Does trade liberalization affect labor market churning?

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May, 2009

Abstract

The trade literature on heterogeneous firms emphasizes the importance of intra-industry reallocation in response to trade liberalization. The theory, also supported by empirical evidence, indicates that more productive firms select into export markets and less productive firms exit with reductions in trade restrictions. This adjustment within the product market suggests that labor market churning will also result, as firms expand or contract their labor forces to reflect the new market structure. Using establishment-level data on employment and wages in the US and detailed trade and tariff data, we examine the effects of changes in trade policy due to the North American Free Trade Agreement (NAFTA) on labor market churning. We exploit variation in tariff rates over commodities and time for identification. According to our preliminary results, indicators of trade openness significantly contribute to labor churning within industries most affected by NAFTA, including the automotive, chemicals, and apparel industries. While results are only suggestive so far, they demonstrate that further probing is worthwhile and necessary.

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†The views expressed in this paper do not necessarily reflect the official positions or policies of the BLS or the views of other BLS staff members. Any remaining errors are the authors' only.

1 Introduction

The trade literature on heterogeneous firms finds that international trade can affect inter-firm reallocations within an industry (Melitz, 2003). Empirical evidence suggests that greater trade openness causes more productive firms to select into export markets, while less productive firms exit (Bernard and Jensen, 1999; Aw, Chung, and Roberts, 2000). This movement in the industry suggests that labor market churning will also result from trade liberalization, as firms expand or contract their labor forces to reflect the new market structure. This issue warrants further attention since labor reallocation plays a key role in determining the welfare implications of trade policy. However, little has been done to find a direct link between trade liberalization and labor market churning.

In this paper, we draw upon an establishment-level longitudinal dataset of employment and wages in the United States (US) to investigate this link between trade liberalization and labor market churning. This dataset allows us to address the labor market implications of Melitz's heterogeneous firm model, where trade liberalization is followed by intra-industry inter-firm reallocations. Specifically, we can examine this question within the context of the North American Free Trade Agreement (NAFTA), which is the second largest preferential trade agreement in the world.

NAFTA came into effect on January 1, 1994 and superseded the previous Canada-US Free Trade Agreement (CUSFTA). Many tariffs were eliminated immediately, while others had been phased out over periods of 5-15 years. For example, the average US tariffs on motor vehicles dropped 2.5% in 1994, while US tariffs on Mexican light trucks were cut from 25% to 10% initially and then were completely eliminated by 1998 (Villareal, 2002). Likewise, Mexican tariffs on motor vehicles and parts were reduced by half in 1999 and completely phased out by 2003 (Villareal, 2002). The agreement also includes provisions governing the regulation of investment, transportation, and financial services, for example (Hufbauer and Schott, 1993). Since NAFTA came into effect, Mexico has become the second largest trading partner of the US, just behind Canada (USITC). Similarly, Canada's share of US imports

has increased since CUSFTA implementation (Romalis, 2007).

We exploit the variation in tariff rates over commodities and time to identify the effect of trade liberalization on labor churning within an industry. Our very preliminary work begins by looking at the impact of NAFTA on the top industries by trade volume. These industries include the two most highly impacted industries – the apparel and automotive industries.[1] Results show that indicators of trade liberalization significantly contribute to labor churning within industries most affected by NAFTA, such as the automotive, chemicals, and apparel industries. These results are only suggestive, but they demonstrate that further probing is necessary.

We face some difficulty in distinguishing the effects of NAFTA from other macroeconomic events that occurred during the same time period. In the 1990's, Villareal (2002) points out that the US underwent an expansion period. To address this issue, we use a difference-in-differences approach, grouping U.S. states in terms of export volume to Canada and Mexico, to see how NAFTA differentially affected within-industry churning in states with high versus low export volumes. The recession in Canada between 1989 and 1991 and the peso devaluation that occurred from late 1994 to 1995 present additional potential issues. Since we have data for a long time period, we can also follow Frías et al. (2009) and compare estimates for the peso crisis period to analogous estimates for periods before and after the crisis period. In essence, we are proposing a difference-in-difference-in-differences approach to isolating the effects of NAFTA. Contingent upon obtaining access to additional establishment-level employment data from countries such as the United Kingdom, France, South Korea, and Japan, we hope to better address this issue by using synthetic control methods (i.e. Abadie et al., 2007). The idea is to use a weighted combination of regions as a comparison for the treated group in analyzing policy interventions.

This paper is most related to Haltiwanger et al. (2004), which analyzes the extent to which trade liberalization increases the pace of within industry job reallocation for a

[1]These two industries were found to be the most highly impacted industires by the Congressional Research Service based on percentage change in trade patterns and the number of workers applying for the NAFTA Transitional Adjustment Assistance (NAFTA-TAA) program (Villareal, 2002).

set of Latin American countries. They use unique harmonized statistics on job flows by sector, country, and year constructed from plant-level manufacturing surveys. They exploit country, year, and sectoral variation in tariff and exchange rate data to identify the response of job flows to increase competition from trade liberalization. They find that reductions in tariffs and exchanges rates do indeed lead to increases in the pace of job reallocation within an industry, and may be associated with costs including net employment growth. While Haltiwanger et al. (2004) relies in part on cross-country variation, we abstract from country specific institutional issues and instead exploit the variation in tariffs across commodities within a sector. Moreover, trade liberalization across Latin American countries has taken on different forms. We focus our analysis on the particular form of trade liberalization as specified in the NAFTA agreement. In addition, unlike Haltiwanger et al. (2004), we are able to carry out our analysis at the establishment level and control for establishment characteristics such as firm size, which papers such as Frías et al. (2009) use to proxy for productivity.

