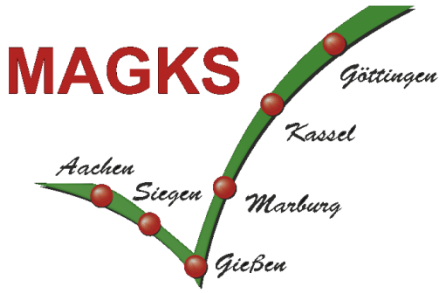

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Can Oil-Rich Countries Encourage Entrepreneurship? 'Yes', 'No' but not 'Perhaps'

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Abstract

This study provides the first empirical investigation to test one of transmission channels of resource curse, i.e., marginalized entrepreneurship activities. Our panel data analysis of 65 countries from 2004 to 2011 shows a negative and statistically significant association between oil rents dependency and entrepreneurship indicator. This finding is robust to control of other major drivers of entrepreneurship, unobservable country and time fixed effects and a different measurement of oil rents dependency. Additionally our main results show that government effectiveness among other dimensions of good governance has a statistically significant moderating effect in entrepreneurship-oil rents nexus.

JEL classification: O13, Q32, M13

Keywords: resource curse, oil rents, entrepreneurship, governance, business formation

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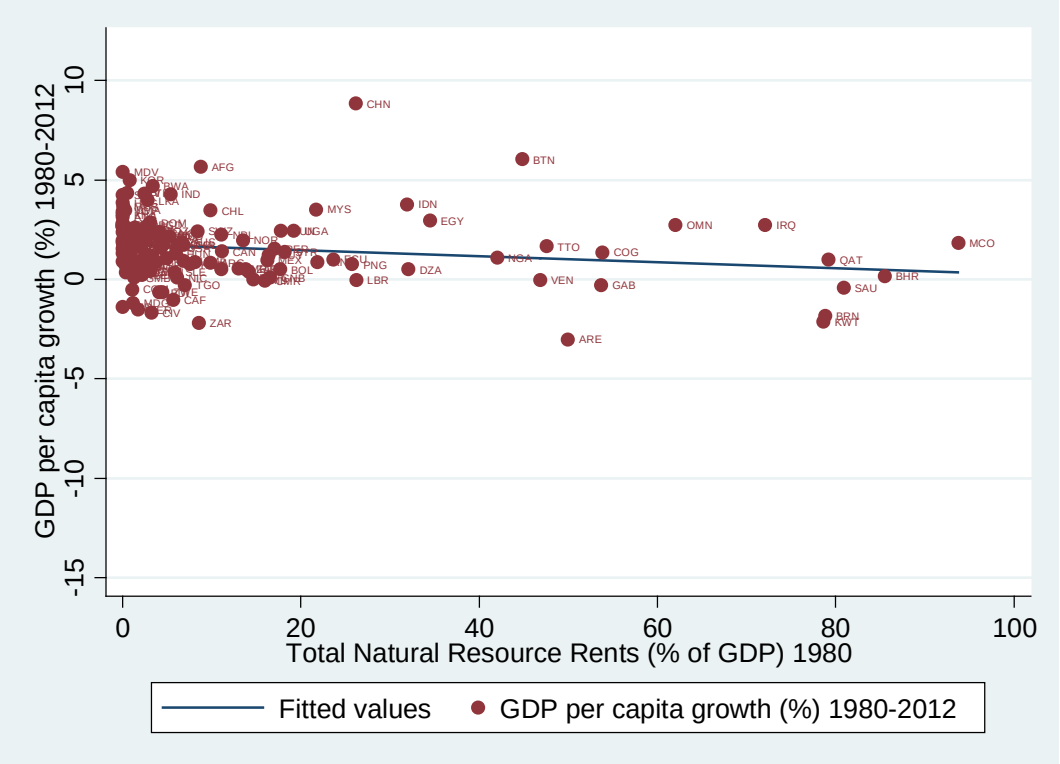
1- Introduction

Resource rich countries have a slower long run economic growth rate compared with resource poor countries, the so called *resource curse*. For illustration, Figure 1 shows that countries which were more dependent on their natural resources in 1980, on average, have shown a slower growth rates in long run (in the subsequent 30 years) compare with less resource dependent countries (negative correlation of 0.015 which is statistically significant at 95% confidence interval).

Figure 1. Long run growth and natural resource rents (1980-2012)



Source: World Bank (2013) and own calculations

A large body of literature has focused on transmission channels of the resource curse (for general surveys of related literature see van der Ploeg, 2011 and Frankel, 2010). We have now a common understanding that natural resources are not a curse *per se*. Resource rents can be a bad news for long run economic prosperity when it accompanies with corruption, rent-

seeking, deterioration of political institutions and fueling conflict. More often governments use public sector employment and large subsidies as a redistributive instrument for "patronage" purposes in order to pacify the potential political unrest and staying in the political power. This is more evident in resource rich economies. Oil rich governments maximize patronage benefits by employing as many public sector workers as possible (Alesina et al., 1998, Robinson et al., 2006, Bjorvatn and Farzanegan, 2013).

Larger size of the state in economy of oil countries crowds out the private investment, diminishing incentives to establish sustainable businesses, marginalizing entrepreneurship in society. Due to patronage purposes of public employment, we can assume that public sector jobs are unproductive. Financial reward in rent seeking and corruption intensive projects will be higher than engaging in productive business especially on the basis of individual innovation and entrepreneurship. The main contribution of our study is the empirical examination of the effect of natural resource wealth on the entrepreneurship.

The theoretical framework for our empirical test is close to Torvik (2002) and Bjorvatn and Farzanegan (2013). Torvik investigates the effect of natural resources on entrepreneurs' activities. His model shows that increasing natural resource rents motivate the citizens' activity in rent-seeking, diverting them from the productive part of the economy. He concludes that the fall of income due to this reallocation of entrepreneurs outweighs the benefits of natural resource rents.

