

Natural Resource Abundance and Human Capital Accumulation

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Summary. — This paper studies the link between resource abundance and human capital accumulation. It reviews the commonly used indicators of resource abundance and human capital accumulation. The case for a form of resource curse in human capital accumulation is not robust to reasonable changes in these indicators. In fact, subsoil wealth and resource rents per capita are shown to be significantly correlated with improved indicators of human capital accumulation. If mineral wealth is what authors have in mind when they refer to natural resource abundance, then they should choose indicators that measure this concept as accurately as possible.
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1. INTRODUCTION

It is widely assumed in the literature that natural resources tend to slow down economic growth in countries that possess or discover them. Sachs and Warner (1995, 1999) have most notably made this claim. It deserves careful scrutiny if only because of its potential implications for development policy. In particular, the Extractive Industries Review (EIR) commissioned by the World Bank (2003) argues that international financial institutions should cease lending for hydrocarbon projects by 2008 and should limit lending for other mining activity to those countries with effective governments. In a press release, the World Bank (2004) has politely dismissed the basic thrust of the EIR's recommendations and announced that "management [...] would continue investments in oil, gas, and mining production, as these will continue to be an essential part of the development of many poor nations." However, subsequent developments seem to indicate that the questions raised by the EIR are likely to continue haunting the World Bank particularly its Mining Department.

The purpose of this paper is to shed some new light on this debate. Because resource abundance is likely to have a large variety of possibly conflicting effects on different sectors

and functions of the economy, the paper restricts its attention to the link between resource abundance and human capital accumulation. The question at stake here is: Do natural resource-abundant countries tend to accumulate more or less human capital than resource-poor countries?

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That human capital accumulation accompanies mineral activities should be positive news from the perspective of economic development. Human capital accumulation is a crucial issue for economic development in all countries. Barro (1997, 2001) argues that education permanently increases the efficiency of the labor force by fostering democracy. He also argues that human capital facilitates the absorption of superior technologies from leading countries. This technology-absorption effect is supposed to be especially important at the secondary and higher education levels. Similarly, Aghion, Caroli, and Garcia-Penalosa (1999) assert that education creates better conditions for good governance by improving health and enhancing equality.

Development economists, most notably Sen (1999), stress the importance of education, and in particular the importance of educating women in developing countries. The marginal social returns of education for growth are considered sizeable at the human capital levels characteristic of developing economies. Additionally, given the high degree of income inequality prevailing in these countries, education is often considered a better indicator of the median level of development than gross domestic product per capita.

Let us briefly review the limited literature dealing with the nexus between resource abundance and human capital accumulation. Gylfason (2001) shows that public expenditure on education relative to national income, expected years of schooling for girls, and gross secondary enrollment are all inversely related to the share of natural capital in national wealth across countries. He concludes that natural capital appears to crowd out human capital, thereby slowing the pace of economic development. Gylfason asserts, "nations that are confident that their natural resources are their most important asset may inadvertently—and perhaps even deliberately!—neglect the development of their [other] resources, by devoting inadequate attention and expenditure to education." He goes on to add, "their natural wealth may blind them to the need for educating their children."

Birdsall, Pinckney, and Sabot (2001) start by observing that most governments around the world extol the benefits of education while claiming that their investment in education is limited because of a lack of money. Indeed, the EIR (World Bank, 2003) reports that governments "believe that [extractive] industries

contribute to [...] poverty alleviation [and that] revenues from extractive industries can be used for [...] education [...]" (Vol. 3, Annex 5, p. 102). As Birdsall *et al.* (2001) note, if limits on human capital investment primarily result from binding government constraints, resource abundance should induce additional investment, all else equal. Yet, these authors argue that the data tell another story: resource-abundant countries, on average, invest less in education than other countries.

Just how surprising we can find the paradoxical result reported by Birdsall and her coauthors is debatable. On one hand, Wade (1992) argues that, in Latin America for example, governments controlled by the owners of natural resources have no incentive to invest in basic skills. The idea is that in resource-abundant countries, with plentiful foreign exchange, there is no incentive for the political elite to invest in basic skills so as to export the manufactures needed to pay for imports. Rather, the resource-owning elite have a tendency in these circumstances to use the country's resources to invest in highly skilled labor, particularly in the form of college-level education for their children.

On the other hand, it is surprising that while mineral states tend to lavishly spend their revenues on numerous development projects and programs (see, e.g., Ascher, 1999), education would be the only exception. It is even more surprising to read that in regard to education, the same mineral states actually spend *less* than other states. In fact, in an under appreciated paper about resource abundance and economic growth, Davis (1995) finds human capital accumulation indicators to be higher in mineral countries than non-mineral countries. The results in this paper support his conclusions. This paper explains why Gylfason (2001) and Birdsall *et al.* (2001) have reached different conclusions. It improves upon Davis (1995) by using richer human capital data and better resource abundance measures.

This paper is organized as follows. Section 2 presents the data used, paying close attention to the different indicators of resource abundance and human capital accumulation used in the literature in order to better understand why they lead us to strikingly different conclusions. Section 3 reports and comments on linear correlation coefficients between these various resource abundance and human capital accumulation indicators. These correlation coefficients are bootstrapped to generate confidence intervals

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