Structural Change and Economic Dynamics 35 (2015) 38–55

Contents lists available at ScienceDirect

Structural Change and Economic Dynamics

journal homepage: www.elsevier.com/locate/sced

Growth and volatility in resource-rich countries: Does diversification help?

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ARTICLE INFO

Article history:
Received December 2014
Received in revised form September 2015
Accepted October 2015
Available online 22 October 2015

JEL classification:
O14, E32, Q32, C67

Keywords:
Diversification
Macroeconomic volatility
Natural resources
Resource curse

ABSTRACT

This paper studies the "natural resources – volatility – growth" link by evaluating the role of economic diversification. I study whether resource-rich countries are able to offset the volatility triggering effects of natural resources by diversifying their economies. Using input–output data, I construct an indicator that captures diversification of the production structure of the economy and density of inter-industry linkages. The results show that resource abundance exerts negative impact on growth through the volatility channel. While the direct effects of natural resources on growth are positive, their adverse indirect effects through volatility could be larger. I find that productive diversification offsets the volatility impact of natural resources. When diversification is controlled for, the negative growth impact of volatility induced by resource abundance disappears. However, the results do not hold true if export concentration measure is used instead of productive diversification.

1. Introduction

Natural resources remain an area on which economists have failed to reach a consensus. Up until 1980s, most neoliberal economists believed that natural resources were a major advantage for countries to enjoy rapid growth and development. Rostow (1961), for instance, considered natural resource abundance an element of preconditions for the "take-off" from a state of underdevelopment to that of an industrial development, as it was in the cases of Britain, Australia, Canada, United States, and Sweden. Balassa (1980) emphasized that "a country's endowment of natural resources will benefit its industrial development" by providing funds for investment and generating demand through market linkages.

However, since the 1980s most economists have been sceptical about the idea that natural resource abundance induces good economic outcome. The literature that has emerged since then has argued that natural resource endowment can have adverse impact on growth and development and could become a "curse". Corden and Neary (1982) and Bruno and Sachs (1982) put forward the "Dutch disease" theory that attracted most attention. They based their analyses on the experience of the Netherlands in natural gas extraction in 1970s and argued that natural resources exploitation draws labour out of the manufacturing towards the extractive sector due to more attractive returns to labour supply. As a result, the manufacturing sector experiences shortage of labour and higher input costs. On the other hand, a rise in mining revenues leads the government to raise its spending which will partly be spent

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http://dx.doi.org/10.1016/j.strueco.2015.10.001
0954-349X/

on non-traded goods such as construction and services. The prices of non-traded goods and services increase, and this leads to an appreciation of the real exchange rate. As a result, economic growth declines as manufacturing output and non-commodity exports drop due to both higher labour costs in manufacturing, and more appreciated real exchange rate that makes non-commodity exports more expensive and less competitive.

Subsequent studies in 1980s and later years evaluated the empirical validity of the Dutch disease effect. Gelb (1988) studied the economic performance of oil-exporting developing countries and found that these countries exhibited poor economic performance during the boom periods of 1970s and 1980s. Sachs and Warner (1995, 2001) were the first to initiate the econometric literature on the impact of resource abundance on economic growth. The authors found that "economies with abundant natural resources have tended to grow less rapidly than natural-resource-scarce economies." Other studies such as Leite and Weidmann (1999), Gylfason et al. (1999), Auty (2001) and Sala-i-Martin and Subramanian (2003) also found similar results.

The "resource curse" theory, however, has not been limited to only poor economic performance. It has developed into a multi-dimensional phenomenon that takes into account developmental issues, institutional quality, and political economy considerations. Economists have explained that natural resource abundance encourages rent-seeking in the economy, weakens the institutions, damages democracy, increases the probability of civil war, and leads to poor development outcomes.

