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More Oil, Less Education Quality?
New Empirical Evidence

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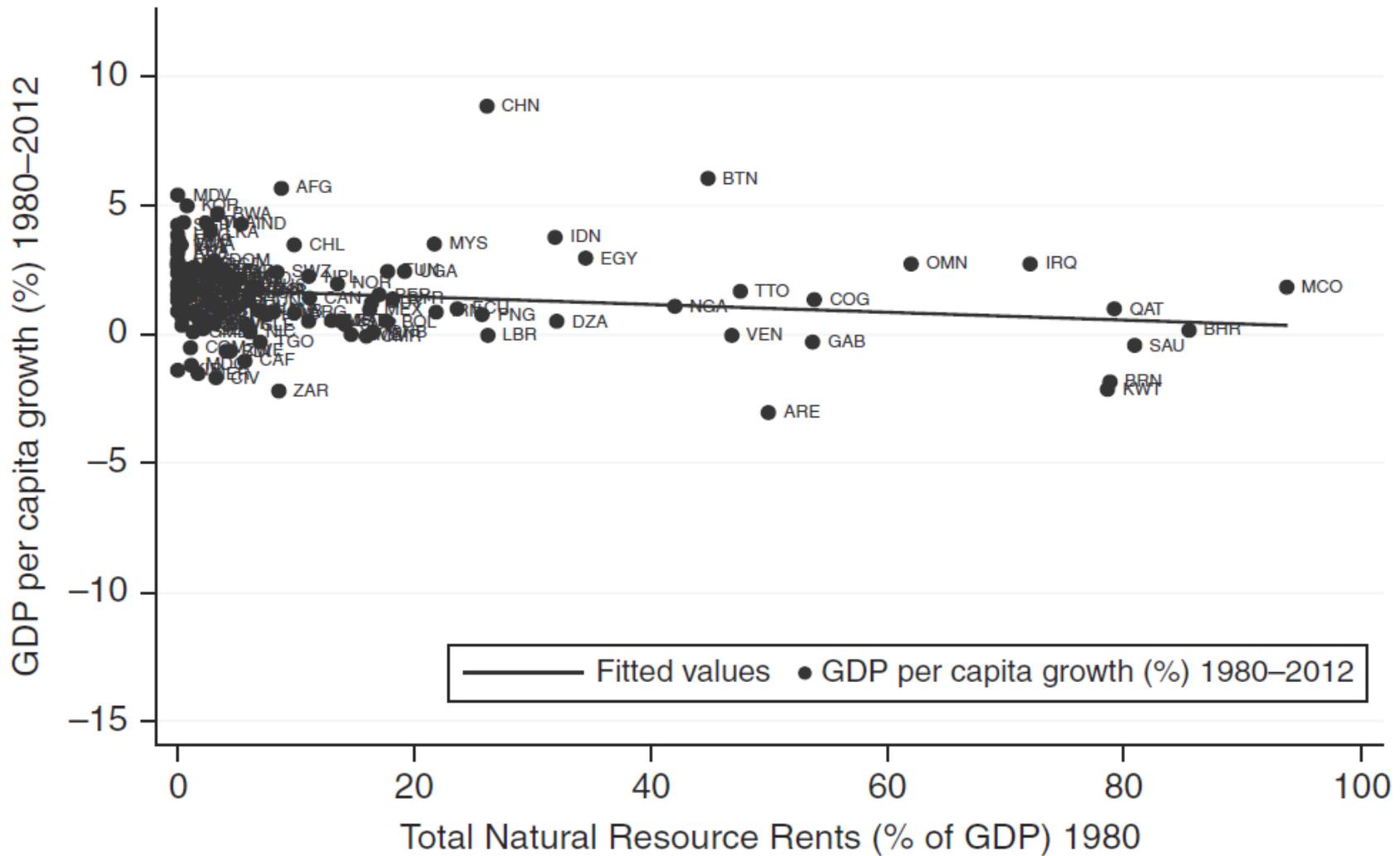farzanegan@uni-marburg.de

