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Foreign direct investment in services and manufacturing productivity: Evidence for Chile[☆]

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ABSTRACT

This paper examines the impact of substantial foreign direct investment (FDI) inflows in producer service sectors on the total factor productivity (TFP) of Chilean manufacturing firms. Positive effects are obtained in firm fixed effects instrumental variables regressions and show that forward linkages from FDI in services explain 7% of the observed increase in Chile's manufacturing users' TFP. Our findings also suggest that service FDI fosters innovation activities in manufacturing. Moreover, we show that service FDI offers opportunities for laggard firms to catch up with industry leaders.

1. Introduction

Foreign direct investment (FDI) inflows into the service sector experienced a boom during the 1990s. By 2002, services accounted for 60% of the world stock of FDI, a four-fold increase since 1990 (UNCTAD, 2004). In developed and developing countries alike, the main recipients of FDI have been profit-seeking producer services which range from network-intensive services such as electricity, telecommunications, and transport to finance and business services. These sectors are characterized by the facilitating and intermediating role which they play for downstream user firms (Francois, 1990). Thus, producer service sectors are an intricate component of a country's business environment. In emerging economies where manufacturing firms are constrained by cumbersome business environments, it is particularly relevant to understand how the performance of service sectors can be improved and how that supports business development and, thus, overall economic growth. FDI is a potentially powerful means to achieve such improvements as it might increase the quality and variety of services available as well as lower their cost. Manufacturing firms may benefit from their interaction with foreign services suppliers through spillovers of management, organizational, marketing, or technological knowledge (Markusen, 1989; Rivera-Batiz and Rivera-Batiz, 1992).

Despite the relevance of this topic, the effects of vertical linkages resulting from the openness of producer services to FDI on downstream manufacturing firms have not been widely documented (Hoekman, 2006). This paper attempts to fill this gap by addressing the following question: did the increased penetration of FDI into producer service sectors in Chile benefit total factor productivity (TFP) of manufacturing firms between 1995 and 2004? Chile is an interesting economy to study

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as its service sector received large FDI inflows during the 1990s. We show that foreign-owned service firms perform better in terms of labor productivity and innovation than their domestic counterparts. The fact that this finding refers also to greenfield FDI – i.e., it is not simply foreign investors cherry-picking the best-performing domestic service firms – suggests these firms introduced superior standards in the Chilean services sector, thus potentially offering improved services for manufacturing firm users.

Evaluating the causal impact of service FDI on manufacturing firm TFP is challenging due to several valid endogeneity concerns discussed below. Our strategy to identify that impact is to estimate by instrumental variables (IV) a regression of firm TFP on a service FDI linkage measure controlling for firm fixed effects as well as industry-year and region-year fixed effects. Our study uses TFP measures obtained as residuals from production functions estimated following the methodologies of Levinsohn and Petrin (2003), Olley and Pakes (1996), and Ackerberg et al. (2006) to correct for the endogeneity of input choices – including the choice of service inputs – with respect to productivity. Our service FDI linkage measure is defined as service FDI penetration weighted by firm-level intensity of service usage. The rationale underlying this novel measure is the expectation that firms that use services more intensively benefit more from any positive effects of service FDI. Our measure of service usage intensity is based on historic values for each firm following Blalock and Gertler (2009) to avoid the potential endogeneity between firm TFP and service intensity. Our choice of instrumental variables estimation addresses another potential endogeneity concern related to fact that large FDI inflows into Chilean service sectors may have responded to the strong performance of the downstream manufacturing users. Service FDI penetration weighted by the historic firm-level intensity of service usage is instrumented using values of the outward FDI stocks in service sectors of the two major foreign investors in Chile – Spain and the U.S. – weighted similarly. The identification assumption is that while increases in total FDI outflows into service sectors by those two countries affect service FDI penetration in Chilean service sectors, they are not correlated with the TFP of manufacturing firms in the country through any other channel.

We find evidence of a positive and significant effect of service FDI on Chilean manufacturing firms' TFP. This effect is robust to the control for differential productivity trends across plants with different services intensity and to allowing the effects of service FDI to operate with lags. Alternative measures of service usage weights and service FDI penetration, including the use of industry-level weights from an input–output table, confirm our main findings. The positive and significant effect of service FDI is also obtained when considering a one-stage regression where output depends on inputs as well as the service FDI linkage measure. We also provide suggestive evidence supporting the hypothesis that service FDI stimulates innovation by Chilean manufacturing firms. Moreover, interestingly, we find that service FDI offers an opportunity for laggard firms to catch up in terms of TFP with industry leaders. From a policy perspective, this finding is particularly relevant since it suggests that the benefits from service liberalization do not accrue mostly to leading firms but seem to offer opportunities for firms that are further behind.

