Review of PhD Thesis by Ilkin Aliyev (CERGE-EI)

Alexander Popov
(ECB)

The question of whether natural resources promote or hinder growth is an old one, but its importance seems to not diminish with time. It has a purely academic as well as a policy side. Academically, we would like to know what are the long-term growth consequences of discovering natural resources, as well as the mechanisms of the effect, so that we can augment our growth models properly. For example, what political economy considerations are at play? Does resource abundance affect growth through changes in relative prices of tradable goods vs. non-tradable goods, or does it affect human capital accumulation? From a policy perspective, we would like to know what institutions we should put in place in order to mitigate any potential negative implications of natural resource abundance.

The literature mostly finds that various types of natural resource abundance tend to depress growth, but this result is far from unanimous. In addition, the empirical investigation into the question is plagued by well-known econometric problems; for example, resource-rich countries can also have poor institutions, less educated and skilled population, resort to inferior macro policies, or be subject to adverse macroeconomic shocks. Many of these confounding variables are difficult to measure or are unobservable, making the identification of the effect tricky.

In his thesis, Ilkin attempts to address a number of aspects in the extant literature. His first chapter deals with the growth implications of natural resource abundance. For a large cross-section of countries, he collects information on a large number of dimensions, including a range of variables related to resource abundance. His contributions to the literature is a modification of the standard empirical test whereby he uses a propensity score matching procedure to select, from the control group of resource non-abundant countries, the best match(es) for each resource abundant country. His results differ from some of the prior literature, notably Sala-i-Martin et al. (2004), in that he finds a negative correlation between the share of mining in GDP and growth. In the second chapter, Alkin studies the effect of resource abundance on the procyclicality of fiscal policy. He finds a robust U-shaped relationship: for moderately resource-rich countries, fiscal policy become more counter-cyclical with additional natural resource, but it starts increasing with resource richness at high levels of natural resources. He complements his findings with a simple model of fiscal policy which incorporates lobbying groups and borrowing constraints. His third paper is more of a case study where Ilkin compares the performance of resource rich Azerbaijan to that of its resource poor neighbors Armenia and Georgia, and finds that oil exports have recently had a positive effect on Azerbaijan's relative GDP growth.

In my personal view, Ilkin's broad research agenda (the natural resource curse) is a very important one and he has made substantial effort in thinking about interesting and important aspects of the literature that he could study. His thesis should meet the necessary standards for awarding a PhD at CERGE-EI. I do not think any of the papers is of publishable quality right now, but the first and especially the second one could be, after a substantial re-write. Below I offer my assessment of the current state of the thesis and my ideas for how the papers could be expanded in the future.

1. Chapter 1. Understanding the resource impact using matching

a) From the introduction, it is relatively unclear what the main contribution of the paper is. Is it to use a propensity score matching (PSM) procedure to account for omitted variable bias? Is it to focus on exhaustible resources, as opposed to Sachs and Warner (1995) who look at primary exports? Or is it both?
b) Ilkin's argument for using the PSM procedure is potential omitted variable bias. This is re-iterated on page 17 where the results are checked for consistency against the evidence in Sala-i-Martin. If I understand correctly, the original idea of PSM is to make sure that we compare observations which are as similar as possible across observable dimensions and only differ in their participation in a program, thus circumventing the fact that the decision to participate in a program may be correlated with individual characteristics. In other words, if we want to compare the effect of smoking on life expectancy, it does not make sense to compare 70 years old smokers to 30 years old non-smokers because we would attribute to smoking what is actually an age effect. The PSM procedure would advise us to compare sub-sample of equally old smokers and non-smokers.
c) In this example, age is observed, so this is not about omitted variable bias. It is rather an argument against using models such as OLS which control for age by including it as a regressor and neglect the fact that the distribution of age does not overlap sufficiently across treatment and control groups. So, I understand if this is what Ilkin is trying to achieve – to compare resource rich countries to resource poor countries which are almost identical in all other dimensions, in order to make sure that the effect of resource abundance on growth is not confounded by poor institutions, say. But why PSM is a solution for the omitted variable problem needs to be explained better.
d) Related to that, the PSM procedure has two well-known drawbacks: it does not control for unobservables and it is more effective in larger samples. These need to be discussed better; in particular, I find the argument that unobservables are being controlled for because they are likely correlated with observables unconvincing.
e) I think it would be interesting to repeat the main tests after choosing a unique match for each resource rich country – the one with the lowest distance in a PS sense.
f) Thinking about resource richness as "treatment", it would be nice to have some panel evidence for a "treatment" group of countries where natural resources (say, oil) were discovered during the sample period, and a similar sample of countries

where it was not. Section 1.4.3 is supposed to be getting at that, but there is no econometric work, which is a pity.

g) Are outliers important? In particular, the graphical evidence in Figure 1.1 seems to be driven by one.

2. Chapter 2. Is fiscal policy pro-cyclical in resource-rich countries?

a) This chapter deals with the question, does resource intensity affect the procyclicality of fiscal policy. It finds a U-shaped relationship whereby at medium levels of resource intensity, procyclicality declines, but then increases again at high levels of resource richness. It then tests for the effect of borrowing constraints and political economy.

b) This chapter is very promising, but I have several quick suggestions for future improvement. First of all, non-linear relationships are very prone to outliers, and Figure 2.9 is worrisome in that respect.

c) It would also be nice to complement the analysis (which so far relies on including a quadratic term in the regression) with an analysis where government expenditure is regressed on dummies corresponding to low, medium, and high levels of resource intensity, where the break points could be determined by the econometrician through repeated testing.

d) The main analysis of the channels that drive the procyclicality of government spending (borrowing constraints and political economy) relies on splitting the countries into OECD and non-OECD, under the assumption that OECD countries face both lower borrowing constraints and have institutions that are less prone to lobbying by strong interest groups. This part can be substantially improved by using actual information on borrowing constraints (say, the ration of private credit to GDP) and quality of institutions, interacted with resource intensity. This will allow Alkin to separate the two channels, and also to detect differences within the group of OECD countries. For example, how does Norway compare to Finland?

e) Also, which types of government expenditures are more pro-cyclical (or U-shaped) with respect to resources? Is it mostly transfers, mostly investment, mostly spending on education and infrastructure, etc.? Answering these questions would give a much fuller picture of what kind of lobbying is taking place at high levels of resource intensity.

3. Chapter 3. Has Azerbaijan been able to use its natural resources to outperform its neighbors?

a) This chapter is more like a case study. It shows that in the past decade or so, Azerbaijan has grown faster than its resource poor neighbors Armenia and Georgia, with the break point around 2005.

b) I fully buy the argument that oil has contributed to Azerbaijan's growth, but this is sort of obvious, so I would be interested to see in the future answers to some more intricate and interesting questions.

c) For example, what is the long-run effect of an oil bonanza? Ilkin shows a substantial short-run effect, but in the long run all the nasty mechanisms that the previous literature has identified kick in, such as rent seeking, currency appreciation, and a brain drain.
d) Also, what is the effect on the distribution of income? What is the effect on productivity? On human capital accumulation?
e) Most importantly – how has the non-oil sector compared, in terms of growth, across the three countries?