Universidad Carlos III de Madrid

Máster Universitario en Desarrollo y Crecimiento Económico
Master in Economic Development and Growth
2015-2016

Trabajo Fin de Máster

"Natural Resources and Instituions in Latin America"

Karoline Jensen Alnes

Tutor

Eva Fernández Garcia

Madrid, 21.06.2016

Palabras clave: Natural Resources Exports Growth Institutions Latin America

Resumen: This thesis investigates the indirect link between natural resource dependency and economic growth through the distinction of good and bad institutional quality in 11 Latin American countries over the period 1975-2012. Research suggest that certain types of resources such as petroleum are more prone to create a resource curse as their production and revenue pattern are more concentrated in comparison to agricultural or manufacturing exports. After estimating several panel data specifications with different indicators of governance instrumented with proxies for resource dependence, the results suggest that natural resource dependency affect growth negatively through the effect of regulations, Furthermore, the results suggest a positive effect of agricultural dependency on growth through improved legal system and secured property rights. Additionally, it is important to also take into account the economic explanations of growth and resource dependency, as they provide explanatory power to growth performance in the region.

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1 Introduction

Over past decades, empirical research seems to have established a negative relationship between natural resources and economic growth. This is posed as one of the biggest puzzles in economic research and often termed as the resource curse. Natural resources have been crucial for the economies in Latin America. Production and export of resources such as metals, sugar, rubber, grains, coffee, copper and oil, to mention a few, have given rise to prosperous societies and colonial powers throughout history. The region is today relatively urbanised and industrialized compared to other developing countries, but production and exports of commodities do still account for a large part of the share of economic activity. Despite the natural resources, the region has since the end of the import-substitution era failed to grow in parallel to other regions, both developing and resource abundant ones (Sinnot et al. 2010).

Natural resources usually refer to primary products such as agriculture and minerals, but also resources such as water and forests (Mavrotas et al. 2011). Following Auty (1997), it could be useful to distinguish between "point source" resources, which are resources extracted from a narrow geographic area that can be controlled at relatively low costs, such as oil and minerals, and "diffuse" resources, which are those that are produced over a wider geographic area and where the government control is weaker, such as food and agricultural products. Isham et al (2005) find that countries dependent on point source resources, in contrast to more diffuse resources and manufacturing in general, are predisposed to worsened socioeconomic divisions and weakened institutional capacity. Mavrotas et al. (2011) have extended this analysis in a panel data setting, finding that a natural resource curse is not only limited to point source resource exporters, but also to some extent agricultural exporters.

In this paper, I will try to conduct a similar analysis to see whether certain types of natural resource dependence can explain growth performance in Latin American countries. I will conduct an analysis with panel data on export classifications of export structure, controlling for a range of other potential determinants of governance to see whether different types of natural resource exporters perform differently on economic governance and intuitional quality. Ultimately, I will look at how this again affect the growth performance of the region.

A hypothesis based on theory can be stated as follows: Natural resource dependency is associated with poor economic performance only insofar the country lacks the institutional quality to handle the potential negative effects of resource booms. Thus, a resource curse will exist in countries lacking good institutions, and not otherwise as the effect of resource dependency on growth will be indirect. This will especially hold the case for exporters dependent on resources such as oil and minerals.

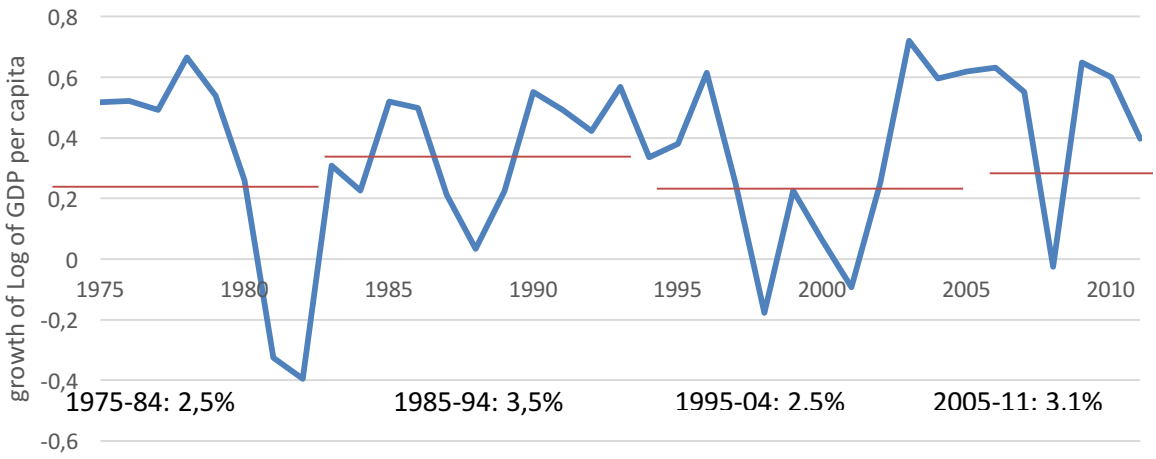
Although the effect of natural resources on growth through the distinction of good and bad institutions have been analysed in several studies, it is worth examining this issue further in order to verify the findings. Here, I will focus only on Latin-American countries. The countries in this region are not homogenous but they have a similar historical pattern, many of whom where colonized by Spain, and conducted trade reforms and liberalization in the more recent economic history. In addition, the previous literature lacks research based on panel data that can give more useful information allowing the variables to vary over time. Lastly, differentiating between institutions according to more persistent and ad hoc types applied for Latin-American countries could be interesting, as many of the countries have experienced a variety of regime changes and instabilities during this time period.

The paper is structured as follows. The next part will give a brief description of the recent economic and political history of the region. Thereafter, section 2 will go through the existing theory and empirics in the literature on natural resources and institutions determinants for economic growth. It will go through the causal mechanism in which natural resources are assumed to affect the quality of intuitions and how institutions then again will affect growth. As the main focus of the investigation is whether or not there may be a resource curse, the effects of institutions and growth is only briefly discussed. Section 3 contains the empirical analysis. The first part presents the economic model that ought to be tested. Additionally, it will address the problem of endogeneity and go through the different econometric tools that will be used. Lastly, it goes through the main variables of interest and its sources. In particular, it will describe how I have constructed the measures of export structures as proxies for natural resources. Section 5 contains the results, and discusses them in light of theory. Section 7 summarizes the analysis and concludes.

1.1 Recent economic trends in Latin America and its background

Following is a general overview of the main aspects of Latin American history from the 1970s to 2012. Figure 1 shows the per capita growth rate for the 11 Latin American countries calculated as a simple average over the period 1975-2012. During this period, Latin America has experienced relatively large boom-and-bust cycles, as illustrated by among other the debt crises in the 1980s and the effect of the Tequila crisis and Russian crisis in the mid-1990s. Despite such large downturns throughout the period, the the decadal growth rates show that the regional average growth rate has varied between 2,5-3,5%, as there have also been several large resource booms.

Figure 1: Per Capita Growth Rates



Source: WDI The growth rates of the region is calculated as a simple average of all countries in the

The cycles presented in the figure reflect important economic and political historical events. After decades of successful growth through an import-substitution led industrialization policy, the gains were exhausted and bureaucratic authoritarianism became the general from of government. These were military governments aimed at producing growth through stabilization programmes and access to international markets. These regimes were to some extent able to promote growth. Politically however, they tended to be highly unstable and unable to improve their creditworthiness to foreign investors.

