The distributional effects of NAFTA in Mexico: Evidence from a panel of municipalities ☆

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ABSTRACT

This paper studies the regional distribution of benefits from trade in Mexico after the North American Free Trade Agreement (NAFTA). Specifically, we ask whether or not NAFTA increased the concentration of economic activity in Mexico. Unlike previous work which uses state-level data, we identify the effect of NAFTA on economic activity at the municipal level allowing us to observe detailed growth patterns across space. To explicitly identify the effect of the trade agreement, we contrast changes in economic activity in regions and sectors more and less likely to be affected by trade. Given the spatial nature of these data, we make use of spatial panel econometric methods. We find that NAFTA caused wealthy regions nearest to the border to grow faster than others, increasing regional disparity. We also find that economic activity in densely populated regions grew less quickly after NAFTA, particularly in the case of traded sectors. Thus, we see evidence that agglomeration lost some of its draw after NAFTA. We also find that regions with a smaller portion of high school graduates and lower levels of infrastructure saw their growth increase after the trade agreement, decreasing regional disparity. We notice these redistributive effects are strongest in the non-traded sectors.

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1. Introduction

Trade not only affects the overall economic growth in a country, it also affects the location of that economic activity (Behrens et al., 2007; Krugman, 1991; Hanson, 1998a). Particularly for a country with great geographical disparity such as Mexico, the distributional effects of trade may be at least as important as the overall effect. The North American Free Trade Agreement (NAFTA) was expected to primarily benefit the wealthier northern states of Mexico due to their proximity to the U.S. market. Standard trade theory might predict that given Mexico's relative abundance of low-skilled labor, poorer regions with large pools of unskilled labor might benefit more from the trade agreement. In this paper, we study the distributional effects of NAFTA throughout Mexico. Specifically, we ask whether NAFTA increased the concentration of economic activity in Mexico.

Mexico has one of the highest rates of income inequality in the world, and there are concerns that NAFTA has made it worse (OECD, 2008). For example, Robertson (2000) and Chiquiar (2008) find that international trade has primarily increased wages in northern states. A recent World Bank report argues that NAFTA did not benefit the poorer South due to insufficient infrastructure, social instability and governance (Esquivel et al., 2002). With a few exceptions, there is little empirical work looking at whether NAFTA made regional disparity worse or better, and what there is produces mixed results (Aroca et al., 2005; Krugman and Livas-Elizondo, 1996; Hanson, 2001; Rodríguez-Pose and Sánchez-Reaza, 2005). Since NAFTA was one of the early bilateral trade agreements to link a developing country to a large developed economy, its effects may shed light on the other bilateral trade agreements currently under negotiation. Further, understanding what characteristics limited a region's ability to benefit from trade might facilitate the development

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of programs to give regions better access to the new export market, or, at a minimum, might allow for targeted compensation.

The few empirical studies that have explicitly analyzed the geographic effect of NAFTA on economic activity in Mexico are limited in that they use state-level data. State-level data mask the spatial distribution of economic activity and severely restrict the number of observations. We believe this paper offers the following four contributions. First, we use municipal panel data to identify the relationship between trade and regional patterns of growth. The use of spatial panel data increases the number of observations as well as our ability to observe geographic patterns. Second, by separating economic activity into traded and non-traded goods, we can better identify the specific effect of trade. Third, we include the latest economic census (2004) to observe longer-term effects of NAFTA. Last, we explicitly control for the spatial nature of our data, and use newly-developed spatial panel data methods (Kapoor et al., 2007; Piras, 2011).[1]

We find that NAFTA has increased the regional concentration of economic activity in Mexico. The output of regions near the border grows faster than those regions further from the United States after NAFTA, even when these border regions already had high levels of economic activity before the trade agreement. Second, we find that the benefits of NAFTA went disproportionately to less densely populated regions. This effect is particularly notable in the Mexico City region. Thus, within regions, we see some redistributive effects of NAFTA. Further, as might be predicted by a standard Heckscher-Ohlin model, we find that regions with lower rates of high-skilled labor benefit more from NAFTA. Similarly, regions with lower levels of infrastructure began to grow more quickly after NAFTA, implying a redistributive effect of these economic changes.

To determine whether we can truly attribute these changes to NAFTA as opposed to other temporal effects, we split the data by region and by sector. We observe that the traded sectors, manufacturing and wholesale/retail, are affected most strongly by the pull of the border after NAFTA. For the non-traded sector, services, we see a tendency to redistribute activity further away from the United States. Additionally, unlike the other sectors, we observe more economic growth in the service sector in those municipalities with lower literacy rates after NAFTA. While overall we find that growth of the Mexican economy decelerated after NAFTA, the traded sectors fared better in terms of economic levels and growth rates after the trade agreement than the non-traded sectors.