Furthermore, the Dutch disease hypothesis can also explain the long run negative effect of increasing resource rents on productive manufacturing, industry and business formation. Increasing public spending, following higher resource revenues, will raise the demand for both tradable and non-tradable goods. Supply of tradable goods is highly elastic and thus the increased demand can be covered by increasing supply via imports, i.e. no significant price increases. But supply of non-tradable goods (such as real estate) is less elastic and increasing

public demand for them will be accompanied with higher prices. Real exchange rate which is defined as relative prices of non-tradable to tradable goods will increase as well, making local non-oil products more expensive for international markets. This latter has a dampening effect on non-oil small and medium businesses by lowering their international market share, and their profit margin. Boosting natural resource sector has low absorbing capacity for increasing working age in resource rich economies, amplifying the demographic burden for the economy.

Repressing small and medium business and entrepreneurship and manufacturing as the engine of long run growth in resource rich country reflect itself in higher (youth) unemployment rate. According to the international labor organization (ILO) the youth unemployment rate for males and females in the resource rich Middle East region in 2012 was 28%, while the average world figure was 12%. The female youth unemployment rate in the Middle East is also the highest in the world with 42.3%, compared with average of 12.8% in world (KILM, 2013). According to calculations of the Kauffman Foundation from 1980 to 2005, almost all net job creation in the United States was realized in firms that were less than five years old.[1] Therefore, encouraging new firms' establishment and facilitating small business activities may be a policy option for dealing with high unemployment in the MENA region.

Growth theory highlights the importance of entrepreneurship. In the Solow (1956) model, growth comes from new and larger plants (economies of scale), while in the Romer (1990) model, it comes from new and growing firms (knowledge spillovers). Acs et al. (2009) argue how knowledge spillovers following research and development spending create opportunities for entrepreneurs. The new firms as an indicator of entrepreneurship lead to higher economic growth and productivity (Hause and Du Rietz, 1984; Black and Strahan,

[1] For more details see http://finance.senate.gov/newsroom/chairman/release/?id=d9c1e0ca-6653-4312-b812-5870d6728926#_ftn1

2002; Djankov et al., 2002; and Klapper et al., 2007), higher employment (Birch, 1979, 1987), more technological innovations (Acs and Audretsch, 1990), and higher levels of education (Dias and McDermott, 2006). Table 1 compares the rate of firms' entry density in the MENA with other regions. The MENA has the lowest rate of entry of new firms in the world.

Table 1. Entrepreneurship and selected political economy indicators

Average 2004 -2011	**MENA**	**EAP**	**LA**	**SSA**	**OECD**	**World**
New business density (new registrations per 1,000 people ages 15-64)	1.49	5.01	2.63	1.52	4.40	3.22
GDP per capita (constant 2000 US$)	4592	5154	5334	917	30280	7288
Domestic credit to private sector (% of GDP)	43.20	140.53	34.62	63.21	156.73	132.98
Cost of business start-up procedures (% of GNI per capita)	45.38	33.48	47.22	158.25	7.33	61.94
Procedures to register property (number)	6.21	5.13	6.95	6.59	4.99	6.10
Procedures to enforce a contract (number)	43.52	36.09	39.39	39.32	32.31	38.07
Oil rents (% of GDP)	31.06	1.13	6.30	16*	0.75	2.94
Total natural resources rents (% of GDP)	37.11	3.35	9.98	12.50	1.74	5.32
Government Effectiveness (2004, from -2.5 to +2.5)	-0.12	-0.02	-0.00	-0.72	1.57	0.00

Note: EAP (East Asia & Pacific), LA (Latin America *and the* Caribbean), SSA (Sub-Saharan Africa). *Source*: World Bank (2013). *Average of oil rents (% of GDP) in SSA is until 2007.

The new business density as a proxy for entrepreneurship in the Middle East and North Africa (MENA) region from 2004-2011 is less than one third of the East Asia & Pacific (EAP), and a half of Latin America (LA). The Organisation for Economic Co-operation and

Development (OECD) rate of new business density is 3 times that of the MENA figure. The MENA region lacks behind the Sub-Saharan region and average world. What are the main reasons behind such a poor performance of the MENA region in terms of entrepreneurship? Previous studies such as Djankov et al. (2010) have examined the main determinants of entrepreneurship across countries. We have shown a group of main drivers of entrepreneurship in Table 1.

Higher levels of real GDP per capita can be a proxy for local market size for the potential entrepreneurs. The MENA real GDP per capital lags behind other regions except for the Sub Sahara Africa (SSA). Although market size and power of purchase are higher in the MENA region than in SSA, entrepreneurship activity of the MENA is still lower than the SSA region. The second critical indicator for entrepreneurship activity is the financial development. Higher financial development means higher access of private sector to financial sources with lower costs. The MENA region shows a significant shortage in terms of financial development (domestic credit to private sector as share of GDP) compared to other parts of the world except for LA. Cost of starting business (as a share of GNI per capita) is lower in the MENA region than average world, significantly better than SSA and comparable to levels of LA. But it is clearly more expensive to start a business in the MENA (and other developing regions) comparing with OECD region, controlling for the income per capita.

Procedures to register property in the MENA is comparable to average world, however it takes a longer time to enforce a contract in the MENA region than in any other regions. Apart from the financial costs of starting new businesses, the MENA and SSA regions perform poorly in terms of government effectiveness. This shows a fragile situation in quality of policy formulation and implementation, and the credibility of the government's commitment to such policies in the MENA and SSA regions.

Finally, a distinct characteristic of the MENA region is its significant dependency to natural resource wealth (mainly oil and gas). The key question of our research is to what extent this dependency on resource rents shape the business behavior of private agents, controlling for other important push factors besides country and period unobservable variables. If resource rents dependency is a curse due to its dampening impact on new business formation at the small and medium size, can we suggest a way to get rid of curse? Can investment in quality of governance moderate the curse of resource rents for the entrepreneurship? And if institutions matter, which dimension of good governance really counts more.

As a framework for our empirical analysis we get insights from Torvik (2002) and Bjorvatn and Farzanegan (2013) and use a panel of more than 60 countries over the period 2004-2011 to examine the effect of resource rents on entrepreneurship. We argue that dependency of economy to "oil rents" is a significant dampening factor for entrepreneurship even after controlling for other major drivers of entrepreneurship, country and time unobservable variables. This is not the unchangeable destiny of oil rich economies: improving government effectiveness is rewarding by moderating the negative effect of oil on new private and formal firm birth rate. We have examined different kinds of natural resources but indeed it seems that devil is in oil rents. Using per capita measure of oil rents instead of share of GDP also does not affect the negative association with entrepreneurship intensity across countries and over time.

This paper is structured as follows: in Section 2 we discuss resource curse theoretical and empirical literature. In Section 3, we describe the data and the empirical methodology. In Section 4 we present the empirical results. We conclude with a summary and discussion.

2- Theoretical and empirical literature review

Our study can be seen as a contribution to the resource curse and entrepreneurship related literature. The negative growth effect of natural resource wealth (resource curse) is documented through different channels[2].

Some link the curse to the Dutch disease. In this case, higher oil prices increase the real effective exchange rate and an appreciation of the domestic currency, thus increasing the price of non-oil exports and causing deindustrialization (see van Wijenbergen, 1984; Torvik, 2001).

Others argue that the neglect of human capital is responsible for the curse of resources. Resource-rich countries invest less in education, leading to lower economic growth in the long run (Gylfason, 2001). The role of political institutions and policies in the resources-growth nexus is also discussed (Mehlum et al., 2006; Brunnschweiler and Bulte, 2008; Brunnschweiler, 2008; Iimi, 2007; Kolstad, 2009 and Arezki and van der Ploeg, 2010). In their theoretical model, Robinson et al. (2006) show that the final impact of the resource booms on growth depends on the quality of institutions. Based on their model, the lack of institutions promoting accountability and state competence is the main cause of the natural resource curse.

Some other studies suggest that resource wealth can increase corruption. In a game theoretical model and panel data analysis, Bhattacharyya and Hodler (2010) show that the effect of resource rents on corruption depends on the quality of democratic institutions. Resource-rich countries have a less developed tax system. The government has less willingness to increase the share of taxes in total revenues. Resource rents lead to a financial independence of the state from its electorate. As a result, the

[2] Recent studies challenge the common wisdom of resource curse (see Alexeev and Conrad, 2009).

accountability of the government to the people is undermined in rentier states (Mahdavy, 1970 and Bornhorst et al., 2009).

Others show that the resources are only a curse for economic growth if a country has a high degree of ethnical factionalism (Montalvo and Reynal-Querol, 2005 and Hodler, 2006) or political factionalism (Bjorvatn and Selvik, 2008; and Bjorvatn, Farzanegan and Schneider, 2012 and 2013).

Finally, a branch of literature discusses the allocation of skills and talents between rent-seeking and productive entrepreneurship activities. As a result of boom in resource rents, the natural resource sector will expand and absorb the human capital from other more dynamic sectors such as manufacturing and advanced services. In the long run, the economy will specialize itself in resource industries. A marginalized manufacturing sector in which knowledge spill over happens means lower levels of innovation and entrepreneurship in the whole economy. Booming resource prices and the discovery of new reserves provide necessary reasons for private investors to compete for resource rents. This destructive competition in combination with weak states in terms of rule of law and transparency lead to distorted economic and political policies in favour of rent-seekers. As a result, entrepreneurship will be punished under such a system (for a formal model of rent-seeking behaviour in resource-rich economies see Tornell and Lane, 1998 and 1999).

Baland and Francois (2000) and Torvik (2002) explain by their theoretical model how entrepreneurship can be marginalized as a result of a resource boom and increasing rent-seeking. Torvik (2002) shows that higher resource rents are a significant factor behind the shifting of entrepreneurs from a productive part of the economy to rent-seeking unproductive fields. It is shown that point-resources such as energy and minerals are more harmful for the economic growth, encouraging higher levels of rent-seeking (Auty 2001; Karl 1997; Ross 1999; Sala-I- Martin and Subramanian 2003 and Boschini et al., 2007).

Bjorvatn and Farzanegan (2013) theoretical model shows how resource rents may lead to higher unemployment of working age population and interaction between public sector and private entrepreneurs in a resource rich country. Their model has two sectors: private (manufacturing) and public (bureaucracy). In public sector number of employees is a function of resource rents. There is a public sector wage mark-up which generates unemployment as people look for highly paid public sector jobs. In private sector, manufacturing productivity depends on pool of knowledge in economy which depends on number of manufacturers (learning by doing effect). If manufacturing (as a proxy for productive private sector including entrepreneurs) is below of a critical level, we will face a low technology production. And if it is beyond a critical level, we have a high technology production. The critical level depends on quality of institutions which stimulate flow of ideas and information. They argue that resource rents tie up people in bureaucracy and unemployment, limiting the number of people available for private sector manufacturing, and thereby reducing pool of knowledge in economy.

Summarizing our literature review, we can define the following hypotheses for our empirical examination:

Hypothesis 1: Higher levels of lootable natural-resource rents (e.g., oil) dependency reduce the entrepreneurship activities, *ceteris paribus*.

Hypothesis 2: Increasing effectiveness of government may moderate the negative entrepreneurship effects of resource wealth dependency.

3- Data and Methodology

The data set we use in our empirical work is an 8-year panel covering the period from 2004 to 2011 for 65 countries[3]. The dependent variable is entrepreneurship indicator which is defined as: *the activities of an individual or a group aimed at initiating economic enterprise in the formal sector under a legal form of business.*[4] To quantify this definition across countries, and following Klapper and Love (2011), we use the entry density indicator as a proxy for entrepreneurship activities.[5] This approach is also in line with Acs and Storey (2004) where they provide an example of entrepreneurial act: "*The clearest example of an entrepreneurial act can lead to resource transfer is the creation of a new firm that offers a product or service not previously available*". The entry density indicator is calculated as the number of newly registered limited-liability firms in the corresponding year as a percentage of the country's working age population (ages 15–64), normalized by 1000. This data is from the World Bank's Entrepreneurship Survey which is also available at the World Development Indicators (World Bank, 2013). This index is widely used in the literature to compare entrepreneurship across countries (see, for example, Herrera-Echeverri et al., 2013).