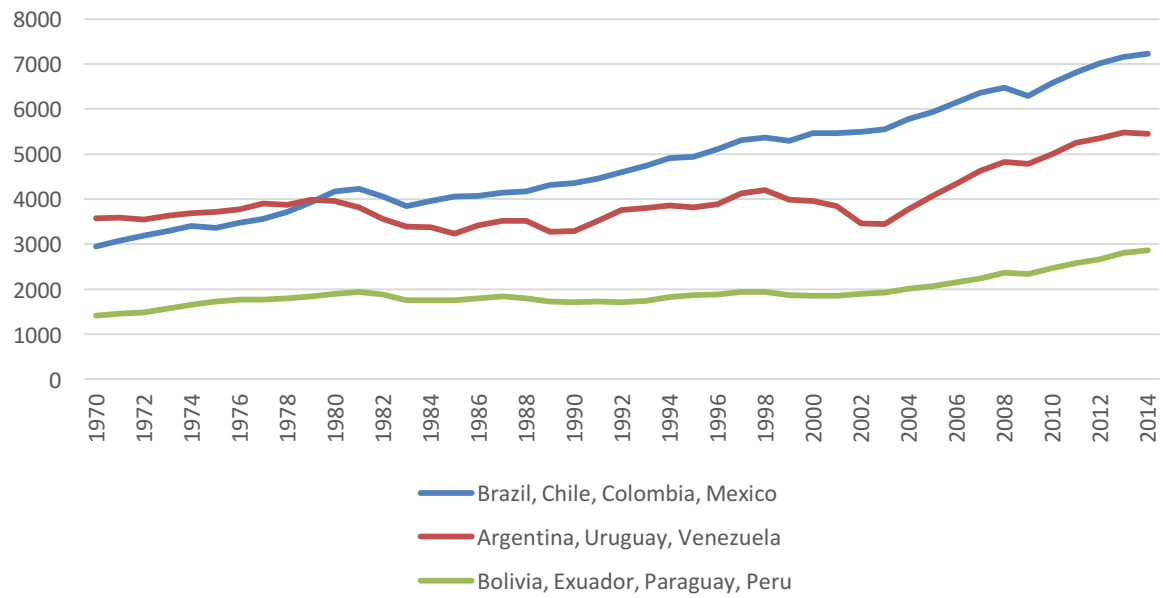
This came to a change in the 1970, with the increase in oil prices. Through recycled petrodollars from countries eager the invest their surplus, Latin America quickly got on the list of creditworthy and profitable clients. Eventually, the heavy borrowing led the region in to a severe debt crisis is the 1980s, turning it into the “lost decade”.

With the Washington Consensus started an era of neoliberalism, in which the Latin American governments pursued deals in order to reduce their debt. Conditional on several macro-adjustments and structural reforms, debt was relieved. The governments had to reduce the size of the government and make efforts to reduce inflation, in addition to open up their markets and reduce trade restrictions.

In the 1990s, things began to reverse back to normality. Capital returned and the period was associated with booming asset markets, real exchange rate appreciation, increasing investment and finally a strong growth performance. Politicians and economists alike attributed this as the consequences of the recent reforms of trade liberalization, privatization, deregulation of domestic markets and the restructuring of external debt. However, new booms and bust cycles followed, due to the Tequila crisis and Russian crisis in 1995 and 1998. A resource boom was again initiated with increasing oil prices from 2002 until build-up of the financial crisis.

This figure naturally conceals some of the variations between the countries. Figure 2 shows the evolution of GDP per capita over the period 1970-2014 for the 11 Latin American countries. Based on different trends, they are grouped into countries that have had a steady increasing trend in GDP per capita, those that have experienced greater volatility, and those who have been characterized by a relatively stagnant trend. We can see that there has been a steady divergence between the different groups of countries. The countries in the first group are Brazil, Chile, Colombia, and Mexico, in which Chile has had the highest average growth rate of 4,95% over the whole period. The countries in the second group are Venezuela, Argentina, and Uruguay. Venezuela has had a relatively volatile economic performance, but also the lowest average over the whole period. Last group of stagnating economies are Bolivia, Ecuador, Peru and Paraguay.

Figure 2: Evolution of GDP per capita 1970-2014



Source: WDI

Interestingly, some of the faster growing economies, Brazil and Mexico, have the largest shares of manufacturing exports. Venezuela has the highest share of petroleum exports, and has had a disappointing growth performance. Similarly, Bolivia, Ecuador and Peru are relatively dependent on gas, petroleum and metals respectively, which all have had relatively stagnant growth rates over the whole period. However, within this pattern, Chile seems to be the exception, the fastest growing country, a country highly dependent on metal exports.

2 Literature review

There is an extensive amount of literature on how natural resources may affect economic performance, and the general view is that it can be a curse for economic and social development rather than a blessing. Theories trying to explain the causes of resource curse can be grouped into economic explanations on one hand, and political-economy explanations on the other.

The economic explanations of the resource curse typically point out that abundance natural resources create a "Dutch disease", or symptoms of the disease. A sudden increase in the price of the resource or the discovery of new resources can have a crowding out effect on other sectors in the economy, most notably the manufacturing sector, by causing a resource misallocation via the mechanism of relative prices (Murshed 2004). Collier and Goderis (2007) find that resource booms can have a positive short-term effect on output, but negative long-term effects. However, the Dutch disease theories alone have not proven to be able to explain the resource curse, and due to the monotonic negative effect predicted, they can neither explain why some countries such as Norway have been successful, while others such as Venezuela have not (Bochini et al. 2008).

In recent years, the main channel to explain the resource curse has been through the political economy of resource rents and bad institutions more generally. There is a variety of causal mechanisms stating that the institutional setting and quality of governance may be of worse quality in resource-abundant countries in comparison to resource-poor countries. In a much-cited paper, Ross (2001) points to three causal mechanisms in which oil can have a negative effect on democracy; the "rentier effect", the "delayed modernisation effect" and the "entrenched inequality effect"[1].

Firstly, the rentier effect can occur in situations in which the government is the main receiver of the revenues of the extracted resources. With a sufficient amount of revenues generated from resource extraction, the government does not have the same need to tax

[1] Even though his analysis is based on oil resources in democracies, are the mechanisms he is describing also highly relevant for other types of resources with similar characteristics and for the quality of institutions more generally.

the population and thus reduces the prospect of developing an accountable political system. Furthermore, the government can use these revenues to alleviate dissent among the population by spending money on patronage and prevent the formation of social interest groups[2]. All these factors will likely hinder the development of impartial, accountable and representative political systems affiliated with democracies.

The second mechanism is related to the Dutch disease theories: resource dependent governments have a tendency to interrupt the structural change of the economy by delaying the modernisation process. A large manufacturing sector is perceived to create alternative sources of economic and political power, establishing labour organizations that can put pressure on the political system and demand economic reforms. With a small industrial sector, labour organizations are less likely to be established (Rodrik 2015). Governments with access to revenues from fuels and minerals will likely spend less on education as the extraction of such resources does not require skilled labour which usually are acquired from abroad (Isham et al. 2005).

Thirdly, the entrenched inequality effect refers to how the export structure affects the social structures, which again affect political and economic outcomes. Engerman and Sokoloff (2002) have analysed diverging growth paths of North and South America according to which the types of resource endowments explain the evolution of institutions and the following economic development. According to them, it is determined by the stark differences in the degree of inequality in wealth, human capital and political power. These differences are again determined by the differences in the initial factor endowments dating back to the European colonization. Societies that started out with more inequality were more likely to develop institutional structures that greatly advantaged members of elite classes by providing them with more political power.

[2] Additionally, there could be a more direct repression effect in which governments can generate funds from the natural resources to repress demands for changes in the political system and the government in general. This is usually done by increasing the public spending on national security, often with the involvement of the military.

Over time, these institutions showed diversities across colonies, even among those of the same European nation. For example, Engerman and Sokoloff (2002) point to the colonies established in the Caribbean or Brazil were they had climate and soil conditions well suited for growing crops as sugar. Such products were highly valued on the world markets and were produced on large slave populations. Other Spanish colonies, most notably Mexico and Peru, were known for awarding claims on land, labour and mineral resources to members of the elite. This generated unequal distributions of wealth, human capital and political power. They emphasize that institutions should not presumed to be exogenous, which is consistent with recent work on the topic.

