

Kurronen, Sanna

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Financial sector in resource-dependent economies

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Sanna Kurronen

Financial sector in resource-dependent economies



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Sanna Kurronen
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Sanna Kurronen*

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Abstract

This paper examines financial sector characteristics in resource-dependent economies. Using a unique dataset covering 133 countries, we present empirical evidence that the banking sector tends to be smaller in resource-dependent economies, even when controlling for several other factors which have been shown to have a significant effect on financial sector development in previous studies. Moreover, the threshold level at which the increasing resource-dependence begins to be harmful for domestic banking sector is very low. We also find evidence that the use of market-based and foreign financing is more common in resource-dependent economies. Further, we argue that a relatively small financial sector used to cater the needs of the resource sector might be unfavorable for emerging businesses, thereby hampering economic diversification and reinforcing the resource curse.

Keywords: resource dependence, resource curse, financial sector, banks, panel data

JEL: G20, O16, O57, Q32

* University of Helsinki and BOFIT, email: sanna.kurronen@gmail.com

1 Introduction

Many resource-rich economies are unable to develop competitive industrial sectors outside the production of raw materials. Previous literature gives several reasons for this resource trap or resource curse, but the role of financial development has received very limited attention. However, the overall importance of the financial sector for economic development has been extensively studied.

Levine (2005) summarizes the key functions of the financial sector addressed in the previous literature. The financial sector produces information on possible investments, allocates capital, monitors investments, and exerts post-financing corporate governance. The financial system also facilitates the trading, diversification and management of risk. It also mobilizes savings and eases the exchange of goods and services.

As financial sector structure is expected to reflect the production structure of the economy (Lin, Sun & Jiang 2009), we presume that the financial sector in a resource-dependent economy is shaped by the needs of big well-known firms in the mineral extraction sector. That is, the domestic banking sector plays a smaller role and the use of capital markets is more common than in resource-poor countries. According to the previous literature, such a financial system is especially challenging for small- and medium-sized enterprises as well as for emerging industries.

This is the first paper to focus on the structure of the financial sector in resource-dependent economies. We describe financial sector characteristics by presenting cross-country data on financial sector development and resource dependence based on a unique dataset collected from different sources, covering an extensive range of countries. We present empirical evidence that, even if we control for several other factors that previous literature has designated as important for financial sector growth, resource-dependence still has a dampening effect on domestic banking sector development. Moreover, the threshold level at which the increasing resource-dependence begins to be harmful for domestic banking sector is very low. We also find evidence that the use of market-based and foreign financing is more common in resource-dependent economies.

We focus solely on point-source resources (energy products and other minerals), as the previous literature has found those resources to be harmful for economic development. Moreover, we confirm our results by using three alternative indicators of resource-dependence, namely export dependence, production dependence and subsoil wealth.

The rest of this paper consists of four sections. Section 2 introduces the related literature, section 3 discusses the data and estimation results, section 4 presents our interpretation of the results, and section 5 concludes.

2 Literature review

There are several often-cited determinants of financial sector development. According to La Porta et al. (1997), investor protection is key to financial sector development. Roe and Siegel (2011) argue that political instability impedes financial development. Engerman and Sokoloff (2002) and Acemoglu et al. (2001) develop a colonial endowment view according to which colonies that have been run by a small elite of immigrants using plenty of unskilled local labor have tended to have weak property rights. These colonies were typically built around extraction industries or agriculture. In colonies settled by bigger groups of immigrants, stronger property rights, higher levels of education and stronger financial and economic development were present. Thus, beneficial institutions are not exogenously determined and more attention should be paid to the question of why institutions are less developed in some countries.

A big branch of research has been focusing on structural issues, namely whether a bank-based or market-based financial sector is better for economic growth (e.g. Demirgüç-Kunt, Levine 1999). Gerschenkron (1962) suggests that banks are more efficient than markets in the early stages of development, when the institutional environment is underdeveloped. The idea is that banks are more powerful than individual investors in forcing firms to reveal their accounts and pay their debts. Securities markets offer mostly long-term funding, whereas banks are superior in offering funds for shorter term investments (Demirgüç-Kunt, Maksimovic 2002). There is some tendency for countries to become more market oriented as they become richer. Also, a low level of corruption, strong protection of shareholder rights and good accounting regulations tend to enhance market-based finance. However, an extensive deposit insurance scheme seems to support bank-based financial system development (Demirgüç-Kunt, Levine 1999). Nevertheless, what really matters for economic development, is the overall sector development; the relative mix of banks and markets is less important (Demirgüç-Kunt, Feyen & Levine 2011). However, this conclusion is drawn for developed economies.

Bank size seems to play an important role. Small businesses usually have difficulties in obtaining loans from big banks, whereas small banks specialize in lending to small businesses. In small banks, lending decision makers are usually close to their clients and thus gather soft

information on firms, such as information about the character of the firm's managers, which can be effectively utilized in the lending decision. On the other hand, small banks are unable to finance big firms, as banks control risks by diversified lending portfolios. Big banks, in which lending decisions are typically made at rather high levels, tend to pay more attention to standard information, such as the firm's financial statements, which are also more readily available to big firms. (Lin, Sun & Jiang 2009)

Literature on new structural economics highlights the evolving role of the financial sector in different stages of economic development (Demirgüç-Kunt, Feyen & Levine 2011). Lin et al. (2009) also point out that the optimal mix of banks and markets or of big and small banks depends on the economy's factor endowments. The relative composition of labor, capital and natural resources define the optimal structure for production, and the production structure defines the optimal financial sector. Capital intensive countries tend to have big production firms and thus are better served by a market-based financial system or by big banks, whereas labor intensive economies have smaller firms that are better served by smaller local banks. However, their work does not pay much attention to the role of natural resources, although it is recognized as the third initial endowment.

According to previous literature, resource-dependent economies indeed seem to suffer from many of the handicaps that can deter financial sector development. According to (Bardhan 1997), resource abundance enhances rent-seeking and poor governance. Also, resource-rich economies tend to under educate their people (Gylfason 2001). According to Auty (2001), there are four reasons why developmental states are associated with poor natural resource endowment: 1) low tolerance of the poor majority for rent extraction from the limited natural resources; 2) efficient use of scarce resources, and investments aimed at developing abundant assets such as human capital; 3) lacking booming commodities, resource poor countries have less incentive for trade policy closure; 4) diversification into competitive manufacturing begins at lower income levels.

All in all, the literature on the relationship between resource abundance and financial development is still scarce. Nili and Rastad (2007) find that oil economies have lower levels of financial development and that financial development has a net dampening effect on investments in oil economies due to the low quality of financial intermediation. Berglof and Lehmann (2009) argue that in the case of Russia, financial sector development does not seem to have unleashed the sectors that are dependent on external financing in developed economies. Bank lending is still of limited importance for corporate investment in Russia. We contribute to

this branch of research by presenting cross-country data on financial sector development and resource dependence. We follow the path of structural economics by presenting special characteristics of the financial sector in resource-dependent economies.

3 Empirical research

3.1 Data

The data are mainly from the World Bank World Development Indicator (WDI) database, with additional financial sector indicators from Beck et al. (2010). To include as wide a range of countries as possible, we employ data for the period 1995 to 2009. We have two main reasons for choosing this period. First, many studies on resource dependent economies thus far have used older data, which do not include the post-Soviet states. As there are many clearly resource-dependent economies in that region with a common history, it is reasonable to assume that leaving these countries out might cause some bias to the estimations. Second, according to Rajan and Zingales (2003a), financial sector development has only started to gather pace in the 1990s. Thus, regarding financial sector development, the past two decades are of the greatest significance.

The sample data include all the countries (128) for which data were available. However, some variables are limited to a much smaller group. The time span is 15 years, and the panel is unbalanced. Countries are listed in Table 9 in appendix.

