

# Are natural resources really a curse?

## A study of firms in developing countries

--A 4-page summary--

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### What is the natural resource curse?

Studies have shown that countries which are more abundant in natural resources tend to have lower economic growth than other countries. This relationship is most aptly described by Sachs and Warner (1997; 1999; 2001) who estimate the simple model shown in figure 1.

Various explanations for the natural resource curse can be advanced. This includes (1) Dutch disease effects in which natural resources are exported, causing exchange rate appreciation, and, due to natural resource price instability, exchange rate volatility; (2) Balassa-Samuelson effects in which resource companies are able to pay a premium for inputs including labour and capital.

This forces up the prices of wage labour and capital for other firms, and general inflation passes through to the rest of the economy. In addition, there may be scarcity of labour and capital for non resource firms; and (3) Political economy or Institutional effects which might include increased opportunity and incentive for corruption and general “malign neglect” of other industries by government and bureaucrats.

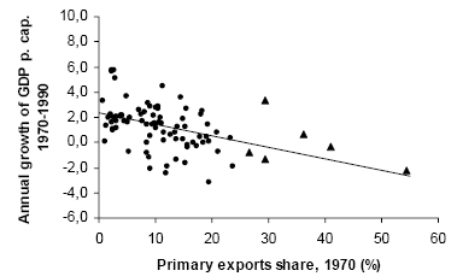
All of these explanations for the relationship shown in figure 1 above indicate that non natural resource firms should suffer. Otherwise put, natural resource abundance should increase the likelihood that non resource firms cite particular obstacles to business. Despite the fact that the macro relationship has been well established, there have been few studies of the natural resource curse on a firm level. This study helps to fill this gap.

We use data from over 15,000 non natural resource firms in 30 developing countries drawn from the World Bank Investment Climate Assessments (ICA). These surveys collect information on constraints/obstacles to doing business. Firms are asked to rate of a scale of 0 (no constraint) to 4 (sever constraint) each of several potential obstacles including corruption; labour regulations; economic and regulatory uncertainty; licensing and operating permits; worker skills; access to finance; cost of finance; and macroeconomic instability. A positive relationship is to be expected between a country’s natural recourse abundance and each of these obstacles if the three explanations cited above are correct. In addition, the ICA collect data on firm characteristic.

This is combined with data on natural resource abundance taken from Sachs and Warner (1997) which gives the primary exports as a share of GNP in 1980. In addition, country controls from World Development Indicators are used. Included countries are shown in table 1 below and descriptive data are given in table 2.

The most important obstacle to doing business is macroeconomic instability at 2.08/4 and the second most important is corruption at 2/4. These are followed (in order of importance) by economic and regulatory uncertainty; cost of finance; access to finance; worker skills; labour regulation; and licensing and operating permits.

Figure 1: Growth and natural resources



Source: Sachs and Warner (1997)

The average firm in the sample is 19 years old and employs 189 employees. Around 2% are former government owned, and 3% are in the service industry, with the rest in manufacturing. Around 34% reported exporting as least a part of their production, and 88% were predominately domestically owned.

Country variables include GNI per capita in 2005, with an average income of around US\$1,800. Life expectancy in the countries sampled averages nearly 69 years of age and 2% of the countries are landlocked. On average, the present value of debt as a percentage of exports in 2006 was 84%. The Sachs and Warner (1997) variable for natural resource abundance gives natural resource exports as a percentage of GDP in 1980. This averages 15%.

### Estimation method and results

We estimate business constraints as a function of firm and country variables, including the natural resource abundance indicator. Since the dependent variable can take the values from zero (no obstacle) to 4 (sever obstacle), we use an ordered probit model. The full model takes the form:

$$Obstacle_i = f(g(Resources_i, Firm_i, Country_i)) + \varepsilon$$

where business constraint (*Obstacle*) is a function of *g(.)* that represents an unobserved perception of the firm's business constraints (the latent variable) that is determined by the natural resource abundance of a country (*Resources<sub>i</sub>*), a vector of firm characteristics (*Firm<sub>i</sub>*) and a vector of country characteristics (*Country<sub>i</sub>*). The error term is given by  $\varepsilon$ . The function *f(.)* rises in five steps as *g* increases. The error term captures firm's inability to give precisely the level of constraint any obstacle poses since they are unable to know other firms' levels of constraint.

Finally, the ordered probit is a suitable model since it allows for ordinality, rather than cardinality in the zero to four ratings for business constraint level in the dependent variable. For example, moving from one to two is not assumed to be the same leap as that from three to four.

Results from the ordered probit models for each business constraint are presented in table 3 at the end of this summary. The results offer little support for the existence of a natural recourse curse. The natural resource

indicator is insignificant at conventional levels in all except two of the eight business constraints analysed. It is however significant for Macroeconomic Instability and Corruption. This is telling since institutions and exchange rate over-valuation are often cited as one of the major means by which the natural resource curse is felt by non resource firms. In addition, exchange rate uncertainty is likely to make planning for business difficult as exchange rates are likely to fluctuate with price changes in natural resources.

