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Export profitability, competition and technology

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ABSTRACT

The present paper seeks to examine the interplay between competition and technology in the export decision-making of homogeneous firms in an oligopolistic framework. The firms' behaviour is studied here in two alternative scenarios: (i) a protected domestic market, and (ii) a non discriminated domestic market (i.e. absence of trading cost etc across the border). In the first scenario, we argue that a higher degree of competition in the domestic market encourages exports when advanced technology prevails and vice versa. Similar effects are noticed in the second scenario. These propositions are analysed both theoretically and empirically.

1. Introduction

Recent years have been experiencing a surge in the literature of firm heterogeneity and export decision-making in the presence of productivity differential and non-trivial costs of exports. Starting with the works of Helpman (2006) and Melitz and Redding (2012) the literature discusses various facets of the problem, both theoretically and empirically (e.g., Melitz and Ottaviano 2008, Ianchovichina et.al. 2000, Roy 2003 and Krugman 1979). A general theoretical framework is used for modelling firm heterogeneity in differentiated product-market in the presence of monopolistic competition. They generally highlight the relationship between the profit of a firm and its productivity. Although Melitz and Redding use the concept of 'technology', there is no discussion about the impacts of technological improvements on the behaviour of a firm and its profitability. Though the role of technology is certainly crucial in analysing a firm's behaviour, the inter-relationship among technology, competition and export is nowhere discussed in the literature. The present paper is an attempt to this end, where the problem is posited from an altogether different angle. It seeks to identify the direction of export incentives for a firm when there is a change in the domestic market structure (i.e. a change in the degree of competition) and/or in the prevailing technology. The nature of our problem warrants the use of time series data, along with cross-sectional components, instead of only cross section data, as in the existing firm-heterogeneity literature. This study is motivated by Bergoeing and Kehoe (2001), Bernard, Eaton, Jensen, and Kortum (2003), and Bernard, Jensen, Redding, and Schott (2012), where firm-level technological differences are focused as the root cause of heterogeneity, as also by Collie and Hu (2011) who, in line with Helpman (as also Helpman & Krugman 1985), discuss about a firm's decision on exports in the presence of FDI. Since the latter category of literature deals with the problem in a Cournot oligopoly framework (at different levels of fixed costs and trading costs), the essence of the change in competition is largely unattended. The role of competition is also absent in Helpman (2006), which argues that exporters are more productive than non-exporters. Our article contributes to this field by studying the impact of different degrees of competition on the export performance of a firm. We argue that, in a market structure where price discrimination against imported products is absent, greater competition leads to a lower domestic price so that the domestic firms will sell more in the global market. The relationship between competition and exports gets, however, further complicated when we

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bring in technological changes. In particular, our paper investigates the question: How does an industry with homogeneous firms evaluate export incentives when there are changes in competition levels and technology? This question involves two components: (i) Does better technology increase the drive for exports in a more competitive industry? and (ii) Will a more restrictive competition policy encourage exports? Indeed, since the firm-level heterogeneity also contributes to an increase in export profitability, our analysis should cover both homogeneous and heterogeneous firms. The limitation of this model is that it considers only homogeneous firms. We, however, propose this model as a prelude to the literature on firm heterogeneity to demonstrate how the effects of competition and technology on the incentive to export should be discussed.