To facilitate cross-country comparability, the Entrepreneurship Database employs a consistent unit of measurement, source of information, and concept of entrepreneurship that is applicable and available among the diverse sample of participating economies. The main sources of information for this survey are national business registries. The units of measurement are private, formal sector companies with limited liability.[6]

[3] This is the sample in which we use oil rents.
[4] Note that our dependent variable focus on business formation in the formal economy. Our interest in this study is also entrepreneurship in the formal economy. Thus our dependent variable may underestimate the total number business formation by neglecting the informal businesses. More often measurement error in dependent variable only weakens the model without introducing bias in either point or interval estimates (Baum, 2006, p. 217).
[5] The similar approach to define Entrepreneurship, i.e. private business formation rate can be also seen in Lee et al., 2004; Armington and Acs, 2002; and Reynolds et al., 1994 among others.
[6] For more details see http://www.doingbusiness.org/data/exploretopics/entrepreneurship

We are mainly interested in the effect of the oil rents (as a major lootable natural resources[7]) dependency on entrepreneurship. Oil rent (as a share of GDP) is an indicator for oil dependency of economy. The estimates of natural resources rents are calculated as the difference between the price of a commodity and the average cost of producing it. This is done by estimating the world price of units of specific commodities and subtracting estimates of average unit costs of extraction or harvesting costs (including a normal return on capital). These unit rents are then multiplied by the physical quantities countries extract or harvest to determine the rents for each commodity as a share of gross domestic product (GDP). It is taken from World Development Indicators of World Bank (2013). The share of rents in GDP, however, may be endogenous with new firm registration density, the dependent variable. Of course, the panel fixed effects approach that we use in our study links within-country variation in business registration density with within-country variations in resource rents and other control variables, thereby reducing the important endogeneity bias that arises because of unobserved cross-country heterogeneity (Arezki and Brückner, 2011).

But endogeneity issue may still be present: new business registration (increasing entrepreneurship activities) may increase GDP and affect share of resource rents in GDP as well. Taking into account this potential concern, we also use per capita rents which are less vulnerable in this context. Furthermore, we use one year lag of all independent variables which not only reduces the reverse feedback effect from dependent variable but also control for possible time lag effect from right hand side variables. One may not expect that business formation intensity of the current year affect resource rents (per capita or share in GDP) of previous year (for similar approach see Bjorvatn, Farzanegan and Schneider, 2012; Bhattacharyya and Hodler, 2010; and Peksen and Drury, 2010).

[7] The natural resource variable covers oil, natural gas, coal, mineral, and forest rents. Since that oil rents play a significant role on resource curse literature, we also focus more on this aspect of resource wealth.

Resource rents are largely exogenous in the model. The major driver of rent, commodity prices are given to countries exogenously. For example, as is mentioned by Farzanegan (2011), oil prices are determined largely in international markets and affected largely by factors beyond the control of national economy (e.g. international economic growth, financial crisis, environmental concerns and conventions, oil importers energy policy and their production technology and speculation activities in oil trading markets among others). Production of resources are also depends on flow of capital and investment from abroad, political stability of target country and related geographical region, climate issues, exogenous sanctions and embargos on investment project and so on. Thus it is reasonable to assume that a large part of within country variation in our key independent variable (rents) is exogenous in respect to private business registration density as a proxy for entrepreneurship.

We have also another main variable of interest namely government effectiveness. Our second hypothesis implies that a better quality of governance should matter in entrepreneurship-rents nexus. Government effectiveness dimension of good governance is especially crucial for boosting private business registration and activity. This dimension of governance captures *perceptions of the quality of public services; the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies* (see World Governance Indicators from the World Bank[8]. Thus, we expect to see a positive sign for the interaction of government effectiveness and rents. Increasing quality of government effectiveness reduces the direct negative effect of rents (and in particular oil rents) on the degree of entrepreneurship.

It is unrealistic to assume that natural resource wealth alone determines entrepreneurship levels. There are other time-variant variables which may affect

[8] http://info.worldbank.org/governance/wgi/ge.pdf and Kaufmann et al. (2010)

entrepreneurship in addition to resource rents. To account for other channels of causality, we add a set of control variables. In choosing our control variables, we follow Klapper et al. (2007) who study entrepreneurship and firm formation across countries.

Table 2 provides summary statistics for our main variables; a more detailed description of the data and data sources is provided in Table A in Appendix. Our dependent variable, new business density (new registrations per 1,000 people ages 15-64), ranges from 0.0021 (Niger, 2006) to 44.129 (Liechtenstein, 2008), with an average in panel of 3.229. The average new business density shows great variation across countries, while the within country changes is less. Our key explanatory variable, oil rents in GDP, ranges from 0.0003% (Israel, 2004) to 100% (Iraq, 2005) with a significant variation between countries.

Figure 2 plots average new business density in 2008 against oil rents (% of GDP) in the same year. These display a negative relationship: *more oil, less new private business formations.* Although this bivariate correlation is first interesting observation but we need to control for other related factors in business formation, country specific properties which are important but difficult to measure and are constant over time (e.g., culture, tradition, geography, historical heritage, religion, ethno-linguistic background and so on). The same is true for time specific shocks such as international financial crisis in a specific year which can affect new business formations across countries, international shocks in oil markets, or political events such as terrorist attacks among others.

Table 2. Descriptive statistics

Variable		Mean	Std. Dev.	Min	Max
New business density (new registrations per 1,000 people ages 15-64)	overall	3.230	4.906	0.002	44.130
	between		5.120	0.005	34.618
	within		1.343	-6.282	16.448
Oil rents (% of GDP)	overall	12.728	19.232	0.000	100.000
	between		18.887	0.001	85.039
	within		3.648	-6.896	31.564
GDP per capita growth (annual %)	overall	2.792	4.796	-18.572	42.578
	between		2.781	-7.942	13.753
	within		3.969	-21.960	38.678
Domestic credit to private sector (% of GDP)	overall	53.997	50.730	0.815	319.461
	between		49.423	3.321	248.843
	within		11.435	-28.929	193.531
General government final consumption expenditure (% of GDP)	overall	15.727	5.863	2.047	39.881
	between		5.806	3.382	36.323
	within		1.744	4.896	26.672
Real interest rate (%)	overall	6.556	19.923	-44.028	508.741
	between		26.298	-7.086	326.710
	within		9.349	-100.879	188.586
Internet users (per 100 people)	overall	27.942	26.415	0.000	95.020
	between		24.990	0.000	90.425
	within		8.322	-10.655	67.066
School enrollment, secondary (% gross)	overall	78.263	27.997	7.790	149.840
	between		28.045	7.790	131.214
	within		3.988	63.038	96.889
Government Effectiveness	overall	-0.026	0.998	-2.450	2.430
	between		0.996	-2.253	2.221
	within		0.126	-0.706	0.472