**Table 1: Number of firms from each country included in the study, by region**

Number of firms from each country included in the study, by region	
<b>Africa</b>	
Benin2004	145
Kenya2003	236
Madagascar2005	286
Malawi2005	151
Mali2003	81
Mauritius2005	173
Senegal2003	141
SouthAfrica2003	583
Tanzania2003	172
Uganda2003	137
<b>Africa total</b>	<b>2,105</b>
<b>East Asia</b>	
Indonesia2003	691
Philippines2003	636
Thailand2004	1,384
<b>East Asia total</b>	<b>2,711</b>
<b>Latin America</b>	
Brazil2003	1,635
Chile2004	877
CostaRica2005	341
Ecuador2003	441
ElSalvador2003	465
Guatemala2003	454
Honduras2003	450
Nicaragua2003	452
Peru2002	137
<b>Latin America total</b>	<b>5,252</b>
<b>Middle East / North Africa</b>	
Algeria2002	416
Egypt2004	974
Oman2003	240
Syria2003	537
<b>Middle East / North Africa total</b>	<b>2,167</b>
<b>South Asia</b>	
Bangladesh2002	972
India2002	1,674
Pakistan2002	135
SriLanka2004	420
<b>South Asia total</b>	<b>3,201</b>
<b>Total</b>	<b>15,436</b>

However, in both cases, the sign is actually *negative*, the opposite to that which would be expected if natural resources increased the obstacles non resource firms faced in these areas. That is, firms in countries more abundant in natural resources, actually rated corruption and macroeconomic instability as a *less* severe obstacle to business.

The strongest interpretation of these results is that the natural resource curse simply doesn't exist. This is in line with Brunnschweiler (2006) and Cerny and Filer (2007). As a minimum, the results suggest that non natural resource firms are not affected by the curse in the ways that are usually suggested, and that we should look at other avenues.

Coefficients on other variables tend to be as would be expected giving increased confidence in the results related to natural resources. Several variables are of interest and deserve some discussion. Former government-owned firms are significantly less likely to cite corruption as a major obstacle than other firms. This is likely to be indicative of the fact that links remain between these firms and the government.

Labour regulations are more of an obstacle the larger the firm, and less of an obstacle for firms in the service industry. This is perhaps due to the fact that larger more stringent labour regulations, whilst a certain amount of employment in the service sector may be informal.

Debt as a percentage of exports is positively related to most potential business constraints. Other things being equal, firms in countries whose government is more indebted face greater business constraints. Older firms and former government owned firms are less likely to face obstacles with licensing or permits. This is likely to reflect established relationships helping to smooth such applications.

The importance of institutions is shown by the World Bank Corruption Score. Firms in countries rated as less corrupt rated six of the eight categories as lower obstacles. This is in line with Sala-i-Martin and Subramanian (2003) who find that institutions are an important driver of the natural resource curse.

Access to and cost of finance as a business constraint decline as the firms age, perhaps the result of established trusting relationships, making it both easier and cheaper for older firms to access capital. In addition, domestically owned firms find both access to and cost of finance more of a constraint than foreign owned firms. This is likely to be a result of the fact that foreign firms are more easily able to access foreign capital when domestic capital is scarce, whilst domestic firms are unable to do so.

**Table 2: Descriptive statistics**

	Obs	Mean	Std. Dev.	Min	Max
<b>Business constraints</b>					
Corruption	15333	2.00	1.59	0.00	4.00
Labour regulations	14981	1.36	1.39	0.00	4.00
Economic and regulatory uncertainty	15256	1.94	1.49	0.00	4.00
Licensing and operating permits	14963	1.11	1.32	0.00	4.00
Worker skills	15367	1.48	1.34	0.00	4.00
Access to finance	14889	1.62	1.54	0.00	4.00
Cost of finance	14879	1.89	1.56	0.00	4.00
Macroeconomic instability	14865	2.08	1.47	0.00	4.00
<b>Firm variables</b>					
Age	15436	18.96	16.81	0.00	193.00
Employees	15436	188.59	570.45	0.02	19453.25
Former government	15436	0.02	-	0.00	1.00
Service industry	15436	0.03	-	0.00	1.00
Exports	15436	0.34	-	0.00	1.00
Domestically owned	15436	0.88	-	0.00	1.00
<b>Country variables</b>					
GNI/capita (2005)	15436	1818.00	1506.83	170.00	7890.00
Life expectancy (2006)	15436	68.55	7.01	47.61	78.66
Present value of debt as % of exports (2006)	15436	83.89	38.48	10.15	157.65
Landlocked	15436	0.02	-	0.00	1.00
Primary exports/GDP (1980) - Sachs and Warner	15436	0.15	0.13	0.02	0.93

