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Explaining export diversification through firm innovation decisions: The case of Brazil

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ABSTRACT

This paper investigates a largely unexplored dimension of export performance, firm level determinants of export diversification. We extend innovation studies and enrich the export literature by analyzing the role of firms' innovation and market strategies in explaining export diversification. To do so, we use a unique dataset that links data on exports, innovation and firms' characteristics at the firm level in Brazil. Our findings show that access to existing resources, as emphasized by existing innovation studies on emerging economies, cannot account for all the heterogeneity observed in firm's export diversification in Brazil. Innovative efforts and the strategic positioning of firms in the domestic market are crucially important in explaining diversification. These results emphasize the importance of distinguishing new from existing exports when investigating the dimensions that affect export performance.

1. Introduction

The importance of product and export diversification for economic growth and development is uncontroversial (see for example Imbs and Wacziarg, 2003; Klinger and Lederman, 2004; Aditya and Acharyya, 2013). A nascent literature concerned with the introduction of new exports at the country level (or "discoveries"), has highlighted the importance of reducing uncertainty, minimizing exchange rate volatility, and encouraging entrepreneurship and human capital development to facilitate export diversification (Hausmann et al., 2007; Agosin et al., 2012). Diversification, however, occurs at the firm level. It is at the firm level that decisions about the commitment of resources to introduce new products (new to the country or to the firm) for export are made. It is also mainly at the firm level that the risks and benefits of new exports, in terms of sales and potential monopoly rents, are taken and appropriated (Wakelin, 1998). This makes the firm the most suitable unit for analyzing the determinants of export diversification.

Existing studies of the firm level determinants of export performance – trade and innovation studies – have highlighted the importance of enhancing productivity and innovation efforts for successful entry to international markets (Cassiman and Golovko, 2011; Becker and Egger, 2007; Wakelin, 1998). One limitation of the existing studies, however, is that typically they do not distinguish between new and existing exports. Export performance is usually evaluated as the propensity to export existing products or to enter new export markets (see Estrada and Heijs, 2006 for a review). The first objective of this paper is to extend existing studies about innovation and trade by researching a rarely explored dimension of export performance: the propensity of firms to introduce new products for export – or export diversification at the firm level. To do so we incorporate insights from the business literature on diversification.

A second limitation of the existing research is the lack of conclusiveness about the role of innovation in supporting exports in firms from less advanced countries. In particular, for firms from these countries, quantitative studies have failed to provide clear evidence supporting the idea that exports follow unique technological assets and product innovations; in contrast with the evidence based on firms from advanced countries (see Cassiman and Golovko, 2011; Wakelin, 1998; Caldera, 2010). The argument is that this is because firms from less advanced countries compete internationally mainly based on the access to existing resources and not so much based on the innovative characteristics of their products (Alvarez, 2007; Özçelik and Taymaz, 2004). Recent evidence from case studies, however, suggests that some firms from emerging markets, are competing internationally based on both access

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to resources and unique innovations (Amann and Cantwell, 2012; Marin and Bell, 2012; Amann and Figueriedo, 2012; The Economist, 2010 The Economist, 2010). The second objective of this paper is to improve our understanding of the role that innovation plays in supporting export diversification of firms from less advanced countries.

One of the main distinctive features of our paper is our unique database. The empirical analysis uses a firm level dataset that links production, trade, and innovation data in Brazil. As a result, the paper also contributes to document the process of export diversification in Brazil, an emerging economy in a process a rapid transformation. Despite the fact that Brazil is one of the most diversified economies in Latin America, it still lags behind advanced economies and other emerging economies, such as China and Mexico regarding export diversification (Hummels and Klenow, 2005). Its export basket is heavily concentrated and dependent on natural resources (NRs). Nevertheless, Brazil has developed some highly competitive manufacturing sectors, which makes the country an interesting case study to test our research questions.

Previous research on export performance in Brazil's has documented the role of education, technology, and production scale (Arbache and de Negri, 2003), and cost leadership and differentiation (Aulakh et al., 2000) in explaining export growth and geographical diversification. Our analysis adds to the existing literature on export performance in Brazil in two dimensions; by examining the role of firm's level innovation and market strategies for exporting and product diversification, instead of geographical diversification.

