column 5 of table 2.

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Table 1. Summary Statistics

Variable	Number of obs.	Mean	Standard Deviation	Minimum	Maximum
Financial Development [FD_{it}]	1062	-1.41	1.00	-7.37	1.14
Resource Rent [RR_{it}]	1075	-3.99	2.44	-14.77	0.81
Democracy Lagged [D_{it-5}]	1573	0.51	0.37	0	1
$RR_{it} \times D_{it-5}$	979	-2.41	2.49	-14.77	0.04
Log GDP [$\ln y_{it}$]	1558	22.36	2.46	16.03	30.12

Table 2: Resource Rent, Democracy and Financial Development

	Dependent Variable: Financial Development [FD_{it}]							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS Estimates						**LIML Fuller 1 IV Estimate (GMM)**	
Resource Rent [RR_{it}]	-0.23***	-0.07**	-0.09*	-0.19**	-0.19**		-0.16**	-0.22**
	(0.023)	(0.035)	(0.054)	(0.084)	(0.087)		(0.082)	(0.110)
RR_{it-5}						-0.18**		
						(0.093)		
Democracy [D_{it}]				0.65*				
				(0.375)				
D_{it-5}					0.66*	0.66*	0.77*	1.19*
					(0.399)	(0.404)	(0.518)	(0.655)
$RR_{it} \times D_{it}$				0.20**				
				(0.071)				
$RR_{it} \times D_{it-5}$					0.21**		0.17**	0.25**
					(0.072)		(0.077)	(0.106)
$RR_{it-5} \times D_{it-5}$						0.21**		
						(0.071)		
Log GDP [$\ln y_{it}$]		0.07***	0.32**	0.35**	0.33**	0.46***	0.28***	0.26***
		(0.007)	(0.146)	(0.147)	(0.149)	(0.126)	(0.045)	(0.064)
F-stat on EI							84.02/170.34	56.94/11.94/40.67
Partial R^2 EI							0.32/0.44	0.23/0.33/0.25
Stock-Yogo							8.03/15.50	12.71/24.09
Controls:								
Country Dummies	NO	NO	YES	YES	YES	YES	YES	YES
Year Dummies	NO	NO	YES	YES	YES	YES	YES	YES
Instruments							Democracy Twice Lagged (D_{it-10}), $RR_{it} \times D_{it-10}$	D_{it-10} , RR_{it-5} , $RR_{it-5} \times D_{it-10}$
Countries	141	141	141	133	133	132	133	132
Observations	810	810	810	768	767	697	749	682
Adjusted R^2	0.40	0.62	0.94	0.95	0.95	0.95	--	--

Notes: ***, **, and * indicates significance level at 1%, 5%, and 10% respectively against a two sided alternative. Figures in the parentheses are cluster standard errors and they are robust to arbitrary heteroskedasticity and arbitrary intra-group correlation. All regressions are carried out without an intercept. Sample years are every fifth year (averages) from 1970 to 2005. '*F*-stat on EI', 'Partial R^2 EI', and 'Stock-Yogo' indicate *F*-statistic on excluded instruments, Partial R^2 on excluded

instruments and Stock-Yogo critical values respectively. Fuller's modified LIML estimator with $\alpha = 1$ (correction parameter proposed by Hausman et al., 2005) is used in columns (8) & (9). Reported Stock-Yogo critical values in columns (7), (8) & (9) are the 5 percent significance level critical values for weak instruments tests based on, respectively, 30 percent and 5 percent maximal Fuller relative bias. The null of weak instruments is rejected in the case that the *F*-statistic on the excluded instruments exceeds the Stock-Yogo critical value/s. Note that the Sargan/Hansen overidentification test for all instruments is not reported as we have an exactly identified system.