However, despite considerable evidence on the notion of a resource curse, the literature has not reached a consensus (Rosser, 2006). Conceptual disagreements on the measures of resource abundance, the types of natural resources, as well as econometric techniques to assess the impact of natural resources on growth and development are the ongoing sources of debate. Some studies have found no evidence for the resource curse, and instead found a positive correlation between resource endowment and growth (Davis, 1995; Lederman and Maloney, 2007; Alexeev and Conrad, 2009). Some others used alternative measures for resource abundance (Stijns, 2000; Herb, 2005; Fearon, 2005) and some distinguished between different types of natural resources (Isham et al., 2002; Sala-i-Martin and Subramanian, 2003; Ross, 2003), which led them to conclude that resource abundance does not necessarily lead to poor economic and development outcomes.

Recent propositions have been made around the volatility channel. van der Ploeg and Poelhekke (2009) argued that the positive effects of natural resources on growth are trumped by their adverse *indirect* effects through the volatility. In fact, natural resources are known to exacerbate macroeconomic volatility (Bleaney and Halland, 2009; Malik and Temple, 2009; Frankel, 2010), while empirical studies confirm a negative relation between volatility and growth (Aizenman and Pinto, 2005; Hnatkovska and Loayza, 2005). Macroeconomic volatility is found to have significant costs in terms of decline in economic growth, loss in welfare, and increase in inequality and poverty (Aizenman and Pinto, 2005). In a seminal paper, Ramey and Ramey (1995) found that volatility adversely affects economic growth. They showed that countries with higher volatility tend to have lower mean growth, even after controlling for other country-specific growth correlates.

Studies have found that less diversified economies face higher risk of external shocks. Low levels of diversification are associated with higher volatility (Acemoglu and Zilibotti, 1997; di Giovanni and Levchenko, 2006; Haddad et al., 2010; Papageorgiou and Spatafora, 2012). Further, Malik and Temple (2009) found that resource-rich countries tend to have greater export concentration which itself is strongly correlated with higher output volatility.

Thus if natural resources adversely affect economic growth through the volatility channel, *diversification* could offer an optimal strategy for resource-rich countries to offset the negative impact of natural resources and allow them to reap the benefits of their resource endowment. Murshed and Serino (2011) argued that "it is only specialization in unprocessed natural resource products that slows down economic growth, as it impedes the emergence of more dynamic patterns of trade specialization." Many economists have suggested that diversification into processed natural resources ("resource-based industrialisation") can be seen as a way out of the resource curse (Gelb and Grasmann, 2010; Murshed and Serino, 2011; Massol and Banal-Estañol, 2012). Diversification lowers the negative impact of shocks on the economy, allows for a gradual allocation of resources to their most productive uses in the economy, and prevents the Dutch disease from affecting the manufacturing and other non-tradable sectors. Chile, Brazil, Malaysia, Mexico and Sweden represent some of the best examples of resource-rich countries that were able to diversify their economies, yet maintaining successful growth and development outcomes.

Diversification in resource-rich countries has attracted renewed attention of academics and development institutions in recent years. Though recent discussions reflect on new approaches to industrialisation within a more complex model of development, the core argument remains unchanged to what the structuralist and neo-classical economists argued in the 20th century: diversification away from commodity exports into new industries is favourable to economic development.

This paper aims to study the role of diversification in resource-rich countries. Diversification could help countries reduce their exposure to external shocks, diversify idiosyncratic risks in the economy, and finally offset the volatility triggering effects of natural resources on growth. Hence, this paper relates to the three domains in economic literature which were discussed heretofore. First, it relates to the literature on the resource curse theory and attempts to explore the impact of resource endowment on growth by looking at the volatility channel. It builds on van der Ploeg and Poelhekke (2009) who studied the *indirect* volatility impact of natural resources on growth. Second, it is linked to the volatility-growth literature initiated by Ramey and Ramey (1995). This paper employs Ramey and Ramey's model to evaluate the impact of volatility on growth in resource-rich countries. Finally, it relates to the literature that has studied the impact of diversification on growth volatility. This paper links these three areas of research