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Intra- and Inter-industry Externalities from Foreign Direct Investment in the Mexican Manufacturing Sector: New Evidence from Mexican Regions

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Summary. — This paper presents new empirical evidence on externalities from Foreign Direct Investment (FDI) in several Mexican regions in the early 1990s. The main findings are threefold. First, the presence of FDI creates negative externalities within industries and positive externalities between industries through backward linkages. Second, FDI-externalities are stimulated by large technological differences between FDI and Mexican firms and by geographic concentration of industries. Third, we identify a substantial level of regional heterogeneity of the externality impact of FDI, in line with the notion that FDI may have contributed to processes of changing regional prosperity under trade liberalization. The findings also imply that maquiladora firms in the border states are generating positive externalities.
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Key words — FDI, maquiladora, externalities, technology gap, geographic concentration, Mexico, Latin America

1. INTRODUCTION

Recent research on the impact from Foreign Direct Investment (FDI) is exploring avenues to improve the statistical identification of FDI spillovers. One development is to broaden the scope of the estimations, by controlling for the full industry dimension of these externalities. The recognition of the importance of this dimension translates into distinguishing between intra- and inter-industry FDI externalities (e.g., Blalock & Gertler, 2008; Driffield, Munday, & Roberts, 2004; Smarzynska, 2004).

A second development is that empirical studies are focusing on identifying structural factors that influence the occurrence and the nature of FDI externalities (Blomström & Kokko, 2003; Crespo & Fontoura, 2007). Two factors appear to be commonly accepted as potential determinants. The first factor is the concept of absorptive capacity, which proposes that only those domestic firms or industries in a host economy that possess sufficient technological knowledge and skills are able to absorb new technologies from foreign-owned firms. The second factor is the extent to which FDI and domestic firms are located in geographic proximity. In line with evidence that proximity between economic agents may foster the creation and the transmission of knowledge spillovers (Audretsch & Feldman, 2004), the hypothesis that FDI spillovers are facilitated by such proximity between FDI and domestic firms is easily put forward.

The purpose of this paper is to build and extend on these recent developments in empirical research on FDI externalities. Using unpublished and thus far unexplored regional data from the 1994 Mexican manufacturing census, we estimate FDI spillovers in detailed manufac-

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turing industries for a number of regional economies in the Republic of Mexico. The main contribution of our analysis is threefold.

First, building on previous empirical findings on FDI externalities among national Mexican manufacturing industries, we present improved evidence of FDI spillovers in regional manufacturing industries. Importantly, in our analysis we are able to distinguish between intra-industry externalities and externalities that arise through backward linkages between FDI and Mexican suppliers, a distinction that is missing in previous research on FDI spillovers in Mexico.

Second, we present new evidence on the effects on FDI spillovers of the technology gap between FDI and Mexican firms and the level of agglomeration of industries. Although geographic concentration is increasingly seen as a potentially important determinant of FDI externalities (Barba Navaretti & Venables, 2005), corroborating empirical evidence remains limited. Furthermore, as a recent paper by Crescenzi, Rodriguez-Pose, and Storper (2007) clearly shows, the effect of proximity on externalities may be place and context specific. In their analysis of innovation dynamics, Crescenzi *et al.*'s findings indicate that whereas proximity is essential for the diffusion of knowledge in the United States, this is much less so in the European Union. Our analysis addresses this issue of proximity by providing new evidence on the relation between agglomeration of industries and FDI externalities.

As for the effect of the technology gap, the issue is of a different nature. The notion that the level of absorptive capacity in a host economy is important for positive FDI spillovers is straightforward (Blomström & Kokko, 2003). The problem here lies with the use of technological differences between FDI and domestic firms as proxy for the level of absorptive capacity of domestic firms, as it only partly captures the underlying notion of technology catch up (Jordaan, 2005). The catch up thesis consists of two elements. The first element is the existence of technological differences between advanced and lagging countries, indicating the scope of potential externalities to arise (Abramovitz, 1986; Gershenkron, 1962). The second element is the level of absorptive capacity of the lagging countries to absorb new technologies (Griffith, Redding, & van Reenen, 2003; Keller, 1996). Using the technology gap as an indicator of absorptive capacity therefore only relates to the second element of this catch up thesis.

This imperfect relation between the technology gap and the catch up thesis generates several interpretational problems. Although a small technology gap may indicate that domestic firms possess sufficient absorptive capacity, it also indicates that the scope of potential externalities is limited. In contrast, large technological differences can stimulate externalities, as "...the greater the backlog of available opportunities to exploit, the greater the pressure for change..." (Findlay, 1978, p. 2). Furthermore, a limited scope of potential externalities does not offer incentives to domestic firms to make externality-facilitating investments, making it less likely that externalities will occur (Rodrik, 1992). [1] In addition, one could argue that limited technological differences may lead to intensified competition between FDI and domestic firms, which may promote the occurrence of negative externalities (Aitken & Harrison, 1999). In sum, these arguments point at the possibility that instead of expecting a positive effect from a small technology gap, positive FDI spillovers may be stimulated in those cases where technological differences between FDI and domestic firms are large. Our analysis will present new evidence on this issue, thereby contributing to this important debate. [2]

Our third contribution is that we explicitly examine whether the externality impact from FDI differs between regions. Following the introduction of trade liberalization in Mexico from the mid 1980s onwards, the Mexican economy underwent significant structural changes. Trade liberalization led to drastic changes in relative regional prosperity: the border states experienced marked economic growth, in contrast to Mexico City which experienced its heydays in the 1970s under import substitution (Chiquiar, 2005; Faber, 2007; Hanson, 1998; Rodriguez-Pose & Sanchez-Reaza, 2002). Interestingly, the role of FDI spillovers in these structural spatial changes has been largely ignored. Our analysis makes a modest contribution in this respect, by assessing whether and how regional heterogeneity of the externality impact of FDI may have contributed to these changes.

The remainder of the paper is constructed as follows. In Section 2, we discuss structural spatial changes in the Mexican economy under trade liberalization, focusing on changes in regional employment shares and on the volume, type, and regional destination of inward FDI. One of the main findings of this section is that FDI has concentrated in those regions that have been most affected by the introduction

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