In considering resources, we focus on point-source resources, which are those extracted from a narrow geographic or economic base, such as oil and minerals (Isham et al. 2005). That is due to the fact that all mineral resources seem to cause problems for economies that can be broadly described as the resource curse, whereas e.g. land and forest resources do not cause similar problems (Murshed 2004). However, WDI data appear to have one deficiency: mineral exports comprise only energy and most of the important metals, whereas in some countries production and export of precious stones plays an important role. Thus, we used country-specific statistics to add the share of precious stones in total exports for major diamond producers where data was available¹. The effect of precious stones, ignored in the WDI statistics, should be more thoroughly captured in our second indicator of resource dependence, non-

¹ Central Bank of Angola, Central Statistics Office of Botswana, Statistical yearbook of Congo republic, Ghana statistical service, Statistics Namibia

manufacturing industrial production as a share of total production. However, that indicator also includes the utilities sector. The third indicator of resource-dependence, subsoil assets, includes only the energy products and metals recorded by the World Bank (2006).²

The variables used to describe resource-dependence are as follows:

- i. MEXPORT: share of minerals on total merchandise exports, our main variable for describing resource dependence. This is a commonly used indicator (e.g. Nili, Rastad 2007) of resource dependence. We use it to describe export dependence, preferring it to another often used indicator, mineral exports to GDP. Share of minerals in total exports indicates whether the competitiveness of the economy depends totally on the minerals sector.
- ii. MQPROXY: share of non-manufacturing production in total industrial production. It is used as a proxy to describe production dependence on mining and quarrying. These data are readily available from WDI database, but we have not seen it used earlier to describe resource dependence. Its strength is its availability, and its shortcoming is that it also includes the third industrial sector, the utilities sector.
- iii. SUBSOIL: ratio of subsoil assets in 2000 to GDP (Brunnschweiler, Bulte 2008). This is used because it is an exogenous indicator of resource abundance. The first figures were collected by World Bank for 1995, but these were limited to a much smaller group of countries than the later observations in 2000 and 2005.

Following previous literature, we consider the following key variables as indicators of financial sector development:

- i. PCRED: ratio of commercial bank credit to private sector to GDP. This is our preferred measure of banking sector size, as it best describes the market-determined banking sector and is also very commonly used. (Levine, Loayza & Beck 2000)
- ii. M2: ratio of money supply (M2) to GDP. Money supply (often called also as broad money or liquid liabilities) is commonly used as an indicator of financial depth. This measure of banking sector size is broader than PCRED, as it includes the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government. We use this indicator in addition to private credit, as it includes public sector or more precisely public enterprises as well, which might be of importance in resource-dependent economies. (Levine, Loayza & Beck 2000)
- iii. RATESPREAD: interest rate spread between bank lending and deposits; used as an indicator for domestic banking sector quality. (Koivu 2002)

² Recorded products include oil, gas, coal, bauxite, copper, gold, iron ore, lead, nickel, phosphate rock, silver, tin and zinc.

Further, to achieve a more thorough analysis of financial sector characteristics, we use the following variables from Beck et al. (2010):

- iv. STMKTCAP: ratio of domestic stock market capitalization to GDP, used as an indicator for domestic market-based sources for finance. (Levine and Zervos 1998)
- v. INTLDEBT: ratio of international debt issues to GDP, indicates degree of access to international capital markets. This measure includes international debt issues by government and state-owned enterprises.
- vi. NRBLOAN: ratio of loans by non-resident banks to GDP, used to indicate the use of foreign bank loans as a source of finance. Again, this measure includes the public sector.

Correlation matrix and descriptive statistics for selected financial sector indicators are presented in Table 1.

Table 1 Summary statistics of selected variables

	Mineral export share, %	Non- manufacturing production share, %	Subsoil assets to GDP	Private credit to GDP, %	M2/GDP, %	Stock market capitalization /GDP	International debt issues/GDP	Loans from non-resident banks/GDP	GDP/cap, USD
<i>Descriptive statistics</i>									
Mean	27.06	47.91	0.94	39.26	42.97	46.88	17.29	20.34	5248.23
Std. Dev.	30.20	20.73	2.00	39.10	32.32	53.84	28.21	44.18	8732.60
Min	0.00	10.19	0.01	0.00	0.00	1.01	1.01	1.00	80.62
Max	99.67	98.35	11.62	231.10	242.24	340.29	344.39	379.12	42132.92
Obs	1692	1780	1713	1827	1817	1158	942	1740	1973
<i>Correlations</i>									
mexport	1								
mqprox	0.8 ***	1							
subsoil	0.73 ***	0.61 ***	1						
pcrd	-0.22 ***	-0.14 ***	-0.22 ***	1					
M2	-0.28 ***	-0.2 ***	-0.23 ***	0.8 ***	1				
stmktcap	0.04	0.03	-0.07 *	0.62 ***	0.49 ***	1			
intldebt	-0.03	0.01	-0.09 *	0.26 ***	0.08 **	0.29 ***	1		
nrloan	-0.15 ***	0.03	-0.12 ***	0.29 ***	0.23 ***	0.18 ***	0.39 ***	1	
gdppercap	-0.05	0.01	-0.1 **	0.68 ***	0.48 ***	0.43 ***	0.47 ***	0.18 ***	1

We also use several control variables (from WDI unless otherwise noted), the most important being GDP per capita, to control for income level, as richer countries tend to have a more developed financial sector even relative to GDP. Secondary school enrollment is used to indicate the level of education (Gylfason 2001). Foreign direct investment to GDP describes the foreign firms' participation in the economy. GDP growth is used, as rapid growth might hamper financial sector development, measured against GDP. Inflation is used to describe macroeconomic stability, and several studies have shown inflation to have a direct effect on financial sector de-

velopment (Boyd, Levine & Smith 2001). Goldman Sachs Commodity Index (GSCI) is used to control for raw materials prices, which can clearly affect the export share of commodities and also strongly influence some financial sector indicators, such as stock market capitalization, in resource-rich economies. Energy products account for roughly 79% of index composition, metals account for about 8% and the rest is other commodities. An index of economic freedom is used as a proxy for quality of institutions, as institutional underdevelopment has been argued to be a major cause of both the resource curse (Auty 2001) and financial sector development (Demirgüç-Kunt, Levine 1999). Finally, we use a dummy variable for common law legal origin, as legal origin has been shown to have an effect on financial development (Porta et al. 1998). The data for the legal origin are from the CIA World Factbook (2012), which covers all the countries for which the rest of our data were available. Summary statistics for control variables are available in Table 10 in appendix.

3.2 Methodology

Multivariate regression analysis with panel data presents some challenges for the choice of the estimators. We use both pooled and fixed effects³ estimators due to their different strengths. A pooled estimator takes into account all available information, but does not capture unobserved variables, whereas a fixed effects estimator controls for all time-constant variables, but is unable to estimate their specific contribution. Moreover, fixed effect estimators are inefficient for controlling slowly moving variables (Wolf 2009).

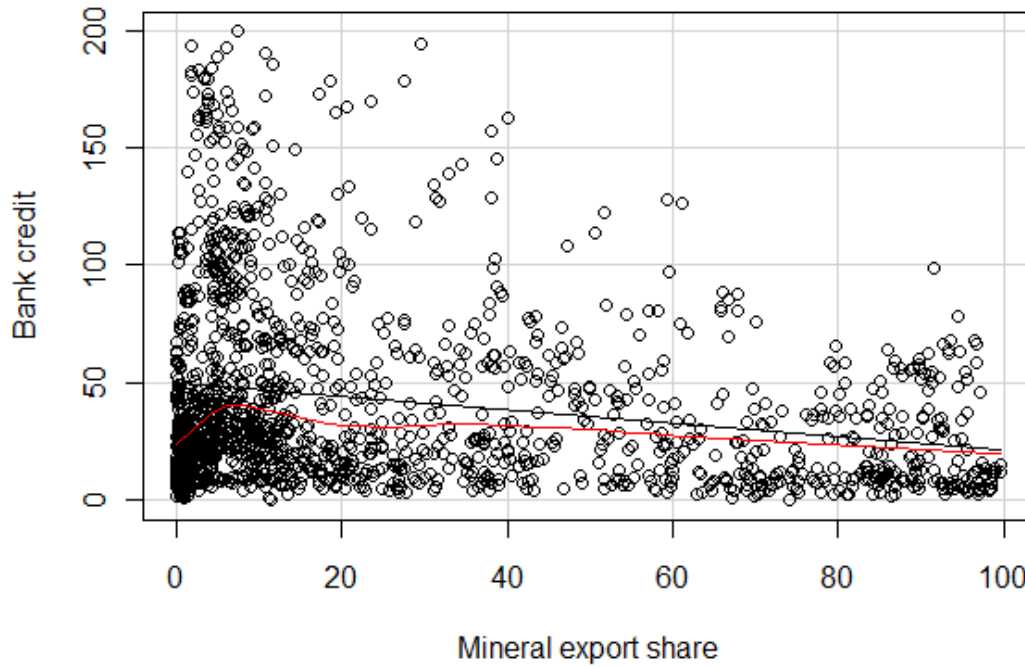
We use financial sector variables as dependent variables to determine whether the resource-dependence has a significant effect on financial sector characteristics. Following Nili and Rastad (2007) we use mineral export share of total merchandise exports as a base indicator for resource dependence. However, MQPROXY and SUBSOIL are also used for robustness checks. In particular, subsoil assets is clearly an exogenous variable, as it is difficult to argue that financial sector size or any other variables would have any effect on the resource endowments of the country. Moreover, the prices at which those resources are valued are also determined exogenously by international markets, where individual countries have little or no effect.

