NATURAL RESOURCES AND INSTITUTIONS IN TRANSITION ECONOMIES

Overview of presentation

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3. Related literature
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5. **Empirical analysis results**
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Aims of the paper

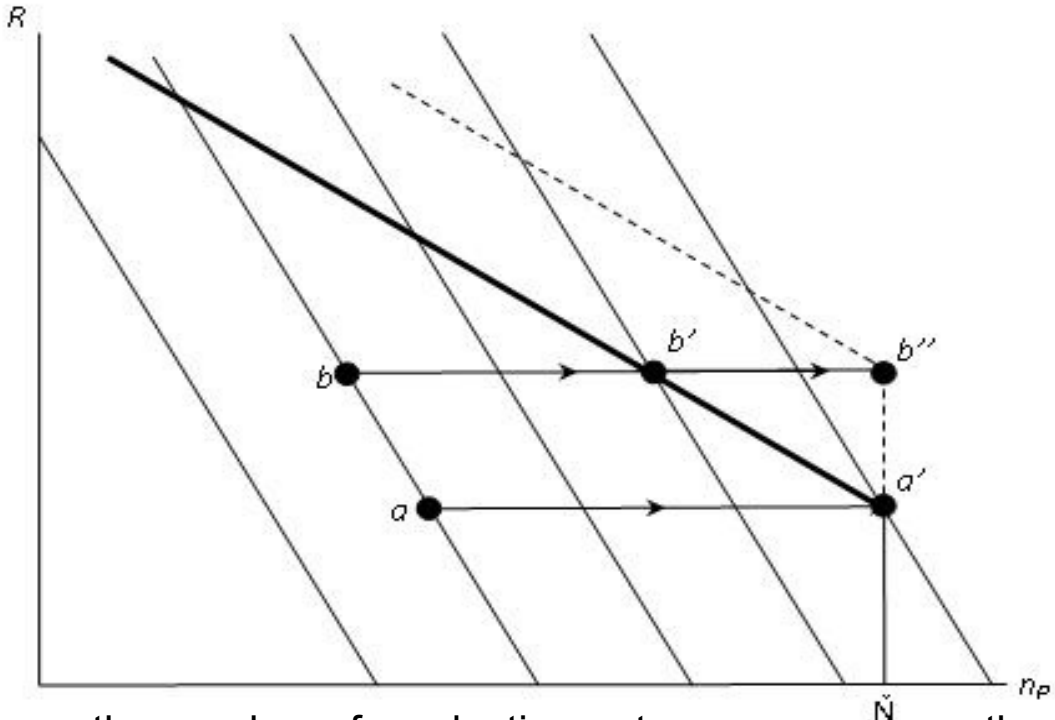
- We examine the **relationship** between natural resource abundance and institutions of transition countries including **Mongolia** between 2000 and 2012.

- Natural resource abundance does therefore hinder economic growth in countries with bad institutions but does not in countries with good institutions. Countries rich in natural resources constitute both growth losers and growth winners. More natural resources push aggregate income down, when institutions are bad, while resources raise income, when institutions are good (Mehlum and others, 2006).

Model of natural resources and institutions: Grabbing Versus Production

- In the model the total number of entrepreneurs is denoted by $N=n_g+n_p$,where n_p-are producers, while n_g – are grabbers.
- Grabbers target rents from natural resources R and use all their capacity to appropriate as much as possible of this rent. To what extent grabbing succeeds depends on the institutions of the country. In the model the institutional quality is captured by the parameter λ, which reflects the degree to which the institutions favour grabbers versus producers.
- Formally λ measures the resource rents accruing to each producer relative to that accruing to each grabber. When λ=-2.5, the system is completely grabber friendly such that grabber extract the entire rent, each of them obtaining R/n_g. A higher λ implies a more producer friendly institutional arrangement. When λ=2.5, there are no gains specialization in grabbing as both grabbers and producers each obtain the share R/N of resources.

Model of natural resources and institutions: Grabbing Versus Production



As shown on figure the number of productive entrepreneurs n_p on the horizontal axis and the value of resources R on the vertical axis The iso-income curve are steeper than the long-run equilibrium curve.

With grabber friendly institutions (low λ) country B converges to point b', while with producer friendly institutions (high λ) country B converges to point b". Income is higher in b" than in b'. Over the transition period growth is therefore highest with producer friendly institutions. Moreover with more producer friendly institutions, the resource rich country B outperforms the resource poor country A, eliminating the resource curse (Mehlum and others, 2006).

In this paper, we study the transition economies of the Central and Eastern Europe and Baltics (CEB), the Commonwealth of Independent States (CIS) and Asian countries such as China, Mongolia and Vietnam.

Central and Eastern Europe and Baltics (CEB),	Commonwealth of Independent States (CIS)	Asian Countries
Albania	Armenia	China
Bosnia and Herzegovinia	Azerbaijan	Mongolia
Bulgaria	Belarus	Vietnam
Croatia	Georgia	
Czech Republic	Kazakhstan	
Hungary	Kyrgyz Republic	
Macedonia	Moldova	
Poland	Russia	
Romania	Ukraine	
Slovakia		
Slovenia		
Latvia		
Lithuania		
Estonia		
Serbia		

Related literature

- Gylfason (2000), Sachs and Warner (1997a, 2001) address the aspect of reverse causality between economic growth and natural resource abundance. Countries with great natural resource wealth tend nevertheless to grow more slowly than resource – poor countries. Another possibility is that the quality of institutions itself is determined by GDP. This aspect of reverse causality is addressed in Acemoglu et al.(2001). They show, by using settler mortality as an instrument for institutional quality, that the effect of institutions on income becomes stronger.
- Kronenberg (2004) finds negative correlation between natural resource abundance and economic growth and point as a reason corruption and a neglect of basic education. However, it should be noted that the regression results are not robust and the results changes with inclusion and exclusion of different variables.
- In opposite side using oil production and reserves data Brunnschweiler (2009) shows that oil had strong and robust positive growth effects during 1996-2006 and the result is confirmed for different types of oil ownerships.
- Using cross-country regressions for two different years, 1996 and 2005 Alexeev and Conrad (2011) present in both OLS and 2SLS with instrumented per capita level of GDP natural resources are insignificant for growth.

Related literature

Gylfason (2001b)	Real GNP growth per capita (1965-1998)	Natural resource abundance (share of natural capital in national wealth, 1994), enrolment rate, investment, initial income	Resource curse
Ning and Field (2005)	Real GDP growth per capita (1970-1990)	Natural resource abundance (natural resource capital per capita), initial GDP, investment rates, openness, rule of law, changes in external terms of trade	Resource blessing
Mehlum and others (2006b)	Real GDP growth per capita (1965-1990)	Natural resource abundance (primary exports/GNP in 1970), initial income, openness, investments, institutional quality, interaction term, secondary school enrolment rate, ethnic fractionalization, language fractionalization	Resource curse only in countries with bad institutions

Related literature

Brunnschweiler (2008)	Real GDP growth per capita (1970-2000)	Natural resource variables [1. average total natural capital per capita in 1994 and 2000 (USD), 2. Average subsoil wealth per capita in 1994 and 2000 (USD)], initial income, rule of law/government effectiveness, geography	Resource blessing
Alexeev and Conrad (2009)	GDP per capita (PPP) 2000	Natural resource variables [1.hydrocarbon deposits, 2. value of oil output , 3. oil/GDP ratio], ethnolinguistic fractionalization, European population, Latin America, East Asia, rule of law	Resource blessing