Table 3: Resource Rent, Democracy and Financial Development: Identification

	Dependent Variable: Financial Development [FD_{it}]				
	(1)	(2)	(3)	(4)	(5)
Resource Rent [RR_{it}]	-0.19**	-0.04	-0.15***	-0.23**	-0.19**
	(0.087)	(0.089)	(0.049)	(0.097)	(0.085)
Democracy Lagged [D_{it-5}]	0.66*		0.34		0.46
	(0.399)		(0.472)		(0.503)
Lagged Expropriation Risk [$EXPR_{it-5}$]		0.05	0.06**		
		(0.089)	(0.030)		
Lagged Executive Constraints [$EXCONST_{it-5}$]				0.11*	0.03
				(0.059)	(0.052)
$RR_{it} \times D_{it-5}$	0.21**		0.16**		0.20**
	(0.072)		(0.062)		(0.071)
$RR_{it} \times EXPR_{it-5}$		-0.001			
		(0.008)			
$RR_{it} \times EXCONST_{it-5}$				0.04**	
				(0.011)	
Controls:	Log GDP [$\ln y_{it}$], Country Dummies, Year Dummies				
Countries	133	101	94	131	131
Observations	767	328	298	755	755
Adjusted R^2	0.95	0.97	0.97	0.95	0.95

Notes: ***, **, and * indicates significance level at 1%, 5%, and 10% respectively against a two sided alternative. Figures in the parentheses are cluster standard errors and they are robust to arbitrary heteroskedasticity and arbitrary intra-group correlation. All regressions are carried out without an intercept. Sample years are every fifth year from 1970 to 2005.

Table 4: Resource Rent, Democracy and Financial Development across Time and Income

	Dependent Variable: Financial Development [FD_{it}]		
	(1)	(2)	(3)
Resource Rent [RR_{it}]	-0.21**	-0.21**	-0.21**
	(0.084)	(0.086)	(0.087)
Democracy Lagged [D_{it-5}]	0.84**	0.73*	0.72*
	(0.409)	(0.410)	(0.394)
$RR_{it} \times D_{it-5}$ ×Year1970	0.18**		
	(0.075)		
$RR_{it} \times D_{it-5}$ ×Year1975	0.20**		
	(0.079)		
$RR_{it} \times D_{it-5}$ ×Year1980	0.25***		
	(0.082)		
$RR_{it} \times D_{it-5}$ ×Year1985	0.23***		
	(0.075)		
$RR_{it} \times D_{it-5}$ ×Year1990	0.23***		
	(0.070)		
$RR_{it} \times D_{it-5}$ ×Year1995	0.19***		
	(0.074)		
$RR_{it} \times D_{it-5}$ ×Year2000	0.18**		
	(0.073)		
$RR_{it} \times D_{it-5}$ ×Year2005	0.17***		
	(0.066)		
$RR_{it} \times D_{it-5}$ ×High Income		0.18**	
		(0.077)	
$RR_{it} \times D_{it-5}$ ×Middle Income		0.31**	
		(0.123)	
$RR_{it} \times D_{it-5}$ ×Low Income		0.19*	
		(0.114)	
$RR_{it} \times D_{it-5}$ ×Very Low Income		0.18***	
		(0.067)	
$RR_{it} \times D_{it-5}$ ×OECD			0.17**
			(0.074)
$RR_{it} \times D_{it-5}$ ×Non OECD			0.20***
			(0.071)
Joint test for all interactive variables: F value (*p-value*)	9.16 (0.00)	73.75 (0.00)	6.66 (0.00)
Controls:	Log GDP [$\ln y_{it}$], Country Dummies, Year Dummies	Log GDP [$\ln y_{it}$], Country Dummies, Year Dummies, Income Dummies	Log GDP [$\ln y_{it}$], Country Dummies, Year Dummies, OECD Dummy
Countries	133	133	133
Observations	767	767	767
Adjusted R^2	0.94	0.95	0.95

Notes: ***, **, and * indicates significance level at 1%, 5%, and 10% respectively against a two sided alternative. Figures in the parentheses are cluster standard errors and they are robust to arbitrary heteroskedasticity and arbitrary intra-group correlation. Sample years are every fifth year from 1970 to 2005. High Income is a dummy for per capita GDP in 2000 being 10, 000 constant 1996 international dollars or more; Middle Income for between 5,000 and 10,000; Low Income for between 2,500 and 5,000; Very Low Income for less than 2,500. The *F*-test is the joint test of significance of the interaction terms and Year Dummies (for column 1); interaction terms and Income Dummies (for column 2); interaction terms and OECD Dummy (for column 3).