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International Iran Forum,

CNMS, Marburg

Agenda

1. Motivation

2. Related literature & contribution

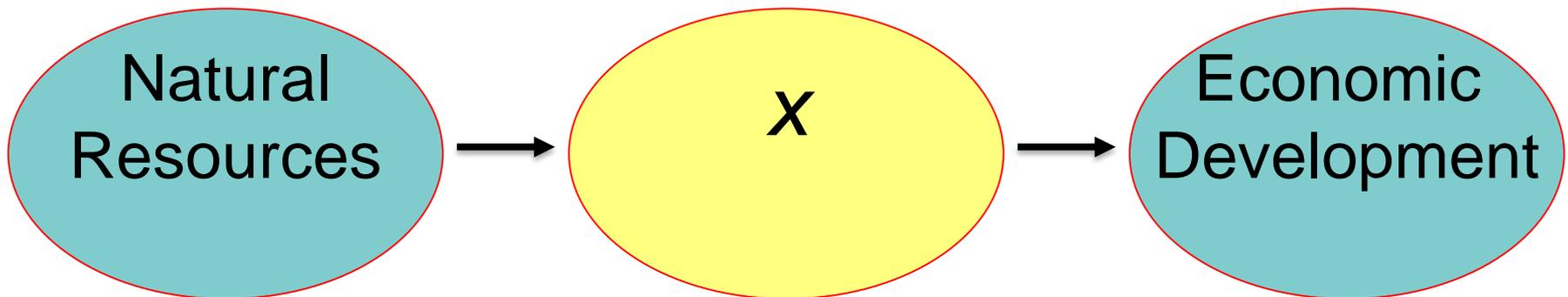3. Questions, data and method

4. Results

5. Conclusion

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Motivation
Natural Resources and Economic Growth- Is there a curse?!

Motivation
Natural Resources and Economic Growth- Transmission Channels

Natural Resources → X → Economic Development

What is X ?

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To sum up the literature
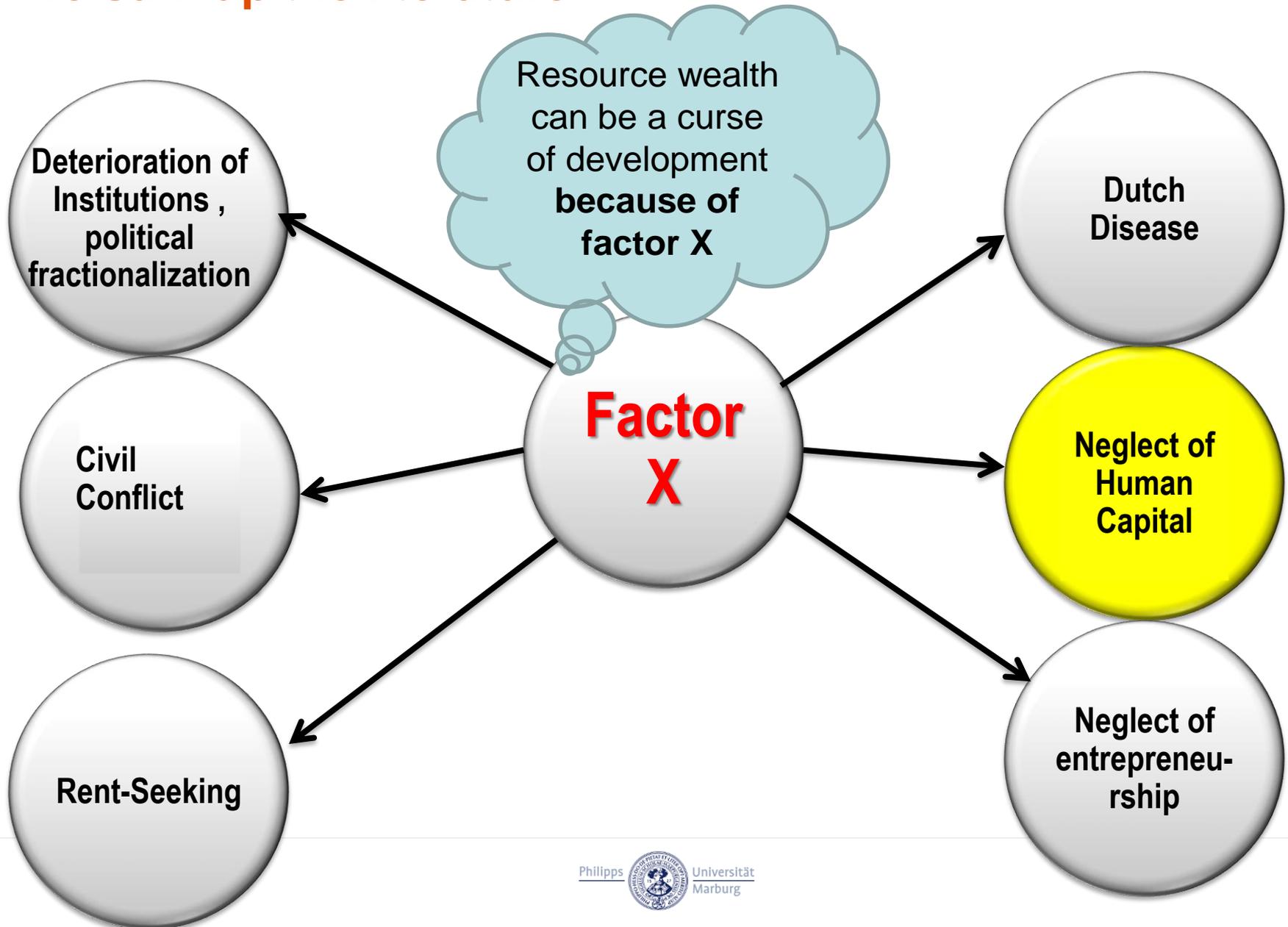
Motivation: Our contribution

- We add to this literature by providing empirical evidence on a new transmission channel of the resource curse, namely, the **negative effect of rents on the quality of education**.