Data

- The dependent variable is: GDP growth – average growth rate of real GDP per capita between 2000 and 2012.
- Explanatory variables are: initial income – log of GDP per capita, PPP (constant 2005 international $) in 2000 (RGDPpc00), controlling for conditional convergence
- ✓ openness – average trade (% of GDP) in the same period, as a proxy for trade openness,
- ✓ resource abundance – the share of average natural resource exports in GDP in the same period,
- ✓ investments – log of the average ratio of gross capital formation over GDP
- ✓ population growth - average population growth in the same period
- ✓ export growth – average annual growth of export in the same period
- ✓ institutional quality an index ranging from -2.5 to 2.5
- ✓ The institutional quality index is unweighted average of six indexes based on data from World bank: voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, rule of law and control of corruption. All these characteristics capture various aspects of producer friendly versus grabber friendly institutions. The index runs from 2.5 (maximum producer friendly institutions) to -2.5. Hence, when the index is -2.5 there is a weak rule of law and a high risk of expropriation, malfunctioning bureaucracy and corruption in the government; all of which favour grabbers and deter producers

Data

- In this regression we include the interaction term that captures the essence of our model prediction.

$$Interaction\ term = natural\ resource\ abundance \times Institutional\ quality$$

- Our prediction is that the natural resource abundance is harmful to growth only when the institutions are grabber friendly. But interaction term has a negative coefficient. The effect from the interaction term is strong and significant (with a p – value of 0.09).
- Dummy=1, if IQ>0

  Dummy=0, if IQ<0

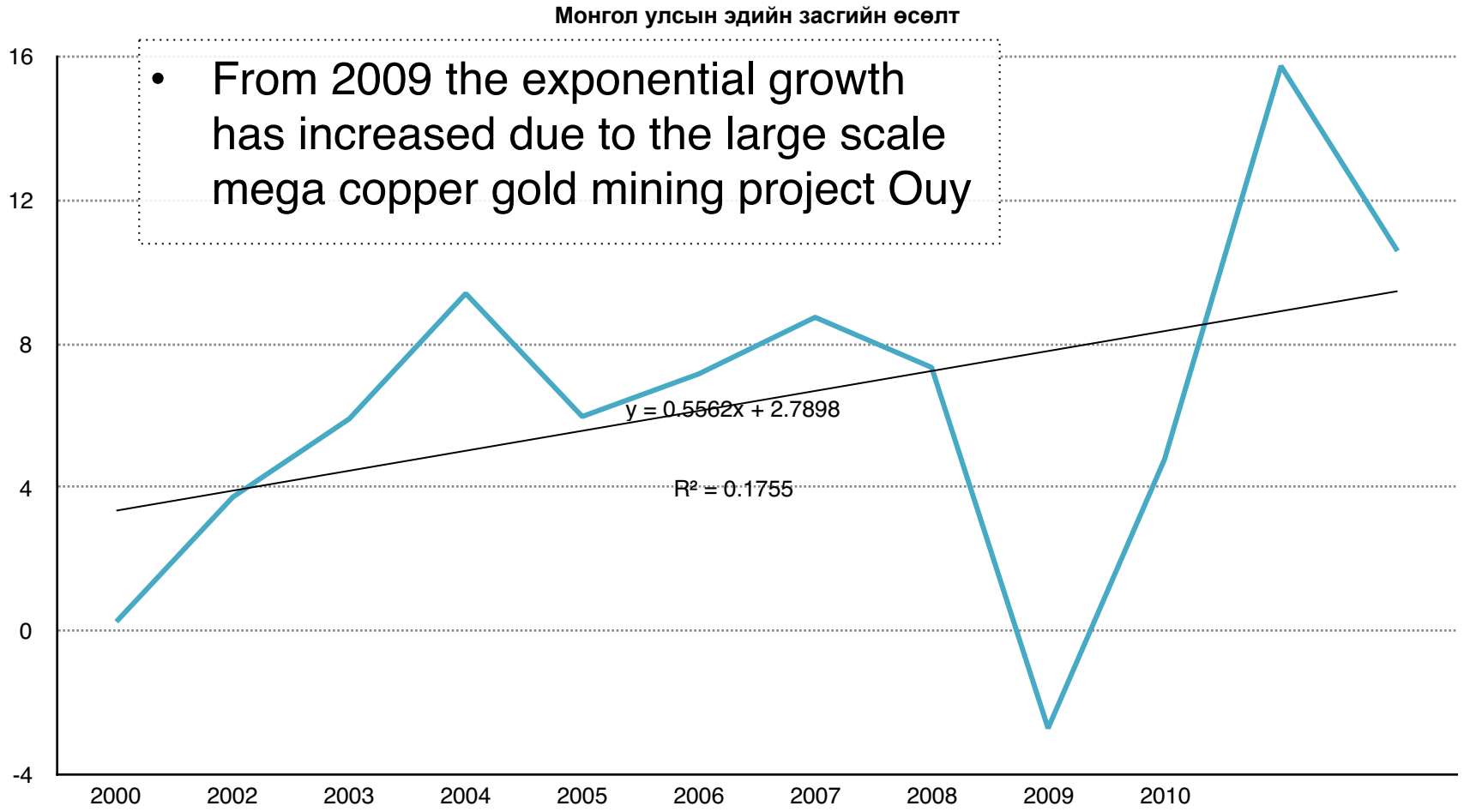
The relationship between economic growth and natural resource abundance

- We plot in Figure on the next slide the average yearly economic growth from 2000 to 2012 versus resource abundance in transition countries. Our sample consists of 27 countries, limited only by data availability.

- To describe existing data two classifications are used based on institutional quality that is unweighted average of six indexes based on data from World Bank:

1. voice and accountability,
2. political stability and absence of violence/terrorism,
3. government effectiveness,
4. regulatory quality,
5. rule of law
6. control of corruption.