Levinsohn (1999) also looks at the effect of trade liberalization on job turnover, but within the context of Chilean unilateral liberalization. The study finds that firm size and trade orientation matters when looking at patterns of job creation and destruction. However, the magnitude of the macroeconomic shocks experienced in Chile during the same period overwhelmed any differential results from trade liberalization, and thus the study was unable to find any employment effects as a direct result of trade liberalization. As described above, our econometric methods can difference out the effects of macroeconomic shocks so that we can link employment patterns to the conditions of NAFTA.

Recent single country studies of Argentina, Brazil, and Uruguay highlight the relationship between trade liberalization and intra-industry reallocation. Sanchez and Butler (2004) find that trade liberalization and labor market reforms in Argentina have led to the displacement of inefficient firms by more efficient entrants. Furthermore, they find that this reallocation has been accompanied by intensified job churning. However, their analysis was done at the sectoral level. Casacuberta et al. (2002) and Ribeiro et al. (2002) both use establishment

level data to examine the effect of trade liberalization on labor market churning in Uruguay and Brazil, respectively, but they find conflicting results. Casacuberta et al. (2002) finds that increased openness to trade results in higher gross flows of labor. Ribeiro et al. (2002) concludes that tariffs in Brazil have no effect on job or worker flows. The discrepancy may stem from the fact that these two papers suffer from severe data limitations in their ability to follow establishments over time.

The rest of the paper proceeds as follows. The next section briefly discusses the theory motivating our empirical investigation. Section 3 describes the data and is followed by a description of our econometric strategy in Section 4. Section 5 presents our preliminary results. Section 6 concludes.

2 Theoretical Motivations

Although the main contribution of this paper is empirical, we provide theoretical motivations for our empirical specification. The underlying framework that we consider is Melitz's (2003) model of heterogeneous firms under monopolistic competition and perfectly competitive labor markets.[2] Firms have the same production technology, but differ in their intrinsic productivity, based on a draw from a distribution. Each firm receives a draw after paying a fixed entry cost. Plants with productivity draws that are too low exit immediately. The remaining firms in the market sort themselves based on their productivity draws. The firms with the highest productivity draw pay another fixed cost and enter the export market. Trade liberalization lowers the productivity cutoff values at which a firm exits the entire market and increases the productivity level requirement for a firm to enter the export market.[3] This sorting of firms and resulting product market churning illustrates the importance

[2]Traditional trade models assume perfectly competitive product and labor markets with homogeneous firms and predict intersectoral factor reallocation when trade barriers are removed. The Ricardian model predicts that resources reallocate to sectors with comparative advantage, while the Hecksher-Ohlin model predicts that resources reallocate to the sectors intensive in the relatively abundant factor.

[3]The Eaton and Kortum (2002) model with heterogeneous firms in a perfectly competitive environment leads to a similar result. Firms receive an idiosyncratic shock as consumers search worldwide for the lowest priced products. Trade induces productivity enhancing reallocations within industries.

of also considering the implications of trade liberalization on labor market churning.

Numerous extensions relaxing the assumption of perfectly competitive labor markets have been introduced. One such extension marries the heterogeneous firms model with an efficiency wage model in order to examine how labor markets adjust to product market churning. In this extension by Davis and Harrigan (2007), firms imperfectly observe worker effort and pay efficiency wages to discourage shirking. There is involuntary unemployment that is little affected by trade liberalization. At the same time, trade liberalization leads to tremendous churning in the labor market, especially for the firms at the bottom of the productivity distribution where they exit altogether, or in the middle of the distribution, where the firms enter the export market. Simulations show that this churning results in substantial job losses of "bad" jobs paying below average wages and also job losses of "good" jobs of up to 25%.

Helpman, Itskhoki, and Redding (2008) propose an alternative model based on Melitz (2003) that incorporates search and screening frictions. As before, firms are heterogeneous in terms of productivity, while workers are heterogeneous in terms of unobserved ability. Each firm pays a search cost to match with a worker and a screening cost to determine a worker's ability relative to some cut-off value. Firms then sort along two dimensions – worker and firm productivity. More productive firms screen for a higher ability and hire a smaller fraction of sampled workers than less productive firms. Since these higher productivity firms in the export market screen workers more, it becomes more costly to replace them. On the other hand, a move from autarky to trade results in higher unemployment, since lower productivity firms exit the market and these higher productivity firms are more selective about which workers they hire. On the other hand still, trade liberalization has a non-monotonic relationship with unemployment as less productive firms with lesser screening begin to enter the export market.

While unemployment is not the focus of this study, these extensions seem to imply that higher productivity firms tend to experience less labor market churning. Given that we have data on the size and average quarterly wage of each establishment we may be able to directly

address the distinction between churning of good jobs versus bad jobs.

3 Data

Our preliminary work is based on data for the top ten industries by trade volume with Canada and Mexico using the North American Industry Classification System (NAICS) four-digit codes.[4] Descriptions of each NAICS four-digit category are provided in Appendix A. A summary of the data is shown in Table 1.

3.1 Employment and Wages Data

Employment and wages data are taken from the Quarterly Census of Employment and Wages (QCEW) of the US Bureau of Labor Statistics (BLS). Data is available from 1990 to the present for a near census of establishments, or plants, at the NAICS six-digit industry level.[5] The BLS defines an establishment as an economic unit, such as a farm, mine, factory, or store and typically at a single location and engaged in one, or predominantly one, industry. An establishment can be part of a larger firm, though it could also be the case that an establishment is the entire firm.

Prior to 1991, employers were allowed to submit a summary for multiple establishments within a county, if the establishments were in the same industry. Beginning in 1991, the QCEW has collected data at the establishment level whenever possible. While the reporting unit is usually an individual establishment, it has not always been possible to collect data at this level. Sometimes, a firm may choose to combine multiple establishments as a reporting unit. For this reason, each observation should be considered as a reporting unit rather than an establishment. In the data, reporting units are delineated by an identification number.

These reporting units may decide to split their reporting into multiple reporting units, or alternatively it may be the case that an establishment was split into multiple establishments

[4]We chose, for our top ten, the NAICS codes that appeared most often, when ranking NAICS for each year from 1997 to 2008.