While the correlation between domestic banking sector size (PCRED and M2) and resource-dependence is negative and significant (Table 1) it is not linear. Figure 1 plots the min-

³ The fixed effects estimator was chosen over the random effects estimator of the Hausman test

eral export share and bank credit to the private sector. The smoothed line shows that, at very low mineral export share, the correlation is positive. This result is robust also to other indicators of resource dependence as well as to M2 as a banking sector indicator.

Figure 1 Relationship between resource dependence and financial sector is non-linear



Data source: WDI and own calculations.

Due to this property, we apply a piecewise linear regression to the data, following Hansen (1999). The general equation becomes

$$y_{it} = \mu_i + \beta_1 x_{it} I(q_{it} \leq \gamma) + \beta_2 x_{it} I(q_{it} > \gamma) + e_{it} \quad (1)$$

where $I(\cdot)$ is the indicator function, which equals 1 if true and 0 if false. Thus, the observations are divided into two regimes by the threshold γ . The regimes are distinguished by different regression slopes β_1 and β_2 . Here, the idea is that only the coefficient of the resource indicator switches when the regime changes, as it is the key variable of interest.

Locating the threshold estimate and its confidence intervals from the scatterplot data depicted in Figure 1 was done by fitting a one knot degree one spline with 1000 bootstrap replications to equation

$$pcred_{it} = \mu_i + \beta_1(mexport_{it}) + e_{it}, \quad (2)$$

Where $pcred_{it}$ equals logarithmic transformation of bank credit to private sector and $mexport_{it}$ equals the logarithmic transformation of mineral export share of total exports for country i in time t . The threshold level seen in Figure 1 was located at

$$\log(\gamma_{MEXPORT}) = 1.753$$

with 95% confidence interval [1.579, 1.951]. We then test for the significance of the located threshold using analysis of variance, comparing the linear model in equation (2) and the following form of piecewise linear model:

$$pcred_{it} = \mu_i + \beta_1(mexport_{it})I(mexport_{it} \leq 1.753) + \beta_2 mexport_{it} I(mexport_{it} > 1.753) + e_{it}. \quad (3)$$

In equation (3), the coefficient for logarithmic transformation of mineral export share ($mexport_{it}$) changes when threshold level of 1.753 is reached. F-statistic with the corresponding p-value in Table 2 shows that the located threshold is very significant.

Table 2 Test for the significance of the located threshold

Test for the threshold level $\gamma=1.753$	
F-statistic	177.6
P-value	0.000

As the estimated threshold level vs. M2 was also within that confidence interval, we use the same threshold level of mineral export share for both private credit and M2. But no clear threshold for market-based financial sector indicators was found. Even though the threshold used is reached already when about 6% of country's exports are minerals, almost one third of the observations are still below that threshold level. Similarly, the threshold level where the correlation coefficient changes sign is found for MQPROXY when the non-manufacturing pro-

duction share equals 41% of total industrial production. Logarithmic threshold estimates with corresponding 95% confidence intervals are reported in Table 3.

Table 3 Threshold estimates for mineral export share of total exports and non-manufacturing production share of total industrial production

	Estimate	95% confidence interval	Obs $\leq \gamma$	Obs $> \gamma$
$\log(\gamma_{MEXPORT})$	1.753	[1.579, 1.951]	536	1145
$\log(\gamma_{MQPROXY})$	3.712	[3.405, 3.776]	852	928

First, we estimate the domestic banking sector indicators, namely private sector credit to GDP and M2 to GDP. We also include estimations of interest rate spread, which we use as an indicator of domestic banking sector quality. We expect these variables to show whether banking sector structure depends on a country's resource dependence. The estimated equation for private credit as a dependent variable is of the following form:

$$\begin{aligned}
 pcred_{it} = & \mu_i + \beta_1(mexport_{it})I(mexport_{it} \leq 1.753) + \beta_2 mexport_{it} I(mexport_{it} > 1.753) \\
 & + \alpha_1 econf_{it} + \alpha_2 cpiyy_{it} + \alpha_3 school_{it} + \alpha_4 gdppercap_{it} + \alpha_5 gdpgrowth_{it} + \alpha_6 FDI_{it} \\
 & + \alpha_7 GSCI_t + \alpha_8 legal_i + e_{it}
 \end{aligned} \quad (4)$$

where the indicator function $I(.)$ equals 1 if the condition in the parenthesis is true and 0 if false. Sub index i refers to country and t to year.

Second, we include other financial sector indicators, namely stock market capitalization, international debt issues and loans from non-resident banks, to estimate whether the roles of capital markets and foreign banks depend on a country's resource dependence. We also conduct several robustness checks to confirm the results.

3.2.1 Results

Table 4 reports the regression results for the size of the domestic banking sector, where credit to the private sector is the main indicator. The high mineral export share of total exports explains the lower level of bank credit to the private sector in sample countries. In particular, the pooled estimator shows that the coefficient of mineral export share changes from significant

positive to significant negative as the threshold level is reached. Even though the coefficient for low export share is insignificant for the within-estimator, the results are similar.

The results are not greatly altered if we use broad money (M2) as the dependent variable. Thus, even when the public sector is accounted for in the banking sector size measure, resource dependence still has a dampening effect on the banking sector in resource-rich countries. Thus, the low level of bank lending to private sector is not explained by the smaller private sector. Moreover, the underdeveloped financial sector is not likely to be explained by bad quality of financial intermediation either, as according to the pooled estimator, the interest rate spread is even slightly lower in resource-dependent countries. This result is not necessarily surprising, as big resource firms can be seen as good borrowers.

Control variables are mostly as expected and in line with previous studies. Index of economic freedom, secondary school enrollment, foreign direct investment and income level are positively correlated with banking sector size, when significant; whereas high inflation seems to be associated with a smaller banking sector. Legal background as a binary and time-invariant variable appears only in the pooled model, but accords with previous literature in that common law legal origin seems to create more a favorable environment for financial sector development than do other legal backgrounds.

