European Economic Review 59 (2013) 1–18

Contents lists available at SciVerse ScienceDirect

European Economic Review

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

Trade, income and the Baltic Dry Index

Faqin Lin [a], Nicholas C.S. Sim [b,*]

[a] School of International Trade and Economics, Central University of Finance and Economics, China
[b] School of Economics, University of Adelaide, Adelaide SA 5005, Australia

ARTICLE INFO

Article history:
Received 30 January 2012
Accepted 9 December 2012
Available online 19 December 2012

JEL classification:
F14
O11
O19

Keywords:
Economic development
International trade
Income
Baltic Dry Index
Instrument variable

ABSTRACT

Does trade improve the income levels of the poor and less developed nations? Focusing on the Least Developed Countries (LDCs) designated by the United Nations, we construct a new measure of trade cost, based on the Baltic Dry Index (BDI), as an instrument for trade. The BDI reflects the cost of utilizing dry bulk carriers, which are specially designed vessels for transporting primary goods internationally, where these goods dominate the output and export sectors of the LDCs. We find that a 1% expansion in trade raises GDP per capita by approximately 0.5% on average. This estimate is much larger than previously found in the literature and its quantitative significance emphasizes the importance of trade towards the economic development of low income countries.

1. Introduction

As early as Sir Dennis Robertson (1940), international trade has been characterized as an "engine of growth" by which the goal of economic development and improving living standards can be achieved. From the development perspective, the positive association between trade and income levels is an encouraging fact. But belying it is an uneasy empirical regularity that the core of global trade is dominated by the exclusive trade between developed, wealthy countries (Baldwin and Martin, 1999; Krugman, 2009).[1] The weak participation levels in international trade by low income countries therefore raises an important question. If the positive association between trade and income is causal, does the benefit of trade in lifting living standards extend to them as well? In this context, the answer is not always clear cut. As early as Nurkse (1959), it has been argued that low income countries may not benefit as much from the opening of trade.[2] This is because their exports are mainly primary goods, and the world market for their output would only expand slowly given that the demand for primary goods is generally income inelastic.

In this paper, we examine the link between trade and income improvements for the 48 Least Developed Countries (LDCs) designated by the United Nations. A main issue, often emphasized in the literature, is that trade is endogenous in the determination of income levels.[3] To address this, we construct a new measure of trade cost as an external source of

* Corresponding author.
E-mail address: nicholas.sim@adelaide.edu.au (N.C.S. Sim).

[1] For instance, in 2010, the total export volume of OECD countries accounts for about 64% of world total exports and their total import volume accounts for about 66% of world total imports.

[2] As compared to higher income countries with manufacturing-based economies. Also see Kaldor (1964).

[3] Firstly, decisions on whether to trade, and how much to trade, are not randomly assigned. Secondly, the regression analysis may be confounded by the reverse causal effect going from income to trade.

0014-2921/$ - see front matter © 2012 Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.euroecorev.2012.12.004

variation in trade, which in turn is used to construct the within-country estimate of the causal effect that trade has on income of the LDCs. The LDCs are home to more than 880 million people, or about 12% of the world's population. However, they account for less than 2% of global output, 1% of global trade in goods and 2% of global trade in primary goods.[4] The export sectors of the LDCs are heavily dominated by the export of primary goods, many of which are transported internationally by a class of specially designed vessels known as dry bulk carriers, or bulk carriers in short. This paper exploits the cost of utilizing bulk carriers as summarized by the Baltic Dry Index (BDI) to construct a new measure of trade cost for the LDCs. Our measure of trade cost, which is used as an instrument for trade, is the interaction between the log of the BDI and the country's primary products share of its total trade. This primary products share captures the relative intensity of bulk shipping utilization across the LDCs. A larger share amplifies the response of trade to the BDI, which helps to generate country-specific effects of the BDI on trade across time.

Our empirical analysis shows that a reduction in the BDI has a positive effect on the income of the LDCs through the trade channel. Our main instrumental variable estimates reveal that a 1% expansion in trade increases GDP per capita by 0.484–0.534% on average. This elasticity of income per capita with respect to trade is especially significant in light of previous findings in the literature. For instance, Feyrer (2009a) finds the elasticity to be in the region of 0.157–0.253 when both developed and developing countries are taken into consideration. Since our focus is restricted to the LDCs, our results suggest that the standard of living in the LDCs may be improved from the opening of trade. Furthermore, inferring from the smaller estimates in Feyrer (2009a), our findings also suggest that a low income country could benefit much more in income improvements from the deepening of trade than its wealthier counterparts.