- This channel of the resource curse has been largely neglected in the literature so far.

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Motivation: Spending on education

- International organizations, such as the World Bank, are allocating significant budgets for the expansion of schooling in developing countries.

- In its **2015** annual report, the World Bank emphasized education as one the best ways to end poverty.

- The **Bank's investment in education** projects is now **more than $14 billion** [World Bank (2015)].

> However, larger spending on education may not automatically lead to a higher quality of education

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Motivation: Spending on education

Government expenditure on education, total (% of GDP)
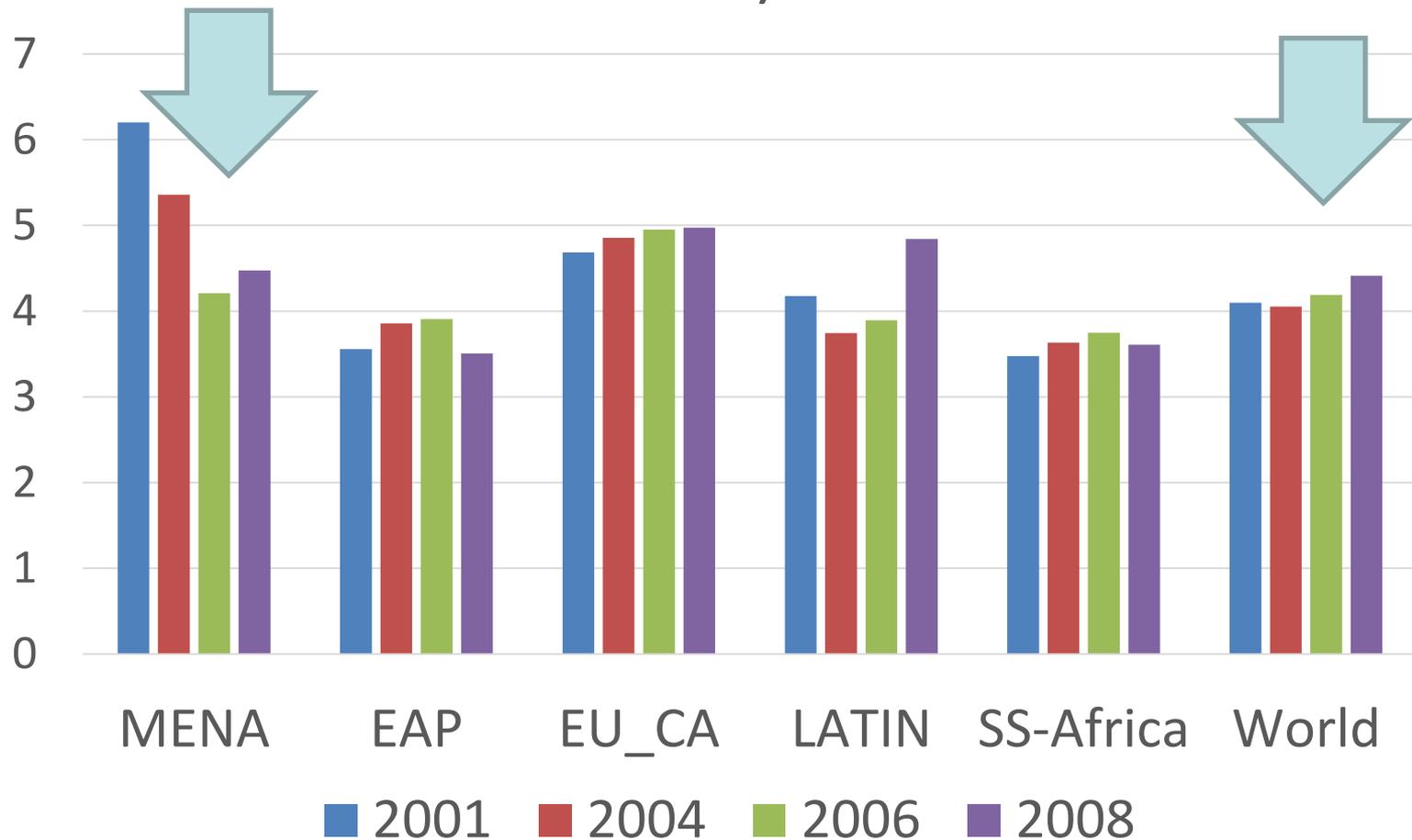
Motivation: Spending on education

- **the monetary investment is not reflected in the quality of education** ... ...
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  schooling...

- He ...
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  are n...
  educa... ...
  consists of th... ...abia,
  Qatar, Kuwait and Oman. ...untries, GDP per
  worker is relatively ... while education quality is
  low"

Kaarsen does not provide any evidence on the nexus between resource rents and education quality.

Our aim is to examine this nexus in a multivariate framework and to clarify the mechanism.

