European Economic Review 70 (2014) 56–74

Contents lists available at ScienceDirect

European Economic Review

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

International productivity gaps and the export status of firms: Evidence from France and Japan

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ARTICLE INFO

Article history:
Received 4 April 2013
Accepted 22 January 2014
Available online 28 March 2014

JEL classification:
F1
D24

Keywords:
International productivity gap
Exports
Firm heterogeneity
Trade costs
Productivity distribution

ABSTRACT

This paper provides new evidence on international productivity gaps; this evidence is obtained from large-scale firm-level data from the French and Japanese manufacturing industries using non-parametric methodologies designed to overcome confidentiality restrictions. Our primary finding is that international productivity gaps are sensitive to the export status of firms. We also show that productivity differences between French and Japanese exporters vary across export destinations. We propose a simple analytical framework to relate those basic findings to the new models of international trade with heterogeneous firms. Under this framework, international firm-level productivity comparisons provide new insights into the importance of trade-related institutional and policy differences across countries.

1. Introduction

Are firms from different countries that compete in international markets closer in terms of efficient productivity than purely domestic firms? This question is non-trivial. On the one hand, if the productivity gap is closer between exporters from two different countries than between domestic firms, it is important to enhance the productivity of domestic firms to fill the international productivity gap. On the other hand, if there are any systematic patterns in the productivity gap between exporters from different countries, we can relate international productivity gaps to international factors such as trade costs, implying that a reduction of trade costs is necessary to fill the international productivity gaps.[1] Such differences

Abbreviation: BSJBSA, basic survey of Japanese business structure and activities; EAE, Enquête Annuelle d'Entreprises; FJ, France–Japan; FTA, free trade agreement; GGDC, Groningen Growth Development Centre; GNS, good Nadiri and Sickles; INSEE, French National Statistical Office; ISGEP, International Study Group on Exports and Productivity; KS, Kolmogorov–Smirnoff; METI, Ministry of Economy Trade and Industry; RIETI, Research Institute for Economy Trade and Industry; SESSI, Research and Statistical Department of the French Ministry of Industry

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[1] In this paper, trade costs will reflect not only transportation costs, but also trade policy such as tariff and non-tariff barriers.

http://dx.doi.org/10.1016/j.euroecorev.2014.01.017
0014-2921/

have different policy implications. While a number of studies attempted to relate international productivity gaps to innovation activities such as research and development (R&D), until now, the relationship between international productivity gaps and international activities has been overlooked, at least for developed countries. This paper contributes to filling this gap by proposing a first investigation of the relationship between international productivity gaps and firm export status across two industrialised countries, namely France and Japan.

Investigating productivity differences across firms over different countries is not a straightforward exercise. On the empirical side, it requires the ability to compute reliable productivity estimates at the firm level that are directly comparable across countries. This methodological challenge is serious enough to make international productivity comparisons using firm-level data very scarce in the literature.[2] On the theoretical side, whereas it is well established that a firm's relative productivity is related to its export status *within* a country–industry, it is less obvious how this property expands to cross-country within-industry comparisons. Assume that countries differ both in terms of their relative firm productivity distributions and in terms of their relative trade costs. Should we expect any systematic patterns in terms of the productivity gaps across exporters (or non-exporters) from two different countries within the same industry?

In this paper, we make the following three contributions. First, we present a framework of analysis in which in the presence of firm heterogeneity and differentiated trade costs across countries, firm selection partly determines international productivity gaps. Second, we propose an empirical strategy that allows the comparison of reliable firm-level total factor productivity (TFP) indices from large-scale firm-level datasets (for which confidentiality restrictions apply). Finally, we reveal that a systematic pattern does indeed exist that relates the productivity gaps between French and Japanese firms to their export status. Specifically, we show that the productivity gap between French and Japanese exporters is *larger* than the average industry gap in the industries in which Japan has a productivity advantage over France and *smaller* than the average industry gap in the industries in which Japan has a productivity disadvantage compared with France. Building on this basic finding, we show how productivity comparisons across exporting and non-exporting firms from different countries can be used as a further test of relevance for the recent models of international trade and heterogeneous firms. In turn, we also show how international firm-level productivity comparisons can be used to provide useful insights into important trade-related institutional and policy differences across countries, using a comparison between France and Japan as a case study.

Our motivation for this research comes from two strands of the literature. The first strand is the literature on international productivity gaps, which is of central interest in various research fields such as industrial organisation and growth theory. Numerous studies have attempted to measure international productivity gaps, relying on country-, industry-, or firm-level datasets. Baily and Solow (2001) in particular emphasised the importance of international productivity comparisons at the firm level. However, international productivity comparisons built from firm-level data have remained scarce and limited in scope. Some of the previous studies have focused only on the *average* productivity of firms.[3] Some of the studies have focused only on large listed firms, precluding the ability to address the issue of firm export heterogeneity because most of the listed firms are exporters.[4] Only a few of the previous studies have provided comparisons of the entire distributions of firm productivity.[5] Finally, some of the previous studies relied on private data sources that are rich, but limited in scope. For instance, using the McKinsey Global Institute firm-level database, Baily and Solow (2001) computed several industry productivity gaps across the United States, Germany, Japan, and France, but only for a limited number of industries.[6]

The other strand of literature is the study of firm heterogeneity in international trade. With the growing number of studies on the relationship between firm productivity and exports in various countries, we now know that, on average, exporters outperform non-exporters in terms of TFP.[7] However, the previous studies on firm heterogeneity and exports lack the perspective offered by an international comparison. An exception is a study by ISGEP (International Study Group on Exports and Productivity) (2008), which analysed the export premia of 14 countries.[8] This study compared the export premia across countries, but not the firm-level productivity. Therefore, none of the previous studies directly compared the productivity of exporters (or non-exporters) between two different countries.

Both strands of research have made significant contributions to the literature. However, the link between the two strands, namely the connection between firm export heterogeneity and international productivity gaps, has not been explored yet. In this paper, we propose to fill this gap by investigating how international productivity gaps relate to firms'

[2] Most of the recent literature investigating international productivity gaps from a firm-level perspective addresses allocative efficiency issues but do not compare directly firm performances across countries (see Bartelsman et al., 2013 for one of the most recent contributions in this field.)

[3] For example, Griliches and Mairesse (1983) compared the average productivity of firms in France and the United States.

[4] Fukao et al. (2008a) compared the productivity of listed firms in China, Japan, and South Korea. Fukao et al. (2008) extended the analysis, adding Taiwanese listed firms. Lee and Fukao (2008) and Jung and Lee (2010) compared the productivity of listed firms in Japan and Korea. All of these studies have focused on the difference in the average productivity gap.

[5] Most notably, Aw et al. (2000) compared large-scale Korean and Taiwanese plant-level data, but the period is different between the two datasets. Ahn et al. (2004) used Korean plant-level data and Japanese firm-level data. Strictly speaking, therefore, some of the previous studies did not directly compare the productivity of *firms* (or plants) from two different countries in the same industry-year.

[6] For France and Japan specifically, this previous study provides an estimate of the average productivity gap for the *automobile* industry only. Japanese firms were shown to be, on average, twice as productive as their French counterparts in this specific industry (see Baily and Solow, 2001, p. 156, Table 2).

[7] Greenaway and Kneller (2007), Wagner (2007, 2012), and Hayakawa et al. (2012) provide excellent literature reviews on firm heterogeneity and export behaviours.

[8] The ISGEP study included France, but not Japan.