Furthermore, there are different theories trying to explain how institutions affect growth. However, the direction of the causality can be debatable, as countries can have good institutions because they are prosperous. Researchers in the growth literature have for long advocated good economic and/or political institutions as fundamental causes of growth. Acemoglu et al. (2005) define good economic instructions as the existence of secure property rights and rule of law. Such economic institutions are more likely to be established when arbitrary exercise of political power is constrained. Collier and Hoeffler (2009) analyse democracy as electoral competition and checks and balances. They find that resource rents together with strong electoral competition reduces growth, while the combination of resource rents and strong checks and balances is growth enhancing.

These are conducted using cross-section data. Mavrotas et al. (2011) also look at the type of natural resource dependence and growth in developing countries and follow a similar categorization as Isham et al. (2005) using panel data. They claim that developing countries that export point source resources are more endangered to growth failure due to institutional failure. Applying a range of different econometric tools, they find that point-source resource dependence does indeed retard institutions when it comes to both governance and democracy, which in turn hampers economic growth. However, the resource curse is not restricted to just mineral resources. The following empirical analysis will be based upon a similar approach but also controlling for more specific constitutional variables affecting growth prospects.

3 Methodology

This paper investigates the link between natural resources, institutional development, and economic growth in 11 Latin American countries over the period 1975-2012[3]. For the purpose of this dissertation, I will conduct an econometric analysis in a panel data setting. This section will go through the empirical approaches that will be applied in this paper. In the following, I will go through the main variables and the sources used to gather the data. Furthermore, I will go through the methodology to create the measures for export structures, utilized as different proxies for resource dependence and abundance.

3.1 The economic model

The challenge is to find an econometric methodology that addresses both the indirect effect of resource dependence on growth, as well as the potential endogeneity problem that goes between institutions and growth. It is well known that institutions promote growth, but also that increased prosperity affects the institutional quality. As indicated by the theoretical overview, natural resource dependency is perceived to determine institutions, which would in turn drive economic growth. This would imply that a model using standard estimation procedures would be misspecified, and that the proxies for resource dependency should be used to instrument for institutions (Bochini et al 2008). Therefore, a Two Stage Least Squared (2SLS) method with instrumental variables (IV) as conducted by Mavrotas et al. (2011) is more suitable as it takes into account the reversed causality and country fixed effects. The econometric model can be presented as follows:

$$Institutions_{it} = \theta_1 + \theta_2 Natural\ Resource\ Dependency + \emptyset_1 Z_{it} + u_i + e_{it} \quad (1)$$

$$Growth_{it} = \beta_1 + \beta_2 Predicted\ I\text{?}stitutions_{it} + \varphi_i Z_{it} \eta_i + \emptyset_1 Z_{it} + v_{it} \quad (2)$$

Equation (1) estimates the effect of natural resource dependency on institutions, where institutions represent either the quality of the regime or different governance scores for country i at time *t*. Z_{it} is a vector of economic and political control variables, u_i is a country

[3] These countries are Argeintina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Urugyay and Venezuela, but also Mexico as it is a big and significant country.

specific unobservable, and e_{it}, which is the stochastic error component assumed to be distributed with zero mean and constant variance. Equation (2) estimates the effect of the predicted institutions on growth, where the proxies for resource dependence are petroleum and agricultural exports as the actual percentages of a country´s principal exports. For robustness checks, I will also use the export measures as the share of GDP.

3.2 Estimation strategies

Empirical research on the effect of natural resource dependency on growth are mostly based on the usage of cross-sectional data. Panel data are repeated observations on the same set of cross-section units. With panel data, it is possible to control for omitted variables even without observing them, by observing changes in the dependent variable over time. It is also possible to use panel data to control for omitted variables that varies over time but are constant between cases.

There are several econometric approaches that can be used to estimate the economic model. A natural starting point is the pooled OLS estimator, or applied here, the pooled IV estimator. This is the simplest model that can be applied, as it basically ignores the panel structure of the data and assume that each observation over time are observations from different units. The model is based on the assumption that the error terms are homoscedastic and serially uncorrelated. This approach is applicable when the cross-sectional sample is too small. The dataset used there consist of 11 different countries, but it might still be unreasonable to assume that there is no unobservable heterogeneity due to the individual characteristics of each country. The model will be included here as standard procedure to compare the results with the other more suitable econometric models. The two methods considered here are the random effects and fixed effects estimators.

In a panel data setting, the error term is composed of two terms: the individual specific, or time-invariant unobservable effect, which is constant across time, and the stochastic error term. The difference between the random effects and fixed effects models is whether or not the individual specific error term is correlated with the vector of explanatory variables. The random effects model assumes that this time-invariant unobserved effect is random and thus uncorrelated with all regressors, while in the fixed effects model, the unobserved

effects are correlated with the explanatory variables. As it is not possible to estimate the unobservable consistently, the fixed effects model uses a transformation to remove the unobserved effects. The random effects model is the most efficient and uses less degrees of freedom than other models. On the other hand, given that the random effects model is valid, the fixed effects estimator will still procure consistent estimates of the identifiable parameters.

The Hausman test is used to determine which of the two models that are appropriate for the data. It tests the null hypothesis that there is no systematic difference between the coefficients estimated estimated with the fixed and random effects models. In other worlds, it checks a more efficient model against a less efficient but consistent model to make sure that the more efficient model also gives consistent results. Given that the fixed effects model is assumed to be consistent, a high p-value indicates that the more efficient random effects model will also be consistent (Woolridge 2009).

3.3 Data Sources and Variables

Two different measures for institutional quality are utilized, based on the differentiation between the quality of governance, or economic institutions, and the quality of the political regime, the polity.

The Fraser chain-linked index measures the degree to which the policies and institutions of countries are supportive of economic freedom (Gwartney et al. 2015b), published in Economic Freedom of the World (EFW). The index is a statistic summed up by five categories: 1) Size of government: expenditures, taxes, and enterprises. It indicates the extent to which countries rely on the political process for resource allocation. A high ranking on this index implies low levels of government spending, smaller government enterprise sector, and lower marginal tax rates. This index migth be biased by whether or not government is oriented on the left or the right on the political landscape, as right-wing regimes often emphasize a smaller size of the government relative to the market; 2) The legal structure and security of property rights, takes into account the judicial independence and impartiality of the courts, protection of property rights and contract enforcement, as

well as the reliability of the police and the interference of the military; 3) access to sound money, which includes money growth, inflation and its standard deviation, and freedom to own foreign currency; 4) freedom to trade internationally, in which Low levels of trade restrictions, convertible currencies, and few controls give a high score on the index; and 5) Regulations contains information about the regulatory constraints that limit exchange of credit, labor and products. The score ranges from 0-10, with 10 indicating larger economic freedom, here proxied as the quality of economic governance. The different sub-indices make it possible to test for more specific governance effects.

The Polity IV database contains data on regime quality dating back to the 1800s, and can be used as a proxy for relatively durable and persistent institutions. The unit of analysis is the polity, which is something that provides a "simple, general definition of all "polities" (or "governments") as subsets of the class of "authority patterns", (Eckstein and Gurr 1975:26, cited in Monty et al. 2014). The Polity II index has a score that ranges from democracy (10) to autocracy (-10), coding democratic and autocratic patterns of authority and regime changes in all independent countries (Gurr and Jagger 2014). The two different institutional measures can thus capture the quality of how a country is run and its policy governance.

Additional variables on the characteristics of the political system were obtained from the World Bank Database of Political Indicators (DPI). The dataset covers the years 1975-2012, and contains variables related to the political regime (presidential versus parliamentary), and other variables related to political parties. Important variables here are the degree of federalism, mean district magnitude, electoral system, military leadership, etc.