Table 5: Resource Rent, Democracy and Financial Development: Robustness with Additional Covariates

	Dependent Variable: Financial Development [FD_{it}]									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	OLS Estimates									
Resource Rent [RR_{it}]	-0.20** (0.089)	-0.19** (0.085)	-0.08*** (0.030)	-0.19** (0.087)	-0.10** (0.050)	-0.20** (0.087)	-0.19*** (0.061)	-0.22** (0.107)	-0.20** (0.087)	-0.17* (0.090)
Democracy Lagged [D_{it-5}]	0.68* (0.402)	0.67* (0.392)	0.34 (0.298)	0.62 (0.393)	0.31 (0.353)	0.65* (0.395)	0.70** (0.342)	0.60 (0.437)	0.66* (0.395)	0.57 (0.439)
$RR_{it} \times D_{it-5}$	0.21** (0.072)	0.21** (0.071)	0.10** (0.039)	0.21** (0.072)	0.11** (0.054)	0.21** (0.071)	0.21*** (0.054)	0.23** (0.081)	0.23*** (0.071)	0.19** (0.086)
Controls:	Log GDP [$\ln y_{it}$], Country Dummies, Year Dummies									
Additional Controls	Foreign Aid	Foreign Direct Investments	S & W Trade Liberal. Index	Trade Share	Schooling	Investments* (+)	Gini Coefficient	Terms of Trade	Commodity Price relative to GDP Deflator	Financial Openness
Countries	112	128	117	131	93	132	105	107	133	115
Observations	594	736	694	756	522	760	352	497	767	559
Adjusted R^2	0.95	0.95	0.95	0.94	0.95	0.95	0.96	0.95	0.94	0.95

Notes: ***, **, and * indicates significance level at 1%, 5%, and 10% respectively against a two sided alternative. Figures in the parentheses are cluster standard errors and they are robust to arbitrary heteroskedasticity and arbitrary intra-group correlation. All the regressions reported above are carried out without an intercept. Sample years are every fifth year from 1970 to 2005. S & W Trade Liberal. Index is the Sachs and Warner Trade Liberalization index.

Table 6: Resource Rent, Democracy and Financial Development: Robustness with Alternative Samples

	Dependent Variable: Financial Development [FD_{it}]							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS Estimates							
Resource Rent [RR_{it}]	-0.23*** (0.083)	-0.19** (0.092)	-0.20** (0.089)	-0.19** (0.092)	-0.19** (0.086)	-0.13*** (0.031)	-0.13*** (0.031)	-0.13*** (0.041)
Democracy Lagged [D_{it-5}]	0.88* (0.470)	0.51 (0.449)	0.62 (0.401)	0.67 (0.459)	0.67* (0.398)	0.40* (0.216)	0.40* (0.217)	0.44* (0.254)
$RR_{it} \times D_{it-5}$	0.24*** (0.082)	0.20** (0.077)	0.21** (0.070)	0.21** (0.079)	0.21** (0.071)	0.14*** (0.032)	0.14*** (0.032)	0.14*** (0.039)
Controls:	Log GDP [$\ln y_{it}$], Country Dummies, Year Dummies							
Omitted Observations	Base sample without Africa	Base sample without Asia	Base sample without Europe	Base sample without the Americas	Base sample without Neo-Europe	Obs. Omitted using Cook's Distance	Obs. Omitted using DFITS	Obs. Omitted using Welsch Distance
Countries	92	103	98	111	129	126	128	128
Observations	526	611	578	620	735	707	709	737
Adjusted R^2	0.94	0.95	0.94	0.95	0.94	0.97	0.97	0.96