Table 4 Regression results for key variables

	<u>Pooled estimator</u>			<u>Within estimator</u>		
	<i>pcred</i>	<i>M2</i>	<i>rate spread</i>	<i>pcred</i>	<i>M2</i>	<i>rate spread</i>
<i>mexport</i> > 5.8%	-0.225 *** <i>0.021</i>	-0.165 *** <i>0.016</i>		-0.060 * <i>0.035</i>	-0.011 <i>0.017</i>	
<i>mexport</i> ≤ 5.8%	0.089 *** <i>0.022</i>	0.030 * <i>0.016</i>		0.010 <i>0.019</i>	0.030 *** <i>0.009</i>	
<i>mexport</i>			-0.009 ** <i>0.004</i>			0.000 <i>0.007</i>
<i>econf</i>	1.131 *** <i>0.161</i>	0.014 <i>0.122</i>	0.177 *** <i>0.061</i>	1.775 *** <i>0.143</i>	0.509 *** <i>0.068</i>	-0.401 *** <i>0.067</i>
<i>cpiyy</i>	-0.355 *** <i>0.044</i>	-0.395 *** <i>0.033</i>	0.056 *** <i>0.017</i>	-0.034 <i>0.028</i>	-0.031 ** <i>0.013</i>	0.038 *** <i>0.012</i>
<i>school</i>	0.262 *** <i>0.045</i>	0.241 *** <i>0.034</i>	0.092 *** <i>0.018</i>	0.149 ** <i>0.075</i>	0.232 *** <i>0.036</i>	0.071 ** <i>0.034</i>
<i>gdp/cap</i>	0.247 *** <i>0.023</i>	0.141 *** <i>0.017</i>	-0.065 *** <i>0.008</i>	1.021 *** <i>0.097</i>	0.566 *** <i>0.046</i>	-0.091 ** <i>0.044</i>
<i>gdpgrowth</i>	-0.485 *** <i>0.161</i>	-0.642 *** <i>0.121</i>	-0.262 *** <i>0.058</i>	-0.310 *** <i>0.088</i>	-0.218 *** <i>0.042</i>	-0.100 *** <i>0.038</i>
<i>FDI</i>	-0.004 <i>0.082</i>	-0.030 <i>0.062</i>	0.019 <i>0.029</i>	0.154 *** <i>0.049</i>	0.091 *** <i>0.023</i>	0.004 <i>0.020</i>
<i>GSCI</i>	0.258 *** <i>0.044</i>	0.203 *** <i>0.034</i>	-0.023 <i>0.017</i>	0.038 <i>0.035</i>	0.019 <i>0.017</i>	-0.044 *** <i>0.015</i>
<i>legal</i>	0.193 *** <i>0.051</i>	0.141 *** <i>0.038</i>	-0.021 <i>0.019</i>			
<i>M2</i>			-0.183 *** <i>0.013</i>			-0.110 *** <i>0.026</i>
<i>Obs.</i>	1296	1290	1070	1296	1290	1070
<i>R</i> ²	0.58	0.46	0.37	0.41	0.46	0.23

Standard errors are below coefficients in italics. Significance level for 10%, 5%, and 1% are indicated by *, ** and *** respectively. Logarithmic transformations are used for both dependent and independent variables. Dependent variables: “pcred”: commercial banks’ credit to private sector to GDP (%); “M2”: money supply (M2) to GDP(%); “rate spread”: interest rate spread between lending and deposit rates(%-points). Independent variables: “mexport”: mineral exports share of total merchandise exports (%); “econf”: index of economic freedom; “cpiyy”: consumer price inflation, year-on-year change (%); “school”: gross secondary school enrollment (%); “gdp/cap”: per capita GDP (USD); “gdpgrowth”: GDP growth rate, year-on-year (%); “FDI”: foreign direct investment inflow to GDP (%); “GSCI”: Goldman Sachs Commodity Index; “legal”: binary variable for legal origin with 1=common law, 0=other.

Table 5 presents regression results for three other dependent variables, namely stock market capitalization, international debt issues and loans from non-resident banks. Stock market capitalization is perhaps the most commonly used indicator of market-based finance, and thus the

results are well comparable to previous studies. However, it is also an indicator of domestic financial sector size. As mineral exporting firms, according to our hypothesis, are able to access international financial markets directly as well, we also include less used indicators of international debt issues and foreign bank loans. For all of these variables, the number of observations is clearly smaller than with estimations on domestic banking sector.

Table 5 Regression results for market-based finance and foreign bank loans

<i>Independent variables</i>	<u>Pooled estimator</u>			<u>Within estimator</u>		
	<i>Dependent variables</i>			<i>Dependent variables</i>		
	<i>stmktcap</i>	<i>intldebt</i>	<i>nrbloan</i>	<i>stmktcap</i>	<i>intldebt</i>	<i>nrbloan</i>
<i>mexport</i>	0.195 *** <i>0.021</i>	-0.025 <i>0.039</i>	-0.003 <i>0.022</i>	-0.016 <i>0.043</i>	0.249 *** <i>0.094</i>	0.166 *** <i>0.040</i>
<i>econf</i>	-0.106 <i>0.284</i>	1.016 ** <i>0.457</i>	1.512 *** <i>0.281</i>	1.269 *** <i>0.278</i>	0.347 <i>0.528</i>	1.923 *** <i>0.265</i>
<i>cpiyy</i>	0.129 <i>0.087</i>	0.458 *** <i>0.137</i>	0.443 *** <i>0.088</i>	-0.028 <i>0.060</i>	0.200 * <i>0.109</i>	0.137 ** <i>0.056</i>
<i>school</i>	-0.115 <i>0.107</i>	0.990 *** <i>0.191</i>	-0.348 *** <i>0.105</i>	-0.032 <i>0.191</i>	0.841 ** <i>0.406</i>	-0.430 ** <i>0.181</i>
<i>gdp/cap</i>	0.304 *** <i>0.037</i>	0.302 *** <i>0.062</i>	0.288 *** <i>0.038</i>	1.105 *** <i>0.205</i>	0.252 <i>0.389</i>	0.824 *** <i>0.196</i>
<i>gdpgrowth</i>	-0.726 *** <i>0.272</i>	-0.753 * <i>0.407</i>	-0.841 *** <i>0.275</i>	-0.071 <i>0.156</i>	-0.444 <i>0.281</i>	-0.902 *** <i>0.146</i>
<i>FDI</i>	-0.085 <i>0.173</i>	0.829 *** <i>0.252</i>	0.990 *** <i>0.169</i>	0.363 *** <i>0.111</i>	-0.126 <i>0.199</i>	0.343 *** <i>0.102</i>
<i>GSCI</i>	0.458 *** <i>0.072</i>	0.125 <i>0.110</i>	-0.191 *** <i>0.073</i>	0.375 *** <i>0.066</i>	0.002 <i>0.126</i>	-0.225 *** <i>0.062</i>
<i>legal</i>	0.648 *** <i>0.075</i>	-0.226 * <i>0.121</i>	-0.509 *** <i>0.077</i>			
<i>M2</i>	1.146 *** <i>0.059</i>	-0.361 *** <i>0.106</i>	0.487 *** <i>0.071</i>	0.305 *** <i>0.111</i>	0.314 <i>0.204</i>	0.545 *** <i>0.104</i>
<i>stmktcap</i>		0.183 *** <i>0.052</i>	0.159 *** <i>0.033</i>		0.177 *** <i>0.067</i>	0.056 * <i>0.033</i>
<i>Obs.</i>	932	749	899	932	749	899
<i>R²</i>	0.57	0.30	0.48	0.45	0.11	0.35

Standard errors are below coefficients in italics. Significance level for 10%, 5%, and 1% are indicated by *, ** and *** respectively. Logarithmic transformations are used for both dependent and independent variables. Dependent variables: “stmktcap”: stock market capitalization to GDP (%); “intldebt”: international debt issues to GDP(%); “nrbloan”: loans from non-resident banks to GDP (%). Independent variables: “mexport”: mineral exports share of total merchandise exports (%); “econf”: index of economic freedom; “cpiyy”: consumer price inflation, year-on-year change (%); “school”: gross secondary school enrollment (%); “gdp/cap”: per capita GDP (USD); “gdpgrowth”: GDP growth rate, year-on-year (%); “FDI”: foreign direct investment inflow to GDP (%); “GSCI”: Goldman Sachs Commodity Index; “legal”: binary variable for legal origin with 1=common law, 0=other; “M2”: money supply (M2) to GDP(%).

Here, pooled and within estimators give significant results with different dependent variables. According to the pooled estimator, higher mineral export share is associated with higher stock market capitalization. The same coefficient in the within estimator is negative, but very small and insignificant. However, the within-estimator shows positive coefficient between mineral export share and international debt issues as well as non-resident bank loans. So the results confirm our hypothesis, that market-based finance plays a bigger role in resource dependent economies.

Control variables show also an interesting result for legal background. Countries with common law legal origins are likely to have lower levels of international debt issues and foreign bank loans whereas their domestic financial sectors tend to be more developed as measured by stock market size or also by banking sector size, in the previous estimations. High inflation leads to a larger role of offshore financial markets.

Thus, it appears that the financial sector structure in resource-dependent economies indeed serves well the financial needs of big well-known firms. That is, domestic bank loans are less common, whereas the use of stock markets and cross-border financing is more common. However, that results in an especially challenging environment for small and medium size enterprises as well as for emerging businesses, which are known to be more dependent on domestic banks. We thus suggest that financial sector structure is likely to constrain economic diversification in resource-dependent economies.