The data on GDP per capita growth rates, openness to trade, the net barter terms of trade index, and the nominal exchange rate were obtained from the World Bank Development Indicators (WDI) and the Penn World Tables version 8.1 (PWT). The variables are calculated as growth rates for a more straightforward interpretation. The terms of trade and exchange rates are used as proxies for macroeconomic stability and they can capture Dutch disease effects. By including these variables, I am controlling for other non-political effects through the increases in relative prices and exchange rates following resource booms on growth.

Table 1 shows differences in growth and institutional quality across export categories based on the mean values and the standard deviation. The first row shows the mean growth rate for the whole period. Ores and metals exporters have the highest mean growth rates, followed by manufacturers. Petroleum exporters have significant lower mean growth rates over the whole period. The following rows show the proxies for institutional quality, the Fraiser index together with its sub-indices, and the Polity II index. We can see that the average scores of the Fraiser index and sub-indices are overall higher for manufacturers and agricultural exporters, but also for ores and metals exporters, than for petroleum and other point source exporters. Manufacturing exporters also have higher mean values in the polity II index. An exhaustive list of the variables and their descriptive statistic are included in the appendix.

Table 1: Descriptive statistics summarized by main export categories

Variable	Full sample	Manufacturers	Agriculture	Petroleum	Ores and Metals	Other Point Source
	(n=418)	(n=44)	(n=71)	(n=132)	(n=93)	(n=78)
(log) of Growth per capita GDP	.0152 (.0430)	.01764 (.0279546)	.01155 (.0511)	.0098 (.0449)	.02341 (.0432)	.0168 (.0377)
Fraiser chained-linked index	5.678 (1.2148)	5.9896 (.7970)	5.7809 (1.3452)	5.5112 (.8820)	6.0790 (1.5603)	5.2157 (1.1120)
Government size	6.6595 (1.1851)	6.7189 (.5229)	6.872 (1.171)	6.4175 (1.225)	6.7911 (1.0664)	6.6849 (1.4582)
Legal property rights	4.351 (1.4379)	5.1268 (.7686)	4.4510 (1.3606)	4.1011 (1.390)	4.6447 (1.6908)	3.8978 (1.3061)
Sound Money	5.8059 (2.8433)	5.7413 (2.4929)	6.1711 (2.6579)	5.9711 (1.970)	5.9987 (3.5157)	5.000 (3.4114)
Freedom to trade internationally	5.9370 (2.224)	7.1308 (.8861)	6.0511 (2.3456)	5.7992 (2.133)	6.4883 (2.1207)	4.7358 (2.3556)
Regulations	5.595 (1.009)	5.8964 (.7393)	5.3438 (1.1478)	5.3452 (.8851)	6.2000 (1.0144)	5.3562 (.8576)
Polity2	4.8110 (5.8719)	7.272 (2.8149)	5.2253 (6.5316)	5.5227 (4.438)	4.0107 (6.5133)	2.7948 (7.0662)

Note: Variable means and standard deviations (in parentheses)

3.4 Creating a measure of export structure

There are several ways to measure the effect of natural resources. The measure originally proposed by Sachs and Warner (1995) uses the share of primary exports in 1971 as a proxy for natural resource abundance. However, Butle and Brunnschweiler (2008) criticize it to be more a measure of resource dependence because it is a flow variable rather than a stock of natural resources. Unfortunately, data for the stock of natural wealth is not available over time. Here, I have constructed different indices reflecting both resource dependency and resource abundancy, disaggregated for different resource types in a similar manner as Isham et al. (2005) and others, but adjusted for the general export patterns in Latin America.

To create measures of resource dependency, data on export was gathered from The United Nations Statistical Division (UNSD) Commodity Trade (UNCOMTRADE) database, accessed via the database of the World Integrated Trade Solutions (WITS). This database contains detailed raw trade data by partner and product. Values are recorded in U.S. dollars and includes statistics dating back to 1962 (WITS 2016).

First, countries were identified by their leading exports items for each year. These items were then classified according to the five different sources of exports structures: manufacturing, agricultures, ores and metals, petroleum and other point source. For such a classification, I used Revision 2 of the Standard International Trade Classification[4] (SITC) at the four-digit level to make different subcategories of export groups based on the level of "technical appropriability" adjusted for the export patterns in the region[5]. Table 2 illustrates the categorization of the main export groups used in this analysis.

[4] Primary products contain the categories i) agricultural products and ii) fuels and mining products. Agricultural products (SITC sections 0-4 minus 27 and 28) have sub-divisions food, fish, other food products, and raw materials. Fuels and mining products consist of ores and other minerals, fuels, and non-ferrous metals. Manufacturers (SITC sections 5, 6, 7, 8, minus division 68 and group 891) consist of seven sub-divisions. Those are Iron and steel, Chemicals, Other semi-manufacturers, Machinery and transport equipment, Textiles, Clothing, and Other manufacturers. Other products are commodities and transactions not classified elsewhere (including gold), arms and ammunition (SITC section 9 and group 891).

[5] How to rank natural resources in terms of technical appropriability or concentration is, of course, debatable. See Auty (1997), Woolcock, Pritchett and Isham (2001), Isham, Prichett and Woolcock (2005), and Bohini, Petterson and Roine (2008; 2013) for slightly different distinctions between types of resources.

Table 2: Classification and aggregation of export groups based on SITC codes Revision 2 at the four-digit level

Export groups	Description	SITC codes
Primary products	Agricultural products and fuels	0-4
Manufacturers	All manufacturing products except non-ferrous metals	5, 6, 7, 8, minus div 68
Agricultures	Primary products except fuels and minerals	0-2, 4, minus div 28
Petroleum	Petroleum oils and crude oils obtained from bitumen minerals	Div. 332 Rev. 1, 334 Rev.2
Ores and metals	Metalliferous and non-ferrous ores and metals	Div. 27,28 and 68
Other point source	Coffee and cocoa, textile fibers, gold and diamonds	Div. 06, 07, 26, and 97

Source: SITC and WITS

Thereafter, I aggregated the SITC codes creating export groups based on the same export categories for each country in each year. These export groups can then be used to make different indices of natural resource. The two major export lines were then summed together such that I could make construct indices for the different export categories as a percentage of these principal exports. This is an index that can be used as a proxy for resource dependence. Additionally, I also utilized the export categories to make an index of resource abundancy similar to the measure by Sachs and Warner. At the end, I have two indices for different export groups based on:

i) Export groups as the actual percentages of a nation's principal exports, which is a proxy of resource dependency.

ii) Export groups as a share of GDP: This is a measure usually applied as resource abundance as it takes the whole economy into account. Importantly, countries that does not export much will have lower ratios than countries that export a lot.

Table 3 shows the mean values of the export measures divided by the export bases in the sample. Numbers in bold indicate the mean values of the indices for each of the type of exporters. The mean value of manufactured exports as a share of both GDP and the principal exports are lager for manufacturers than for other types of exporters. Similarly, for

agricultural exporters, petroleum exporters, metal and ores and other point source exporters. The last rows also show the mean values for primary exports.