[5]The QCEW includes all workers covered by State unemployment insurance (UI) programs or the Unemployment Compensation for Federal Employees program.

and sold to another firm. In the data, we observe when one observation splits into multiple observations. However, we do not know whether the split should be attributed to the former or the latter reason. Thus, we take a more conservative approach to this "breakout" and assume that a change in ownership did not occur, as we would like to avoid overestimating the amount of labor market churning in the economy. More specifically, we base our quarter to quarter changes on the employment of the larger reporting unit at the time of the breakout.

Likewise, multiple reporting units may decide to report as a single unit, or multiple establishments may consolidate into a single establishment. In the case of a "consolidation", we calculate quarter to quarter employment changes based on the employment levels of the smaller units in the base period.

Table 2 gives a count of unique establishments involved in breakouts and consolidations in each industry. In total, 4% of the establishments experience some sort of breakout or consolidation. These events may even occur multiple times for these establishments.

Some reporting units are involved in a complicated series of breakouts and consolidations that involve up to over 100 reporting units. In these cases, quarter to quarter links need to be investigated on an individual basis in order to disentangle the complications that result from a change in the QCEW's firm-identification numbering system. For now, we exclude these cases until we have the time to do this analysis. Nearly 0.4% of the observations are excluded for this reason.[6] Table 3 shows the number of observations that we exclude by NAICS code for this reason.

We also exclude observations that relate to the entry and exit of reporting units into the data. These reporting units are only excluded in the quarter of entry or exit, eliminating cases where employment is zero in one quarter.

Employment data is available monthly and represent the number of workers covered under the UI program, who worked during, or received pay for, the pay period including the 12th of the month. Since QCEW data is processed quarterly, the most consistent reporting of employment is the data from the 3rd month of the quarter, so we use this measure to

[6]Note that an establishment may be excluded in multiple quarters.

represent monthly employment. The unemployment will help take into account cyclical effects on changes in labor over time.

Wages represent total compensation paid during the quarter at the establishment level, regardless of when services were performed. Compensation includes wages, as well as pay for vacation and other paid leave, bonuses, stock options, tips, the cash value of meals and lodging, and in some States, contributions to deferred compensation plans (such as 401(k) plans). We use this data to calculate average monthly wage at each reporting unit. We think it is important to control for wage differences between firms, as it may proxy for some firm level differences that might affect changes in labor.

3.2 Tariff and Trade Data

Tariff data for the US is based on tariff schedules from the United States International Trade Commission. Data is available on their website for the years beginning in 1997 to the present. A compilation of the tariff data for years 1989-2001 is available from Feenstra, Romalis, and Schott (2002). US tariffs are set at the HS eight-digit commodity level.

Tariff data for Canada and Mexico are available for most years from the World Bank World Integrated Trade Solution (WITS) database. Data for Canada is available for years 1989, 1993, 1996-2007, while data for Mexico is available for years 1991, 1995, 1997-2006. For the years where the data is unavailable, we use the last levels for which the data were available.

Ad valorem equivalent rates are calculated for specific tariffs by dividing the specific tariff by the price of the commodity (Stawowy, 2001). The world import unit value price is used as a proxy for the price when import data is available. Since the employment data is defined at the NAICS six-digit level, the data is aggregated from the HS eight-digit level to the NAICS six-digit level by taking trade-weighted averages using concordance tables of Feenstra, Romalis, and Schott (2002). For US tariffs, we weight by imports, while for Mexico and Canada tariffs we weight by exports, since import data from Mexico and Canada are not available at a fine enough level of disaggregation.

As argued by Romalis (2007), there are several limitations to using tariff schedules in calculating tariffs, especially with respect to NAFTA. For one, there exist "production sharing" provisions that exclude maquiladoras from having to pay duties on any US sourced content of any exports to the US. Similarly, Mexico does not collect any duty on some intermediate inputs that are destined to be exported. Thus, in this case, tariff schedules overstate NAFTA preferences. Furthermore, some goods only qualify for tariff preferences if they satisfy some rules of origin restrictions.

To address these limitations, we follow Romalis (2007) and calculate US tariffs using actual import duties collected when trade is observed. Then we supplement with data from tariff schedules when data on duties collected is not available. For Canada and Mexico, we are still looking for a source of data on import duties.

Trade data for 1989-2006 is also made available by Feenstra, Romalis, and Schott (2002). Data on US imports are collected under two methods – general imports that come off the dock or imports for consumption which include imports coming from foreign trade zones and withdrawals from warehouses for consumption. Data on US exports are also collected under two methods – domestic exports, which excludes the value of re-exports and total exports, which represents both domestic and foreign exports. As suggested in Feenstra, Romalis, and Schott (2002), we use the general imports and domestic exports measures for our analysis.

We calculate trade volume (equal to imports plus exports) as a share of world trade volume to capture the general level of trade openness at the NAICS six-digit level.

3.3 Other Variables

Wage data are deflated using regional Consumer Price Indices from the BLS. The regions we use are Northeast, South, Midwest, and West.

Unemployment data at the state level is available from the Local Area Unemployment Statistics office at the BLS. The concepts and definitions underlying this data come from the Current Population Survey (CPS). State monthly model estimates are based on historical and current relationships found within each state's economy as reflected in the CPS, the

Current Employment Statistics survey, and the UI system.

Previous work by Davis, Haltiwanger, and Schuh (1996) and Levinsohn (1999) looks at how job creation and destruction varies with employer size in the manufacturing sector. Given that they find firm size affects job creation and destruction rates, we think it is important to include in our regressions indicators for firm size as well. In this study, firm size indicators are based on employment data found in the QCEW.

For our difference-in-differences strategy, we obtain state export data from the US Census Bureau to group states. Data is available at the four-digit NAICS level for each state. We rank states according to total export data for the earliest year available (2002) to determine our groupings.