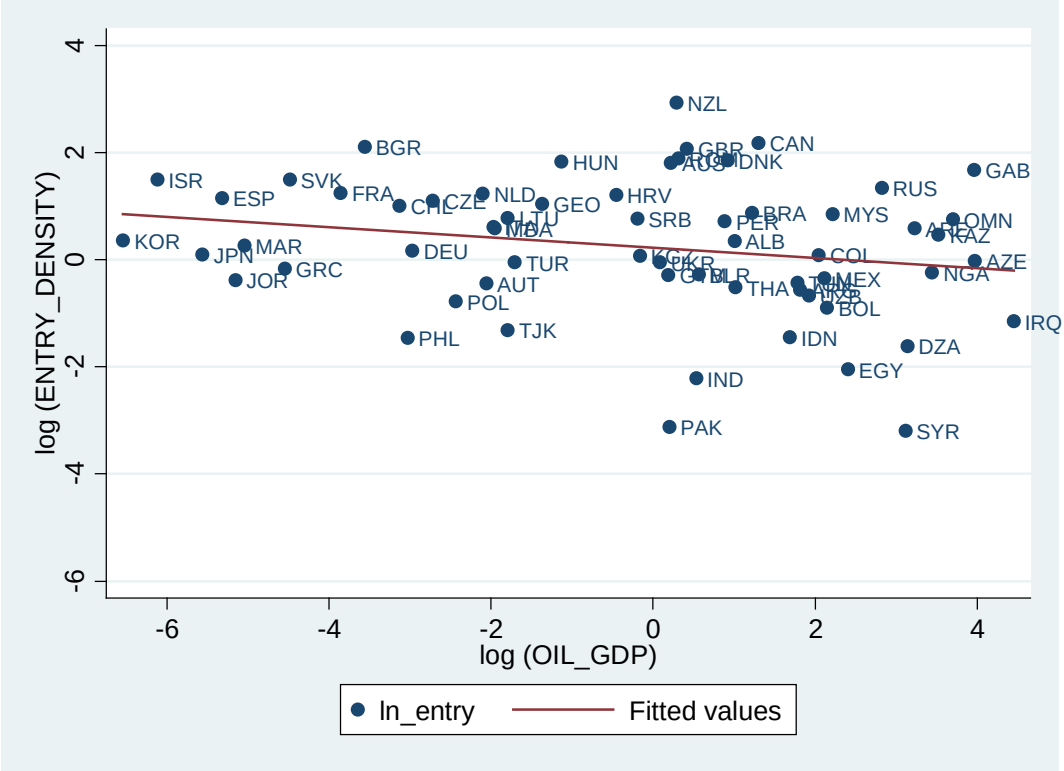


Fig. 2. New business density and oil rents (% GDP), 2008.
Source: World Bank (2013) and own calculations.

To measure the effect of oil rents dependence on entrepreneurs' activities we estimate the following country and year fixed effects panel regression for 65 countries from 2004 to 2011[9]:

$$nbd_{it} = cons + \beta_1 \cdot oil_{it} + \beta_2 \cdot ge_{it} + \beta_3 \cdot (oil_{it} \cdot ge_{it}) + \beta_4 \cdot Z_{it} + u_i + \theta_t + \varepsilon_{it} \quad (1)$$

where the subscripts denote the country *i* and the time period *t*. Our dependent variable is new business density (*nbd*). Main variables of interest are oil rent (*oil*) and government effectiveness (*ge*) and their interaction term. *Z* includes other drivers of private business formation such as GDP per capita growth rate, domestic credit to private sector (% of GDP), general government final consumption expenditure (% of GDP), real interest rate (%), internet

[9] The period of analysis is due to the availability of entrepreneurship data.

users (per 100 people) and School enrollment, secondary (% gross).[10] In contrast to cross-country regressions, we allow for country (u_i) and time (θ_t) fixed effects. Country fixed effects eliminate the latent heterogeneity between countries. Such heterogeneity between countries may originate from different attitudes toward entrepreneurship activities and private business formation culture besides other historical, ideological and geographical factors which are country specific elements. We use one year lag of explanatory variables in order to account for the possible time lag effect and reducing the risk of reverse feedback from dependent variable.[11] Table B in Appendix shows the name of countries included in the basic model for new business density-oil rents estimation.

4- Results

Our empirical focus is how oil rents shape the new business formation density within and across countries and whether government effectiveness matter in this nexus. Our estimations start with looking at new business density (*nbd*) and oil rents (% of GDP), adding other control variables in order to see how the oil-new firm birth rate nexus changes in different specifications. We test also the results with per capita oil rents instead of share of oil rents in GDP. The results for this specification (Eq. 1) estimated by ordinary least squares (OLS), with country and year fixed effects to reduce the risk of omitted unobservable factors. We use one year lag of all explanatory variables. In addition, we report the robust *t-statistics* on the basis of White-period standard errors. White period method assumes that the errors for a cross-section (country) are heteroskedastic and serially correlated (cross-section clustered).

[10] We did also control for cost of doing business variables such as registration procedures, enforcement of contracts and startup costs. Due to their statistical insignificance we have not mentioned them in regressions.
[11] Alternatively we also use per capita oil rents (one year lag) instead of oil rents as share of GDP to address the possible endogeneity of oil variable in respect to increasing private business formation.

Table 3 shows the results.[12] Table 3 shows that the effect of oil rents dependency on new business density rate is negative and statistically significant for all models, following a specific to general approach. Model 1 in Table 3 shows that a 1% increase in oil rents dependency in past year reduces new business density rate this year by -0.168% which is statistically significant at 95% confidence interval, controlling for country and time fixed effects.[13]

In subsequent models, we add other control variables which may have an effect on private business formation across countries. Model 9 shows the most general specifications in which we have controlled for main control variables besides oil rents and fixed effects. The size of negative estimated effect of oil rents dependency on new business formation has increased from -0.16% in model 1 to -0.22% in model 9. In addition, in model 9, we are 99% confident that there is a negative association between past oil rents dependency and current new private business formation density. Thus, our first hypothesis is supported by data.