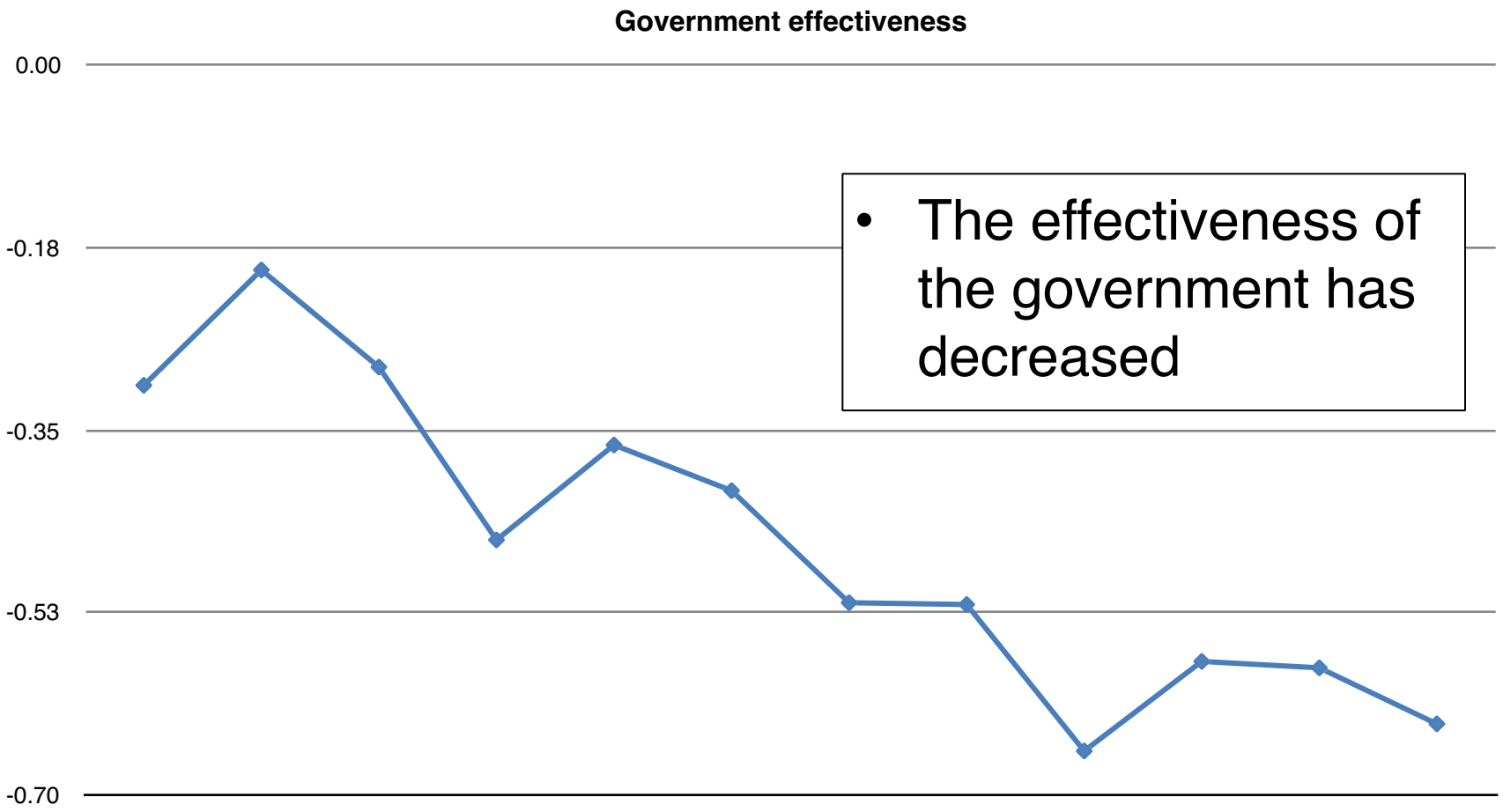
Economic growth of Mongolia



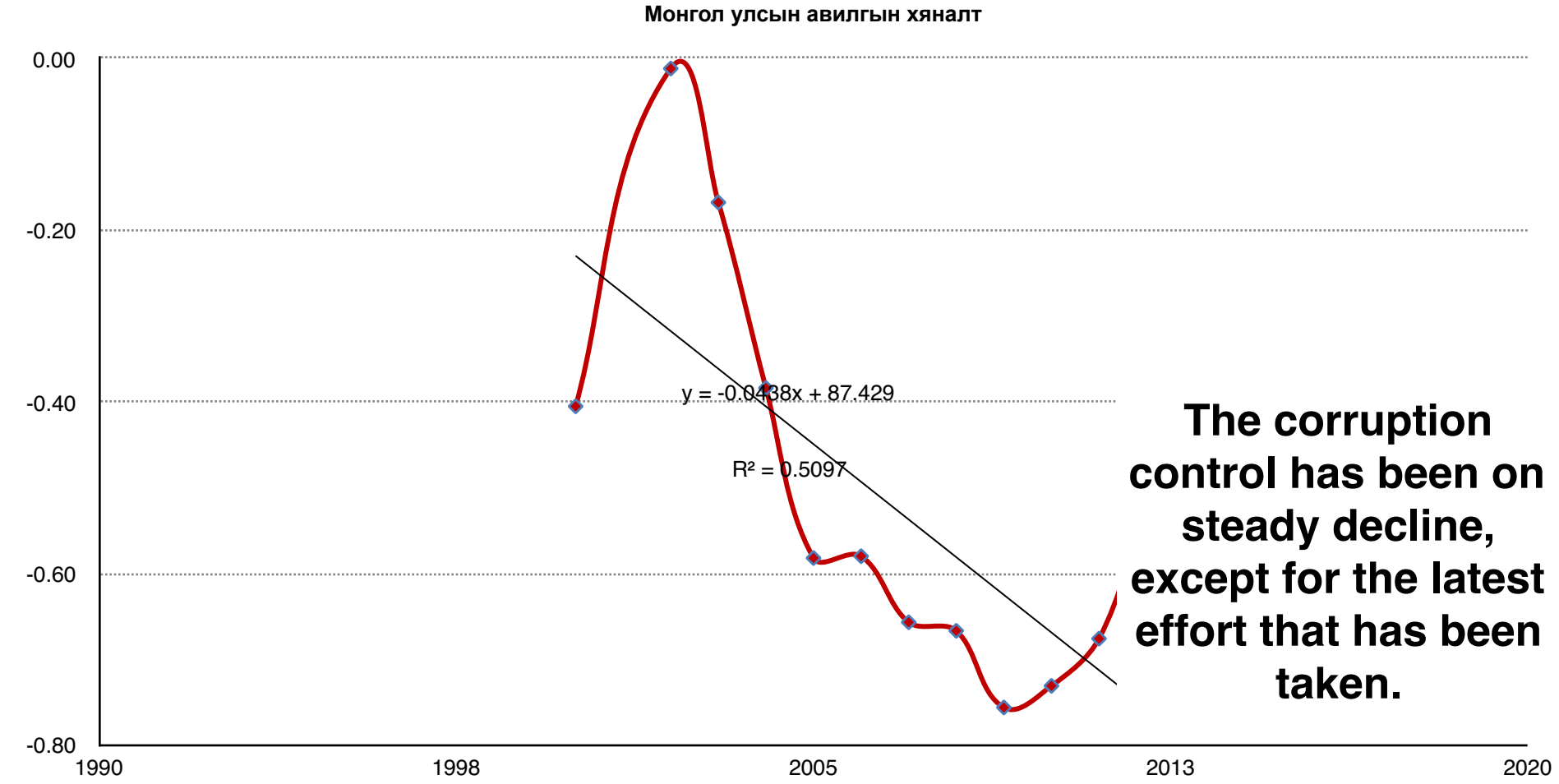
- From 2009 the exponential growth has increased due to the large scale mega copper gold mining project Ouy

Government effectiveness

world governance indicators (Mongolia)