4 Econometric Strategy

We are interested in analyzing the effect of tariff rates and non-tariff barriers to trade on job turnover within an industry. Since establishment size varies greatly in our data, we choose to use a measure introduced by Davis and Haltiwanger (1992) that takes this into account and also accommodates both entry and exit. Specifically, the measure we use for change in employment at time t for establishment i is the following:

$$\gamma_{it} = \frac{x_{it} - x_{it-1}}{(x_{it} + x_{it-1})/2}$$

This growth rate measure offers advantages over measures of log changes and growth rates, which are calculated based only on employment in the previous period. It also yields a measure that is symmetric about zero and bounded.

The explanatory variable of most interest to this study is a measure of trade openness between the United States and either Mexico or Canada. We compare two different measures that give some indication of trade openness between each country. The first measure that we use are the bilateral ad valorem equivalent tariff rates between each country. The other

measure we use is the level of bilateral trade volumes, which captures the effective level of openness between two countries including the effect of tariffs and non-tariff barriers.

We estimate an Ordinary Least Squares (OLS) regression, controlling for the region, size and the real average wage of each establishment. Year dummies are also included to control for time trends in employment changes, and quarterly unemployment by state is added to account for cyclical effects.

We start by pooling the quarterly establishment level data by industry from 1990 to 2006. In the first specification, we include US tariff on imports from Canada and the tariff that Canada charges on imports from the US. We run the analogous regression for Mexico. Then, in the second specification, we use the share of total US trade volume for each country. We estimate both models for each four-digit NAICS code under consideration. All specifications include the controls described above.

We also use a difference-in-differences approach to look at how the changes provided in NAFTA affect the labor market within an industry. The primary reason for this alternative method is to try and distinguish between effects of NAFTA and other coinciding macroeconomic events during that same period. We choose to use observations from 1991-1992 as this coincides with the beginning of the period of expansion in the US, while also avoiding the period of time just prior to the implementation of NAFTA. We use 2004-2005, allowing ten years to pass after NAFTA implementation, so that most of the tariff reductions are already in place.

In order to difference out the effect of US expansion during the 1990's, we group U.S. states in terms of export volume to Canada and Mexico, to see how NAFTA differentially affected within-industry churning in states with high versus low export volumes. This requires defining two groups: a treatment/experimental group and a control group. We classify states that have high export volumes to Mexico/Canada as our "treatment "group, since we might expect NAFTA policy to have a greater effect on their behavior.[7] Remaining states will

[7]We classified the states based on export volume to Canada and Mexico in 2002. We decided to use the top eight states in trade volume for each classification, since eight states account for roughly half the export volume to Canada. The states that are in the Canada treatment group are: MI, OH, CA, TX, NY, IL, IN,

comprise our "control"group, as they will be subject to the same policies, yet the policies should not alter their labor market behavior.

We can write the absolute growth in labor for a generic establishment in either group as

$$\gamma = \beta_0 + \beta_1 dT + \beta_2 X + \delta_0 d2 + \delta_1 dT d2 + \varepsilon$$

where γ is the change in labor described above, X is a vector of firm characteristics and $d2$ is a dummy variable for the second period. The variable dT is a dummy variable that captures possible differences between the treatment and control groups prior to the introduction of NAFTA. The time period dummy, $d2$, captures aggregate factors that would cause changes in labor, even in the absence of any policy change. The coefficient of interest here is δ_1, which multiplies the interaction term, which is the equivalent of a dummy variable that equals one for observations that are from "treatment"states in the second period.

Subtracting the average gain in the control group from the average gain in the treatment group removes biases in later period comparisons between the treatment and control groups that could result from permanent differences between these groups. Biases from comparisons over time in the treatment group that could be the result of trends are also removed. The assumption of this strategy is that changes over time in the behavior of establishments, that are unrelated over time to the differences in exports to Mexico/Canada, are common to establishments that exist in these two different types of states. While this is a strong assumption, we will conduct tests to assess the validity of this assumption.

The difference-in-differences estimate is

$$\widehat{\delta_1} = (\bar{\gamma}_{T,2} - \bar{\gamma}_{T,1}) - (\bar{\gamma}_{C,2} - \bar{\gamma}_{C,1})$$

where T represents the treatment group and C represents the control group. The estimate can be made robust to different group/time period variances by estimating δ_1 in a regression

and PA. The states that are in the Mexico treatment group are: TX, CA, MI, AZ, OH, IL, IN, and NY. We are considering alternate ways of defining the "treatment ", perhaps dividing by the state's GDP to account for differences in state size.

framework rather than simply using group averages.

The recession in Canada between 1989 and 1991 and the peso devaluation that occurred from late 1994 to 1995 present additional potential issues. Since we have data for a long time period, we can follow Frías et al. (2009) and a pursue a difference-in-difference-in-differences approach. To isolate the effects of NAFTA from these events, we compare estimates for the peso crisis period (and likewise with the period of recession in Canada for the Canada analysis) to analogous estimates for periods before and after the crisis period.

5 Preliminary Results

We have two sets of regressions. In all of these regressions, our dependent variable is the absolute value of our constructed measure of employment growth discussed above. We use the absolute value, because we are more interested in the amount of labor churning within a NAICS industry, and thus we do not distinguish between whether this change in employment is positive or negative. The first subsection discusses our OLS regression results. We have two specifications using two different measures of trade openness. The second subsection discusses the results from our difference-in-differences analysis.

5.1 Ordinary Least Squares Regressions

The results from our OLS regressions are shown in Table 4 and Table 5 for Canada and Mexico, respectively. In our first specification, we include two measures of tariffs: the ad valorem equivalent US tariff rate on imports from Canada or Mexico, which is based on import duties collected and tariff schedule data, and the ad valorem equivalent tariff rate that either Canada or Mexico charges on imports from the US, which is solely based on tariff schedule data. It is necessary to note that the tariff data from Canada and Mexico are incomplete, particularly so for Mexican data. Therefore, the results should be interpreted with this note in mind. For this reason, we prefer the results from our second regressions, where we use the share of total US trade volume for both countries to proxy for the direct

rates.

