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Sourcing strategies and productivity: Evidence for Spanish manufacturing firms



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Abstract This paper explores the relationship between productivity and sourcing strategies using a sample of Spanish manufacturing firms. In this analysis we use different measures of productivity and alternative ways of grouping firms. Our results indicate that productivity differs systematically across groups of firms with different sourcing strategies. The ranking of productivities we observe is not fully consistent with the predictions of Antràs and Helpman's (2004) model but we confirm many partial aspects of the proposed ranking. In our preferred specifications, the productivity advantage is highest for firms that import inputs from foreign subsidiaries. Moreover, the group of firms that outsource in the domestic market is, in general, at the bottom of the productivity distribution, with firms that outsource abroad having an intermediate productivity advantage. When analysing the direction of causality between productivity and sourcing strategies, we find weak evidence of self-selection of firms into offshoring and no influence of relocation on firm productivity.

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Introduction

Foreign sourcing has grown in prominence in recent decades as a major international firm activity. Underlying this phenomenon is the growing fragmentation of production processes across firms and countries, which has led to

steadily increasing shares of intermediate inputs in total trade.

The choices faced by a firm which needs an intermediate input can be represented by four different sourcing options. First, the firm can decide to keep the process within its boundaries or to contract it externally to a non-related party. Second, the firm can decide to locate the process either in the domestic market or abroad. The combination of these choices yields four options. The intermediate input can be subcontracted at home (domestic outsourcing), subcontracted to an external supplier abroad (foreign outsourcing), integrated within the boundaries of the firm at home (domestic integration) and integrated abroad (foreign integration). This classification has been proposed by

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Feenstra (2010) and Helpman (2011), among many others, and extensively used to describe the sourcing strategies of firms at home and abroad.

Several theoretical models have been suggested to investigate the organizational choices of firms. An approach based on the theory of property rights to the firm with incomplete contracts has been proposed by Grossman and Helpman (2002), Antràs (2003) and Antràs and Helpman (2004) (see a recent review of this literature by Antràs, 2014). In this setting, companies make two endogenous organizational choices, an integration decision and a location decision, and the model shows how a firm's decisions to integrate or to outsource are a consequence of the level of firm technology. The prevalence of one way over the other to organize the production (integrate vs. outsource; outsource in the domestic market vs. outsource abroad) depends on the distribution of productivity across firms within an industry. A second approach, proposed by Grossman and Helpman (2004), who model input sourcing in a principal-agent framework, suggests a different relationship between organizational mode and productivity at the firm level.

There is an empirical literature using firm-level data that have explored the relationship between input sourcing and productivity. Our paper is related to this literature. Tomiura (2007) analyses the choices between foreign outsourcing and FDI for Japanese manufacturing firms. Choices of organizational form follow a productivity ordering which is consistent with Antràs and Helpman (2004). Most productive firms engage in FDI and less productive firms choose foreign outsourcing. Federico (2010) estimates sourcing premia for Italian manufacturing firms. There is a productivity ordering by which firms integrating abroad are the most productive ones, and domestic outsourcing firms are the least productive ones. However, in contrast to the assumptions of Antràs and Helpman's (2004) model, foreign outsourcing firms are less productive than firms that integrate at home. Kohler and Smolka (2011) estimate the productivity premia for every organizational form relative to domestic outsourcing for a sample of Spanish manufacturing firms. The productivity advantage is highest for firms that import inputs from foreign subsidiaries and lowest for firms outsourcing at home. The productivity difference between firms that integrate at home and firms performing outsourcing abroad are not statistically significant. Defever and Toubal (2013) examine French multinationals. They find that the least productive firms are multinationals that produce their intermediate inputs in foreign subsidiaries while the most productive outsource abroad.

This paper explores the relationship between a firm's sourcing decisions and productivity. This issue is addressed empirically using a sample of Spanish manufacturing firms. Our dataset provides detailed firm-level information based on a survey where firms report how they acquire intermediate inputs in each of the four theoretical modes. A second characteristic of the dataset is that the information the firm provides refers to intermediate inputs that are acquired within a bilateral relationship that implies specific investments in such a way that the goods and services produced are tailored to the needs of the firm. Therefore, our measure of sourcing does not refer to a simple purchase of intermediate inputs consisting of raw materials and standardized

goods. It rather refers to inputs that are produced within a "subcontracting" relationship. The third characteristic of the dataset used is that it is an unbalanced panel of firms from 1990 to 2005. This structure allows us to observe the transition firms make between different sourcing strategies. For example, we are able to observe cohorts of firms establishing a stable relationship with a foreign supplier (offshoring) for the first time.

The paper contributes to the literature, first, by providing a number of stylized facts related to the heterogeneity of sourcing decisions by Spanish manufacturing firms. Second, we estimate productivity premia for groups of firms with different sourcing strategies. The estimation of productivity premia permits us to check whether they conform to the sorting of productivities predicted by models of global sourcing. We pay particular attention to the predictions of Grossman and Helpman (2004) and Antràs and Helpman (2004). Third, the pattern of correlation between firm productivity and sourcing decisions does not imply any kind of causality running from sourcing to the productivity level of the firm. However, the panel-structure of our dataset permits us to perform some basic descriptive regressions that can be interpreted in terms of alternative hypotheses concerning the direction of causality between sourcing strategies and firm productivity. In particular, we test for the selection hypothesis (i.e., whether firms self-select into their sourcing strategy as the theoretical models suggests) and for the relocation hypothesis (i.e., firms' decisions to relocate some stages of their production process to external suppliers result in a positive impact on the productivity level of these firms).

The paper is organized as follows. Section 'Theoretical framework and related literature' provides a review of the main characteristics of the theoretical literature of global sourcing. Section 'Data and descriptive evidence' describes the characteristics of the data set used in the analysis and presents some basic descriptive evidence on the magnitude and evolution of sourcing. Section 'Sourcing strategies and the pattern of firm productivities' introduces the empirical approach, presents the sorting of productivities across groups of firms with different patterns in their sourcing activity and offers some robustness checks of the main results. Section 'Offshoring and firm productivity: selection vs. relocation' takes firms with different transition patterns in their sourcing strategies as a reference to test for two alternative hypotheses of the superior performance of offshoring (foreign integration and/or foreign outsourcing). Finally, Section 'Conclusions' summarizes the main conclusions.

Theoretical framework and related literature

To organize our empirical work, this section briefly summarizes the predictions of theories on the choice between integration and outsourcing.

Most models of global sourcing assume the existence of two forms of organizational choice: vertical integration, or the provision of inputs within the boundaries of the firm, and outsourcing or provision through an independent supplier. There is a basic trade-off between integration and outsourcing. Integration has the advantage of a greater control over

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