Journal of Economic Dynamics & Control 38 (2014) 37–64

Contents lists available at ScienceDirect

Journal of Economic Dynamics & Control

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

The short and long-run impact of globalization if firms differ in factor input ratios

Julian Emami Namini [a,b,*]

[a] Department of Economics, Erasmus University Rotterdam, Postbox 1738, 3000 DR Rotterdam, The Netherlands
[b] Centro Studi Luca d'Agliano, Milan, Italy

ARTICLE INFO

Article history:
Received 3 May 2011
Received in revised form
6 February 2013
Accepted 3 September 2013
Available online 18 September 2013

JEL classification:
F12
L11
O41
D33

Keywords:
International trade
Economic growth
Firm heterogeneity in factor input ratios
Factor market competition
Income distribution

ABSTRACT

Empirical evidence has shown that exporters are more capital intensive than non-exporters. Based on this evidence, I construct a two-factor general equilibrium model with firm heterogeneity in factor intensities, monopolistic competition, scale economies and international trade. This setting can explain several empirical regularities on international trade, factor market competition, factor relocations and factor returns: (i) exporters are more capital intensive than non-exporters, regardless of a country's relative factor endowments; (ii) finite supply of capital limits a country's export activities; (iii) trade liberalization increases the relative return to capital; (iv) new profit opportunities in export markets change the distribution of firms towards the more capital intensive ones. Finally, I extend the setting to endogenous capital accumulation and show that trade liberalization induces economic growth and, in the long-run, benefits all factors in real terms.

1. Introduction

Bernard et al. (2007b) show for narrowly defined US industries that the capital employment per worker is, on average, 12% higher for exporters, compared to non-exporters. Using Chilean data, Alvarez and López (2005) show that exporters are, on average, 60% more capital intensive than non-exporters. This evidence suggests that firm heterogeneity in factor input ratios is crucial to explain firm selection into export markets.[1]

This paper analyzes how firm heterogeneity in factor input ratios contributes to the 'new' trade theory, in which international trade is due to product differentiation and scale economies. I extend the Krugman (1980) setup by considering (i) two factors of production, (ii) CES production functions and (iii) firm heterogeneity in the factor share parameters of the

* Correspondence address: Department of Economics, Erasmus University Rotterdam, Post box 1738, 3000 DR Rotterdam, The Netherlands. Tel.: +31 10 408 1399; fax: +31 10 408 9161.
E-mail address: emaminamini@ese.eur.nl

[1] If the notion of capital is extended to include human capital, the same picture emerges for Denmark (Munch and Skaksen, 2008), Mexico (Hanson and Harrison, 1999) and Portugal (Martins and Opromolla, 2011). Klein et al. (2010) and Leonardi (2007) document the general prevalence of firm heterogeneity in factor input ratios.

0165-1889/$ - see front matter © 2013 Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.jedc.2013.09.005

production function. In equilibrium firms produce with different factor input ratios. This setting rationalizes several empirical findings on international trade, factor market competition, factor relocations and factor returns.

First, this setting can explain why exporters are more capital intensive than non-exporters, regardless of a country's relative factor endowments. I show that exporters are more capital intensive than non-exporters if the effective price of capital is smaller than the one of labor and if exporting is costly. The relationship between effective factor prices and a country's relative factor endowments depends on the firm distribution. If the firm distribution is sufficiently skewed towards the more labor intensive firms, the effective price of capital is smaller than the one of labor, also if the country's labor endowment exceeds its capital endowment. Thus, this setting can rationalize the empirical finding that exporters are more capital intensive than non-exporters, also in less developed countries like Chile or Mexico.

Second, there is quite some anecdotal evidence stating that in export-oriented economies like China or Germany, the limited supplies of those factors, which are used intensively by exporters, limit a sector's export activities (e.g., McKinsey, 2009, for Germany or World Bank, 2012, for China). In the present setting a finite supply of capital, which is used intensively by exporters, limits a country's export activities. The reason is that trade liberalization intensifies relative competition for capital. This makes it more costly for the capital intensive exporters to serve the foreign market and, thus, limits their relative frequency in the firm distribution. Notice that in a setting with firm homogeneity in factor intensities (e.g., Bernard et al., 2007a), the share of exporting firms in a sector's firm distribution depends only on the export cost parameters and is not related to a country's relative factor endowments.