We find that lower tariff rates seem to increase the amount of labor movement within a four-digit industry class for most NAICS codes in our group of top ten. In six NAICS classifications, the effect of US tariff rates on imports from Canada is negative and significant at the 1% level (see Table 4).[8] In industries where the change in US tariffs is negligible, labor churning is unaffected (e.g. these industries include Motor Vehicle Manufacturing (3361) and Aerospace Product and Parts Manufacturing (3364)).

The tariff rates that Canada imposes on imports from the US have a similar effect. In four NAICS industries, there is a negative effect of higher tariff rates on changes in labor, and this effect is significant at the 1% level.[9] There is also a negative effect in Artificial Synthetic Fibers and Filaments Manufacturing (3252), but this effect is only significant at the 10% level.

The second specification yields quite similar results to the first. Here, we use the share of total US trade volume as the trade measure of interest. It is positive and significant in four industries, which supports the theory that greater openness is positively related to more reallocation, which is positively related to more job churning.[10] However, it is also negative and significant at the 1% level in four industries, which suggests that the theory might not hold for certain kinds of industries.[11]

For Mexico, the results from the first regression are similar to that of Canada's (see Table 5). The effect of US tariffs is significant in six NAICS industries.[12] In the cases of

[8]These industries are: Oil and Gas Extraction (2111); Pulp, Paper, and Paperboard Mills (3221); Basic Chemical Manufacturing (3251); Agriculture, Construction, and Mining Machinery Manufacturing (3331); Motor Vehicle Parts Manufacturing (3363); and Plastics Product Manufacturing (3261).

[9]These industries are: Basic Chemical Manufacturing (3251); Other General Purpose Machinery Manufacturing (3339); Motor Vehicle Manufacturing (3361); and Plastics Product Manufacturing (3261).

[10]These industries are: Oil and Gas Extraction (2111) at the 5% level; Pulp, Paper, and Paperboard Mills (3221), Agriculture, Construction, and Mining Machinery Manufacturing (3331), and Other General Purpose Machinery Manufacturing (3339) at the 1% level.

[11]These industries are: Basic Chemical Manufacturing (3251), Artificial Synthetic Fibers and Filaments Manufacturing (3252), Aerospace Product and Parts Manufacturing (3364), and Plastics Product Manufacturing (3261).

[12]These industries are Oil and Gas Extraction (2111) and Basic Chemical Manufacturing (3251) at the 10% level; Communications Equipment Manufacturing (3342) at the 5% level; and Computer and Peripheral Equipment Manufacturing (3341); Navigational, Measuring, Electromedical, and Control Instruments Manufacturing (3345); and Electrical Equipment Manufacturing (3353) at the 1% level.

Oil and Gas Extraction (2111) and Electrical Equipment Manufacturing (3353), the effect is negative, as the Melitz model would imply. On the other hand, in four of the six cases, the effect is positive.

The measure of Mexican tariff rates on US imports, as mentioned above, is fairly unreliable. In five industries, the data are missing. The measure is only significant in Basic Chemical Manufacturing (3251), where the effect is positive and significant at the 5% level and also in industry Computer and Peripheral Equipment Manufacturing (3341), where the effect is negative and significant at the 10% level.

We believe that the results from the second specification for Mexico are an improvement over the first specification, since we currently have incomplete tariff data for Mexico. We expect better results when using Mexico's share of total US trade volume instead of the tariff measures.

As expected, we have stronger results in this specification that are largely consistent with the results of the first specification. In seven NAICS industries, the share of total US trade volume is significant at the 1% level. In Computer and Peripheral Equipment Manufacturing (3341) and Electrical Equipment Manufacturing (3353), the effect is positive. In five industries, the effect is negative.[13] The competing results suggest that the next step is to spend some time exploring why trade openness might have opposing effects in different industries.

5.2 Difference-in-Differences Specification

In our Difference-in-Differences regression, we use observations from 1991-1992 and 2004-2005 and run separate regressions for each NAICS code and country. These results are shown in Table 6.

The new variables of interest are an indicator for whether the observation is from the later period, an indicator for whether the firm is from a state that we deem to trade heavily

[13]These industries are: Basic Chemical Manufacturing (3251), Communications Equipment Manufacturing (3342), Semiconductor and Other Electronic Component Manufacturing (3344), Navigational, Measuring, Electromedical, and Control Instruments Manufacturing (3345), and Motor Vehicle Manufacturing (3361).

with either Canada or Mexico, and an interaction of these two terms.

The "post" coefficient indicates that in most of the industries we look at, observations from 2004-2005 have less labor movement. The coefficient on the "post" term is negative and significant in eight NAICS classifications.[14] Being in the "treatment" group has a significant effect in six NAICS industries. The interaction term is negative and significant in six of the NAICS codes: Oil and Gas Extraction (2111), Basic Chemical Manufacturing (3251), Artificial Synthetic Fibers and Filaments Manufacturing (3252), Plastics Product Manufacturing (3261), and Aerospace Product and Parts Manufacturing (3364). This indicates that in these industries, states that traded more intensively with Canada had less labor churning after NAFTA relative to other states.

Table 6 presents the results for Mexico as well. Again, the "post" coefficient indicates that observations from 2004-2005 tend to have less labor movement. The coefficient of the "post" term is negative and significant in eight NAICS classifications.[15] Being in the "treatment" group has a positive and significant effect in three NAICS industries: Oil and Gas Extraction (2111), Communications Equipment Manufacturing (3342), and Motor Vehicle Manufacturing (3361). This implies that in these industries, trading more with Mexico corresponds with more labor churning. The interaction term is negative and significant at the 1% level in four of the NAICS codes.[16] The effect is negative and significant at the 5% level in Semiconductor and Other Electronic Component Manufacturing (3344). These results indicate that NAFTA implementation corresponds to decreases in labor churning in states that trade more with Mexico.