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Main Questions

Q1: Do resource-rich countries invest less in education systems, particularly at primary and secondary levels?

Q2: Does higher dependency on resource rents affect the quality of the education system negatively?

- With Q1, we replicate some parts of Gylfason's analysis on the rent-spending nexus with more recent data.

- Q2 then shifts the focus to education quality.

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Reply to Q1

To answer **Q1** we employ the following specification:

$$eduexp_i = cons + \boldsymbol{\beta_1} \cdot rent\_gdp_i + \beta_2 \cdot Z_i + \varepsilon_i \quad (1)$$

where **eduexp** stands for the government expenditure on education, **rent_gdp** stands for the ratio of resource rents to GDP, and **Z** covers the set of other control variables.

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Q1: Dependent variable

- We use **the (log of) PPP adjusted spending per student on both primary and secondary education** as dependent variables.

- It is important to adjust per student spending by considering the purchasing power in different countries.

- For example, spending **500 US$ on education** buys quite different amounts of teaching hours in **Yemen and Germany.**

- We use the **simple average from 2006 to 2015.**

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Q1: Key independent variable

- Our key variable of interest in explaining cross-country differences in public spending on education is the **dependency on resource rents.**

- In line with most of the literature on the resource curse, we focus on oil rents, as oil is the economically most relevant resource.

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Q1: Estimation results

Resource rents and government spending per student

at the primary and secondary levels

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	(1.1)	(1.2)	(1.3)	(1.4)	(1.5)	(1.6)	(1.7)
	log_ppp_spending_secondary student 2006_15						
oil rent (% GDP)	-0.001	0.004	0.021***	0.024***	0.021***	0.023***	0.020**
	(-0.37)	(0.75)	(2.72)	(3.18)	(2.75)	(3.05)	(2.30)
log GDP per capita	0.777***	0.754***	0.606***	0.570***	0.628***	0.588***	0.649***
	(22.92)	(22.51)	(7.57)	(7.71)	(6.84)	(6.86)	(6.96)
population growth		-0.127***	-0.140***	-0.115**	-0.161***	-0.134***	-0.163**
		(-3.28)	(-2.67)	(-2.40)	(-3.02)	(-2.69)	(-2.28)
ICRG institutional quality			0.221*	0.277**	0.162	0.238**	0.168
			(1.80)	(2.63)	(1.23)	(2.08)	(1.25)
FDI (% GDP)				0.015***		0.004	0.002
				(3.51)		(0.58)	(0.24)
trade (% GDP)					0.002***	0.002**	0.002**
					(3.25)	(2.32)	(2.13)
Sub-Sahara							0.187
							(0.84)
Latin							-0.265
							(-1.47)
East Asia							-0.191
							(-1.11)
EU & Central Asia							-0.071
							(-0.34)
Countries	104	104	94	93	93	92	92
R-sq	0.85	0.87	0.87	0.89	0.87	0.90	0.91

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	(1.8)	(1.9)	(1.10)	(1.11)	(1.12)	(1.13)
	log_ppp_spending_primary_student 2006_15					
oil rent (% GDP)	0.008**	0.014**	0.016**	0.014*	0.016**	0.012*
	(2.28)	(2.00)	(2.30)	(1.82)	(2.06)	(1.80)
log GDP per capita	0.770***	0.714***	0.683***	0.711***	0.675***	0.646***
	(26.35)	(12.32)	(13.59)	(11.16)	(12.35)	(10.33)
population growth	-0.224***	-0.217***	-0.194***	-0.224***	-0.204***	-0.154***
	(-5.80)	(-4.58)	(-4.32)	(-4.57)	(-4.39)	(-2.76)
ICRG institutional quality		0.081	0.143	0.063	0.138	0.103
		(0.75)	(1.60)	(0.57)	(1.50)	(0.97)
FDI (% GDP)			0.005		-0.006	-0.004
			(1.35)		(-1.08)	(-0.49)
trade (% GDP)				0.001**	0.002**	0.002
				(2.18)	(2.19)	(1.65)
Sub-Sahara						-0.481***
						(-2.69)
Latin						-0.242*
						(-1.67)
East Asia						-0.056
						(-0.28)
EU & Central Asia						-0.005
						(-0.03)
Countries	104	94	93	93	92	92
R-sq	0.90	0.90	0.92	0.90	0.92	0.93

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Our investigation shows that earlier findings in the resource curse literature (e.g., Gylfason, 2001) that <u>resource-rich countries are under-spending in their educational system are no longer present</u> when using recent data.

This, however, <u>does not imply that the resource curse has vanished</u>.

The interesting question now is <u>whether the high public spending on education at primary and secondary levels in oil-rich countries translates into a high quality of education</u>.

Reply to Q2: The Quality of Education

Our second question aims at examining the **effectiveness of government spending on primary and secondary education in oil-rich countries** compared to other countries.

Can we trace a higher quality of education in oil-rich economies?