Our estimates suggest that a one-standard deviation increase in service FDI would lead to an increase in TFP of Chilean firms by 3%, all else constant. The economic magnitude of this impact is that forward linkages from FDI in services accounted for at least 7% of the observed increase in manufacturing users' TFP in Chile during the sample period. This economic impact is quite meaningful in light of the finding by Haskel et al. (2007) that horizontal spillovers from manufacturing FDI explain a roughly similar share of manufacturing TFP growth in the U.K. during the 1973–1992 period. The positive effects of service FDI on manufacturing firms' TFP may capture to some extent an unmeasured decline in quality-adjusted services prices but also the spillover of managerial and organizational knowledge from service providers to manufacturing users.

The microeconomic evidence provided by our study contributes to the emerging literature on the impact of services liberalization on growth and the performance of services users. At the macro level, Eschenbach and Hoekman (2006) and Mattoo et al. (2006) show that countries with liberalized service sectors grow faster, once all standard growth correlates are controlled for. Based on computable general equilibrium models, Jensen et al. (2007) and Konan and Maskus (2006) argue that business services liberalization could bring large GDP gains to Tunisia and Russia, respectively.[1] The main mechanism for these gains is the increase in the number of services available for manufacturing users as a result of FDI.[2] At the industry level, Francois and Woerz (2008) show that the increased openness of business services through exports and FDI has strong positive effects on exports, value added, and employment of manufacturing industries in the OECD while Fernandes (2009) estimates positive and significant effects of liberalization of finance and infrastructure on labor productivity of downstream manufacturing industries in Eastern European countries. At the firm-level, Arnold et al. (2007) show significant positive effects of services liberalization in the Czech Republic on manufacturing firms' TFP while Arnold et al. (2010) find significant positive effects of banking, telecommunications, and transport reforms on Indian manufacturing firms' TFP. Finally, Javorcik and Li (2008) estimate a positive effect of FDI in Romania's retail sector on the TFP of manufacturing suppliers to that sector.[3]

Relative to the existing literature, the contribution of our study is three-fold. First, we exploit the heterogeneity in service usage by considering firm-level measures of the intensity of service usage. Evidence on the usage of services shows considerable heterogeneity across Chilean firms which suggests that the practice followed in all the aforementioned studies of using industry-level usage measures based on input–output tables may be inappropriate. The advantage of our measures is that they enable us to identify the intensive service users within each industry. Second, we follow a rigorous empirical approach by relying on firm fixed effects IV estimation to identify the causal effects of services FDI on TFP. Hence our specifications exploit the within-firm variation in TFP in response to instrumented changes in the service FDI linkage measure. Third, we go beyond previous studies by exploring the nature of the effects of service FDI allowing for heterogeneity across industries relating to their potential for innovation. We also focus on heterogeneous effects across firms relating to their distance to technologically advanced firms.

The remainder of the paper proceeds as follows. Section 2 describes recent trends in FDI in services in Chile and the effects of FDI in services. Section 3 describes the data. Section 4 describes our empirical specification. Section 5 discusses our main results and robustness checks. Section 6 discusses extensions to our main results. Section 7 concludes.

2. FDI in services: trends and effects

2.1. Trends in FDI in services in Chile

Over the last three decades, liberalization, privatization, and deregulation reforms in Chile opened its economy to trade and

[1] Markusen et al. (2005) also show important GDP gains from services liberalization based on general equilibrium simulations for a hypothetical country. In their model, the presence of foreign-owned service providers allows final goods producers to rely on more specialized expertise.

[2] This increase in the number of services increases the TFP of manufacturing firms through a Dixit-Stiglitz-Ethier framework (Dixit and Stiglitz, 1977; Ethier, 1982).

[3] By considering the potential role of knowledge spillovers from service providers to manufacturing users, our study also relates to the literature on vertical spillovers from manufacturing FDI, which are shown to be more important than horizontal spillovers by Blalock and Gertler (2008), Damijan et al. (2008), Javorcik (2004), Kugler (2006), and Marcin (2008). A rationale provided in this literature for vertical forward linkages is that foreign suppliers provide assistance and complementary services to local buyers.