Is this negative effect of oil on entrepreneurship is a destiny for oil rich economies? Or there is a way to reduce this negative role of oil? Interaction term between government effectiveness index and oil rents dependency is positive and statistically significant at 90% confidence interval. This shows that final or marginal entrepreneurship effects of oil rents depends on the quality of government effectiveness. Higher investment in this specific dimension of governance reduces the curse of oil for entrepreneurship. Therefore, our second hypothesis has also empirical support.

In addition to oil rents dependency we have also examined other kinds of natural resources. However, we cannot find any statistically significant association between other

[12] We have also estimated random effects instead if fixed effects. The results are similar to fixed effects. We use the Hausman test to find the most appropriate approach. The Hausman test tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. In all models, we get a significant P-value (smaller than 0.05), providing more support for the use of fixed effects.

[13] Note that both oil and new business density are in logarithmic transformation.

non-oil natural resources on entrepreneurship.[14] This indicates that point source resources or lootable resources in terminology of Mehlum et al. (2006) such as oil are the main discouraging force behind entrepreneurship development. This observation is in line with Torvik's (2002) theoretical predictions. Higher reliance on lootable resource rents affects the allocation of labor forces in favor of directly unproductive activities rather than entrepreneurship ones. In a resource-based economy, fewer entrepreneurs will run firms and more will engage in rent seeking (Torvik, 2009).

Economic growth rate of the past year has a robust association with current new business formation. A higher share of government spending in the economy as a proxy for the governmental interventions has also a dampening effect on the entry density of new firms. Indeed larger interventions of the state in the economy by distributing oil rents via subsidies (price distortion) and increasing public employment for buying the political opposition has a negative effect of private business establishment and innovation.

Government effectiveness which shows quality of policy formulation and implementation, and the credibility of the government's commitment to such policies has a strong positive effect on new business creation. This indicates the importance of investing in good governance for addressing some parts of oil curse for private formal business startups. [15]

We also examine our hypothesis using oil rents per capita instead of share of oil rents in GDP. Increasing new business formation density may have an increasing effect of GDP and affecting oil rents in GDP. Of course since we use lag of independent variables such reverse feedback should be less significant. Using per capita oil rent reduces the endogeneity concern.

[14] Results are available upon request.
[15] We have also tried an estimation in which all other dimensions of governance (political stability, regulatory quality, control of corruption and voice and accountability) are controlled besides government effectiveness (ge). We find that while ge and its interaction term with oil remain significant, none of other dimensions of governance show a statistically significant effect on business formation.

Models 10 and 11 in Table 3 show general specification using per capita oil rents (lagged one year). Our main finding on the curse of oil for entrepreneurship remains robust. We also estimated the general specifications (Models 9 and 11) including a squared term of oil rents indicator to investigate any non-linear relationship or turning point between oil dependency and firm birth rates. Our estimations show that there is no turning point in this relationship within our sample of countries. Oil rich economies have a difficult way to encourage new private and formal firm birth rates. Yet, their only empirically relevant hope is through investing in their government effectiveness by increasing quality of public services, the quality of the civil service, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

Table 3. Determinants of entrepreneurship estimation: country & year fixed effects (oil rents % of GDP and oil rents per capita)

Dependent variable: New business density (new registrations per 1,000 people ages 15-64)													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(9a)	(10)†	(11)†	(11a)†
oil	-0.168**	-0.191**	-0.157**	-0.127*	-0.193***	-0.191***	-0.195***	-0.189***	-0.227***	-0.273**	-0.195***	-0.200***	-0.175***
	(-2.06)	(-2.53)	(-1.98)	(-1.71)	(-2.67)	(-2.61)	(-2.67)	(-2.98)	(-2.75)	(-2.24)	(-2.67)	(-2.67)	(-2.67)
oil^2										-0.009			-0.012
										(-0.82)			(-1.56)
gdp per capita growth		0.022***	0.023***	0.023***	0.018***	0.020***	0.019***	0.016***	0.015***	0.015**	0.017***	0.016***	0.016***
		(7.89)	(9.43)	(4.45)	(3.13)	(3.97)	(3.19)	(2.77)	(2.69)	(2.44)	(2.81)	(2.86)	(2.72)
private credit			0.070	0.186	0.20	0.137	0.034	-0.07	-0.096	-0.10	-0.024	-0.018	-0.011
			(0.43)	(1.23)	(1.28)	(0.90)	(0.18)	(-0.45)	(-0.64)	(-0.68)	(-0.16)	(-0.12)	(-0.08)
government spending				-0.660**	-0.629**	-0.513*	-0.412	-0.421*	-0.350*	-0.345*	-0.426*	-0.415*	-0.411*
				(-2.26)	(-2.18)	(-1.76)	(-1.30)	(-1.77)	(-1.80)	(-1.80)	(-1.78)	(-1.82)	(-1.83)
real interest rate					-0.000	-0.001	-0.002	-0.004	-0.005	-0.005*	-0.004	-0.004	-0.005
					(-0.20)	(-0.35)	(-0.61)	(-1.31)	(-1.62)	(-1.76)	(-1.47)	(-1.47)	(-1.54)
internet user						-0.001	0.006	0.007	0.006	0.006	0.007	0.007	0.007
						(-0.15)	(0.95)	(1.15)	(0.93)	(0.91)	(1.14)	(1.04)	(1.01)
secondary school							0.441	0.177	-0.034	-0.09	0.25	0.23	0.24
							(0.68)	(0.31)	(-0.05)	(-0.15)	(0.42)	(0.38)	(0.38)
ge								0.651***	0.732***	0.719***	0.691***	0.648***	0.560***
								(2.81)	(3.15)	(3.12)	(3.03)	(3.26)	(2.71)
*oil*ge*									0.090*	0.090*		0.015	0.042
									(1.65)	(1.78)		(0.30)	(0.85)
Observations	395	393	378	362	293	289	260	260	260	260	260	260	260
Countries	65	65	63	61	51	51	49	49	49	49	49	49	49
Adj R-sq	0.96	0.96	0.96	0.97	0.97	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.98

Note: Robust *t- statistics* in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively. Constant is included. † in these models we use per capita oil rents. To reduce any simultaneity issues between the dependent and independent variables, we use a one-year lag of all the independent and control variables.