As expected, we find substantial spatial correlation in the level of municipal economic activity and their economic growth rates.

In the next section, we look at the regional distribution of economic activity before and after NAFTA. Next, we review the trade literature and New Economic Geography that suggest which factors might affect this distribution. A presentation of our empirical model follows along with a description of the estimation technique and data. Results and conclusions end the paper.

2. Regional distribution of economic activity in Mexico

Overall, Mexico has grown rich. Its $1.578 trillion economy is the world's eleventh-largest, up from fifteenth place 15 years ago. Trade volume has nearly tripled since the NAFTA, from $52 billion to $161 billion in 2003, placing Mexico ahead of Britain, South Korea and Spain as a trading power (Smith and Lindbland, 2003; Jordan and Sullivan, 2003). Over the same time, the number of poor in Mexico has increased.[2] Over half (54%) of the Mexican population is

poor, and this proportion is unchanged since the early 1980s. Given the increase in population from 70 to 100 million over the same period, 16 million more Mexicans are living in poverty than 20 years ago. More worrying, about 24 million people, nearly one in every four Mexicans, are classified as extremely poor and unable to afford adequate food (Jordan and Sullivan, 2003). Income inequality and poverty levels in Mexico remain the highest across the OECD. These poverty and income inequality levels are one and a half times higher than in a typical OECD country and twice as high as in low-inequality countries, such as Denmark (OECD, 2008). Furthermore, most of those who are extremely poor live in rural areas. As a result between 400 and 600 people a day are packing up and migrating to cities or to the United States (Jordan and Sullivan, 2003). The situation is even more dire for those families who are not easily mobile, and the increasing income disparity has arguably led to social unrest (de Palma, 1996).

Economic output varies sharply by region. Following Chiquiar (2008), we begin by dividing Mexico into 4 regions i) the Border Region, being states that border the United States; ii) the Center; iv) the capital (Mexico City and surroundings); and v) the South (see Fig. 1). Fig. 2 shows the Gross Value Added (GVA) in real pesos by region. In the first year, GVA in Mexico City is higher than in the other regions, with the border states and the south lagging behind. However, we see growth slowing in Mexico City after NAFTA, while other regions continue to expand.

The growth of GVA before and after NAFTA is illustrated in Fig. 3. The map showing growth from 1980 to 85 (panel a) illustrates that a larger number of regionally-diverse municipalities grew more than 100% before NAFTA. By contrast, in 1998 to 2003, high growth is more concentrated in clusters along the US-Mexico Border (panel b). Some of the clusters that can be seen in the post-NAFTA map are Chihuahua, Saltillo, and Monterrey. One can clearly identify the areas of low growth in the south and more rapid growth in the north. Note that these maps also indicate that growth is by no means homogenous within a state. Therefore, considering these data by municipality allows us to more accurately discern the patterns of economic activity.

3. The location of economic activity after trade

In this paper, we ask: What is the distributional effect of NAFTA on Mexico? In particular, we are interested in whether NAFTA afforded poor regions economic opportunities, or whether the benefits are concentrated in those regions where economic growth was already robust. First, we review what standard trade theory may imply for regional distribution of gains from trade. Second, we review the New Economic Geography (NEG), and its predictions about the location of economic activity, particularly after trade. We then use these theories to develop several hypotheses about how NAFTA may have changed the location of economic activity in Mexico.

3.1. Standard trade theory

Standard trade theory can be used to predict which groups may benefit from trade. As long as inputs are not completely mobile across regions, those regions with a greater endowment of inputs used in export production will presumably gain more from trade than those regions who are endowed with inputs that most efficiently produce import-substituting products. The standard Hecksher–Ohlin–Samuleson (H–O–S) model predicts that if Mexico has an abundant supply of unskilled labor relative to its trading partners, the United States and Canada, then it will export goods that are 'unskilled-labor intensive'. The Stopler Samuelson theorem would further predict that as the relative price of 'unskilled-labor intensive' goods increases in Mexico, unskilled labor in Mexico will benefit from higher wages resulting from this increase in demand for their services. This

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[1] See Baltagi et al. (2007) for a similar application to FDI.
[2] Jordan and Sullivan (2003) define poor as those individuals unable to meet basic needs.