[14]The exceptions being 3251 and 3361.

[15]These industries are: Oil and Gas Extraction (2111), Computer and Peripheral Equipment Manufacturing (3341), Communications Equipment Manufacturing (3342), Audio and Video Equipment Manufacturing (3343), Semiconductor and Other Electronic Component Manufacturing (3344), Navigational, Measuring, Electromedical, and Control Instruments Manufacturing (3345), Electrical Equipment Manufacturing (3353), and Other Electrical Equipment and Component Manufacturing (3359).

[16]These industries include: Oil and Gas Extraction (2111), Basic Chemical Manufacturing (3251), Communications Equipment Manufacturing (3342), and Motor Vehicle Manufacturing (3361).

6 Conclusion

Does trade liberalization affect labor market churning? The theoretical trade literature on heterogeneous firms suggests that increased labor market churning will result from trade liberalization, as more productive firms expand into the export market and the least productive firms exit the market altogether. We use establishment-level data on employment and wages in the US and detailed trade and tariff data that are rich enough to examine this question within the context of NAFTA. We exploit the variation in tariff rates over commodities and time for identification.

Our preliminary results suggest that tariffs and non-trade barriers significantly affect labor market churning in the majority of the industries most affected by introduction of NAFTA. Interestingly, these tariffs and non-trade barriers increased churning in some industries, but reduced churning in others. This issue warrants further investigation to determine why certain industries behaved differently when faced with a new tariff regime. We also employed a difference-in-differences methodology to approach the question from a different perspective. Using this approach, we find that the introduction of NAFTA significantly reduced churning in 6 of 10 industries that traded most with Canada, and in 4 industries that traded most with Mexico. We found no evidence of increased churning in this framework.

Further work investigating the direct link between trade liberalization and labor market churning would be interesting to pursue. We plan to use a difference-in-difference-in-differences approach to tease out the effect of NAFTA from other macroeconomic events. Since the magnitude of tariff effects may depend on the size of the trading partners within the preferential trade agreement, plans for future work include comparing NAFTA and an agreement with smaller members, such as the Dominican Republic - Central America Free Trade Agreement.

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Table 1: **Descriptive Statistics**

NAICS (N)	**Abs. Change** Labor	**Firm Size**	**Real Avg. Wage**	**US Tariff on Imports**		**Tariff Rate on US in 1000s**		**Volume Share in 1000s**	
				Canada	**Mexico**	**Canada**	**Mexico**	**Canada**	**Mexico**
2111 (536,143)	0.092 (0.212)	18.742 (108.463)	9,791.038 (20,904.473)	0.000 (0.001)	0.003 (0.003)	0.114 (0.237)	0.000 (0.000)	0.224 (0.043)	0.114 (0.011)
3221 (56,622)	0.089 (0.204)	232.011 (415.919)	10,276.721 (30,712.412)	0.002 (0.005)	0.000 (0.001)	0.626 (1.193)	0.000 (0.000)	0.490 (0.157)	0.071 (0.039)
3251 (165,402)	0.089 (0.195)	80.144 (231.621)	10,806.943 (15,247.7)	0.004 (0.016)	0.008 (0.025)	3.207 (3.476)	0.086 (0.272)	0.199 (0.09)	0.067 (0.023)
3252 (82,494)	0.102 (0.203)	112.177 (352.873)	9,857.772 (28,613.462)	0.005 (0.012)	0.006 (0.022)	3.001 (2.507)	0.062 (0.267)	0.282 (0.063)	0.115 (0.037)
3261 (837,820)	0.131 (0.209)	54.827 (102.851)	6067.345 (7,765.451)	0.012 (0.016)	0.006 (0.008)	3.734 (3.838)	0.232 (0.235)	0.292 (0.106)	0.174 (0.062)
3331 (230,885)	0.137 (0.218)	63.287 (277.172)	6,673.328 (6,964.522)	0.001 (0.003)	0.001 (0.003)	1.515 (1.206)	0.014 (0.058)	0.172 (0.094)	0.057 (0.025)
3339 (476,155)	0.117 (0.201)	46.691 (115.99)	7,541.177 (19,612.953)	0.002 (0.006)	0.002 (0.004)	1.767 (2.576)	0.152 (0.648)	0.206 (0.065)	0.071 (0.03)
3341 (125,454)	0.132 (0.238)	139.472 (607.442)	11,805.386 (34,475.463)	0.001 (0.002)	0.003 (0.007)	0.682 (1.393)	0.055 (0.110)	0.094 (0.047)	0.081 (0.056)
3342 (161,593)	0.124 (0.22)	91.573 (381.029)	10,393.13 (46,148.686)	0.005 (0.009)	0.004 (0.007)	1.245 (2.877)	0.111 (0.140)	0.114 (0.050)	0.148 (0.065)
3343 (43,997)	0.129 (0.221)	75.521 (244.391)	7,415.022 (8,308.74)	0.007 (0.008)	0.009 (0.013)	1.131 (0.704)	0.089 (0.086)	0.037 (0.007)	0.248 (0.033)
3344 (416,738)	0.128 (0.214)	90.399 (409.798)	8,347.179 (21,564.389)	0.003 (0.007)	0.004 (0.011)	2.796 (6.073)	0.000 (0.000)	0.148 (0.125)	0.144 (0.102)
3345 (453,579)	0.106 (0.201)	74.489 (300.328)	9,187.928 (20,075.742)	0.004 (0.006)	0.007 (0.028)	0.53 (1.277)	0.012 (0.106)	0.135 (0.068)	0.132 (0.127)
3353 (198,198)	0.113 (0.202)	70.585 (178.343)	7,779.621 (38,091.581)	0.005 (0.008)	0.005 (0.007)	1.743 (2.100)	0.000 (0.000)	0.151 (0.0220)	0.298 (0.077)
3359 (151,788)	0.115 (0.208)	76.125 (183.383)	7,689.518 (10,852.238)	0.006 (0.012)	0.008 (0.017)	2.212 (3.398)	0.000 (0.000)	0.164 (0.057)	0.222 (0.115)
3361 (27,873)	0.136 (0.25)	641.534 (1,440.737)	10,301.846 (19,109.886)	0.000 (0.000)	0.011 (0.031)	5.551 (3.357)	0.000 (0.000)	0.461 (0.152)	0.130 (0.088)
3363 (426,790)	0.12 (0.206)	121.413 (360.489)	6,573.055 (44,318.566)	0.001 (0.002)	0.006 (0.011)	1.331 (2.677)	0.000 (0.002)	0.394 (0.16)	0.264 (0.173)
3364 (180,055)	0.115 (0.203)	199.386 (1,203.267)	9,016.672 (19,192.422)	0.000 (0.001)	0.001 (0.005)	0.005 (0.01)	0.000 (0.000)	0.111 (0.032)	0.011 (0.007)