5- Discussion and conclusion

One of the main challenges in resource (and in particular oil) rich countries is high unemployment rate of ever increasing working age population. Bjorvatn and Farzanegan (2013) show that demographic transition in resource rich countries may lead to a demographic curse rather than a demographic dividend. Entrepreneurship is the engine of economic growth, employment, innovation and political openness worldwide. Increasing new private business formation can be a key policy to absorb parts of increases in working age population. In our paper we investigate the oil-formal private business formation nexus around the world. The initial goal of our paper is to quantify the impact of rents on private formal business establishment rate in a panel for 65 countries from 2004 to 2011.

Theoretical models of Torvik (2002), Bjorvatn and Farzanegan (2013) and insights from Dutch disease hypothesis show that productive manufacturing and private sector tend to decline while unproductive public sector expands. Our results show that indeed higher dependence on oil rents (measured as share of oil rents in GDP and oil rents per capita) has a significant dampening effect of new business formation density. This negative association remains robust controlling for other drivers of entrepreneurship such as past economic growth, financial development indicators, interest rate, share of government spending in economy, human capital, internet penetration and government effectiveness. Controlling for country and year fixed effects also reduce the risk of omitted unobservable factors such as social norms, tradition and attitudes toward entrepreneurship and international financial crisis in specific time periods. Our results also show that among different dimension of governance, only government effectiveness, which captures quality of policy formulation and implementation, and the credibility of the government's commitment to such policies, matter in business-oil nexus. Improving government effectiveness may moderate the curse of oil for private business formation.

References

Acs, Z., Audretsch, D. B., 1990. Innovation and Small Firms. Cambridge: MIT Press.

Acs, Z., Braunerhjelm, P., Audretsch, D. B., Carlsson, B., 2009. The knowledge spillover theory of entrepreneurship. Small Business Economics 32, 15-30.

Acs, Z., Storey, D., 2004. Introduction: entrepreneurship and economic development. Regional Studies 38, 871-877.

Alesina, A., Baqir, R., Easterly, W., 1998. Redistributive public employment. Journal of Urban Economics 48, 219-241.

Alexeev, M., Conrad, R., 2009. The elusive curse of oil. The Review of Economics and Statistics 91, 586-598.

Arezki, R., Brückner, M., 2011. Oil rents, corruption, and state stability: Evidence from panel data regressions. European Economic Review 55, 955–963.

Arezki, R., van der Ploeg, F., 2010. Trade policies, institutions and the natural resource curse. Applied Economics Letters 17, 1443-1451.

Armington, C., Acs, Z., 2002. The determinants of regional variation in new firm formation. Regional Studies 36, 33-45.

Auty, R., 2001. The political economy of resource-driven growth. European Economic Review 45, 839–846.

Baland, J-M., Francois, P., 2000. Rent-seeking and resource booms. Journal of Development Economics 61, 527–542.

Baum, C., 2006. Introduction to Modern Econometrics Using Stata. Stata Press. Texas.

Bhattacharyya, S., Hodler, R., 2010. Natural resources, democracy and corruption. European Economic Review 54, 608-621.

Birch, D., 1979. The Job Generating Process. Cambridge, MA: MIT Press

Birch, D. 1987. Job Creation in America: How Our Smallest Companies Put the Most People to Work. New York: The Free Press.

Bjorvatn, K., Farzanegan, M.R., 2013. Demographic transition in resource rich countries: a blessing or a curse? World Development 45, 337–351.

Bjorvatn, K., Farzanegan, M.R., Schneider, F., 2013. Resource curse and power balance: evidence from Iran. Review of Middle East Economics and Finance 9, 133–158.

Bjorvatn, K., Farzanegan, M.R., Schneider, F., 2012. Resource curse and power balance: evidence from oil-rich countries. World Development 40, 1308–1316.

Bjorvatn, K., Selvik, K., 2008. Destructive competition: factionalism and rent-seeking in Iran. World Development 36, 2314-2324.

Black, S.E., Strahan, P.E., 2002. Entrepreneurship and bank credit availability. Journal of Finance 57, 2807–2833.

Bornhorst, F., Gupta, S., Thornton, J., 2009. Natural resource endowments and the domestic revenue effort. European Journal of Political Economy 25, 439-446.

Boschini, A.D., Pettersson, J., Roine, J., 2007. Resource curse or not: A question of appropriability. Scandinavian Journal of Economics 109, 593-617.

Brunnschweiler, C.N., 2008. Cursing the blessings? Natural resource abundance, institutions, and economic growth. World Development 36, 399–419.

Brunnschweiler, C.N., Bulte E.H., 2008. The resource curse revisited and revised: A tale of paradoxes and red herrings. Journal of Environmental Economics and Management 55, 248-264.

Dias, J., McDermott, J., 2006. Institutions, education, and development: The role of entrepreneurs. Journal of Development Economics 80, 299– 328.

Djankov, S., Ganser, T., McLiesh, C., Ramalho, R., Shleifer, A., 2010. The effect of corporate taxes on investment and entrepreneurship. American Economic Journal: Macroeconomics 2, 31–64.

Djankov, S., La Porta, R., Lopez-de-Silanes, F., Shleifer, A., 2002. The regulation of entry. Quarterly Journal of Economics 117, 1–35.

Farzanegan, M.R., 2011. Oil revenue shocks and government spending behavior in Iran. Energy Economics 33, 1055–1069.

Frankel, J.F., 2010. The natural resource curse: a survey. NBER working paper, no. 15836.

Gylfason, T., 2001. Natural resources, education, and economic development. European Economic Review 45, 847–859.

Hause, J.C., du Rietz, G., 1984. Entry, industry growth, and the microdynamics of industry supply. Journal of Political Economy 92, 733–757.

Herrera-Echeverri, H., Haar, J., Estévez-Bretón, J. B., 2013. Foreign direct investment, institutional quality, economic freedom and entrepreneurship in emerging markets. Journal of Business Research (in press).

Hodler, R., 2006. The curse of natural resources in fractionalized countries. European Economic Review 50, 1367-1386.

Iimi, A., 2007. Escaping from the resource curse: Evidence from Botswana and the rest of the world. IMF Staff Papers 54, 663-699.

Karl, T. L., 1997. The Paradox of Plenty: Oil Booms and Petro-States. University of California Press, Berkeley.