Table 3: Mean values of different export group indices by export Composition and Natural Base

Measures of export groups	Manufacturers	Agriculture	Petroleum	Ores and Metals	Other Point Source	Full sample
Manufactured exports as a share of GDP	**106,37**	34,90	27,64	25,44	24,52	36,09
Manufactured exports as a share of main exports	**2,70**	0,85	0,44	0,38	0,54	0,75
Agricultural exports as a share of GDP	28,21	**92,91**	37,99	51,62	65,79	54,51
Agricultural exports as a share of main exports	1,16	**1,91**	0,55	0,66	1,18	0,99
Petroleum exports as a share of GDP	1,74	2,10	**23,74**	4,27	2,60	9,47
Petroleum exports as a share of main exports	0,06	0,06	**0,15**	0,06	0,05	0,09
Ores and metal exports as a share of GDP	7,05	1,37	6,84	**94,25**	20,95	28,01
Ores and metal exports as a share of main exports	0,32	0,04	0,08	**0,95**	0,22	0,32
Primary exports as share of GDP	45,23	98,66	152,19	103,98	114,67	114,11
Primary exports as a share of main exports	1,60	2,04	1,43	1,25	1,61	1,55

Note: Variable means of selected export measures based on different groups of export structures

**Bold numbers indicate the highest value for each row*

Source: calculations using SITC Rev 2, based on WITS

4 Results

Check for endogeneity and direction of causality between growth and institutions by estimating an instrumental variables pooled regression. The Hansen J test for overidenifying restrictions implies that the instruments are valid for the fraiser index, and the sub-indices of the size of the government, legal property rights, and sound money. Due to the presence of unobservable individual heterogeneity, the pooled IV estimator is likely to be biased. The results from the instrumental variables pooled regressions are therefore presented in table A3 in the Appendix.

After estimating the proposed model with the fixed and random effects methods, a Hausman test is performed comparing both estimators, showed in Table 4. The test compares the results of the fixed-effects estimator, which is assumed to always be consistent, with the results of the random-effects estimator, which is more efficient, in order to verify if the latter estimator would also be able to yield consistent results. A large Chi-square test-statistic implies that the random effects estimator is inconsistent, implying that there is a correlation between the included variables and the error term, and therefore the fixed effects estimator is a better choice than the random effects estimator. As showed in Table 4, this is the case for only one regression, namely the one instrumenting for the quality of the regime. For the other six regressions, the random-effects model is applied.

Table 4: Hausman Test Results. Fixed-effects vs. Random-effects

Regression based on indicator	**Chi 2**	**Prob>Chi2**	**Result**
Fraiser	2.38	0.9838	Does not reject Ho. Use RE
Polity2	27.75	0.0011	Reject Ho. Use FE
Government size	6.43	0.6960	Does not reject Ho. Use RE
Legal property rights	11.93	0.2173	Does not reject Ho. Use RE
Sound Money	4.56	0.8705	Does not reject Ho. Use RE
Freedom to trade internationally	4.45	0.8792	Does not reject Ho. Use RE
Regulations	6.54	0.6846	Does not reject Ho. Use RE

Tables 5 and 6 contain the results from the instrumental variable panel regression for the growth rate of per capita GDP for a panel of 11 countries over the period 1975-2012. Table 7 and 8 contain the first-stage regressions for institutions. They contain a mix of the random and fixed effects estimators according to the Hausman test. The p-value corresponding to a test for overidentifying restrictions of the instruments is also included at the bottom of the tables. A discussion of the regression results for each of the explanatory variables included in the proposed model follows.

Table 5: Instrumental Variables Two-Stage Least Squares Panel Regressions of GDP per Capita Growth Rate Using Petroleum and Agricultural Exports as a Share of Main Exports as Instruments

log growth	(1)	(2)
VARIABLES	Fraiser	Polity2
	RE	FE
Institutions	0.0326**	-0.0608
	(0.0164)	(0.472)
Investment	0.168***	0.137
	(0.0166)	(0.110)
Terms of trade	0.0442**	0.193
	(0.0220)	(0.995)
Exchange rate	0.00435	-0.0142
	(0.0139)	(0.0705)
Federalism	0.00745**	0.228
	(0.00339)	(1.723)
Military	0.0499**	-0.294
	(0.0207)	(2.367)
Checks	-0.00217	0.0638
	(0.00180)	(0.501)
Stability	-0.00349	0.0497
	(0.00732)	(0.425)
Openness	-0.0410**	-0.0239
	(0.0177)	(0.0768)
Constant	-0.180*	-0.0410
	(0.102)	(0.470)
Overid	0.3084	0.9309
Observations	349	349
Number of iso	11	11

Note: RE and FE indicate random and fixed effects estimator.
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Instrumental Variables Two-Stage Least Squares Panel Regressions of GDP per Capita Growth Rate Using Petroleum and Agricultural Exports as a Share of Main Exports as Instruments

log growth	(1)	(2)	(3)	(4)	(5)
VARIABLES	Government size	Legal property	Sound money	Free trade	Regulations
	RE	RE	RE	RE	RE
Institutions	0.0209**	0.0146**	0.0169	0.0113	0.0103
	(0.00895)	(0.00576)	(0.0278)	(0.0130)	(0.00828)
Investment	0.148***	0.153***	0.173***	0.160***	0.154***
	(0.0134)	(0.0120)	(0.0392)	(0.0159)	(0.0109)
Terms of trade	0.0599***	0.0851***	0.0559*	0.0355	0.0555***
	(0.0174)	(0.0170)	(0.0286)	(0.0404)	(0.0169)
Exchange rate	-0.0163***	-0.0213***	0.0154	-0.0123	-0.0169***
	(0.00404)	(0.00280)	(0.0623)	(0.0120)	(0.00510)
Federalism	0.0103***	-0.00276	0.00963	0.00456	0.00338*
	(0.00396)	(0.00291)	(0.0118)	(0.00306)	(0.00187)
Military	0.0298***	0.0221***	0.0336	0.0409	0.0190**
	(0.0103)	(0.00726)	(0.0378)	(0.0349)	(0.00820)
Checks	-0.000815	0.000130	-0.00489	-0.00269	-0.00116
	(0.00157)	(0.00148)	(0.00671)	(0.00248)	(0.00127)
Stability	0.000686	-0.00368	-0.00154	-0.00605	-0.00497
	(0.00718)	(0.00607)	(0.0106)	(0.00652)	(0.00541)
Openness	-0.0260*	-0.0249*	-0.0673	-0.0219	-0.0278**
	(0.0144)	(0.0130)	(0.0724)	(0.0144)	(0.0119)
Constant	-0.129**	-0.0435	-0.0848	-0.0489	-0.0376
	(0.0657)	(0.0269)	(0.178)	(0.0832)	(0.0494)
Overid	0.5148	0.3884	0.0610	0.0176	0.0055
Observations	349	349	349	349	349
Number of iso	11	11	11	11	11

Note: RE indicate Random effects estimator.
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Governance, as measured by the summarized fraiser index, has a positive effect on growth. The same holds for the indices for the size of the government and the legal system and property rights. A smaller size of the government is associated with higher growth as resources may be allocated more efficiently in the private market. Similarly, rule of law and secure property rights is important for growth, as pointed out by Acemoglu et al. (2010).

The fact that the polity index, sound money, free trade and regulations do are not have any significant effect on growth may first and foremost be explained by the model specification, as the overidentifying restrictions of the instruments are not valid. One can question

whether natural resource dependency is determining specific policy related institutions. For example, sound money and free trade policies can change more in the short term, and might not be as determined by the resource dependency. It is relatively surprising that freedom to trade internationally and regulations that limits the exchange of credit, labour and products are not significantly affecting growth, and that the instruments are not valid as exporters are dependent on a non-constrained trade policy. However, the elites in Latin-America have traditionally been landowners. In accordance with the Hecksler-Ohlin model, will the abundant factor owners lose from opening up to trade and the elites may thus block institutional change, which indeed can be argued was the case in the period of restrictive protectionism before the debt crises struck the region. A negative effect of the change in openness may underscore this argument.

For the polity index, the problem can be solved by conducting the same regression for the polity1 index, which yields a significant and negative effect of regime quality on growth. This effect, in addition to the positive effect of the presence of a military executive, can be related to the period of strong growth under bureaucratic authoritarian governments led by the military that this region experienced from the 1960s to the 1980s.

The proxies for macroeconomic stability, the growth rates of the terms of trade and the exchange rate, are both significant. This can undermine the effect of resource dependency via institutions, as both could be explaining growth performance.