To answer Q2, we use the following specification:

$$education\ quality_i = cons + \beta_1 \cdot rent\_gdp_i + \beta_2 \cdot Z_i + \varepsilon_i$$

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Reply to Q2: Dependent variable

- We **use two different indicators** – one measure of **objective** quality and one of **perceived** quality.

- Our <u>main proxy to measure quality is a new (objective) index introduced by Kaarsen (2014).</u>

- In his study on "cross-country differences in the quality of schooling", education quality is defined as the "increase in cognitive skills obtained from an additional year of schooling".

- He converts the <u>Trends in Math and Science Study (TIMSS) test scores</u> to an index of education quality

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Reply to Q2: Dependent variable

- His index captures "**the effectiveness of one year of schooling in country *i* relative to one year of schooling in the U.S.**".

- The lowest education quality score in our sample is for **Yemen with 0.250**, and the highest one is for **Singapore with 1.363.**

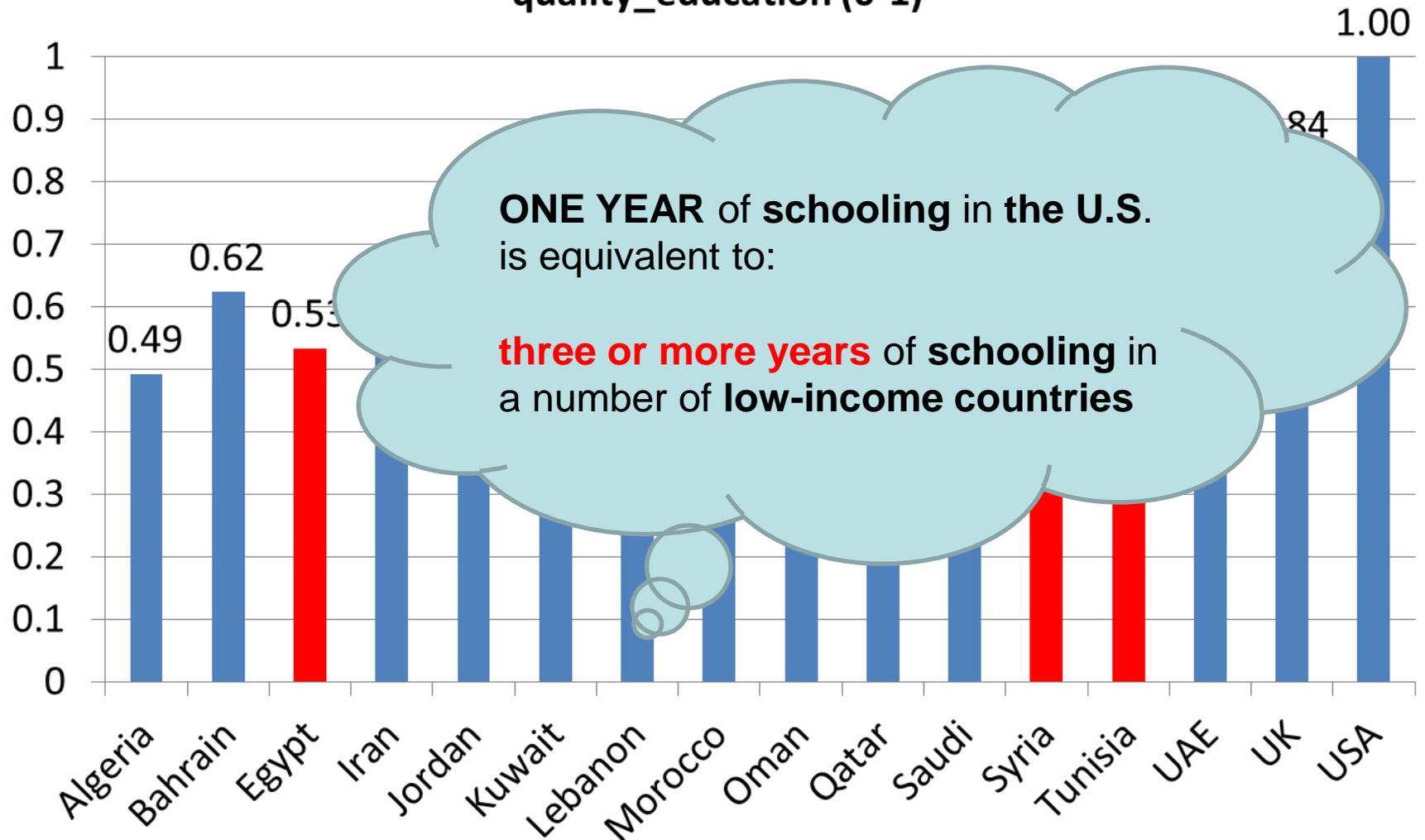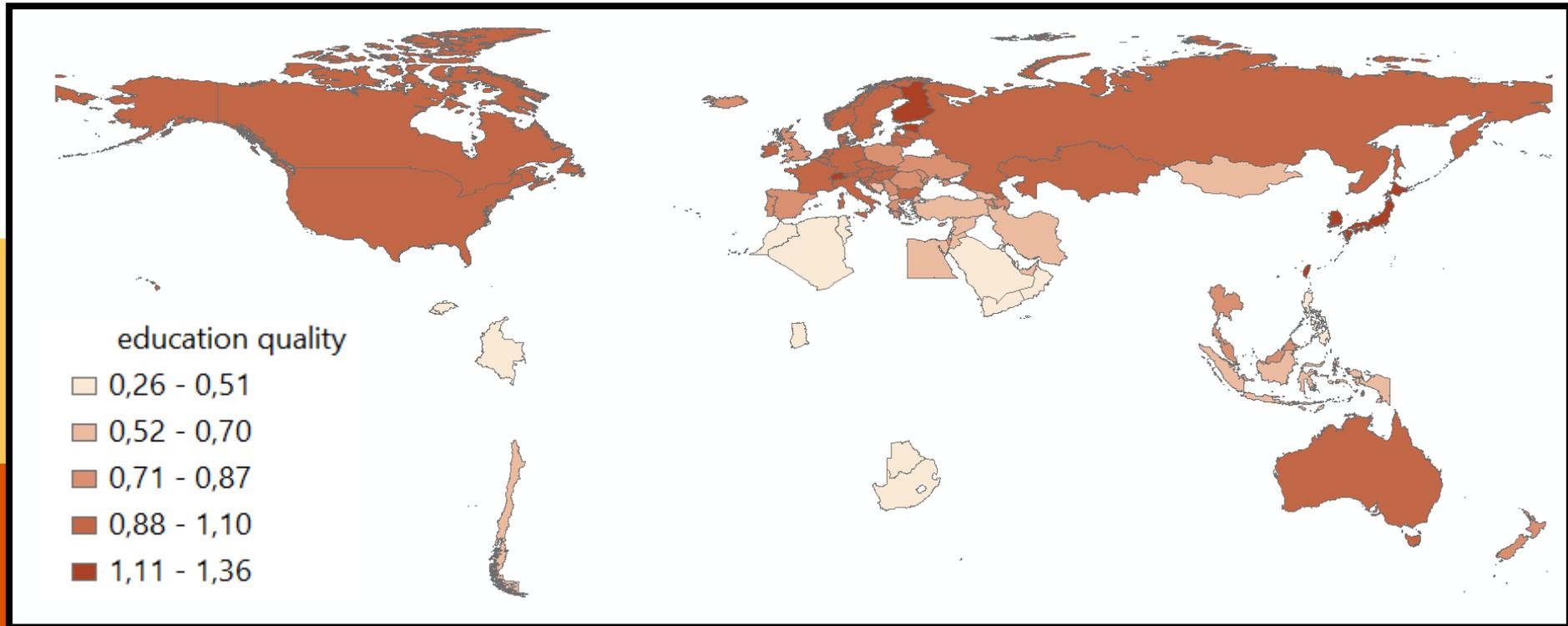Philipps Universität Marburg