Our analysis shows interesting results. First, we found that a significant share of exporters engages each year in the introduction of new products for export (25% in some years) and that they do so in most industries; including industries conventionally identified as high-tech and also as low-tech. More importantly, regarding the main determinants of firmís level export diversification, our empirical approach allowed identifying the importance of developing unique technological assets to support exports, in the case of firms from less advanced countries, a result that previous research, without distinguishing new from existing exports, failed to identify. It also allowed identifying the importance of the position of firms in the domestic market, as an important dimension in explaining differences in performance regarding export diversification.

These results suggest that existing research about innovation and trade might benefit from distinguishing increases in existing exports from increases in new exports as a measure of exports performance. Our study contributes to existing research about innovation and trade by providing a first step in this direction. We began to evaluate the potential importance of distinguishing new from existing exports, expand existing empirical models within the innovation literature to explore the determinants of new exports incorporating insights from the diversification literature, and explore the proposed exploratory model using a rich dataset from Brazil a developing country in expansion.

The paper is organized as follows. Section 2 surveys the existing literature and discusses our research questions and hypotheses. Section 3 discusses the dataset and methodology used. Section 4 describes some features of the pattern of export diversification in Brazil. Section 5 analyses the main determinants of firm export diversification in Brazil. The last section concludes.

2. The oretical background, objectives, and hypotheses

Our research is about firm level determinants of export diversification. Trade studies have been traditionally concerned with the determinants of export performance. They have, however, only very recently incorporated firm's heterogeneity in models of understanding of trade patterns and performance. In doing so, this literature has emphasized the role of structural characteristics of firms, such as size and productivity, in explaining exportsí performance; both at the intensive margin (same products) and extensive margin (new products) (Melitz, 2003).[1] One limitation of this literature, however, is that it treats productivity as exogenous to the firm; and just like the size of firms, it is considered a structural characteristic of the firm. The question of how firms achieve the productivity threshold that allows them to export tends to be left out of the models (Cassiman and Martinez-Ros, 2007).

Innovation studies have more directly addressed the association between firms' decisions and performance, including export performance (Vernon, 1966; Cassiman and Martinez-Ros, 2007). Vernon (1966) was one of the first authors to directly link innovation to exports, in his product-cycle model. He suggested that exports typically follow firm's product innovations when the domestic market is saturated, in a process which usually starts in advanced countries where markets can pay a premium for innovation. Based on Vernon's product cycle model, numerous studies have theoretically and empirically explored the association between innovation and exports; supporting in general the prediction of the product-cycle model that product innovation is a driving force for the exports of firms from advanced countries (Cassiman and Golovko, 2011; Wakelin, 1998; Caldera, 2010; Lachenmaier and Wößmann, 2006; Bernard and Jensen, 1999; Becker and Egger, 2013; Nassimbeni, 2001).

One important limitation of this literature, however, is that this typically has not distinguished between new exports and existing exports (i.e., export performance is usually evaluated as the propensity to export existing products or to enter new export markets)[2] (Estrada and Heijs, 2006). The first objective of this paper is to extend existing studies about innovation and trade performance by researching the propensity of firms to introduce new products for exports (or export diversification at the firm level). We are interested in understanding the extent to which the same firm level efforts that have been found important in explaining export performance in general, are important also for export diversification. We are also interested in the identification of efforts and behaviors that are particularly significant for export diversification. To explore this second issue we incorporate some insights deriving from the business literature which has addressed issues of firm's diversification.

The more important point made by the business literature in relation to the determinants of diversification, following Penroseí ideas (Penrose, 1959; Teece, 1980, 1982), is similar to the one made by the innovation literature: firms diversify to exploit resources in excess difficult to trade, typically brand name and technological resources. Based on this idea, thus, numerous studies have identified a positive link between diversification and technological resources and marketing' efforts – including patents, product innovations, and efforts in R&D and marketing (Montgomery and Hariha-ran, 1991; Dierickx et al., 1989; Teece et al., 1997; Hargadon and Sutton, 2000; Duarte et al., 2007).[3]

The business literature on diversification, however, has emphasized also two other important dimensions for diversification. First, it has emphasized the importance of the strategic position of firms

[1] Other empirical studies include (Roberts and Tybout, 1997; Isgut, 2001; Cassiman et al., 2010).

[2] Out of 46 studies explored by Estrada and Heijs (2006), none uses the introduction of new to the firm exports as the measure of exports performance.

[3] In both cases, it has been argued that there could be a problem of endogeneity, between innovation and exports and innovation and diversification, however, empirical evidence is rather unanimous in supporting causality going from innovation to exports (see Cassiman and Golovko, 2011, Becker and Egger, 2013 and from innovation to diversification (Rodríguez-Duarte et al., 2007).