Table 2: **Breakouts and Consolidations by Industry**

NAICS	Breakouts	Percent	Consolidations	Percent
2111	344	1.45	625	2.64
3221	122	5.18	84	3.57
3251	259	3.89	177	2.66
3252	105	3.25	75	2.32
3261	569	2.01	404	1.43
3331	177	2.18	138	1.70
3339	250	1.55	292	1.81
3341	155	2.42	118	1.84
3342	175	2.48	154	2.18
3343	38	1.89	53	2.64
3344	350	2.18	346	2.13
3345	308	1.80	351	2.05
3353	135	1.95	140	2.02
3359	112	1.97	131	2.30
3361	41	2.96	36	2.60
3363	442	2.86	375	2.42
3364	165	2.59	90	1.41
Total	3,747	2.17	3,589	2.08

Table 3: **Number of Excluded Firms by Industry**

NAICS	Count	Percent
2111	1,205	0.21
3221	463	0.77
3251	392	0.22
3252	692	0.78
3261	2,215	0.25
3331	793	0.32
3339	1,269	0.25
3341	802	0.58
3342	929	0.53
3343	10	0.02
3344	1,945	0.43
3345	2,365	0.49
3353	880	0.42
3359	1,067	0.66
3361	168	0.55
3363	2,185	0.48
3364	1,682	0.87
Total	19160	0.39

Table 4: OLS Regression Results - Canada

NAICS	Variables	(1)	(2)
2111	US Tariffs on Imports from Canada	-5.416**	
N = 509,001		(1.728)	
	Canadian Tariffs on US Imports	0.000	
		(0.002)	
	Canada's Share of Total US Trade Volume (in 1000s)		0.032*
			(0.013)
	Unemployment	0.267**	0.265**
		(0.038)	(0.038)
	Real Average Wage (in 10,000s)	0.002**	0.002**
		(0.001)	(0.000)
3221	US Tariffs on Imports from Canada	-1.552**	
N = 48,371		(0.430)	
	Canadian Tariffs on US Imports	-.001	
		(0.001)	
	Canada's Share of Total US Trade Volume (in 1000s)		0.023**
			(.006)
	Unemployment	0.012	0.000
		(0.119)	(0.119)
	Real Average Wage (in 10,000s)	0.004**	0.004**
		(0.000)	(0.001)
3251	US Tariffs on Imports from Canada	-.195**	
N = 146,702		(0.038)	
	Canadian Tariffs on US Imports	-.003**	
		(0.000)	
	Canada's Share of Total US Trade Volume (in 1000s)		-.063**
			(0.006)

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Table 4 – continued from previous page

NAICS	Variables	(1)	(2)
	Unemployment	-.077	-.023
		(0.062)	(0.062)
	Real Average Wage (in 10,000s)	0.002**	0.002**
		(0.000)	(0.000)
3252	US Tariffs on Imports from Canada	0.501**	
N = 73,154		(0.123)	
	Canadian Tariffs on US Imports	-.001	
		(0.001)	
	Canada's Share of Total US Trade Volume (in 1000s)		-.085**
			(0.013)
	Unemployment	-.348**	-.365**
		(0.097)	(0.097)
	Real Average Wage (in 10,000s)	0.000	0.000
		(0.000)	(0.000)
3261	US Tariffs on Imports from Canada	-.380**	
N = 627,481		(0.066)	
	Canadian Tariffs on US Imports	-.001**	
		(0.000)	
	Canada's Share of Total US Trade Volume (in 1000s)		-.049**
			(0.003)
	Unemployment	-.086**	-.088**
		(0.032)	(0.032)
	Real Average Wage (in 10,000s)	0.000	0.000
		(0.000)	(0.000)
3331	US Tariffs on Imports from Canada	-2.207**	
N = 205,545		(0.242)	
	Canadian Tariffs on US Imports	0.000	
		(0.001)	

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Table 4 – continued from previous page

NAICS	Variables	(1)	(2)
	Canada's Share of Total US Trade Volume (in 1000s)		0.143**
			0.006
	Unemployment	-.189**	-.049
		(0.054)	(0.054)
	Real Average Wage (in 10,000s)	0.006**	-.005**
		(0.000)	(0.001)
3339	US Tariffs on Imports from Canada	-.095	
N = 432,446		(0.085)	
	Canadian Tariffs on US Imports	-.002**	
		(0.000)	
	Canada's Share of Total US Trade Volume (in 1000s)		0.034**
			(0.005)
	Unemployment	-.092*	-.001*
		(0.038)	(0.037)
	Real Average Wage (in 10,000s)	0.001**	0.001**
		(0.000)	(0.000)
3361	US Tariffs on Imports from Canada	11.702	
N = 21,753		(10.013)	
	Canadian Tariffs on US Imports	-.004**	
		(0.001)	
	Canada's Share of Total US Trade Volume (in 1000s)		-.018
			(0.13)
	Unemployment	0.037	0.008
		(0.220)	(0.223)
	Real Average Wage (in 10,000s)	0.003**	0.003**
		(0.001)	(0.001)
3363	US Tariffs on Imports from Canada	-2.225**	
N = 320,483		(0.228)	