Kaufmann, D., Kraay, A., Mastruzzi, M., 2010. The Worldwide Governance Indicators: Methodology and Analytical Issues. World Bank Policy Research Working Paper No. 5430, Washington DC.

KILM, 2013. Key Indicators of the Labour Market 7th Ed. (KILM). International Labour Organization, Geneva.

Klapper, L., Amit, R., Guillén, M. F., Quesada, J.M., 2007. Entrepreneurship and firm formation across countries. World Bank Policy Research Working Paper 4313, Washington.

Klapper, L., Love, I., 2011. The impact of the financial crisis on new firm registration. Economics Letters 113, 1-4.

Kolstad, I., 2009. The resource curse: which institutions matter? Applied Economics Letters 16, 439-442.

Lee, S. Y., Florida, R., Acs, Z., 2004. Creativity and entrepreneurship: a regional analysis of new firm formation. Regional Studies 38, 879-891.

Mahdavy, H., 1970. The patterns and problems of economic development in rentier states: the case of Iran. In: Cook, M.A. (Ed.), Studies in the Economic History of the Middle East, Oxford University Press, pp. 428-467.

Mehlum, H., Moene, K., Torvik, R., 2006. Institutions and resource curse. Economic Journal 116, 1-20.

Montalvo, J. G., Reynal-Querol, M., 2005. Ethnic polarization, potential conflict, and civil wars. The American Economic Review 95, 796-816.

Peksen, D., Drury, A.C., 2010. Coercive or corrosive: the negative impact of economic sanctions on democracy. International Interactions: Empirical and Theoretical Research in International Relations 36, 240-264.

Reynolds, P., Storey, D. J., Westhead, P., 1994. Cross-national comparisons of the variation in new firm formation rates. Regional Studies 28, 443-456.

Robinson, J.A., Torvik, R., Verdier, T., 2006. Political foundations of the resource curse. Journal of Development Economics 79, 447-468.

Romer, P. M., 1990. Endogenous technological change. Journal of Political Economy 98, S71–S102.

Ross, M. L., 1999. The Political Economy of the Resource Curse. World Politics 51, 297–322.

Sala-I-Martin, X., Subramanian, A., 2003. Addressing the natural resource curse: an illustration from Nigeria. NBER Working Paper No. 9804. Cambridge, Mass.

Solow, R. M., 1956. A contribution to the theory of economic growth. Quarterly Journal of Economics 70, 65–94.

Tornell, A., Lane, P.R., 1998. Are windfalls a curse? A non-representative agent model of the current account. Journal of International Economics 44, 83–112.

Tornell, A., Lane, P.R., 1999. The voracity effect. American Economic Review 89, 22–46.

Torvik, R., 2001. Learning by doing and the Dutch disease. European Economic Review 45, 285–306.

Torvik, R., 2002. Natural resources, rent-seeking and welfare. Journal of Development Economics 67, 455-470.

Torvik, R., 2009. Why do some resource-abundant countries succeed while others do not? Oxford Review of Economic Policy 25, 241–256.

van der Ploeg, F., 2011. Natural resources: curse or blessing? Journal of Economic Literature 49, 366-420.

van Wijenbergen, S., 1984. Inflation, employment, and the Dutch disease in oil exporting countries: a short-run disequilibrium analysis. Quarterly Journal of Economics 99, 233–250.

World Bank, 2013. World Development Indicators, Online Database, World Bank, Washington DC.

Appendix A.

Table A. Variable descriptions

Variable	Transformation	Definition and Source
nbd: New business density (new registrations per 1,000 people ages 15-64)	Logarithmic	The number of newly registered limited liability corporations per calendar year, normalized by working age population. To facilitate cross-country comparability, the Entrepreneurship Database employs a consistent unit of measurement, source of information, and concept of entrepreneurship that is applicable and available among the diverse sample of participating economies The data is taken from World Development Indicators, World Bank (2013)
Oil: Oil rents (% of GDP) and per capita oil rents	Logarithmic, one year lag	Oil rents are the difference between the value of crude oil production at world prices and total costs of production. It is taken from World Bank (2013). Per capita oil rents is calculated by dividing oil rents by the total number of population.
GDP per capita growth (annual %)	One year lag	Annual percentage growth rate of GDP per capita based on constant local currency. Aggregates are based on constant 2005 U.S. dollars. GDP per capita is gross domestic product divided by midyear population. World Bank (2013)
Domestic credit to private sector (% of GDP)	Logarithmic, one year lag	Domestic credit to private sector refers to financial resources provided to the private sector, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises. World Bank (2013)
General government final consumption expenditure (% of GDP)	Logarithmic, one year lag	This includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security, but excludes government military expenditures that are part of government capital formation. World Bank (2013)
Real interest rate (%)	one year lag	Real interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator. World Bank (2013)
Internet users (per 100 people)	one year lag	Internet users are people with access to the worldwide network. World Bank (2013)
School enrolment, secondary (% gross)	Logarithmic, one year lag	Secondary education completes the provision of basic education that began at the primary level, and aims at laying the foundations for lifelong learning and human development, by offering more subject- or skill-oriented instruction using more specialized teachers. World Bank (2013)
ge: Government Effectiveness	one year lag	Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. http://data.worldbank.org/data-catalog/worldwide-governance-indicators

Table B. List of countries in new business density-oil model

Albania	**Algeria**	Argentina	Australia	Austria	Azerbaijan	Bangladesh	Belarus
Bolivia	Brazil	Bulgaria	Canada	Chile	Colombia	Croatia	Czech Rep.
Denmark	**Egypt**	France	Gabon	Georgia	Germany	Ghana	Greece
Guatemala	Hungary	India	Indonesia	**Iraq**	**Israel**	Italy	Japan
Jordan	Kazakhstan	Korea, Rep.	Kyrgyz Rep.	Lithuania	Malaysia	Mexico	Moldova
Morocco	Netherlands	New Zealand	Nigeria	Norway	**Oman**	Pakistan	Peru
Philippines	Poland	Romania	Russia	Serbia	Slovak Rep.	South Africa	Spain
Syria	Tajikistan	Thailand	**Tunisia**	Turkey	Ukraine	**UAE**	United Kingdom
Uzbekistan							

Note: bold names are from the Middle East and North Africa (MENA)