DYNAMICS OF PRODUCT DIVERSIFICATION AND VALUE CHAIN UPGRADING

(Extended Abstract)

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Firms use different strategies in order to survive in the market. Usually, we rely on measures such as sales growth, productivity or size to study firm performance and describe its evolution. However, performance is only the final result of a process of adaptation of firms to new conditions. One intermediate step in that process is to enter into new markets and go out of those that are no longer profitable. When a firm changes the set of products that offers to the market, it might be specializing or diversifying its activities. A different product mix can put a firm in a different position in the value chain, if on average products in the new set are closer (or further) to the final consumer than products in the old one. These two dimensions of the firm, its degree of diversification and its average position in the value chain, can tell us a lot about the dynamics behind firm performance. In this paper we analyze the evolution of the firm according with those two characteristics to explain: how does the set of products produced at the firm level evolve? What is the strategy followed by firms when choosing a new market to diversify into? Do firms exploit previous capabilities? What is the relationship between patterns of firm diversification and firm upgrading in value chains?

Previous papers have explored the relationship between changes in the firms’ product mix and their probability of survival using export data for Latin America (Iacovone,L., 2008; Iacovone,L., & Javorcik,B. S., 2010, and Gutierrez-Rocha,M. et.al., 2013). They revealed a strong effect of having prior sale experience of a given product in the home-market on the firms’ probability of starting to export that product on the international market. They also showed how lacking such experience results in low firm survival rates after introducing the new product. This is also true when firms pioneering new markets do so with only little investments. Using production data, Bernard et al. (2006) and Navarro (2012) found that changes in firms’ product portfolio are an important driver of sales growth. Kugler and Verhoogen (2011) and Eaton et. al. (2008) revealed, using Colombian data, how large and highly productive firms are much more likely to diversify and change the portfolio of products that they export than small and less productive firms. However, none of the previous studies have measured production capabilities at the plant level and specifically analyzed the relationship between firms’ diversification, their capabilities and the upgrading process of firms’ position on the value chain. This works aims at filling this gap.
We use novel data on products manufactured in each of the ~7000 plants belonging to Colombian manufacturing firms between 1982 and 2013 to build a network of products based on relatedness. First, we measure the proximity between two products by computing how many times they are co-produced in the same plant. We then compare this quantity to what could be expected under a null hypothesis of random allocation of products to plants while preserving both the skewed distributions of plant and product size (as done by Bottazzi and Pirino, 2011). It is the first time that such normalized measure is computed at the plant level. This measure captures the extent to which products demand similar capabilities. Second, we design a new product proximity measure, which we call ‘Input-Output Relatedness (IOR)’. We exploit the information of materials demanded by each plant in our data, to create use tables for each year at the SITC 7 digits product level. Using the input and output coefficients coming from the use tables we calculate the IOR measure which is later normalized following Eck N. J. Van & Waltman L., 2009. This second measure captures the extent to which products belong to the same value chain.

Using the two product networks, we explain movements of firms over time between diverse groups of products. Special focus is put on the role of related diversification. We measure Product Density (as in Hausmann and Klinger; 2007) and use it to test the hypothesis that firms preferentially diversify into related products. Finally the “average position” in value chain proposed by Fally, 2012 is used to study the evolution of value chain upgrading at the plant level. Use tables built at the product level are instrumental to understand and relate changes in the set of products at the firm level and movements along the value chain.

Preliminary results show an increasing importance of related diversification on the Colombian manufacturing industry on the last 20 years. An interesting relationship with value chain upgrading is revealed, being particularly strong on plants that produce very central products in the network. Input - output relatedness appear to be determinant to understand changes of location along the value chain in the future.