Third, trade liberalization is correlated with a country's income distribution and, on an aggregate level, with labor's share in national income. While the empirical evidence on the correlation between trade liberalization and income distribution is ambiguous (Milanovic, 2005) the correlation between trade liberalization and labor's share in national income is typically found to be negative (IMF, 2007). This paper argues that the time dimension might explain the ambiguity concerning the correlation between globalization and income distribution. I show that, if exporters are more capital intensive than non-exporters, trade liberalization increases the relative price of capital in the short-run. The resulting incentives for investments into capital increase a country's capital stock in the long-run which, in turn, brings the relative price of capital down again. Concerning labor's share in national income, the impact of globalization does not differ between the short and the long-run in this paper. The reason is that labor's share not only depends on factor prices, but also on factor endowments. The negative short-run impact of globalization on labor's share results from the increase in the relative price of capital. In the long-run, it is the increase in the country's capital stock that impacts labor's share negatively.

Fourth, Bernard and Jensen (1997) report for the US that trade liberalization relocates resources towards the more capital intensive exporters. If the notion of capital is extended to include human capital, the empirical literature which is reviewed in Goldberg and Pavcnik (2007) supports this finding: trade liberalization is positively correlated with demand for skilled labor, a resource shift towards the more skill intensive firms and an increase in the sector-wide skill intensity. Importantly, Goldberg and Pavcnik (2007) emphasize that these correlations hold also for developing countries. This is in line with this paper's result that exporters can be the more capital intensive firms, regardless of a country's relative factor endowments. I show that, if a country's effective factor prices are such that only the more capital intensive firms export, trade liberalization increases relative capital demand. In the short-run with a fixed capital stock, the resulting adjustment of relative factor prices shifts the firm distribution either towards the non-exporters or towards the exporters, depending on the magnitude of export costs. In the long-run with an endogenous capital stock, the firm distribution shifts towards the exporters, regardless of the magnitude of export costs.

Finally, a large number of empirical studies has documented the positive impact of trade liberalization on economic growth (see, e.g., the literature which is reviewed in Singh, 2010). This paper shows that the trade-induced relocation of production factors towards the more capital intensive exporters induces capital accumulation by households. In addition, this paper shows that, due to the growth impact of trade liberalization, both capital and labor gain in real terms in the long-run after trade liberalization. Empirical evidence on the short-run versus long-run welfare impact of trade liberalization is scarce. This is mainly due to the ambiguity in separating the long-run from the short-run. Still, Porto (2007) finds evidence suggesting that, after households had the time to adjust their production and consumption patterns, the welfare impact of trade liberalization is positive for all households, regardless of whether they are producers of consumption goods or workers.

The analysis in this paper starts with the short-run, which is characterized by fixed factor supplies. I show that firms with different factor input ratios produce with different levels of marginal costs. Thus, when a country opens up to costly trade, exporters and non-exporters use factors in different intensities. I show for which combinations of (i) the firm distribution and (ii) a country's relative factor endowments, exporters are more capital intensive than non-exporters. I will highlight that, if the firm distribution is sufficiently skewed towards the more labor intensive ones, exporters are more capital intensive than non-exporters, even when a country's relative capital endowment is smaller than unity. I will first focus on symmetric countries, which are such that exporters are more capital intensive than non-exporters. Thus, trade liberalization increases the relative price of capital and decreases labor's share in national income. Furthermore, it is a priori ambiguous into which direction trade liberalization shifts the firm distribution. On the one hand, increased profit opportunities abroad ceteris paribus shift the firm distribution towards capital-intensive exporters. On the other hand, increased competition for capital ceteris paribus shifts the firm distribution towards labor intensive non-exporters. Thus, the sector's export volume is restricted by a limited supply of capital.

Afterwards, I extend the analysis to the long-run and assume that the countries' capital stocks are determined endogenously in terms of the Ramsey growth model. I highlight that, also with endogenous capital stocks, exporters can be