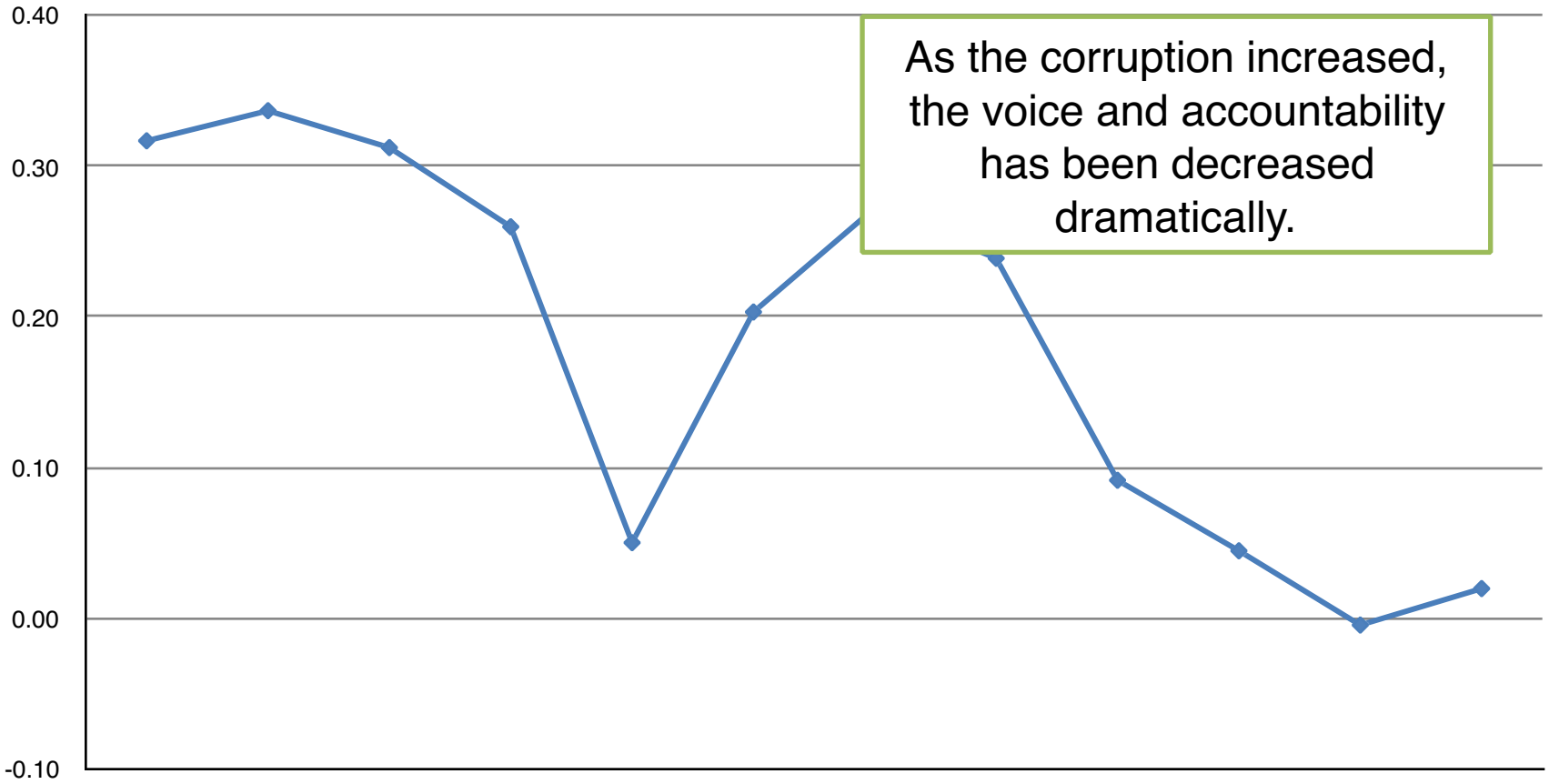


Corruption control

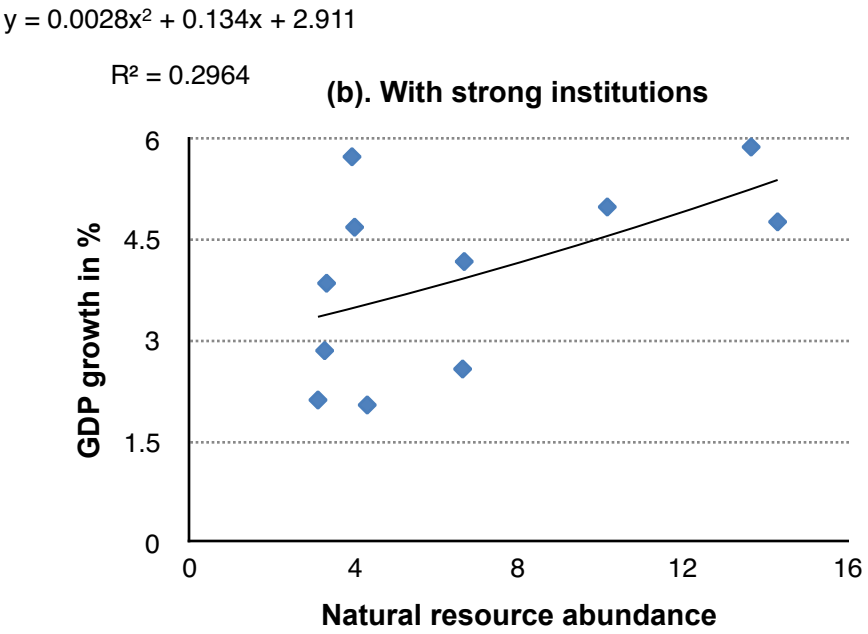


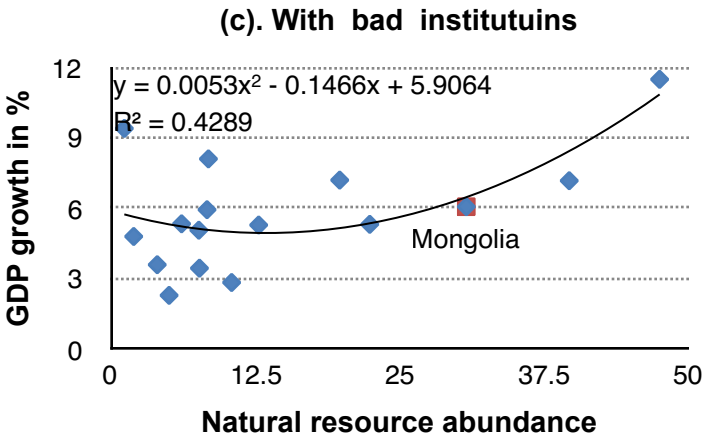
The corruption control has been on steady decline, except for the latest effort that has been taken.