In essence, our study belongs to the literature on the roles of domestic rivalry, degree of competition and technology on the export performance of a firm. We place technology at the helm of our discussion in view of the fact that technological advancement (or relative deterioration) basically determines the behaviour of industries. The novelty of this paper lies in that it seeks to locate the critical level of technology in the decision-making process of a domestic firm regarding global sales. Our deliberations are, however, motivated by a number of studies. First, while discussing the role of oligopolistic competition in international trade for countries with different levels of technology, Yomogida (2008) emphasizes the significance of critical level of competition in case of a two-way trade for small or large technology gaps. Our paper, however, seeks to identify the critical level of technology in the relevant decision-making process. Secondly, in Clougherty and Zhang (2009) (e.g., Kayalica and Espinosa Ramirez, 2009), a relationship is established between domestic rivalry and export performance on the belief that the rivalry factors including domestic networking, merger, foreign rivalry etc. considerably affect the export performance. They develop a theoretical model for a single industry dealing in two markets - domestic and international. Their finding is that if there is a rise in the number of firms competing in both 'home' and 'foreign' markets, the domestic output, and also the country's export share, are augmented. The impact of a larger number of domestic firms is analysed in three alternative scenarios in the production process of domestic and international outputs: (i) joint economies; (ii) diseconomies, and (iii) the absence of such effects. In the presence of joint economies, an increase in the number of domestic firms suggests a negative relationship between domestic rivalry and export performance. In a similar paper (Clougherty and Zhang 2005), they investigate the relationship between export orientation and domestic merger policy. But the impact of technology (or productivity) on export profitability is not prominent in those papers. But one cannot deny that, at a given level of the entry cost and at a given degree of competition, there should exist a critical level of technology below which exports appear more profitable. Similar to the idea of Clougherty and Zhang, however, this paper also starts with the basic surmise that the difference between the local and world prices, (P_L-P_W), is less than the trading cost, which signifies an entry restriction for foreign firms in the domestic market. However, domestic firms are free to sell in the global market. Again, in Clougherty and Zhang (2009), the impact of domestic rivalry occupies a central place in export decisions of a firm. In line with that spirit, this paper seeks to integrate the degree of competitiveness and the export prospect of a firm. Akin to the concept of domestic rivalry and the effect of innovation on export performance, we study the inter relationship between the nature of technology, degree of competition and firms' profitability from export.

Thirdly, Barua, Chakraborty and Hariprasad (2010) examine the inter-relationship among the entry to the domestic market, the level of competitiveness and the level of export in an oligopolistic market framework. They consider the conventional argument that, in the wake of economic liberalization, the entry of foreign firms in an oligopolistic industry reduces the domestic market power of the existing firms, thereby reducing the price-cost margins, fostering aggregate exports and improving consumer welfare. However, the price-cost margin also depends on the technology of the firm. An improvement in technology up to a certain threshold point is likely to cause higher profit margins. But the impact of technology is absent there. Similarly, Das and Pant (2006) focus on the impact of the new industrial policy in India on the competitive environment and productivity in the manufacturing sector. In the empirical exercise, they find that there is no significant entry of middle-sized firms in the wake of new industrial policies during 1989–2003. Nor is there any significant improvement in the profitability of firms. Yao and Mukherjee (2013) also discuss the issues relating to economic liberalisation, highlighting the significance of technology in an oligopolistic set up. These studies motivate us to take up India's post liberalization era (1995–2013) to discuss the issues of our interest. In contrast to the findings in Das and Pant, our exercise suggests that, in India's post-liberalization era, an increase in competition (treated as an endogenous variable) raises the export profitability of firms. The export incentive of firms is modelled here by taking into account firms enjoying 'profit with export' and those enjoying 'profit without export'. Moreover, the significant role of the nature of technology in determining profitability is prominently evolved in our paper. Our model thus provides an idea about the impact of increasing competition and advancement of technology on the prospect of export in developing countries, where a relatively low technology prevails.

We start with the first scenario that the domestic market is highly protected. In this market we assume first that advanced technology (i.e., represented by a lower value of 's') prevails among the domestic firms. If now the foreign firms can come up in the domestic market, the domestic firms can successfully compete with them. Under the pressure of competition (that is represented by higher value of n) it is expected that their efficiency level will go up, and hence, they will enjoy higher profitability in export as well. On the other hand, if low technology (i.e., represented by higher value of 's') prevails among the domestic firms in a protected domestic market, and if the foreign firms can enter into this market, the domestic industries cannot survive the foreign competition in the domestic market so that their total production level will fall. If, now, the domestic firms belong to the falling segment of the average cost curve, their average cost of production will be higher and their profitability in the export market will also fall (even if they sell the same amount in the global market as before). In contrast, if the domestic firms belong to the flat part of the average cost curve their cost of production will not change and hence their profitability will also remain unchanged. Thus, the curvature of the average cost curve at the point where the domestic firms presently belong would determine whether export profitability will fall or not. In other words, since the curvature of the average cost curve is determined by technology, the prevailing technology amongst the domestic firms would determine whether the export profitability will fall or not.