Table 3: Order probit models for constraints to doing business

	Corruption	Labour regulations	Economic and regulatory uncertainty	Licensing and operating permits	Worker skills	Access to finance	Cost of finance	Macroeconomic instability
<b>Firm variables</b>								
Age	-0.001 (-0.358)	0.000 (0.171)	0.002 (1.527)	-0.005** (-2.143)	-0.002** (-2.090)	-0.008*** (-4.323)	-0.004** (-2.489)	0.002 (1.374)
Age square	-0.000 (-0.532)	0.000 (0.418)	-0.000* (-1.805)	0.000 (1.497)	0.000* (1.700)	0.000 (1.586)	0.000 (0.107)	-0.000 (-1.415)
Employees	0.000 (0.641)	0.000*** (3.084)	0.000 (1.453)	0.000 (1.264)	0.000 (1.518)	-0.000 (-0.166)	0.000 (1.195)	0.000** (1.969)
Former government	-0.223** (-2.342)	0.044 (0.397)	-0.119 (-1.415)	-0.343*** (-2.969)	0.231 (1.615)	-0.120 (-1.067)	-0.137 (-1.183)	0.068 (0.859)
Service industry	-0.027 (-0.187)	-0.243** (-2.021)	-0.188 (-0.999)	-0.196 (-0.951)	-0.182 (-1.571)	0.031 (0.176)	-0.124 (-0.892)	-0.180 (-1.399)
Export	-0.041 (-0.577)	0.086 (1.451)	0.004 (0.086)	0.007 (0.117)	0.070 (1.508)	-0.114** (-2.378)	-0.126* (-1.775)	0.047 (0.718)
Domestically owned	0.011 (0.242)	-0.018 (-0.429)	-0.018 (-0.419)	0.014 (0.307)	0.045 (1.534)	0.329*** (6.837)	0.228*** (5.403)	-0.003 (-0.087)
<b>Country variables</b>								
GNI/capita (2005)	0.000 (0.628)	0.000* (1.898)	0.000 (1.395)	0.000 (0.745)	0.000*** (2.684)	0.000 (0.780)	0.000 (1.548)	0.000 (1.321)
Life expectancy (2006)	-0.006 (-0.339)	-0.022** (-1.978)	-0.009 (-0.551)	0.014 (0.509)	-0.017 (-1.352)	0.015 (0.835)	0.008 (0.402)	-0.003 (-0.217)
Present value of debt as % exports (2006)	0.002 (0.991)	0.008*** (3.026)	0.006*** (3.026)	0.005** (2.204)	0.001 (0.599)	0.003* (1.758)	0.006** (2.327)	0.005*** (2.937)
Landlocked	-0.314 (-1.621)	-0.351** (-1.966)	-0.485** (-2.382)	-0.285 (-1.037)	0.013 (0.078)	0.075 (0.305)	0.175 (0.700)	0.158 (0.549)
World Bank Governance Score	-0.789*** (-4.653)	0.012 (0.066)	-0.626*** (-3.920)	-0.235 (-1.137)	-0.280** (-2.398)	-0.479*** (-3.420)	-0.650*** (-3.533)	-0.422*** (-2.918)
<b>Primary exports / GNP (1980)</b>								
- Sachs and Warner	-0.869** (-2.199)	-0.704 (-1.169)	-0.379 (-0.774)	-0.386 (-0.558)	-0.525 (-1.354)	0.003 (0.007)	-0.053 (-0.087)	-1.129** (-2.528)
<b>Regional dummies (Latin America excluded)</b>								
Africa	-0.143 (-0.444)	0.277 (0.964)	-0.153 (-0.516)	0.578 (1.248)	0.114 (0.524)	0.434 (1.584)	0.554* (1.733)	0.044 (0.144)
East Asia	-0.859*** (-4.891)	0.057 (0.260)	-0.445** (-2.425)	-0.055 (-0.271)	-0.060 (-0.358)	-0.710*** (-5.117)	-0.697*** (-3.787)	-0.274 (-1.624)
Middle East/ N.Africa	-0.208 (-1.150)	0.678** (2.262)	0.185 (0.599)	0.539 (1.436)	0.177 (1.063)	-0.220 (-1.080)	-0.168 (-0.598)	0.374 (1.095)
South Asia	-0.500*** (-2.719)	0.285 (1.206)	-0.397** (-2.357)	0.385 (1.351)	-0.148 (-1.129)	-0.226 (-1.293)	-0.114 (-0.610)	-0.568*** (-3.071)
Cut 1	-0.946 (-0.733)	-0.636 (-0.700)	-0.612 (-0.534)	1.617 (0.816)	-1.071 (-1.203)	1.236 (0.961)	0.997 (0.727)	-0.490 (-0.468)
Cut 2	-0.590 (-0.456)	-0.218 (-0.242)	-0.215 (-0.186)	2.034 (1.025)	-0.614 (-0.684)	1.554 (1.204)	1.315 (0.950)	-0.109 (-0.103)
Cut 3	-0.163 (-0.125)	0.363 (0.404)	0.310 (0.266)	2.556 (1.288)	0.012 (0.014)	1.980 (1.529)	1.768 (1.267)	0.436 (0.407)
Cut 4	0.348 (0.268)	0.940 (1.048)	0.977 (0.833)	3.112 (1.569)	0.737 (0.817)	2.560** (1.970)	2.373* (1.692)	1.119 (1.035)
N	1533	14981	15256	14963	15367	14889	14879	14865
Pseudo R2	0.057	0.027	0.046	0.017	0.011	0.039	0.051	0.040
Chi 2	659.146	371.678	372.560	332.514	122.669	336.061	568.719	921.085