Voice and accountability

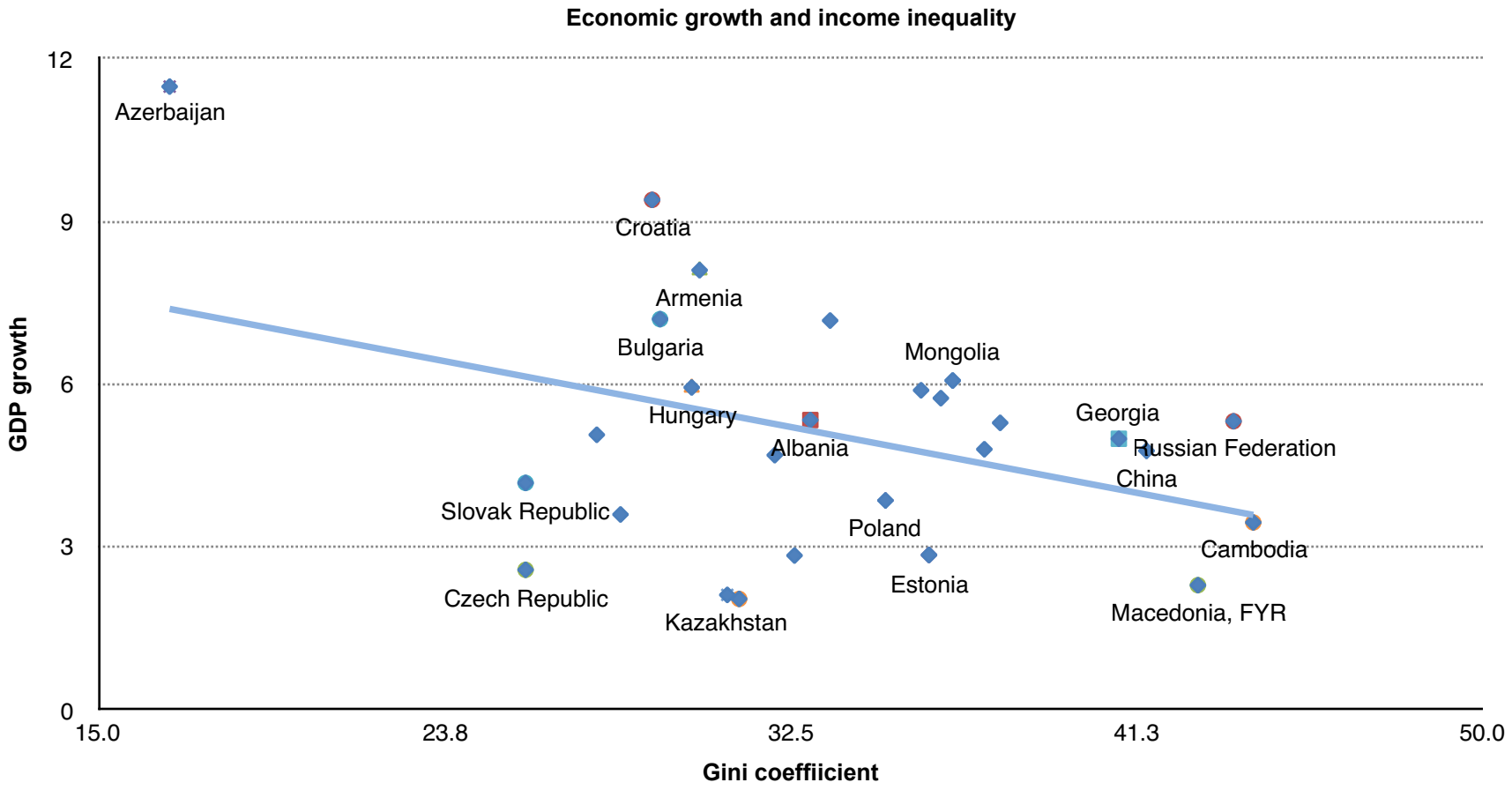


Resource rich countries with bad institutions

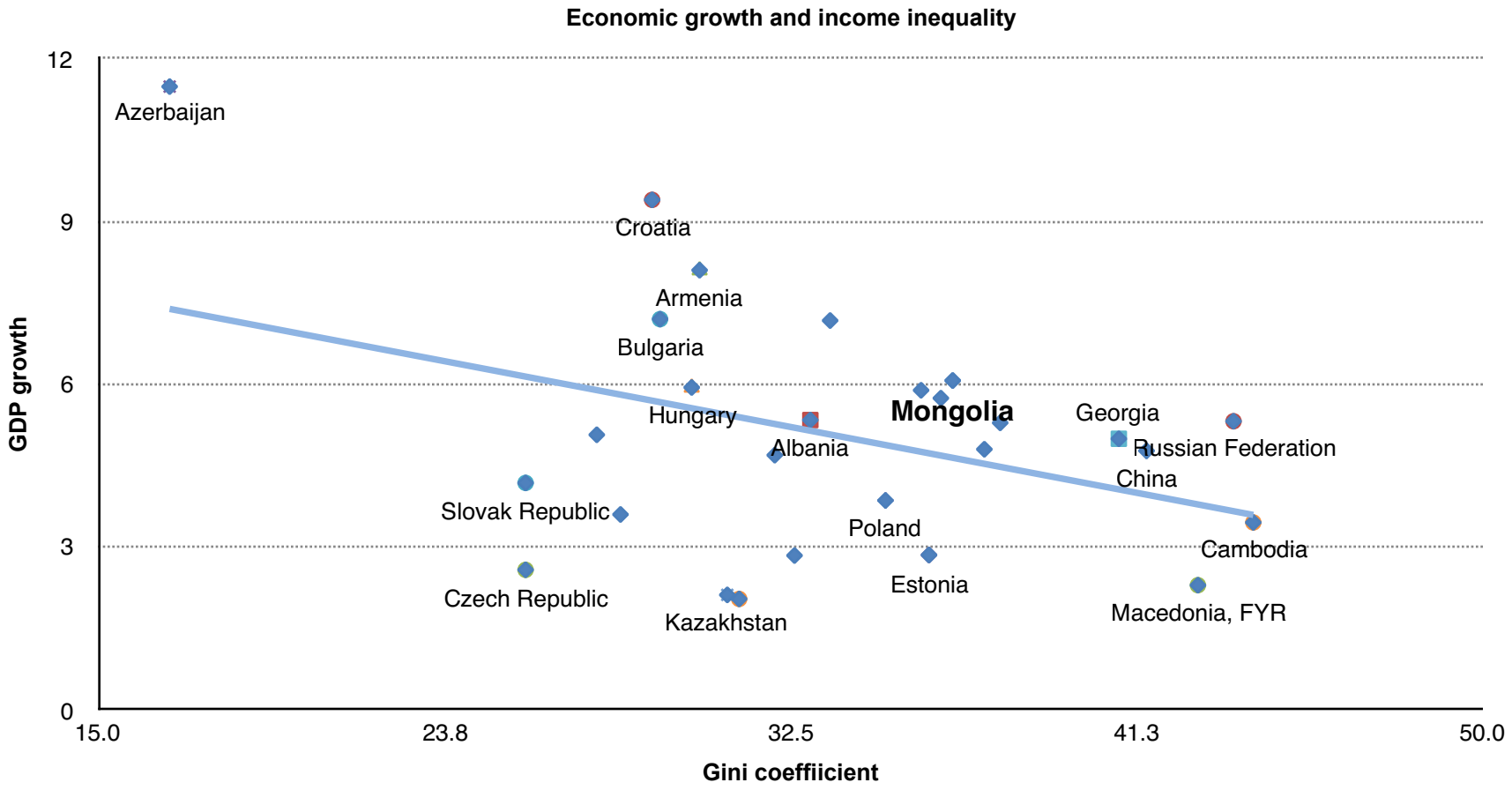




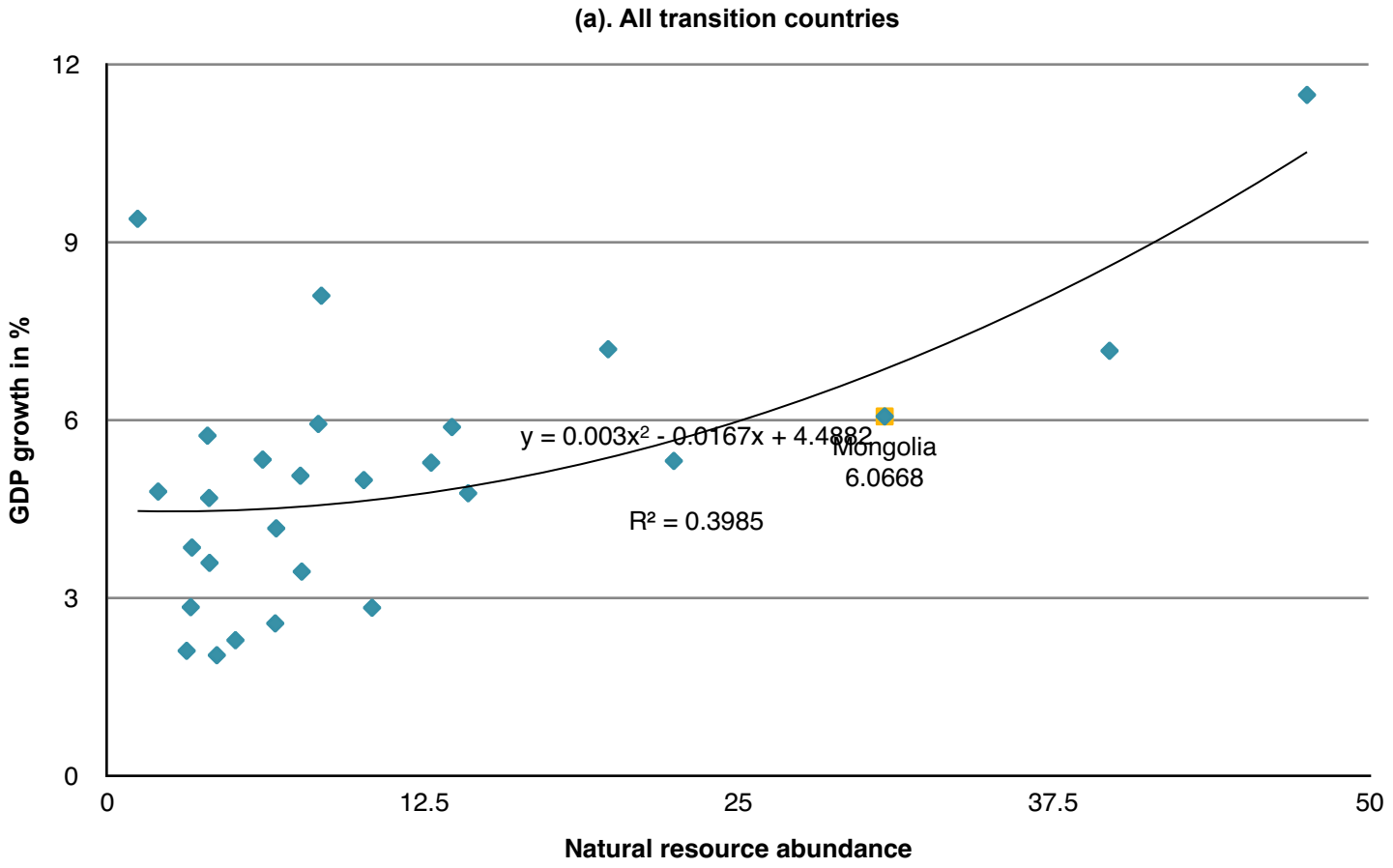
Mongolia's economic growth and Gini coefficient