Table 7 and 8 shows the first-stage IV regressions for the respective institutional indicators as instrumented by petroleum export and agricultural exports. The results indicate that petroleum dependency does indeed have a negative effect on the quality of economic governance. Turning to the different sub-indices of the fraiser index, we can see here that the negative effect of petroleum export might have been driven solely by the negative effect on regulations. Agricultural export has a positive and significant effect on all indicators but regulation.

Whether the executive leader is a military officer negatively affects all the indicators, which again may reflect the more politically unstable periods of military leadership in the 1960s-

70s. Checks on the executive power are positive related to government size and sound money, implying a greater political accountability. The degree of federalism has a negative effect on the score of the government size, implying increased government involvement in investment and enterprises.

Table 7: First stage Regressions for Fraiser and Polity2

	(1)	(2)
VARIABLES	Fraiser	Polity2
	RE	FE
Petroleum/exports	-1.236**	-0.337
	(0.526)	(3.259)
Agriculture/exports	0.0428	0.0461
	(0.0692)	(0.594)
Investment	-0.529	-0.179
	(0.333)	(1.135)
Terms of trade	0.812*	2.119
	(0.432)	(1.485)
Exchange rate	-0.819***	0.148
	(0.0771)	(0.285)
Federalism	-0.123**	3.660***
	(0.0609)	(0.424)
Military	-1.172***	-5.027***
	(0.164)	(0.642)
Checks	0.0491	1.062***
	(0.0395)	(0.148)
Stability	-0.0445	0.905
	(0.167)	(0.576)
Openness	0.437	-0.0318
	(0.362)	(1.240)
Constant	6.214***	-1.015
	(0.167)	(0.906)
Observations	349	349
Number of iso	11	11

Note: RE and FE indicate random and fixed effects estimator.
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8: First stage Regressions for Governance indicators

Instrumented:	(1)	(2)	(3)	(4)	(5)
VARIABLES	Government size	Legal property	Sound money	Free trade	Regulations
	RE	RE	RE	RE	RE
Petroleum/exports	-0.811	-0.969	-0.903	-1.526	-2.021***
	(0.571)	(0.755)	(1.261)	(1.019)	(0.516)
Agriculture/exports	0.256***	0.372***	-0.0651	-0.102	-0.116*
	(0.0751)	(0.0993)	(0.166)	(0.134)	(0.0679)
Investment	0.0986	-0.214	-1.275	-0.708	-0.193
	(0.361)	(0.477)	(0.797)	(0.644)	(0.326)
Terms of trade	0.340	-1.260**	0.795	3.022***	1.407***
	(0.468)	(0.619)	(1.034)	(0.836)	(0.424)
Exchange rate	-0.321***	-0.112	-2.222***	-0.876***	-0.516***
	(0.0836)	(0.111)	(0.185)	(0.149)	(0.0756)
Federalism	-0.414***	0.298***	-0.370**	-0.0985	0.0178
	(0.0660)	(0.0872)	(0.146)	(0.118)	(0.0597)
Military	-0.964***	-0.856***	-1.282***	-2.573***	-0.671***
	(0.178)	(0.235)	(0.393)	(0.317)	(0.161)
Checks	0.00267	-0.0627	0.239**	0.165**	0.0353
	(0.0428)	(0.0566)	(0.0945)	(0.0764)	(0.0387)
Stability	-0.266	-0.0824	-0.230	0.0571	-0.0391
	(0.181)	(0.239)	(0.399)	(0.323)	(0.164)
Openness	0.0559	0.0173	2.459***	-0.361	0.166
	(0.392)	(0.518)	(0.866)	(0.700)	(0.355)
Constant	7.150***	4.326***	6.460***	6.511***	6.064***
	(0.181)	(0.240)	(0.400)	(0.323)	(0.164)
Observations	349	349	349	349	349
R-squared	11	11	11	11	11

Note: RE indicate Random effects estimator.
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Thus, there is some evidence for a negative relationship between natural resources and growth. That is, petroleum, and to some degree agricultural export shares, have a negative effect on growth through the effect of regulation constraints on the exchange of credit, labour and products. As implied earlier, this may be due to elite and "landowner's" resistance to open markets as this eventually will lead to lower returns to their factors. The effect is specific for one hypothesis. For the other indicators tested here, the results imply that there is no resource curse. The significant effects of agricultural exports on several

governance indicators such as legal property rights suggest that resource dependency in agriculture improve growth. Latin America has traditionally had a large peasant and rural population, which through reforms may have put pressure on land reform and the security of property rights.

However, one must take into account the robust effects of the macroeconomic variables. Similar as Collier and Goderis (2007), do the results here point to a positive short term effect of resource booms through the positive effect of the terms of trade increase on growth. Additionally, changes in the exchange rate are negatively related to growth in several specifications. These may reflect the short term volatilities that the region has experienced during several resource booms and busts.

4.1 Robustness checks and discussion for further research

The results above are overall robust to different specifications, adding and subtracting different control variables. I also conducted the same analysis using export structures as a share of GDP as instruments for the institutional variables[6]. For all seven regressions but government size and regulations insignificant. The effect on growth is less present, but the effect of natural resource abundance on institutional quality is more significant. Increased agricultural exports as a share of GDP has a positive effect on all governance indicators. As far as these export structure measures can be interpreted as proxies for resource abundance, there seem to be more evidence for a positive effect of resource abundance, and specifically, agricultural abundance, on growth via the effect of institutions.

Additionally, excluding Venezuela from the sample do not change significantly. However, the effect of petroleum exports on the quality of governance also becomes negative with the restricted sample, suggesting that the adverse effect of petroleum exports is still significant for other petroleum dependent countries in the sample.

For further investigations it would be necessary to have a more complete sample that would help find more robust results. Although the aim of the paper is to conduct a regional

[6] The regression tables are included in the appendix.

analysis, a sample of only 11 countries may be insufficient. Adding the Central-American countries to the sample would improve the analysis significantly. Furthermore, when applying panel data estimation, there are several methodologies than can be applied to take into account the multiple endogeneity problems, such as dynamic panel data estimation using the variables own lagged levels as instruments.

Additionally, empirical research on the relation between growth and natural resources suggest that there are numerous variables that would have added richness to the analysis. Some variables, such as corruption, was not included in the regression due mainly to the lack of available data over time. Additionally, if data on the stocks of natural resource wealth also was available over time, this would be an interesting addition as one more certainly can interpret such variables as natural resource abundancy. Other variables such as the population growth rate is excluded, as the dependent variable, per capita growth rate, already takes the population growth rate into account. Initial level of per capita GDP takes into account the conditional convergence. Since this study look at growth in the short term, it has not been considered as a crucial variable.

5 Conclusions

The relatively poor and volatile economic performance in this region over the period considered here has made economist and political scientist questioned whether there exists a resource curse in Latin American countries. Research suggests that certain types of resources such as petroleum are more prone to create a resource curse as their production and revenue pattern are more concentrated in comparison to agricultural or manufacturing exports. To investigate whether or not this is the case has been the main aim of this paper. I have used a panel data, which allows both the institutional quality and resource dependency to vary over time.

This paper has investigated the link between natural resources and economic performance, taking into account the endogenous effect of institutions for 11 Latin American countries in the period 1975-2012. In particular, it has analysed whether different types of natural

resource dependency have a different effect on growth through poor institutional quality, both in terms of governance but also in terms of the political regime.

After running several models with different proxies for both institutions and resource dependency, I find a negative effect of petroleum and agricultural export shares on the governance index, specifically related to the score of regulation constraints on the exchange of goods, credit and labour. Additionally, agricultural exports have a positive effect on growth through the legal system and property rights index. Thus, for the majority of the results obtained here, the hypothesis stated in the introduction could be restated so say that: natural resource dependency will have positive effects on growth if the country has a sufficient institutional quality to handle the potential negative effect of natural resource dependency.

