International trade, exhaustible-resource abundance and economic growth

Beatriz Gaitan a, Terry L. Roe b, *

a Free University of Berlin, Garystrasse 21, 14195 Berlin, Germany
b University of Minnesota, 337h Ruttan Hall, 1994 Buford Av., St. Paul, MN 55108, USA

1. Introduction

The economics of exhaustible resources received increased attention following Sachs and Warner’s (1995, 2001) suggestion that countries with ample natural resources tend to grow less rapidly than natural resource-scarce countries. This apparent paradox led to a number of papers with conflicting findings. Sala-i-Martin (1997) and Doppelhofer et al. (2000) find the export share of primary products to be negatively correlated with economic growth. They also find, however, that the fraction of GDP in mining and GDP growth are positively correlated. Papyrakis and Gerlagh (2007) find economic growth among U.S. states to be negatively affected by their natural resource abundance. Empirical studies by Lederman and Maloney (2003), Stijns (2005) and Brunnschweiler (2008) either come to opposite conclusions or find that natural resource abundance does not affect growth. Brunnschweiler and Bulte (2008) conclude from their statistical analysis that the apparent paradox may be a red herring.1

Given this puzzling empirical evidence, the challenge is whether a theoretical model that posits a specific yet plausible economic structure can help us understand whether and how resource abundance affects economic growth, thus alleviating to some degree the red herring suggestion. Instead of focusing on the broader concept of natural resource abundance,
we focus on analyzing the effects of **exhaustible** resource abundance on economic growth. Since exhaustible resources are exported to countries deficient in these resources (referred to henceforth as resource-poor countries), we argue that resource-poor countries likely play a role in the growth performance of the endowed countries (referred to henceforth as resource-abundant countries). Further, the abundance of these resources must also influence the economic performance of resource-poor countries. The main contribution of this paper is to show that country interdependence through trade can give rise to the resource curse under plausible conditions. This interrelationship is the key focus of this paper.

We consider a continuous-time, infinite-horizon two-country model of trade and analyze the conditions which lead a resource-abundant country to grow less rapidly than a resource-poor country—we call this the resource curse (henceforth RC). One country is endowed with deposits of an exhaustible resource (such as petroleum), The countries produce an identical final good with the same technology using a flow of the exhaustible resource and human and physical capital. At each instant of time, the resource-abundant country extracts and employs some of the exhaustible resource to produce the final good and exports the remainder to the resource-poor country. International borrowing is not allowed and trade between the two countries is balanced at each instant of time. Each country has a representative household that maximizes discounted instant utility from consuming the final good subject to a budget constraint. Consumers across countries have identical preferences. Thus, countries are identical and differ only with regard to their initial endowments of the exhaustible resource and possibly capital stocks.

Since, after controlling for corruption, Sachs and Warner (1995) find that resource abundance negatively affects economic growth, we first consider a setting in which capital stocks across countries are equal as a way to abstract from corruption and institutional effects. The model suggests that even under these circumstances, the RC can occur. We analytically characterize the conditions causing the rate of growth of the resource-abundant country’s gross domestic product (GDP) to be transitionally smaller than that of the other country. This “growth gap” solely depends on technological and preference parameters. Specifically, the size of the elasticity of intertemporal substitution and the exhaustible resource demand’s own price elasticity play a crucial role in determining whether such a gap occurs. In particular, given an elasticity of intertemporal substitution equal to or less than unity, the more own price inelastic is the derived demand for the exhaustible resource, the larger the growth gap, that is, the stronger the RC.

This result may seem counterintuitive. In the process of growth, an inelastic demand for a flow resource mined from an exhaustible resource tends to generate a growing income stream to the resource-abundant country which, one may incorrectly conclude favors the country’s relative income growth. An intuitive explanation is the following. An inelastic own price elasticity of demand for the resource is associated with a factor of production that accounts for a relatively small share in the value of total output, as is the case with petroleum. In the process of economic growth, the stock of the resource is depleted, the price of the flow resource increases in transition, and the inelastic own price elasticity causes the total revenue remunerated to the resource-abundant country to increase. Households in the resource-poor country obtain a higher discounted value of utility by saving to increase their human and physical capital stocks (and income) to remunerate the increasing cost of the flow resource, thus causing trade to be balanced. The growing income stream from exports of the exhaustible resource induces households in the resource-abundant country to invest relatively less than those in the other country, and thus, at the expense of future income growth. This effect is reinforced the stronger incentives are to smooth consumption over time. Our empirical exercise helps to confirm our analytical results and shows that our model can explain about one-fourth of the average GDP growth gap between resource-poor and resource-abundant countries observed in the data.

Several hypotheses have been put forward to explain why resource-abundant economies grow less rapidly than resource-poor countries. Tornell and Lane (1995) argue that it may be explained by the struggle of groups attempting to extract natural resource rents. Sachs and Warner (1995) argue in favor of Dutch Disease effects (see Corden, 1984 for a survey on this literature). Rodriguez and Sachs (1999, p. 278) argue that “resource-rich countries may grow more slowly because they are likely to be living beyond their means …“ We argue that the interaction of resource-abundant and resource-poor countries through international trade plays a role in the growth performance of resource-abundant countries.

The structure of our model draws upon early well-known literature on exhaustible resources. While many studies focus on single economies (e.g. Rodriguez and Sachs, 1999, and Kemp and Long, 1982), only few address international trade issues associated with exhaustible resources. Among these are Asheim (1986) and Hartwick (1995), who study a two-country world and investigate whether constant consumption paths are achievable when rents accruing to exhaustible resources are invested in new capital. Kemp and Long (1980) analyze monopsonistic behavior in a two-country model with exhaustible resources, absent of physical capital. Brander and Taylor (1998) and Jinji (2007) investigate the effect of international trade on welfare using Ricardian models of trade with renewable resources.
دریافت فوری
متن کامل مقاله

امکان دانلود نسخه تمام متن مقالات انگلیسی
امکان دانلود نسخه ترجمه شده مقالات
پذیرش سفارش ترجمه تخصصی
امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
امکان دانلود رایگان ۲ صفحه اول هر مقاله
امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
دانلود فوری مقاله پس از پرداخت آنلاین
پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات