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Measuring productivity premia with many modes of internationalization

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HIGHLIGHTS

- We study how to estimate productivity premia for internationalization modes.
- This requires information compression when firms can choose from many modes.
- We compare different approaches of information compression.
- We illustrate these options by using survey data on 9541 European companies.
- We advice researchers to choose from these methods consciously and check robustness.

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ABSTRACT

We show that estimating productivity premia for internationalization modes requires information compression when firms can choose from many modes. Using a unique database of European firms we illustrate the different approaches and suggest that researchers should deliberately choose from them.

1. Introduction

Export and FDI premia, the extent to which the productivity of trading firms is larger than that of their non-trading counterparts, play a key role in understanding firm-level self-selection and learning in international trade.[1]

In most datasets, only one or two internationalization modes are identified (typically: export and FDI), in which case the calculation of premia is straightforward. Recent literature, however, has found that internationalization mode choice is more continuous and complex than simply choosing from two alternatives.[2] Indeed, firms may export directly or indirectly, may set up a service affiliate or production facilities in the foreign market. Furthermore, they can combine different modes: by, for example, establishing a service affiliate which helps them in direct exporting.

In this paper we will argue that the presence of many single or combined modes enables researchers to answer new questions but also raises new challenges. We will show that the sheer number of combinations necessitates some kind of information compression or classification across modes. We will demonstrate that some

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[1] See Helpman et al. (2004); Das et al. (2007) or Ahn et al. (2011).

[2] On flexibility, see Kim and Hwang (1992), on the economics of complex internationalization strategies of multinational firms, see Yeaple (2003) or Grossman et al. (2005).

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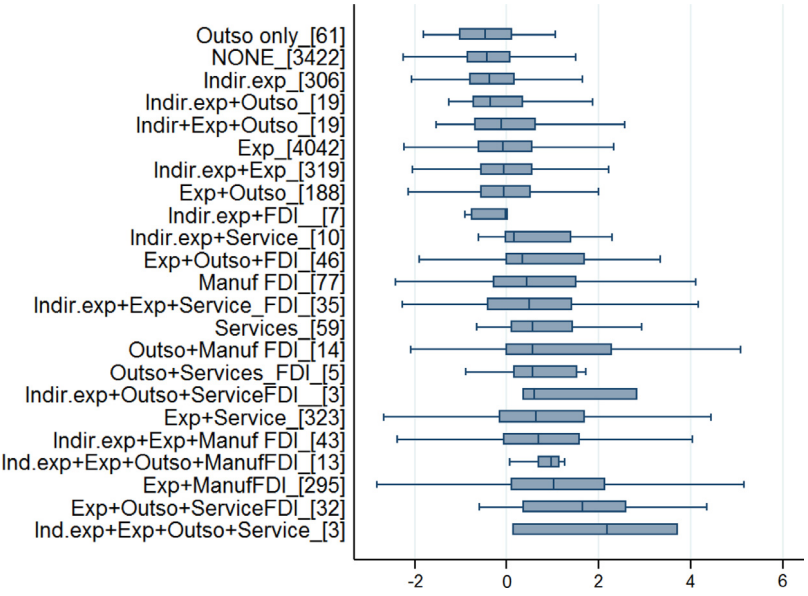

Fig. 1. Distribution of TFP by internationalization modes [#observations]. Notes: *Indir.exp*: indirect export, *Exp*: direct export, *outso*: outsourced manufacturing, *Service*: Services FDI, *ManufFDI*: Manufacturing FDI.

aggregation approaches used in practice may generate spurious sorting hence it is important to choose the method consciously and test the robustness of the results.

2. Data

We will discuss these questions by relying on the unique firm-level survey from seven European countries, EFIGE (European Firms in a Global Economy), which directly asked managers whether the firm was engaged in internationalization, such as (1) indirect export, (2) direct export, (3) outsourced manufacturing in the foreign market, (4) service FDI affiliates and (5) manufacturing FDI affiliates.

Indirect exporters are those selling goods or services "through an intermediary based in home country". Manufacturing FDI affiliates are firms who "run at least part of their production activity in another country directly". A firm was considered using outsourced (or contract) manufacturing abroad when it runs "at least part of its production activity in another country via contracts and arm's length agreements with local firms". Finally, service FDI is defined as firms who have any foreign affiliates but have no manufacturing FDI. Hence, Manufacturing FDI firms may also have service affiliates but service FDI firms reported no foreign production.

In the sample, we have 9341 firms with financial information. As an illustration, we will use total factor productivity (TFP) as the variable of interest, demeaned at industry and country level.[3] Fig. 1 shows the prevalence of different trade modes and their many combinations. Throughout this paper we will call the five stand-alone modes *single modes*, while their combinations will be referred to as *combined modes*.

In terms of substantive questions, we will focus on two illustrative examples. First, outsourced manufacturing raises interesting theoretical questions about the boundaries of the firm and, hence, the premium associated with it is of great interest. However, it is hard to dissect its premium since outsourced manufacturing is rarely done alone: 82% of firms engaged in it also conduct other modes (Fig. 1). Second, combined modes in general are of interest. Do they reflect complementarity or mechanical combinations?

The measurement problem is also illustrated by Fig. 1. First, there are simply too many combinations – 5 single and 18 combined modes in our sample – for meaningful interpretation. Second, under realistic sample sizes, the inevitably small number of observations in some of these modes generates large confidence intervals. Both of these issues suggest the need for information compression.[4]

3. Information compression methods and results

In all of the exercises, we will estimate an OLS regression, $y_i = \alpha + \beta X_i + \varepsilon_i$, where y_i is demeaned TFP, and X_i is a set of dummies representing different classes of trade modes.

In our benchmarkapproach [1] (presented in Columns 1–5 of Table 1), the regression simply compares the group of firms conducting each of the single modes with non-traders. Such statistics are often reported as descriptive evidence. In this approach, the combined mode premia are attributed to all of the contained single modes; the premium of outsourced manufacturing (6.9%), for example, partly includes the export or FDI premium.

Approach [2] is to add, either explicitly or implicitly, an additional structure, most frequently that of additivity, i.e. that the premia of the combined modes is the sum of the single modes. Empirically, this means including dummies for each of the single modes, which is illustrated in Column 6 of Table 1. Importantly, the premia of indirect exporting and outsourced manufacturing becomes insignificant when controlling for export and FDI.

The additivity assumption is quite restrictive indeed even in simple self-selection frameworks when firms supply multiple countries or sell multiple products. Consider two markets and two modes: export and FDI. If there is no complementarity, the most productive firm will enter both markets with FDI (so one observes FDI at the firm level), while a somewhat less productive firm may enter with FDI to one and will export to the other. In an alternative framework, export and FDI may complement each

[3] The EFIGE dataset was merged with balance sheet data from BvD Amadeus. TFP was estimated by fixed effects panel regression using the whole economy data available in Amadeus dataset for the seven countries in EFIGE. Results are robust to the Wooldridge (2009) method. For details, see Békés and Muraközy (2015).

[4] See Toimura (2007).