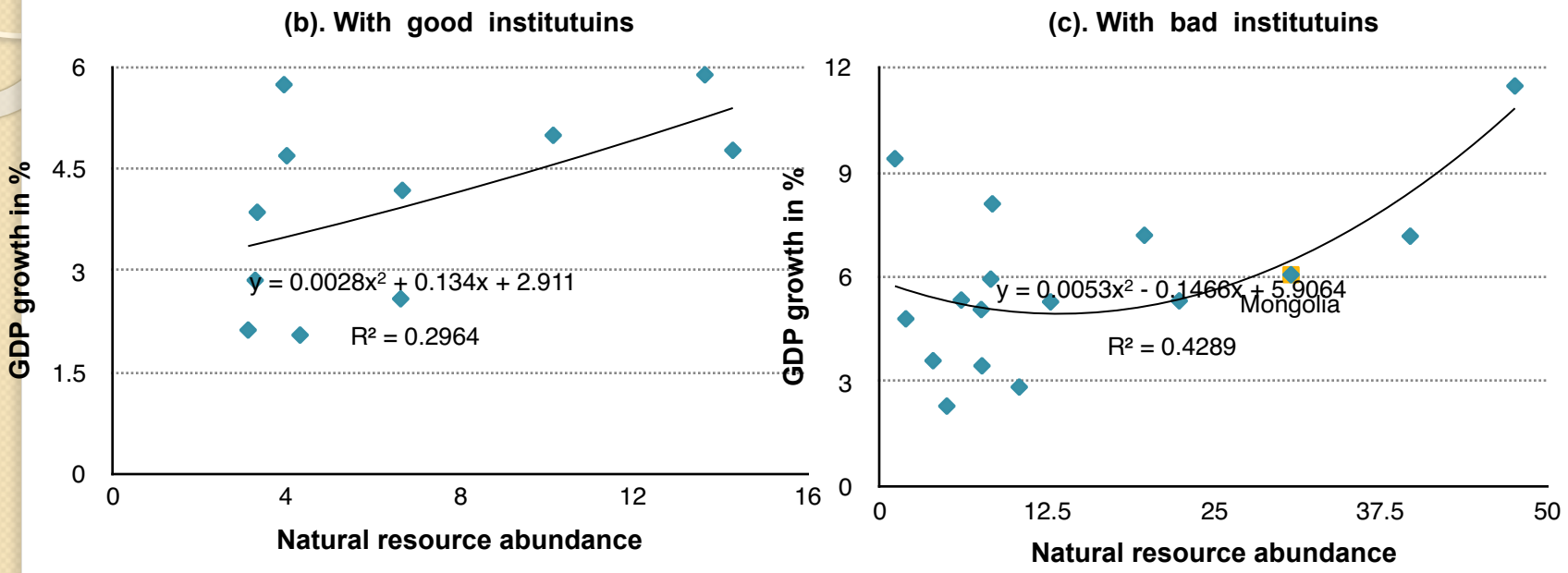
The Economic growth and income inequality



The relationship between economic growth and natural resource abundance



The relationship between economic growth and natural resource abundance



In panel (b) that depicts the relationship between natural resource abundance and economic growth, in countries with good institutions (producer friendly). In panel (c) that depicts the slow indication of a resource curse only appears for countries with bad institutions (grabber friendly).