Notes: ***, **, and * indicates significance level at 1%, 5%, and 10% respectively against a two sided alternative. Figures in the parentheses are cluster standard errors and they are robust to arbitrary heteroskedasticity and arbitrary intra-group correlation. All the regressions reported above are carried out without an intercept. Sample years are every fifth year from 1970 to 2005. In column 2, Neo-Europe includes Australia, Canada, New Zealand, and the United States. In column 6, omit if $|Cooksd_i| > 4/n$; in column 7, omit if $|DFITS_i| > 2\sqrt{k/n}$; and in column 8, omit if $|Welschd_i| > 3\sqrt{k}$ formulas are used (see Belsley et al. 1980). Here n is the number of observation and k is the number of independent variables including the intercept. The influential observations according to the Cook's Distance formula are DZA1975-2005, AGO2000-2004, BTN1985, BOL1985, BOL2000, BWA1975, BGR1995-2000, BDI2005, CMR1970, CMR1980, CAF1995, TCD2005, CHL1975, ZAR1995, ZAR2005, COG1995, COG2005, CZE2005, DNK2005, GNQ1990, GNQ2005, EST1995, GAB1970, GHA1980, HTI1970, IRQ1970-1975, KWT1975, LAO1990-2000, LVA2005, LSO2005, MDA1995, MDA2005, MNG2005, NPL1970, NLD1995, NGA1970, PER1990, PER2000, POL1985, QAT2005, RWA1970, SAU1975, SVK2000-2005, SDN1975-1980, SDN2005, SWZ2000, UGA1985, and VEN2005. The influential observations according to the DFITS formula are all of the above except TCD2005 and QAT2005. Influential observations according to the Welsch Distance formula are DZA1995-2000, AGO2000-2005, BOL1985, BGR1995-2000, CMR1970, CHL1975, ZAR1995, ZAR2005, COG1995, COG2005, GNQ1990, GNQ2005, IRQ1970-1975, LAO1990-2000, MDA1995, MDA2005, MNG2005, PER1990, POL1985, SAU1975, SVK2000-2005, SDN2005, and SWZ2000.

Table 7: Resource Rent, Democracy and Financial Development: Robustness with Alternative Measures of Financial Development

	Dependent Variables						
	Log of Money and Quasi-money (M2) to GDP	**Log of Deposit Money Bank Assets to GDP**	**Log of Bank Deposits to GDP**	**Log of Financial System Deposits to GDP**	**Log of Stock Market Capitalization to GDP**	**Log of Bank Return on Assets to GDP**	**Log [Private Credit / Population]**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS Estimates						
Resource Rent [RR_{it}]	-0.076***	-0.18*	-0.16*	-0.16*	-0.02	-0.14	
	(0.027)	(0.103)	(0.096)	(0.093)	(0.237)	(0.177)	
Log [Rent from natural resources/Population]							-0.16**
							(0.089)
Democracy Lagged [D_{it-5}]	0.10	0.79*	0.66	0.73*	0.30	0.64	1.7**
	(0.144)	(0.448)	(0.439)	(0.440)	(0.973)	(0.834)	(0.653)
$RR_{it} \times D_{it-5}$	0.05*	0.20**	0.17*	0.20*	0.11	0.03	0.18***
	(0.027)	(0.084)	(0.079)	(0.081)	(0.251)	(0.161)	(0.072)
Controls:	Log GDP [$\ln y_{it}$], Country Dummies, Year Dummies						
Countries	132	133	133	133	102	127	133
Observations	829	771	770	774	354	329	766
Adjusted R^2	0.89	0.88	0.89	0.87	0.94	0.99	0.99

Notes: ***, **, and * indicates significance level at 1%, 5%, and 10% respectively against a two sided alternative. Figures in the parentheses are cluster standard errors and they are robust to arbitrary heteroskedasticity and arbitrary intra-group correlation. All the regressions reported above are carried out without an intercept. Sample years are every fifth year from 1970 to 2005.

Table 8: Resource Rent, Democracy and Financial Development: Robustness with Alternative Measures of Democracy

	Dependent Variable: Financial Development [FD_{it}]			
	(1)	(2)	(3)	(4)
	OLS Estimates			
Resource Rent [RR_{it}]	-0.14* (0.074)	-0.01 (0.033)	-0.15** (0.071)	-0.18** (0.077)
Fraction of Years Democratic since 1950 Lagged [d_{it-5}]	0.19 (0.533)			
$RR_{it} \times d_{it-5}$	0.16** (0.053)			
Freedom House Democracy Index Lagged [DFH_{it-5}]		0.19** (0.080)		
$RR_{it} \times DFH_{it-5}$		0.05*** (0.016)		
Boix and Rosato Democracy Dummy Lagged [$DDUM_{it-5}$]			0.49** (0.231)	
$RR_{it} \times DDUM_{it-5}$			0.20*** (0.048)	
Polity IV Democracy Dummy Lagged [$PIVD_{it-5}$]				0.07** (0.034)
$RR_{it} \times PIVD_{it-5}$				0.20*** (0.06)
Controls:	Log GDP [$\ln y_{it}$], Country Dummies, Year Dummies			
Countries	133	139	133	131
Observations	767	741	767	755
Adjusted R^2	0.94	0.95	0.95	0.94

Notes: ***, **, and * indicates significance level at 1%, 5%, and 10% respectively against a two sided alternative. Figures in the parentheses are cluster standard errors and they are robust to arbitrary heteroskedasticity and arbitrary intra-group correlation. All the regressions reported above are carried out without an intercept. Sample years are every fifth year from 1970 to 2005.