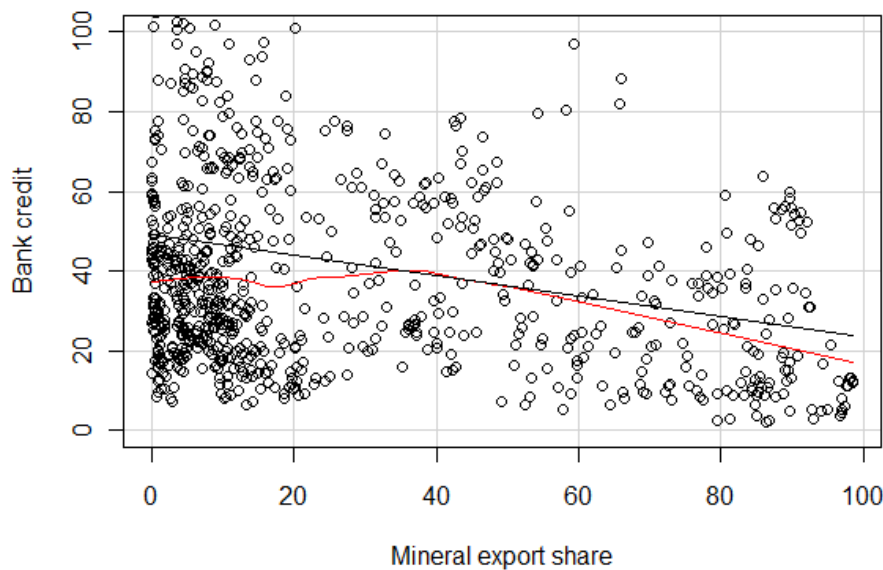
3.2.2 Robustness checks

Cross-country regressions always pose several challenges. The first is obviously country heterogeneity, which is difficult to fully capture by estimators. In particular, correlations tend to be kinked at the extreme ends of the income distribution. Thus, we repeat the estimations for middle income countries based on the World Bank income rank in 1995. Limiting the data to middle-income countries reduces the outlier problem, as some rich countries have extremely large banking sectors. Similarly, some of the poorest countries have extremely underdeveloped financial sectors. The sample of middle-income countries includes 64 countries in total, roughly half of the full sample.

The results are mostly unaltered. Interestingly, even though again the relationship between mineral exports and bank credit seems to require piecewise regression, the threshold is clearly higher. In fact, it is close to the often-used criterion for resource-dependence (e.g. Nili,

Rastad 2007), 40% share of minerals in total exports, as seen in Figure 2. In fact, this dramatic change happens when the poorest countries are removed, which means that even quite low dependence on resources is harmful for financial sector development in the poorest countries in particular.

Figure 2 Mineral export share and bank credit to private sector in middle-income countries



Data source: WDI and own calculations.

Regression results are reported in Table 6. Again, the coefficient for resource-dependence is negative and significant in the resource-dependent group. Also in line with earlier regressions, stock market capitalization seems to be higher in resource-dependent countries, according to the pooled model.

Table 6 Regressions repeated with only middle-income economies

	<u>Pooled estimator</u>		<u>Within estimator</u>	
	<i>pcred</i>	<i>stmktcap</i>	<i>pcred</i>	<i>stmktcap</i>
<i>mexport>40</i>	-0.810 *** <i>0.098</i>		-0.359 ** <i>0.140</i>	
<i>mexport≤40</i>	-0.011 <i>0.017</i>		0.006 <i>0.015</i>	
<i>mexport</i>		0.260 *** <i>0.027</i>		-0.049 <i>0.072</i>
<i>econf</i>	1.479 *** <i>0.195</i>	0.998 *** <i>0.345</i>	1.410 *** <i>0.159</i>	1.621 *** <i>0.346</i>
<i>cpiyy</i>	-0.376 *** <i>0.056</i>	-0.126 <i>0.104</i>	0.040 <i>0.033</i>	-0.065 <i>0.076</i>
<i>school</i>	0.469 *** <i>0.108</i>	0.085 <i>0.191</i>	0.181 * <i>0.107</i>	0.167 <i>0.274</i>
<i>gdp/cap</i>	-0.054 <i>0.042</i>	0.115 * <i>0.065</i>	1.573 *** <i>0.119</i>	0.751 ** <i>0.295</i>
<i>gdpgrowth</i>	-0.419 ** <i>0.194</i>	-0.541 * <i>0.323</i>	-0.349 *** <i>0.088</i>	-0.220 <i>0.196</i>
<i>FDI</i>	0.192 ** <i>0.094</i>	-0.275 <i>0.209</i>	0.126 *** <i>0.048</i>	0.279 ** <i>0.138</i>
<i>GSCI</i>	0.210 *** <i>0.054</i>	0.476 *** <i>0.090</i>	-0.159 *** <i>0.043</i>	0.463 *** <i>0.100</i>
<i>legal</i>	0.119 <i>0.081</i>	1.030 *** <i>0.133</i>		
<i>M2</i>		1.080 *** <i>0.076</i>		0.207 <i>0.155</i>
<i>Obs.</i>	710	585	710	585
<i>R²</i>	0.38	0.47	0.52	0.41

Standard errors are below coefficients in italics. Significance level for 10%, 5%, and 1% are indicated by *, ** and *** respectively. Logarithmic transformations are used for both dependent and independent variables. Dependent variables: “pcred”: commercial banks’ credit to private sector to GDP (%); “stmktcap”: stock market capitalization to GDP (%). Independent variables: “mexport”: mineral exports share of total merchandise exports (%); “econf”: index of economic freedom; “cpiyy”: consumer price inflation, year-on-year change (%); “school”: gross secondary school enrollment (%); “gdp/cap”: per capita GDP (USD); “gdpgrowth”: GDP growth rate, year-on-year (%); “FDI”: foreign direct investment inflow to GDP (%); “GSCI”: Goldman Sachs Commodity Index; “legal”: binary variable for legal origin with 1=common law, 0=other; “M2”: money supply (M2) to GDP(%).

Also, we have other indicators of resource dependence as described in chapter 3.1. First, we use the non-manufacturing share of industrial production as the independent variable in explaining the financial sector variables. Results are depicted in Table 7. Again, the regression results for credit to private sector seem robust. However, results on stock market capitalization are mixed,

as stock market capitalization has a negative and significant coefficient here, whereas with MEXPORT the coefficient has always been positive, when significant. Other than that, these regressions seem to confirm the earlier findings.

Table 7 Regressions repeated with minerals production share as resource indicator

	<u>Pooled estimator</u>		<u>Within estimator</u>	
	<i>pcred</i>	<i>stmktcap</i>	<i>pcred</i>	<i>stmktcap</i>
<i>mqproxy</i> > 41 %	-0.951 *** <i>0.079</i>		-0.150 <i>0.121</i>	
<i>mqproxy</i> ≤ 41 %	0.375 *** <i>0.084</i>		-0.092 <i>0.089</i>	
<i>mqproxy</i>		0.042 <i>0.080</i>		-0.279 ** <i>0.123</i>
<i>econf</i>	1.233 *** <i>0.143</i>	-0.350 <i>0.302</i>	1.375 *** <i>0.145</i>	1.224 *** <i>0.290</i>
<i>cpiyy</i>	-0.285 *** <i>0.040</i>	0.166 * <i>0.092</i>	-0.032 <i>0.025</i>	-0.028 <i>0.062</i>
<i>school</i>	0.299 *** <i>0.042</i>	0.030 <i>0.113</i>	0.079 <i>0.076</i>	0.045 <i>0.200</i>
<i>gdp/cap</i>	0.230 *** <i>0.021</i>	0.332 *** <i>0.040</i>	1.016 *** <i>0.098</i>	0.913 *** <i>0.210</i>
<i>gdpgrowth</i>	-0.562 *** <i>0.150</i>	-0.808 *** <i>0.290</i>	-0.331 *** <i>0.087</i>	-0.100 <i>0.161</i>
<i>FDI</i>	-0.051 <i>0.079</i>	0.130 <i>0.194</i>	0.228 *** <i>0.049</i>	0.375 *** <i>0.125</i>
<i>GSCI</i>	0.265 *** <i>0.044</i>	0.507 *** <i>0.077</i>	0.012 <i>0.036</i>	0.421 *** <i>0.066</i>
<i>legal</i>	0.207 *** <i>0.051</i>	0.673 *** <i>0.080</i>		
<i>M2</i>		1.047 *** <i>0.062</i>		0.381 *** <i>0.116</i>
<i>Obs.</i>	1344	911	1344	911
<i>R</i> ²	0.57	0.52	0.35	0.44