Economic growth and corruption

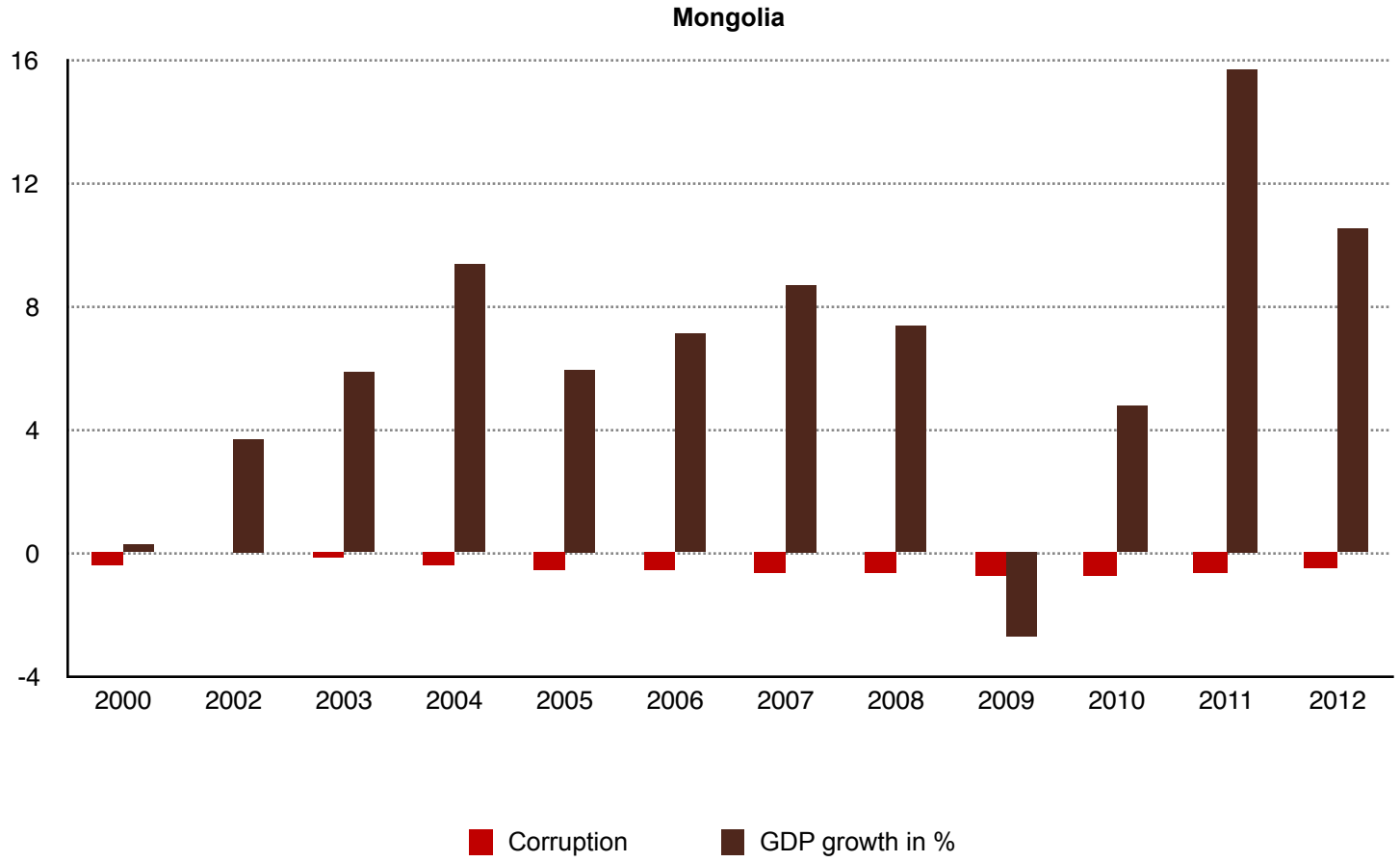
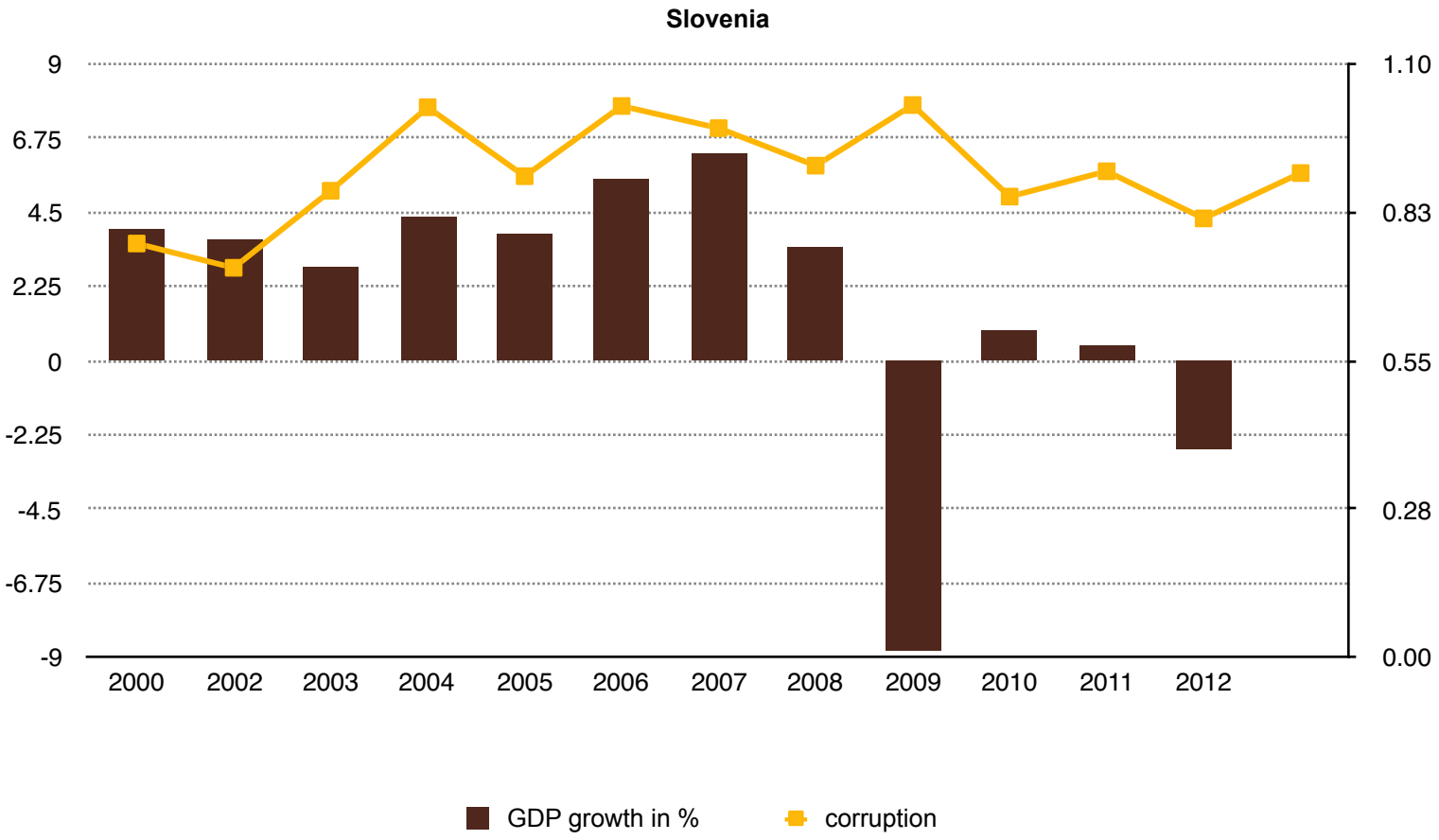


Figure depicts the relationship between economic growth and corruption in Mongolia (grabber friendly) and Slovenia (producer friendly).