Quality of education also matters

quality_education (0-1)

Source: Kaarsen (2014)

Quality of education also matters

Source: Kaarsen (2014)

Quality of education also matters

education quality
- ☐ 0,26 - 0,51
- ☐ 0,52 - 0,70
- ☐ 0,71 - 0,87
- ■ 0,88 - 1,10
- ■ 1,11 - 1,36

Source: Kaarsen (2014) &
own mapping

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Reply to Q2: Dependent variable

- In addition to the objective measure of education quality (Kaarsen, 2014) and for robustness checks, **we also use the perceived quality of education systems** from the Global Competitiveness Reports of the World Economic Forum (WEF).

> The subjective measure of perceived quality is based on information gathered through executive opinion surveys.

> Several questions address the quality of education across countries. We use the following survey question**: "*How well does the educational system in your country meet the needs of a competitive economy?*"** The scores are from **1 (not well at all) to 7 (very well).**
>
> These data are available from **2006 to 2014**. We take the average of the scores for this question from 2006-2014 as a dependent variable.

Reply to Q2: Independent variable

- **What are the determinants of cross-country differences in education quality?**

In addition to our main independent variable (oil rents dependency), we control for following:

- *Youth unemployment rate (-)*

- *Logarithm of government spending on each student in primary (and secondary) education (PPP adjusted) (+)*

- *Student to teacher ratio at primary and secondary levels of education (+)*

- *Quality of institutions (+)*

Reply to Q2: *Results on the Objective Measure of Education Quality*

- We observe a **consistent negative and statistically significant** effect of oil rents on education quality.

- This negative effect is robust to inclusion of other control variables.