Standard errors are below coefficients in italics. Significance level for 10%, 5%, and 1% are indicated by *, ** and *** respectively. Logarithmic transformations are used for both dependent and independent variables. Dependent variables: “*pcred*”: commercial banks’ credit to private sector to GDP (%); “*stmktcap*”: stock market capitalization to GDP (%). Independent variables: “*mqproxy*”: non-manufacturing production share of total industrial production (%); “*econf*”: index of economic freedom; “*cpiyy*”: consumer price inflation, year-on-year change (%); “*school*”: gross secondary school enrollment (%); “*gdp/cap*”: per capita GDP (USD); “*gdpgrowth*”: GDP growth rate, year-on-year (%); “*FDI*”: foreign direct investment inflow to GDP (%); “*GSCI*”: Goldman Sachs Commodity Index; “*legal*”: binary variable for legal origin with 1=common law, 0=other; “*M2*”: money supply (M2) to GDP(%).

We say relatively little about causality in this paper, as the aim here is more to describe financial sector characteristics in resource-dependent economies. However, we do have a good exogenous variable for resource wealth, subsoil assets, which can be used at least as a strong argument that financial sector structure yields from the endowment structure, not the other way around. However, as we have only one observation for subsoil assets, we calculate country averages. The results are depicted in Table 8. Again the results seem very robust for private credit, so that a higher ratio of subsoil assets to GDP pairs with a lower level of credit to the private sector. However, we fail to find a significant coefficient for resource-dependence when stock market capitalization is the dependent variable.

Table 8 Regression results for country averages

<i>independent variables</i>	OLS Estimator for country averages			
	<i>dependent variable is pcred</i>		<i>dependent variable is stmktcap</i>	
	<i>Coefficient</i>	<i>Std. Error</i>	<i>Coefficient</i>	<i>Std. Error</i>
<i>subsoil assets</i>	-0.071	0.029 **	0.084	0.055
<i>econf</i>	0.277	0.617	0.908	1.340
<i>cpipy</i>	-0.621	0.197 ***	0.522	0.476
<i>school</i>	0.528	0.154 ***	0.381	0.438
<i>gdp/cap</i>	0.231	0.076 ***	0.136	0.156
<i>gdpgrowth</i>	-0.327	1.014	-5.528	2.301 *
<i>fdi</i>	-0.793	0.433 *	-1.027	0.953
<i>legal</i>	0.279	0.156 *	0.408	0.281
<i>M2</i>			1.250	0.245 ***
<i>Obs.</i>	112		82	
<i>R²</i>	0.66		0.59	

Significance level for 10%, 5%, and 1% are indicated by *, ** and *** respectively. Logarithmic transformations are used for both dependent and independent variables. Dependent variables: “pcred”: commercial banks’ credit to private sector to GDP (%), country average for 1995-2009; “stmktcap”: stock market capitalization to GDP (%) country average for 1995-2009. Independent variables: “subsoil”: subsoil assets in 2000 to GDP; “econf”: index of economic freedom, country average for 1995-2009; “cpipy”: consumer price inflation, year-on-year change (%), country average for 1995-2009; “school”: gross secondary school enrollment (%), country average for 1995-2009; “gdp/cap”: per capita GDP (USD), country average for 1995-2009; “gdpgrowth”: GDP growth rate, year-on-year (%), country average for 1995-2009; “fdi”: foreign direct investment inflow to GDP (%), country average for 1995-2009; “legal”: binary variable for legal origin with 1=common law, 0=other; “M2”: money supply (M2) to GDP(%).

Omitted variable bias is tackled by using the fixed effects estimator but obviously remains present. Risk of spurious regression, though existent, is not severe in our view, given that resources must be considered an initial endowment. Of course, resources are valued with market prices, which are often driven by benign global economic developments. Strong global growth

is likely to support most countries' growth and thus financial sector development. However, we control for both resource prices and GDP growth in our regressions.

4 Interpretation of results

Very little research has been done on the link between financial sector and natural resources. Most microeconomic studies on financial needs of firms concentrate on the manufacturing sector (e.g. Rajan and Zingales (1998), Cetorelli and Gambera (2001)). Moreover, while macroeconomic research on resource-dependent economies is extensive, it is focused more on economic growth. Thus, there are plenty of open issues related to financial sector's role in resource-dependent economies.

Here we suggest three alternative hypotheses on why the financial sector has the above described characteristics in resource-dependent economies. Demand hypothesis is based on the assumption that the financial sector is formed according to the needs of the most prominent sector of the economy, the resource sector. As intuitive as this assumption is, one should keep in mind that financial sector development is rarely free of the country's political interests, and thus the assumption of purely market-based financial sector development is likely to be rather unrealistic.

Interest group hypothesis, first presented by Rajan and Zingales (2003b), thus has some appeal. Incumbents in a given sector are prone not to support financial sector development, as finance disproportionately supports entrants and thus spurs competition. Although Rajan and Zingales did not originally suggest the theory for resource firms in particular, it seems to fit perfectly with many resource-dependent economies.

Finally, we look at volatility hypothesis, which suggests that the macroeconomic volatility caused by highly cyclical raw materials prices might deter financial sector development.

4.1 Demand hypothesis

The most obvious reason for an underdeveloped banking sector in resource-dependent economies is based on a low level of demand for banking services by resource firms. However, as there has been very little empirical work done on financial needs of big resource firms, this hypothesis remains for future research.

Resource firms tend to be big compared to the size of the economy. As mineral production is unlikely to require constant external financing, cash flow financing is probably the main source of working capital. However, when resource firms invest, their investments can easily be big relative to the banking sector size especially in developing economies. Thus, bank-based finance might be difficult to obtain, as banks might find it difficult to sufficiently diversify their loan portfolios. Due to their size however, resource firms achieve economies of scale in market-based finance (Lin, Sun & Jiang 2009), which would explain the use of equity and debt markets. Firm size also helps in the capital markets due to the fact that big resource firms tend to be well known by international investors. Government involvement might also have an effect on financial sector structure. As government ownership often plays a big role in the resource sector (Wolf 2009), resource firms are likely to have better access to international capital markets.

An interesting implication of this theory is the low level of economic diversification in resource-dependent countries. That is, as Rajan and Zingales (1998) argue, a developed banking sector enhances the development of industries that require a great deal of external funding. These industries tend to be high value added manufacturing sectors such as pharmaceuticals and IT, that is, exactly those industries that would support economic diversification in resource-dependent economies. Following the reasoning by Lin et al. (2009), a financial sector built on the needs of big firms tends not to serve smaller firms well. That is likely to further deter the development of the vital SME sector.

The shortcoming of this demand theory is that the financial sector tends to be subject to significant regulation, especially in developing economies. Typically, there is regulation on capital requirements and other risk monitoring for banks. Also, regulation of entry is not uncommon (Rajan, Zingales 2003a). Thus, we are not convinced that financial markets are formed solely to meet market-determined demand. The financial sector continues to gather substantial political attention even in the most developed countries, so that undistracted development of financial markets in developing economies seems rather unrealistic.

4.2 Interest group hypothesis

Rajan and Zingales (2003b) present an interest group theory on financial sector development according to which incumbents in different sectors might want to thwart financial sector devel-

opment because finance disproportionately supports new entrants and thus spurs competition. However, trade openness reduces incumbent opposition to financial development, as expanding product markets add to incumbents' own funding needs.