Economic growth and corruption



Economic growth and income distribution

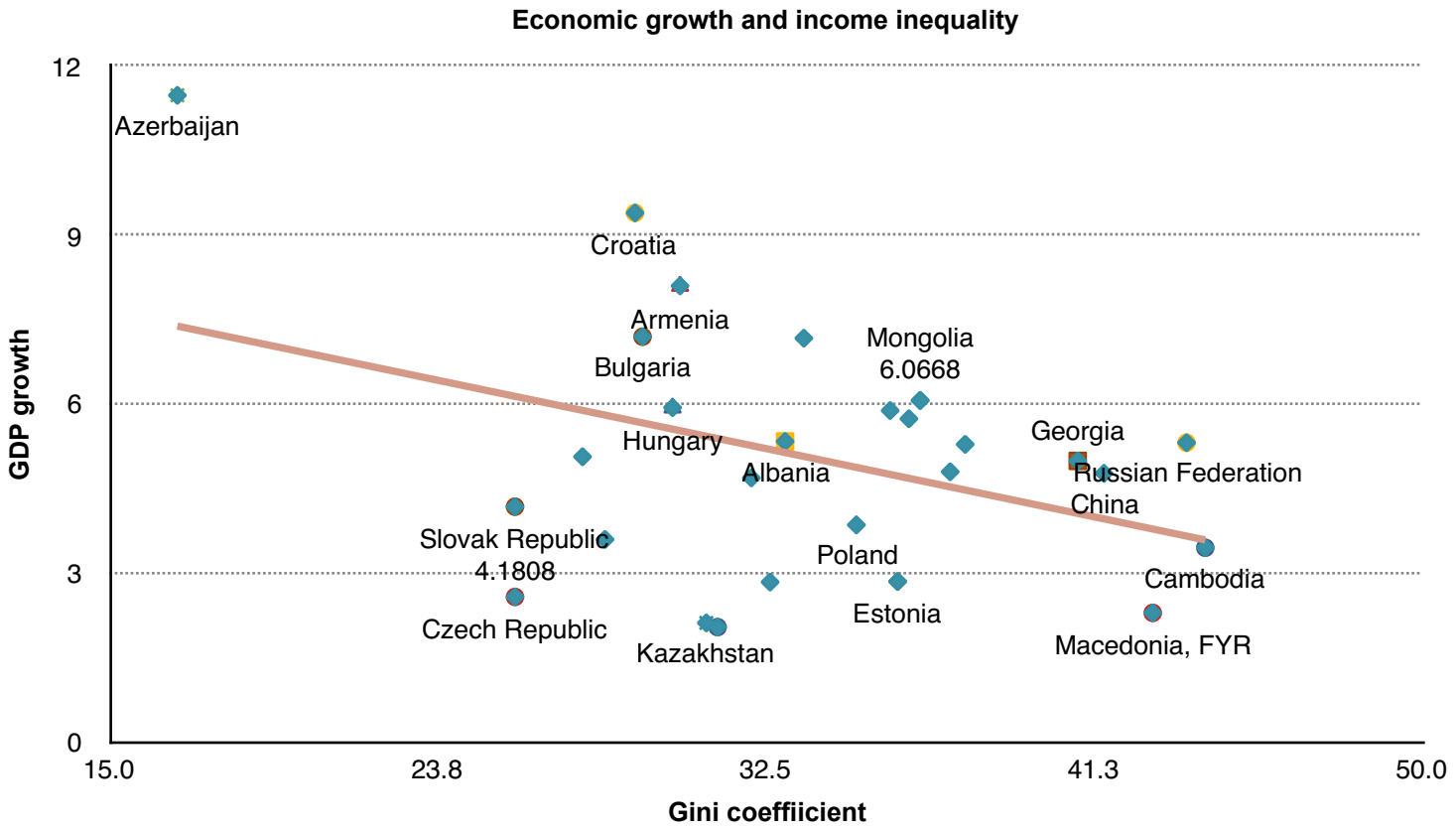


Figure depicts the relationship between economic growth and income inequality in transition countries. The relationship between economic growth and income inequality has a negative.

Estimation

Our main cross regression is as following:

$$G_i = \alpha + \beta_0 I_i + \beta_1 N_i + \beta_2 Inv_k + \beta_3 X_k + \beta_4 P_k + \beta_5 Op_k + \beta_6 IQ_k + \varepsilon_i$$

i- is a country index
G- is a per capita real GDP growth rate (data source from World development indicators)
I- is a initial income level expressed by per capita real GDP in 2000 (data source from World development indicators)
Ni- is natural resource abundance, and *Inv*- is investment rate
X-export growth
P-population growth
Op-openness
IQ-institutional quality(data source from World development indicators)

Empirical analysis results

Dependent variable: GDP growth					
Explanation variables	(1)	(2)	(3)	(4)	(5)
Initial income level	-0.86* (-2.54)	-1.15* (-3.30)	-0.91* (-2.81)	-0.76* (-2.40)	-1.55 (-2.68)
Natural resource abundance	0.11* (5.42)	0.11* (5.14)	0.11* (5.63)	0.23* (3.30)	0.11* (3.87)
Openness	-0.02* (-2.59)		-0.02* (-2.60)	-0.01* (-1.92)	-0.03* (-2.27)
Population growth	-1.35* (-3.45)	-1.49* (-3.57)	-1.36* (-3.65)	-1.51* (-4.14)	
Investments	6.40* (4.70)	5.86* (4.03)	6.28* (4.83)	6.83* (5.36)	
Export Growth		0.18** (1.75)	0.16** (1.79)	0.16** (1.91)	
Rule of law					1.22** (1.59)
Interaction term				-0.06** (-1.76)	
Observations	27	27	27	27	27
Adjusted R^2	0.75	0.78	0.78	0.80	0.52

Note: The numbers in brackets are t-values. *, ** statistically significant at 5%, 10% levels

Interpretation of results

- The relationship between economic growth and natural resource has a positive.
- Aside from natural resource abundance, there are other important explanatory variables: investment, export growth, interaction effect, initial income level and population growth.
- Initial income is negatively correlated with subsequent growth, indicating conditional convergence. Among the transition economies there appears to be conditional convergence. The level of GDP per capita in 2000 can be interpreted as a proxy for the general development level of an economy.
- Export growth, investment are positively but population growth, interaction are negatively with economic growth. These seven variables, natural resource abundance, export growth, investment, initial income, openness, population growth, interaction term, together explain more than 80 percent of the variation in growth rates among the transition countries.

Dependent variable: AvGroRGDPpC
Multiple correlation coefficient: 0.92
Adjusted R2: 0.83
Observations: 20

	Coefficient	*Standard error*	*t-statistic*	*p-value*
intercept	***-5.15***	***4.03***	***-1.28***	***0.21***
ShaPrimEx	***-12.03***	***1.55***	***-7.74***	***8.42E-07***
Log(RGDPpC89)	***1.60***	***1.08***	***1.47***	***0.16***
Interaction	***0.375***	***0.11***	***3.60***	***0.002***

Tobias Kronenberg, Maastricht Economic Research Institute On Innovation And Technology, (MERIT), University of Maastricht, The Netherlands

- Table shows is that we have found a model containing only three explanatory variables that is capable of explaining more than 80 percent of the variation in growth rates of the transition economies during the 1990s.
- The estimated coefficient on ShaPrimEx is negative and highly significant, with an extremely low p-value.
- The coefficient on RGDPpC89 is positive, suggesting that high initial income led to faster growth, but it is only borderline significant.
- InterAction is highly significant, supporting the notion that export growth has a positive, but asymmetric, effect on growth.

Results of regressions

Dependent variable is GDP growth	Kronenberg regression	Regression 4 (alternative)
Initial income level	1.60* (1.47)	-0.76* (-2.40)
Openness		-0.01* (-1.92)
Natural resource abundance	-12.04* (-7.75)	0.23* (3.30)
Population growth		-1.51* (-4.14)
Investment		6.83* (5.36)
Export Growth		0.16** (1.91)
Interaction term	0.38* (3.64)	-0.06** (-1.76)
Observations **Adjusted R^2**	20 0.83	27 0.80

Note: The numbers in brackets are t-values. *, ** statistically significant at 5%, 10% levels

Conclusion

- Cross–section empirical analysis of 27 countries between 2000 and 2012 indicates that transition economies benefited from natural resource exports.
- According to results of previous studies in transition countries the relationship between economic growth and natural resource had negative.
- However, our results show that relationship between economic growth and natural resource has a positive. Therefore, Kronenberg (2004) had used the data from 1989 to 1999 , I have used the data between 2000 and 2012.
- As shown in results of different years the relationship between economic growth and natural resources has a contrast.

Related literature

Author	Dependent	Independent	Results
Sachs and Warner (1997)	Average annual real GDP growth divided by the economically active population (1970-1990)	Natural resource abundance(primary products exports/GDP), initial GDP, openness, investment rates, human capital accumulation rates, changes in external terms of trade, government expenditure ratios, terms of trade volatility, efficiency of government institutions	Resource curse
Sachs and Warner (2001)	Real GDP growth per capita (1970-1989)	Natural resource abundance (natural resource exports/GDP) in 1970, initial GDP, openness, interaction variable,% Land w/in 100 km coast, km to closest port, % land in geographical tropics, falciparam malaria index 1966	Resource curse
Kronenberg (2001)	Average growth of GDP per capita (1989-1999)	Natural resource abundance(primary products exports/Ex), initial GDP, gross capital formation(% of GDP) gross secondary enrollment, State capture index, average annual export growth, openness	Resource curse
Gylfason (2000)	Average growth of GNP per capita (1965-1998)	Natural capital, enrolment rate, investment, initial income	Resource curse