Table 9: Resource Rent, Democracy and Financial Development: Robustness with Alternative Data Frequency

	Dependent Variable: Financial Development [FD_{it}]		
	(1)	(2)	(3)
	OLS Estimates		
	Annual Data	**Three Year Averages**	**Decadal Average**
Resource Rent [RR_{it}]	-0.10**	-0.11**	-0.08*
	(0.053)	(0.061)	(0.048)
Democracy Lagged [D_{it-5}]	0.39**	0.34*	0.25
	(0.182)	(0.207)	(0.353)
$RR_{it} \times D_{it-5}$	0.11***	0.12**	0.10*
	(0.043)	(0.044)	(0.052)
Controls:	Log GDP [ln y_{it}], Country Dummies, Year Dummies		
Countries	132	132	129
Observations	3129	1123	344
Adjusted R^2	0.95	0.94	0.95

Notes: ***, **, and * indicates significance level at 1%, 5%, and 10% respectively against a two sided alternative. Figures in the parentheses are cluster standard errors and they are robust to arbitrary heteroskedasticity and arbitrary intra-group correlation. All the regressions reported above are carried out without an intercept. Sample years are from 1970 to 2005.

Table 10: Resource Rent, Democracy and Financial Development before 1940

	Dependent Variable: Log of Deposits in Commercial and Savings Bank to GDP	
	(1)	(2)
	OLS Estimates	
Log Primary Product Exports to GDP [sxp_{it}]	-0.51 (1.47)	-1.8*** (0.62)
Democracy [D_{it}]		
Democracy Lagged [D_{it-5}]	0.09** (0.04)	
Polity IV Democracy Dummy Lagged [$PIVD_{it-5}$]		0.97*** (0.26)
$sxp_{it} \times D_{it}$		
$sxp_{it} \times D_{it-5}$	0.07 (0.06)	
$sxp_{it} \times PIVD_{it-5}$		2.1*** (0.48)
Controls:		
Log GDP [$\ln y_{it}$]	YES	YES
Country Dummies	YES	YES
Year Dummies	YES	YES
Countries	31	31
Observations	278	278
Adjusted R^2	0.91	0.92

Notes: ***, **, and * indicates significance level at 1%, 5%, and 10% respectively against a two sided alternative. Figures in the parentheses are cluster standard errors and they are robust to arbitrary heteroskedasticity and arbitrary intra-group correlation. All the regressions reported above are carried out without an intercept. Sample years are every fifth year from 1870 to 1940.

Table 11: Resource Rent, Democracy and Financial Development: Causal Channel

	Financial Development in 2000 [FD_{i2000}]			**Legal Formalism (Check Measure)**	**Legal Formalism (Eviction Measure)**
	(1)	(2)	(3)	(4)	(5)
	OLS Estimates				
Resource Rent in 2000 [RR_{i2000}]	-0.23** (0.100)	-0.22 (0.152)	-0.24 (0.159)	0.41*** (0.111)	0.32*** (0.114)
Democracy in 1995 [D_{i1995}]	-2.51** (1.30)	-1.56 (2.18)	-1.91 (2.26)	6.18*** (1.55)	5.51*** (1.54)
$RR_{i2000} \times D_{i1995}$	0.30*** (0.089)	0.18 (0.16)	0.22 (0.16)	-0.55*** (0.115)	-0.44*** (0.120)
Legal Formalism (Check Measure)		-0.26*** (0.101)			
Legal Formalism (Eviction Measure)			-0.23** (0.106)		
Controls:	Log GDP in 2000 [lny_{i2000}]				
Countries	127	84	84	88	88
Adjusted R^2	0.99	0.99	0.99	0.93	0.94

Notes: ***, **, and * indicates significance level at 1%, 5%, and 10% respectively against a two sided alternative. Figures in the parentheses are cluster standard errors and they are robust to arbitrary heteroskedasticity and arbitrary intra-group correlation.