- **It shows that dependency on oil rents has a dampening effect on education quality reflected in the performance of students at (lower) secondary levels on international mathematics and science tests.**

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Reply to Q2: Results on Oil rents and the quality of education (Kaarsen Index)

	(2.1)	(2.2)	(2.3)	(2.4)	(2.5)	(2.6)	(2.7)	(2.8)	(2.9)	(2.10)	(2.11)
	quality education kaarsen 1995 2011										
oil rents (% GDP)	-0.012***	-0.011***	-0.011***	-0.011***	-0.011***	-0.015***	-0.013***	-0.010	-0.010*	-0.008***	-0.007***
	(-6.31)	(-5.02)	(-4.77)	(-4.51)	(-4.56)	(-4.66)	(-2.80)	(-1.66)	(-1.94)	(-3.68)	(-3.79)
log GDP per capita		0.113***	0.111***	0.111***	0.110***	0.068	0.096	0.086	0.019	0.078***	0.085***
		(6.88)	(6.86)	(6.71)	(5.40)	(0.86)	(0.91)	(0.88)	(0.21)	(2.90)	(5.89)
trade (% GDP)			0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.001	
			(1.36)	(1.33)	(1.24)	(1.62)	(1.04)	(1.12)	(0.01)	(1.36)	
FDI (% GDP)				-0.001	-0.001	-0.006	-0.006	-0.007**	-0.001	-0.006*	
				(-0.13)	(-0.13)	(-1.60)	(-1.66)	(-2.26)	(-0.29)	(-1.89)	
youth unemployment					-0.000	-0.001	-0.003	-0.002	-0.001	0.001	
					(-0.14)	(-0.38)	(-0.88)	(-0.56)	(-0.28)	(0.67)	
log PPP spending per secondary stud.						-0.163*	-0.236**	-0.259***	-0.126		
						(-1.79)	(-2.33)	(-2.73)	(-1.26)		
log PPP spending per primary stud.						0.266**	0.230	0.220	0.236		
						(2.08)	(0.97)	(0.93)	(1.23)		
stud teacher secondary							-0.009	-0.010	-0.008	-0.007	
							(-0.97)	(-1.17)	(-0.80)	(-0.79)	
stud teacher primary							-0.004	-0.002	0.008	0.004	
							(-0.32)	(-0.20)	(0.68)	(0.51)	
ICRG institutional quality								0.068	-0.002	0.033	
								(1.35)	(-0.03)	(0.82)	
Sub-Sahara									-0.279**	-0.301***	-0.253***
									(-2.40)	(-3.90)	(-4.03)
Latin									-0.136	-0.059	-0.110***
									(-1.06)	(-0.63)	(-2.76)
East Asia & Pacific									0.150	0.187	0.225**
									(1.27)	(1.67)	(2.62)
EU & Central Asia									0.170*	0.162**	0.215***
									(1.92)	(2.39)	(4.82)
Countries	73	72	72	72	72	51	46	46	46	61	72

Transmission Channels?

Demand for high-quality education?

- **The demand for high-quality education may be low in resource-rich economies simply because parents are less reluctant in accepting low quality schools.**

- This might be the case when disadvantages of poor education are cushioned by the redistribution of resource rents.

- If this were the case, we should observe parents being less worried about their children's education in resource-rich economies.

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Transmission Channels?

Demand for high-quality education?

The World Value Survey (wave 6, 2010-2014) contains the question **"To what degree are you worried about the following situations? Not being able to give my children a good education. 1 = very much … 4 = not at all"**.

As parents might be more concerned about insufficient education when the school system is working poorly, we control for educational quality and income per capita:

$$WVS\_worry\_good\_education_i = cons + \beta_1 \cdot oilrent\_GDP_i + \beta_2 \cdot eduquality_i + \beta_3 \cdot GDP\ per\ capita_i + \varepsilon_i$$

Transmission Channels?

The estimated effect of oil rents (β_1) is *positive* (0.47) with robust *t* statistics of 2.06 (significant at 95% CI).

Hence, parents in oil-rich countries are more worried (not less) about the quality of the education of their children. The low quality of education requires explanations other than parents' attitudes or norms.

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If β_1 is negative and significant, parents in oil-rich countries care less for a given quality of the school system and for a given income per capita.

$$WVS\_w\ldots y\_good\_education_i = cons + \beta_1 \cdot oilrent\_GDP_i + \beta_2 \cdot eduquality_i + \beta_3 \cdot GDP\ per\ capita_i + \varepsilon_i$$

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Transmission Channels?

Demand for high-quality education?

- A straightforward explanation for lower human capital formation in resource-rich economies might be the **Dutch disease**, which leads to an increase in the size of the non-tradable sector.

- **The non-tradable sector employs less skilled labor and does not require high levels of human capital.**

- However, university enrollment in resource-rich economies is often above the world average, which suggests that the overall demand for high-quality education is not distorted downwards by the large sector of non-tradables.

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Transmission Channels?

Demand for high-quality education?

- **Another explanation focuses on the public sector.**

- The public sector in resource-rich countries plays an important role for the employment of graduates while private businesses are marginalized in rent-based economies (Farzanegan, 2014).