The results do also suggest that growth performance in Latin America may also be explained by other factors such as the effect of external factors and macroeconomic instability affecting the whole economy and not only the natural resource exports. The terms of trade are related to the unit value of all imports relative to all exports for any given period, and will thus change as the price composition of these variables change. Empirical investigations have suggested positive, negative and non-existent secular trends in the terms of trade of developing countries. Lately, a positive trend in terms of trade for Latin America has been uncovered. This seems to be supported by data here, as the proxies for macroeconomic stability are significant for most specifications. However, the effects estimated here reflects short term effects, and can thus reflect the positive resource shocks.

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Appendix

Table A.1 Variables and sources

Variable name	Description	Source
GDP per capita	GDP per capita (constant 2005 US$)	WDI
Growth rate	Log growth per capita	WDI
Nominal exchange rate	% change in the official exchange rate (LCU per US$, period average)	WDI
Investment	% change in the share of gross capital formation at current PPPs	PWT 8.0
Openness	% change in Merchandise trade (% of GDP)	WDI
Terms of trade	% change in net barter terms of trade index (2000 = 100)	WDI
Fraiser	Summarized Fraiser chained-linked index based on 5-year averages. Ranges from 1-10	Fraiser institute
Size of government	Area 1 Size of government. Ranges from 1-10	Fraiser institute
Legal property rights	Area 2 Legal System and Property Rights. Ranges from 1-10	Fraiser institute
Sound money	Area 3 Sound Money. Ranges from 1-10	Fraiser institute
Freedom to trade internationally	Area 4 Freedom to Trade Internationally. Ranges from 1-10	Fraiser institute
Regulations	Area 5 Regulations. Ranges from 1-10	Fraiser institute
Polity2	Revised combined polity score. Ranges form -10 to 10	Polity IV
Plurality	Plurality. Dummy variable, 1 if majoritarian election system, 0 otherwise	DPI 2012
Pr	Proportional Representation. Dummy variable; 1 if proportional representation, 0 otherwise	DPI 2012
Federalism	Are there state/province governments locally elected? Ranges from 0-2, no local elections,	DPI 2012
Checks on executive	Index of checks and balances, ranges from 1-7	DPI 2012
Stability	Index of political stability. Ranges from 0-1	DPI 2012
Agriculture/main exports	Agricultural export (measured in 1000 US$) as a share of the two first mayor exports	Calculations WITS
Manufacturing/main exports	Manufacturing export (measured in 1000 US$) as a share of the two first mayor exports	Calculations WITS
Ores and metals/main exports	Ores and metals export (measured in 1000 US$) as a share of the two first mayor exports	Calculations WITS
Petroleum/main exports	Petroleum export (measured in 1000 US$) as a share of the two first mayor exports	Calculations WITS
Point Source/main exports	Point source export (measured in 1000 US$) as a share of the two first mayor exports	Calculations WITS
Primary exports/main exports	Primary export (measured in 1000 US$) as a share of the two first mayor exports	Calculations WITS
Agriculture/GDP	Agricultural export (measured in 1000 US$) as a share of GDP at market prices (current US$)	Calculations WITS
Manufacturing/GDP	Manufacturing export (measured in 1000 US$) as a share of GDP at market prices (current US$)	Calculations WITS

Ores and metals/GDP	Ores and Metals export (measured in 1000 US$) as a share of GDP at market prices (current US$)	Calculations WITS
Petroleum/GDP	Petroleum export (measured in 1000 US$) as a share of GDP at market prices (current US$)	Calculations WITS
Point Source/GDP	Point Source export (measured in 1000 US$) as a share of GDP at market prices (current US$)	Calculations WITS
Primary exports/GDP	Primary export (measured in 1000 US$) as a share of GDP (Sachs &Warner primary export measure)	Calculations WITS

Table A2: Pooled IV regression using petroleum and agriculture as a share of main exports as instruments

log growth	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	Fraiser	Polity2	Government size	Legal property rights	Sound money	Free trade	Regulations
Institutions	0.0578*	-0.00607***	0.0265***	0.0180***	0.113	-0.0738	0.0169
	(0.0341)	(0.00228)	(0.00942)	(0.00575)	(0.264)	(0.101)	(0.0126)
Investment	0.133***	0.129***	0.125***	0.131***	0.120	0.118**	0.131***
	(0.0226)	(0.0148)	(0.0160)	(0.0148)	(0.104)	(0.0597)	(0.0132)
Terms of trade	0.0850***	0.0641***	0.0611***	0.0620***	0.260	0.0917	0.0522***
	(0.0319)	(0.0201)	(0.0195)	(0.0176)	(0.515)	(0.0857)	(0.0163)
Exchange rate	0.0146	-0.0216***	-0.0154***	-0.0177***	0.184	-0.0608	-0.0166***
	(0.0221)	(0.00454)	(0.00446)	(0.00398)	(0.482)	(0.0559)	(0.00548)
Federalism	0.0120*	0.00202	0.0123***	-0.00480*	0.0536	-0.0153	0.00391*
	(0.00653)	(0.00190)	(0.00413)	(0.00282)	(0.120)	(0.0257)	(0.00203)
Military	0.0698**	-0.0177	0.0310***	0.0234***	0.142	-0.152	0.0211**
	(0.0354)	(0.0136)	(0.0103)	(0.00746)	(0.314)	(0.223)	(0.00920)
Checks	0.00370	0.00564*	0.00176	-0.000240	-0.0110	-0.0100	0.000547
	(0.00339)	(0.00296)	(0.00182)	(0.00167)	(0.0250)	(0.0133)	(0.00167)
Stability	-0.00423	0.00636	0.00319	-0.000278	0.0343	0.0198	-0.00392
	(0.00999)	(0.00811)	(0.00749)	(0.00639)	(0.0951)	(0.0405)	(0.00593)
Openness	-0.0541*	-0.0358**	-0.0273	-0.0322**	-0.264	-0.0639	-0.0339**
	(0.0285)	(0.0177)	(0.0202)	(0.0141)	(0.565)	(0.0755)	(0.0157)
Constant	-0.378	0.0555***	-0.169**	-0.0408	-0.896	0.607	-0.0885
	(0.242)	(0.0140)	(0.0725)	(0.0261)	(2.176)	(0.787)	(0.0904)
Hansen J	0.6510	0.0721	0.3938	0.6353	0.8555	0.5799	0.0046
Observations	349	349	349	349	349	349	349
R-squared	-0.263	0.393	0.307	0.467	-22.632	-5.768	0.603

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A3: Pooled IV regression using petroleum and agriculture as a share of GDP as instruments