Although the interest group theory was not originally designed to describe the behavior of the resource sector, we find this theory useful for analyzing resource-dependent economies. Interestingly, the resource sector is not likely to push for economic developments that are typically needed by the manufacturing sector. Following the reasoning by Rajan and Zingales (2003b), resource-rich countries are likely to have a strong elite built around the resources, which has very little interest in developing the country so as to favor the manufacturing sector. The resource sector does not need masses of educated labor force or immaterial property rights, as the sector typically does not actively pursue innovation. The elite with access to resource rents have much influence over politicians or are directly involved in politics and have thus no interest in promoting a more democratic state. The legal environment is also of little importance, as once again the elite have sufficient power to advance their own interests, which is perhaps even easier to do with a weaker rule of law. Public protection of property rights is not necessary, as it can be replaced by private protection of property rights (Sonin 2003). Market conditions are mostly determined exogenously, as the resource sector is highly dependent on global commodity prices.

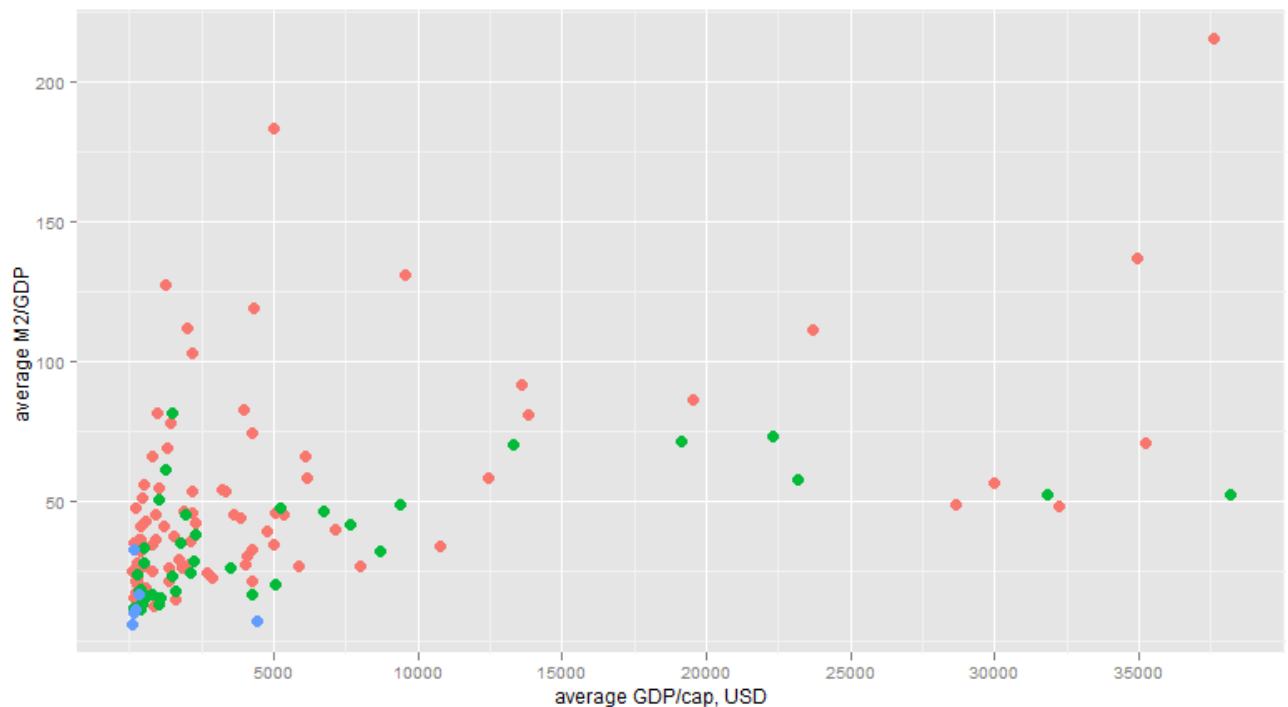
The threat to the resource elite lies in the fact that it does not require much special knowledge to manage resources. Thus, the incumbents in the resource sector can be displaced at any time, if entrants gain sufficient political and financial power. As Rajan and Zingales (2003a) argue, the financial sector is a significant factor in supporting entrants, thus the development of the financial sector actually creates a threat to incumbents in the resource sector. Moreover, trade openness rarely changes the situation, as international trade barriers usually do not concern minerals, at least not energy products. Moreover, firms in resource sector tend to be big and well-known and thus have access to global financial markets.

Thus, in addition to the fact that the resource sector does not need domestic banking services, it is reasonable to assume that it does not even want a highly developed domestic financial sector. This theory would also extend the grabbing hand theory introduced by Frye and Shleifer (1997). Perhaps not only government, but also an influential group of resource sector firm managers will have little interest in supporting law enforcement.

4.3 Volatility hypothesis

Van der Ploeg and Poelhekke (2009) suggest that volatility is an important but overlooked channel of the resource curse. Although macroeconomic volatility is likely to dampen growth through several channels, it is probably also a factor behind underdevelopment of the financial sector in resource-dependent economies. Boyd et al. (2001) provide empirical evidence that even predictable increases in the inflation rate produce disturbances in the financial sector. Similarly, volatility of GDP growth, terms-of-trade and the real exchange rate, caused by significant uncertainty related to commodities prices, could deter financial sector development.

Figure 3 Resource-dependent countries (green dots) often have intermediate levels of banking sector development



Resource-dependent countries are countries where mineral export share of total exports is greater than 40% on average in 1995-2009. Those countries include Algeria, Angola, Australia, Azerbaijan, Bahrain, Bolivia, Botswana, Cameroon, Chile, Republic of Congo, Ecuador, Egypt, Gabon, Guinea, Iran, Kazakhstan, Kuwait, Libya, Mauritania, Mongolia, Mozambique, Namibia, Niger, Nigeria, Norway, Oman, Peru, Qatar, Russia, Saudi Arabia, Sudan, Syria, Tajikistan, Trinidad and Tobago, United Arab Emirates, Venezuela, Yemen and Zambia. Red dots indicate countries where mineral export share of total exports is below 40%. For countries marked with blue dots, the export data were not available. Data source: WDI and own calculations.

Berglof and Lehmann (2009) note that resource-dependent economies tend to suffer from the bulkiness of investments and thus lack more sustainable demand for financial services. Roe and Siegel (2011) argue that political instability is another major obstacle for financial sector de-

velopment. Especially in early stages of development, resource-rich countries tend to be particularly vulnerable to political instability.

Aghion et al. (2004) use an open economy model to show that countries with intermediate levels of financial development are likely to suffer most from macroeconomic volatility as well as from capital account liberalization. As resource dependent economies are scarce among the financially developed countries (Figure 3), they are likely to be vulnerable to macroeconomic volatility.

However, the causality remains subject to debate, as Van der Ploeg and Poelhekke (2009) show that financially underdeveloped countries are likely to suffer from higher volatility, whereas many studies (e.g. Boyd, Levine & Smith 2001) suggest that the financial sector is not likely to develop in a volatile environment. However, as the main source of volatility in resource dependent economies is commodity prices, which are exogenous, we expect commodity price volatility to cause the overall volatility in these economies.

5 Conclusions

This paper contributes to research related to both financial sector and the resource curse. We shed light on the previously neglected question of how resource wealth affects a country's financial sector structure and suggest that the banking sector characteristics might be one of the reasons for economic problems observed in resource-dependent economies. We argue that the observed financial development can at least partly be attributed to natural resource dependence due to the fact that natural resource wealth is seen as the country's initial endowment just like labor and capital. Further, we argue that a financial sector structure in resource-dependent economies might be unfavorable for emerging businesses, which could play a part in the resource curse by hampering economic diversification.

Using a unique dataset covering 128 countries, we present empirical evidence that the banking sector indeed tends to be smaller in resource-dependent economies, even when controlling for several other factors which have been shown to have a significant effect on financial sector development in previous studies. Intuition says that resource wealth, like any other wealth, should be benign for financial development. Indeed, that seems to be the case at very low levels of resource dependence. We locate a threshold where the country's mineral exports account for about 6% of total exports. With export dependence on minerals above the threshold

level, correlation between resource export share and domestic banking sector size turns negative.

Whereas the evidence for a smaller domestic banking sector is strong, there is more uncertainty in our estimations of the role played by market-based finance in resource dependent economies, due to more limited data availability. However, the main results point to larger stock market capitalization, a higher level of international debt issues and more foreign bank loans in resource-dependent economies.