- Studies show that **public sector employment is used by governments as a redistributive tool and mostly for patronage purposes**, increasing their chances of re-election (Alesina et al., 1998; Auty, 2001; Robinson et al., 2006) or buying political stability (Bjorvatn and Farzanegan, 2015).

- In the Gulf countries, over 60% of the national labor force is employed in the public sector; in Kuwait and Qatar, this number is even close to 90% (Baldwin-Edwards, 2011). Given the patronage purposes of public employment, particularly in oil-rich countries, these jobs are often entirely unproductive (Bjorvatn and Farzanegan, 2013).

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Transmission Channels?

Demand for high-quality education?

- The **insufficient incentive for high learning efforts** is further exacerbated by **labor market regulations**.

- Several oil-rich countries have implemented **nationalization policies** requiring firms to fulfill a fixed quota of domestic employees.

- For instance, the **Nitaqat** program in **Saudi Arabia** aims at increasing the number of Saudis employed in the private sector by sanctioning firms that do not fulfill the quota (Koyame-Marsh 2016).

- In addition, the **U.A.E. have implemented an Emiratization** program, which has increased employment of domestic workers, but it has also led to ghost employees who are on the payroll without delivering any productive services. Al Riyami et al. (2015) estimate that in the U.A.E., "**over 80% of nationals currently employed in the private sector are considered ghost employees**". As ghost employment is not linked to human capital, there is little incentive to excel in educational tournaments.

Transmission Channels?

Supply of high-quality education

- The low quality of education in resource-rich economies could also be driven by supply-side factors.

- A **crucial determinant of educational output is teacher quality**.

- In oil-rich economies, the personnel in educational institutions are often hired in international labor markets.

- **Becoming a teacher is not among the most prestigious jobs in oil-based economies.**

- According to Ridge et al. (2015), the educational system in oil-rich countries in the MENA region has been unable to attract the domestic high-skilled teachers, relying more heavily on migrant teachers.

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Transmission Channels?

Supply of high-quality education

- Therefore, a s**ignificant fraction of the teaching staff consists of foreigners who are employed on fixed-term contracts**.

- For example, **90% of teachers in boys' public schools in the UAE were expatriate Arabs as of 2010-2011.**

- Similar numbers are reported for the case of **Qatar**: the share of Arab migrant teachers in public schools was approximately 90% in 2013 (Ridge et al., 2015).

- In contrast to **permanent teaching staff** that is rooted in the local community, the incentives for long-term development of educational quality are clearly lower for migrant teachers with fixed-term contracts

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Transmission Channels?

Supply of high-quality education

- Ridge (2010) shows that the **majority of male teachers in UAE** are mostly from **Syria, Egypt and Jordan**, where "[a]s in most Arab countries, teachers tend to be from the lower end of the graduating cohort" [Ridge (2010, 28)].

- In contrast to Emirati teachers, the expatriates receive lower wages, have limited contracts (one year) and have very limited training and promotion opportunities.

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Conclusion

- **We investigated a new transmission channel of the oil curse**: education quality (overall and at the lower secondary levels of education).

- Using updated data on different measures of public spending on education, we show that oil-rich economies are not under-spending in their educational system.

- However, our <u>results show that higher spending on education (in particular, at the primary and secondary levels per student) has not translated into higher (objective and subjective) measures of education quality</u>

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Conclusion

The significant negative effect of oil rents dependency on education quality can be explained by both the demand and supply side channels.

1. On **the demand side**, we refer to the effects of the **Dutch disease on the allocation of resources**, the redistribution of rents through **unproductive jobs in the public sector** and the Emiratization programs generating ghost employment.

2. On the **supply side**, we note the **insufficient incentives of migrant teachers** to provide high-quality education.

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Thank you!

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Reading

Mohammad Reza Farzanegan, Marcel Thum

More Oil, Less Quality of Education? New Empirical Evidence

Dokumente und Dateien

Volltext (PDF) - 0.39 MByte - MD5 SHA512

Hinweis

Bitte nutzen Sie beim Zitieren immer folgende Url:

http://nbn-resolving.de/urn:nbn:de:bsz:14-qucosa-227300

Kurzfassung in Englisch

The resource curse hypothesis suggests that resource-rich countries show lower economic growth rates compared to resource-poor countries. We add to this literature by providing empirical evidence on a new transmission channel of the resource curse, namely, the negative effect of rents on the quality of education. The cross-country analysis for more than 70 countries shows a significantly positive effect of oil rents on the quantity of education measured by government spending on primary and secondary education. Hence, the underspending hypothesis championed by Gylfason (2001) no longer holds with newer data. However, we find a robust and negative effect of oil rents dependency on the current objective and subjective indicators of quality of education, controlling for a set of other drivers of education quality and regional dummies. Despite spending significant shares of GDP on education, oil-rich countries still suffer from an insufficient quality of primary and secondary education, which may hamper their growth potentials. The significant negative effect of oil rents dependency on education quality can be explained by both the demand (e.g., skill acquisition) and supply (e.g., teacher quality) side channels.

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