Even though the literature on trade and income has a rich history, it is more recently that the issue of identification is given specific attention.[5] Our paper fits into this line of research on identifying the causality of trade on income by using the variation in trade cost as an estimation strategy. The groundbreaking paper is due to Frankel and Romer (1999), who use geographic distance between countries in the gravity equation as a reflection of trade cost for identifying the exogenous variation in bilateral trade volumes. However, in his seminal work, Feyrer (2009a,b) cautions that distance (or proximity) may be capturing other factors unrelated to trade cost.[6] For instance, he argues that distance may be correlated with geography-based determinants of income such as tastes, cultural characteristics, colonial institutions and disease environments, which raises question about the validity of the exclusion restriction in Frankel and Romer (1999).[7] While the effects of these geography-based determinants may be purged by including country fixed effects, the cross-sectional regression design of Frankel and Romer (1999) makes it virtually infeasible to do so.[8] In this regard, although our paper is related to Frankel and Romer (1999) in its focus on trade and income, it differs by constructing an instrument that contains not only cross-country variation but also time variation so that country fixed effects can be used to control for all unobserved permanent income differences.

In the spirit of constructing a time-varying instrument for trade to study its effect on income, our paper is related to two important papers of Feyrer (2009a,b), which introduce a key insight that distance is not a static concept. In Feyrer (2009a), a natural experiment, stemming from the Arab-Israeli conflict that saw the closing and re-opening of the Suez canal during 1967–1975, provides two major shocks to shipping distance that is crucial for identifying the exogenous variation in trade. In Feyrer (2009b), the identification strategy relies on improvements in air transportation technology that may increase the relative importance of air versus sea freight over time. Because countries utilize air and sea routes for trade in various ways, the rapid decline in the cost of air relative to sea freight would benefit countries differently,[9] generating country-specific effects of air transportation innovation that form the basis of Feyrer's (2009b) approach. While our paper shares a common goal as Feyrer (2009a,b) in trying to pin down the exogenous variation in trade, the estimation strategies of Feyrer (2009a,b) are not easily adaptable to our study focusing on the LDCs for the following reasons.

[4] These are calculated based on 2010 data from the United Nations Conference on Trade and Development (UNCTAD).

[5] For instance, Dollar (1992) and Sachs and Warner (1995) find that trade openness and income are positively related, but they do not focus on addressing the issue that trade openness is potentially endogenous. Although Edwards (1998) uses instrumental variables based on historical information such as historical TFP growth, measures of openness, and trade to GDP ratio, he cautions that the use of instrumental variables to address the endogeneity problem has not been conclusive hitherto, and that the causal relationship of trade and income is still a somewhat open issue in the empirical literature.

[6] Other related studies, focusing on historical trade flows, include Jacks and Pendakur (2010) and Jacks et al. (2011). Jacks and Pendakur (2010) exploit the revolution of maritime transport to explain the historical variation in international trade from 1870 to 1913 but find no evidence that the maritime transport revolution was the primary driver of the late 19th century global trade boom. Jacks et al. (2011) look at the importance of bilateral trade costs in determining international trade flows over different periods in history.

[7] Rodriguez and Rodrik (2000) argue that the instrument of Frankel and Romer (1999) may not be valid. For instance, they show that by including additional summary indicators of geography such as distance from the equator, the percentage of a country's land area that lies in the tropics, and a set of regional dummies, the statistical and quantitative significance of trade found in Frankel and Romer (1999) may be driven out completely.

[8] This critique is also relevant to Alcalá and Ciccone (2004), Irwin and Tervio (2002) and Noguer and Siscart (2005), as they examine the relationship of trade and income using the Frankel and Romer approach. Based on an extension of Frankel and Romer (1999) and Alcalá and Ciccone (2004) employ all available bilateral trade data, including bilateral trade pairs with zero trade, and show that doing so would improve the explanatory power of the first stage regression and generate more robust second stage estimates of the effect of trade on income. Irwin and Tervio (2002) evaluate the findings of Frankel and Romer using data from the pre-World War I, interwar and post-war periods, and conclude that the main result of Frankel and Romer holds throughout the whole of 20th century. Noguer and Siscart (2005) use a richer data set with fewer missing observations to conduct the Frankel and Romer analysis and arrive at a similar conclusion.

[9] Feyrer (2009b,p.3) notes that the cost of moving goods by air fell by a factor of 10 between 1955 and 2004.