There are several possible reasons for the underdevelopment of domestic banking sector and bigger role of market-based finance. Theoretically, a country's production structure is formed on the basis of its initial endowments, and the financial sector is then formed on the basis of the needs of the production sector. According to previous literature, big firms are likely to be best served by big banks or by capital markets, as their financing needs can be large relative to domestic bank assets, especially in developing economies. The literature also suggests that macroeconomic volatility due to volatile resource prices is likely to hamper domestic banking sector development. Thus, our results are well in line with the previous literature.

Whatever the reason behind the financial development in resource-dependent economies, the financial sectors in those countries seem to have characteristics that are unfavorable to small and medium size enterprises and emerging businesses, which tend to be more dependent on the domestic banking sector than are the bigger and more mature firms. Consequently, we argue that financial sector development based on large resource endowments might play a role in the resource curse. A financial sector that is structured to serve large firms is perhaps unable to serve emerging sectors of the economy and thus restrains economic diversification.

However, very little research has been done on the financial sector's role in resource-dependent economies. Both determinants of observed financial sector development and the effect of financial structure for future economic development remain open for study.

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Appendix

Table 9 Sample countries and their sample means for mineral exports and private credit

<i>Country</i>	<i>Mineral export share of total exports, %</i>	<i>Bank credit to private sector/GDP, %</i>
1 Algeria	97.1	8.9
2 Angola	98.5	6.6
3 Argentina	16.6	17.3
4 Armenia	28.6	8.6
5 Australia	43.2	96.3
6 Azerbaijan	82.7	7.2
7 Bahrain	85.6	67.6
8 Bangladesh	0.6	28.8
9 Belarus	26.2	13.4
10 Belize	16.7	54.8
11 Benin	1.4	13.4
12 Bolivia	53.3	49.7
13 Botswana	84.2	15.7
14 Brazil	14.2	37.0
15 Bulgaria	22.4	34.1
16 Burkina Faso	0.9	13.2
17 Burundi	3.9	22.8
18 Cambodia	0.5	8.8
19 Cameroon	51.6	8.8
20 Canada	22.2	135.9
21 Cape Verde	0.2	41.7
22 Central African Republic	21.5	5.6
23 Chile	51.2	76.1
24 China	4.5	109.5
25 Colombia	39.4	29.9
26 Congo, Rep.	86.9	5.3
27 Costa Rica	1.6	27.9
28 Croatia	13.8	42.8
29 Cyprus	8.7	120.5
30 Czech Republic	5.2	49.3
31 Denmark	7.6	97.2
32 Djibouti	6.8	30.6
33 Dominican Republic	4.1	31.4
34 Ecuador	45.1	26.0
35 Egypt, Arab Rep.	47.4	53.2
36 El Salvador	4.4	41.3
37 Estonia	10.6	50.7
38 Ethiopia	1.4	19.6
39 Fiji	0.8	35.5
40 Gabon	84.8	9.6
41 Gambia, The	2.5	13.4
42 Georgia	27.5	11.9

<i>Country</i>	<i>Mineral export share of total exports, %</i>	<i>Bank credit to private sector/GDP, %</i>
43 Ghana	34.7	11.4
44 Guatemala	7.0	23.0
45 Guinea	70.8	4.0
46 Guinea-Bissau	0.5	5.9
47 Guyana	37.1	53.9
48 Honduras	6.5	38.2
49 Hungary	4.4	38.9
50 Iceland	21.2	89.6
51 India	11.5	33.6
52 Indonesia	32.1	32.7
53 Iran, Islamic Rep.	83.0	34.9
54 Israel	1.6	80.5
55 Jamaica	13.2	21.9
56 Japan	2.4	195.7
57 Jordan	17.6	79.2
58 Kazakhstan	71.8	22.8
59 Kenya	12.3	28.3
60 Korea, Rep.	6.5	89.0
61 Kuwait	91.7	57.8
62 Kyrgyz Republic	21.1	7.1
63 Latvia	6.7	40.0
64 Lebanon	10.1	63.9
65 Lesotho	0.1	13.7
66 Libya	93.7	20.4
67 Lithuania	21.6	26.5
68 Macedonia, FYR	10.7	24.7
69 Madagascar	7.7	9.6
70 Malawi	0.4	7.8
71 Malaysia	11.9	126.7
72 Mali	2.7	16.8
73 Malta	1.2	108.4
74 Mauritania	60.2	21.2
75 Mauritius	0.5	63.4
76 Mexico	13.4	20.0
77 Moldova	3.3	18.4
78 Mongolia	54.8	20.5
79 Morocco	12.4	54.6
80 Mozambique	47.1	12.9
81 Namibia	49.1	46.2
82 Nepal	1.5	29.1
83 New Zealand	7.5	117.2
84 Nicaragua	2.1	27.5
85 Niger	59.3	6.3

<i>Country</i>	<i>Mineral export share of total exports, %</i>	<i>Bank credit to private sector/GDP, %</i>
86 Nigeria	96.2	15.0
87 Norway	66.4	78.9
88 Oman	83.0	35.8
89 Pakistan	3.0	25.4
90 Panama	6.0	88.3
91 Paraguay	0.7	25.4
92 Peru	58.1	22.6
93 Philippines	4.6	41.6
94 Poland	10.1	28.1
95 Qatar	89.1	33.8
96 Romania	11.8	15.3
97 Russian Federation	61.5	20.6
98 Rwanda	26.7	9.7
99 Samoa	0.5	32.7
100 Saudi Arabia	89.6	54.9
101 Senegal	24.7	19.2
102 Slovak Republic	8.6	42.4
103 Slovenia	5.6	38.8
104 South Africa	28.8	132.2
105 Sri Lanka	1.9	30.1
106 Sudan	53.4	5.7
107 Suriname	10.8	16.7
108 Swaziland	1.1	16.7
109 Sweden	6.6	100.0
110 Switzerland	4.9	162.2
111 Syrian Arab Republic	63.6	11.1
112 Tajikistan	69.7	16.9
113 Tanzania	11.1	8.1
114 Thailand	4.2	119.5
115 Togo	23.5	17.3
116 Trinidad and Tobago	61.1	37.3
117 Tunisia	12.4	65.9
118 Turkey	5.2	21.4
119 Uganda	4.0	7.7
120 Ukraine	14.7	23.0
121 United Arab Emirates	79.8	58.2
122 United States	5.4	170.7
123 Uruguay	2.7	35.4
124 Venezuela, RB	87.5	13.9
125 Vietnam	22.3	51.0
126 Yemen, Rep.	94.1	6.0
127 Zambia	76.5	8.7
128 Zimbabwe	20.2	30.6

Table 10 Summary statistic for control variables

	Consumer price inflation, % y/y	Index of economic freedom	Foreign direct investments to GDP	GDP growth, % y/y	GDP per capita, USD	Goldman Sachs commodity price index	Secondary school enrollment	Mineral export share of total exports, %	Bank credit to private sector/GDP, %
<i>Descriptive statistics</i>									
Mean	8.8	58.7	4.1	2.8	5248.2	299.4	67.9	27.06	39.26
Std. Dev.	12.9	9.9	6.6	4.9	8732.6	142.5	31.1	30.20	39.10
Min	-9.8	22.7	-16.6	-29.6	80.6	154.2	5.2	0.00	0.00
Max	128.4	82.6	77.4	65.8	42132.9	640.3	161.8	99.67	231.10
Obs	1864	1869	1936	1970	1973	15	1832	1692	1827
<i>Correlations</i>									
CPI	1								
econf	-0.27 ***	1							
FDI	-0.11 ***	0.11 ***	1						
GDP growth	-0.09 ***	-0.06 **	0.16 ***	1					
GDP per cap	-0.21 ***	0.58 ***	-0.02	-0.09 ***	1				
GSCI	-0.06 **	0.06 **	0.19 ***	0.21 ***	0.01	1			
school	-0.11 ***	0.48 ***	0.18 ***	0.14 ***	0.57 ***	0.10 ***	1		
mexport	-0.02	-0.19 ***	0.02	0.03	-0.07 **	0.06 **	-0.02	1	
pcrd	-0.26 ***	0.59 ***	0.06 **	-0.07 **	0.72 ***	0.08 ***	0.50 ***	-0.23 ***	1

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