log growth	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	Fraiser	Polity2	Government size	Legal property rights	Sound money	Free trade	Regulations
Institutions	0.0256***	-0.00262*	0.0265***	0.0163***	0.0206	-0.00881	0.0404***
	(0.00985)	(0.00147)	(0.0100)	(0.00524)	(0.0156)	(0.00605)	(0.0143)
Investment	0.132***	0.130***	0.125***	0.131***	0.129***	0.129***	0.131***
	(0.0143)	(0.0128)	(0.0158)	(0.0143)	(0.0212)	(0.0148)	(0.0173)
Terms of trade	0.0650***	0.0556***	0.0611***	0.0608***	0.0878**	0.0543***	0.0563**
	(0.0177)	(0.0167)	(0.0193)	(0.0172)	(0.0377)	(0.0182)	(0.0222)
Exchange rate	-0.00582	-0.0218***	-0.0154***	-0.0181***	0.0157	-0.0266***	-0.00923
	(0.00721)	(0.00384)	(0.00468)	(0.00391)	(0.0291)	(0.00521)	(0.00600)
Federalism	0.00648***	0.00205	0.0123***	-0.00416	0.0115	5.97e-06	0.00645**
	(0.00239)	(0.00161)	(0.00400)	(0.00259)	(0.00790)	(0.00231)	(0.00261)
Military	0.0373***	-0.00102	0.0310***	0.0223***	0.0356*	-0.00785	0.0342***
	(0.0111)	(0.00913)	(0.0103)	(0.00685)	(0.0198)	(0.0147)	(0.0107)
Checks	0.000860	0.00164	0.00176	-0.000347	-0.00315	-0.00242	0.00323
	(0.00178)	(0.00201)	(0.00192)	(0.00160)	(0.00226)	(0.00158)	(0.00232)
Stability	-0.00332	0.00126	0.00319	-0.000495	0.00415	7.21e-05	-0.00576
	(0.00630)	(0.00612)	(0.00742)	(0.00615)	(0.0106)	(0.00684)	(0.00742)
Openness	-0.0394**	-0.0312**	-0.0273	-0.0318**	-0.0709*	-0.0320**	-0.0425**
	(0.0163)	(0.0150)	(0.0202)	(0.0138)	(0.0385)	(0.0155)	(0.0193)
Constant	-0.148**	0.0438***	-0.169**	-0.0337	-0.136	0.103**	-0.260**
	(0.0707)	(0.00998)	(0.0766)	(0.0239)	(0.130)	(0.0476)	(0.106)
Hansen J	0.0451	0.0011	0.1562	0.1403	0.0793	0.0024	0.9965
Observations	349	349	349	349	349	349	349
R-squared	0.498	0.584	0.307	0.505	-0.050	0.523	0.277

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A4: Hausman Test Results. Fixed-effects vs. Random-effects

Indicator	Chi 2	Prob>Chi2	Result
Fraiser	0.12	1	Does not rejcet Ho. Use RE
Polity2	11,09	0,2695	Does not rejcet Ho. Use RE
Government size	5,47	0,7912	Does not rejcet Ho. Use RE
Legal property rigths	0,4	1	Reject Ho. Use FE
Sound Money	18,94	0,0257	Reject Ho. Use FE
Freedom to trade internatonally	2,03	0,991	Does not rejcet Ho. Use RE
Regulations	2,85	0,9701	Does not rejcet Ho. Use RE

Table A5: IV Panel Regression using petroleum and agriculture as a share of GDP as instruments

lngrowth	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	fraiser	polity2	govsize	legalprop	soundmon	freetrade	regulations
	RE	RE	RE	FE	FE	RE	RE
Institutions	0.0286***	-0.00110	0.0278***	0.0163***	0.0206	-0.00838	0.0330***
	(0.0107)	(0.00167)	(0.0104)	(0.00565)	(0.0186)	(0.00686)	(0.0108)
Investment	0.146***	0.145***	0.136***	0.131***	0.129***	0.130***	0.149***
	(0.0141)	(0.0113)	(0.0157)	(0.0142)	(0.0208)	(0.0131)	(0.0144)
Terms of trade	0.0567***	0.0662***	0.0586***	0.0608***	0.0878**	0.0559***	0.0394**
	(0.0174)	(0.0155)	(0.0195)	(0.0179)	(0.0430)	(0.0167)	(0.0198)
Exchange rate	-0.00165	-0.0225***	-0.0146***	-0.0181***	0.0157	-0.0266***	-0.00684
	(0.00839)	(0.00257)	(0.00458)	(0.00343)	(0.0342)	(0.00473)	(0.00612)
Federalism	0.00683**	0.00259	0.0128***	-0.00416	0.0115	0.000164	0.00517**
	(0.00267)	(0.00177)	(0.00454)	(0.00293)	(0.00895)	(0.00242)	(0.00238)
Military	0.0430***	0.00507	0.0344***	0.0223***	0.0356	-0.00713	0.0336***
	(0.0134)	(0.0107)	(0.0112)	(0.00708)	(0.0232)	(0.0163)	(0.0101)
Checks	-0.000486	0.000618	0.000414	-0.000347	-0.00315	-0.00221	-0.000553
	(0.00159)	(0.00281)	(0.00185)	(0.00162)	(0.00279)	(0.00161)	(0.00164)
Stability	-0.00338	-0.00303	0.00321	-0.000495	0.00415	-0.000232	-0.00316
	(0.00657)	(0.00588)	(0.00787)	(0.00641)	(0.0111)	(0.00621)	(0.00693)
Openness	-0.0400***	-0.0260**	-0.0267	-0.0318**	-0.0709	-0.0314**	-0.0328**
	(0.0155)	(0.0121)	(0.0163)	(0.0144)	(0.0441)	(0.0136)	(0.0157)
Constant	-0.158**	0.0248***	-0.183**	-0.0516*	-0.118	0.0837*	-0.177***
	(0.0684)	(0.00575)	(0.0777)	(0.0264)	(0.127)	(0.0495)	(0.0649)
Overid	0.0929	0.0001	0.1686	0,0004	0.1553	0.0009	0.5532
Observations	349	349	349	349	349	349	349
Number of iso	38	38	38	38	38	38	38

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A6: First-stage Panel Regression using petroleum and agriculture as a share of GDP as instruments

VARIABLES	(1) fraiser	(2) polity2	(3) govsize	(4) legalprop	(5) soundmon	(6) freetrade	(7) regulations
Petroleum/GDP	5.61e-05	0.0486***	-0.00185	-0.00149	0.00357	0.00861*	-0.00512***
	(0.00256)	(0.0105)	(0.00280)	(0.00380)	(0.00584)	(0.00487)	(0.00254)
Agriculture/GDP	0.00640***	0.0224***	0.00622***	0.00981***	0.00506	0.00570*	0.00428**
	(0.00174)	(0.00716)	(0.00191)	(0.00259)	(0.00398)	(0.00331)	(0.00173)
Investment	-0.629*	-0.432	0.0599	-0.201	-0.00473	-0.635	-0.275
	(0.330)	(1.355)	(0.368)	(0.573)	(0.880)	(0.653)	(0.327)
Terms of trade	0.604	3.585**	0.184	-0.765	-1.914*	2.333***	1.091***
	(0.423)	(1.737)	(0.468)	(0.700)	(1.074)	(0.824)	(0.419)
Exchange rate	-0.779***	0.256	-0.257***	-0.188	-1.784***	-0.761***	-0.523***
	(0.0769)	(0.316)	(0.0855)	(0.129)	(0.199)	(0.151)	(0.0762)
Federalism	-0.0806	0.318	-0.302***	0.489***	-0.408***	-0.131	-0.0202
	(0.0566)	(0.233)	(0.0618)	(0.0832)	(0.128)	(0.107)	(0.0562)
Military	-1.123***	-5.896***	-0.807***	-0.557**	-1.126***	-2.554***	-0.692***
	(0.160)	(0.658)	(0.175)	(0.244)	(0.374)	(0.306)	(0.159)
Checks	0.0558	1.582***	0.00411	-0.0188	0.0959	0.102	0.0389
	(0.0390)	(0.160)	(0.0431)	(0.0644)	(0.0989)	(0.0758)	(0.0387)
Stability	-0.0682	1.077	-0.290	-0.152	-0.349	0.0814	-0.0433
	(0.164)	(0.676)	(0.181)	(0.256)	(0.393)	(0.317)	(0.163)
Openness	0.676*	0.132	0.217	0.535	2.271**	-0.0401	0.369
	(0.361)	(1.482)	(0.399)	(0.582)	(0.894)	(0.700)	(0.358)
Constant	5.729***	-0.874	6.869***	3.775***	6.416***	6.066***	5.624***
	(0.207)	(0.849)	(0.228)	(0.318)	(0.488)	(0.400)	(0.205)
Observations	349	349	349	349	349	349	349
R-squared							
Number of iso	38	38	38	38	38	38	38

standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1