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Table 4 – continued from previous page

NAICS	Variables	(1)	(2)
	Canadian Tariffs on US Imports	0.002**	
		(0.000)	
	Canada's Share of Total US Trade Volume (in 1000s)		0.002
			(.002)
	Unemployment	-.039	-.036
		(0.046)	(0.046)
	Real Average Wage (in 10,000s)	0.000	0.000
		(0.000)	(0.000)
3364	US Tariffs on Imports from Canada	0.125	
N = 158,119		(0.630)	
	Canadian Tariffs on US Imports	-.120	
		(0.077)	
	Canada's Share of Total US Trade Volume (in 1000s)		-.049**
			(0.017)
	Unemployment	-.145*	-.128*
		(0.065)	(0.065)
	Real Average Wage (in 10,000s)	0.002**	0.002**
		(0.000)	(0.000)

Table 5: **OLS Regression Results - Mexico**

NAICS	Variables	(1)	(2)
2111	US Tariffs on Imports from Mexico	-.701	
N = 509,001		(0.409)	
	Mexican Tariffs on US Imports	.	

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Table 5 – continued from previous page

NAICS	Variables	(1)	(2)
		(.)	
	Mexico's Share of Total US Trade Volume (in 1000s)		-.046
			(0.42)
	Unemployment	0.258**	0.258**
		(0.042)	(0.042)
	Real Average Wage (in 10,000s)	0.002**	0.002**
		(0.000)	(0.000)
3251	US Tariffs on Imports from Mexico	0.038	
N = 146,898		(0.022)	
	Mexican Tariffs on US Imports	0.004*	
		(0.002)	
	Mexico's Share of Total US Trade Volume (in 1000s)		-.099**
			(0.024)
	Unemployment	-.019	-.011
		(0.066)	(0.066)
	Real Average Wage (in 10,000s)	0.002**	0.002**
		(0.000)	(0.000)
3341	US Tariffs on Imports from Mexico	0.604**	
N = 109,339		(0.135)	
	Mexican Tariffs on US Imports	-.037**	
		(0.008)	
	Mexico's Share of Total US Trade Volume (in 1000s)		0.081**
			(0.018)
	Unemployment	-.454**	-.488**
		(0.100)	(0.100)
	Real Average Wage (in 10,000s)	0.001**	0.001**
		(0.000)	(0.00)

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Table 5 – continued from previous page

NAICS	Variables	(1)	(2)
3342	US Tariffs on Imports from Mexico	0.535*	
N = 144,729		(0.214)	
	Mexican Tariffs on US Imports	0.000	
		(0.005)	
	Mexico's Share of Total US Trade Volume (in 1000s)		-.141**
			(0.012)
	Unemployment	0.134	0.136
		(0.080)	(0.080)
	Real Average Wage (in 10,000s)	0.001**	0.001**
		(0.000)	(0.000)
3343	US Tariffs on Imports from Mexico	.	
N = 39,265		(.)	
	Mexican Tariffs on US Imports	.	
		(.)	
	Mexico's Share of Total US Trade Volume (in 1000s)		.
			(.)
	Unemployment	-.015	-.015
		(0.153)	(0.153)
	Real Average Wage (in 10,000s)	0.004**	0.004**
		(0.001)	(0.001)
3344	US Tariffs on Imports from Mexico	0.010	
N = 374,785		(0.037)	
	Mexican Tariffs on US Imports	.	
		(.)	
	Mexico's Share of Total US Trade Volume (in 1000s)		-.016**
			(0.004)
	Unemployment	-.137**	-.136**
		(0.049)	(0.049)

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Table 5 – continued from previous page

NAICS	Variables	(1)	(2)
	Real Average Wage (in 10,000s)	0.002**	0.001**
		(0.000)	(0.000)
3345	US Tariffs on Imports from Mexico	0.135**	
N = 405,325		(0.013)	
	Mexican Tariffs on US Imports	0.001	
		(0.003)	
	Mexico's Share of Total US Trade Volume (in 1000s)		-.008**
			(0.003)
	Unemployment	-.007	-.002
		(0.042)	(0.042)
	Real Average Wage (in 10,000s)	0.002**	0.002**
		(0.000)	(0.000)
3353	US Tariffs on Imports from Mexico	-.506**	
N = 177,308		(0.117)	
	Mexican Tariffs on US Imports	.	
		(.)	
	Mexico's Share of Total US Trade Volume (in 1000s)		0.028**
			(0.001)
	Unemployment	-.033	-.030
		(0.062)	(0.062)
	Real Average Wage (in 10,000s)	0.000	0.000
		(0.000)	(0.000)
3359	US Tariffs on Imports from Mexico	-.011	
N = 134,503		(0.044)	
	Mexican Tariffs on US Imports	.	
		(.)	
	Mexico's Share of Total US Trade Volume (in 1000s)		0.002
			(0.005)

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Table 5 – continued from previous page

NAICS	Variables	(1)	(2)
	Unemployment	-.166*	-.166*
		(0.079)	(0.079)
	Real Average Wage (in 10,000s)	0.003**	0.003**
		(0.000)	(0.001)
3361	US Tariffs on Imports from Mexico	-.027	
N = 21,753		(0.071)	
	Mexican Tariffs on US Imports	.	
		(.)	
	Mexico's Share of Total US Trade Volume (in 1000s)		-.079
			(0.028)
	Unemployment	0.457*	0.420
		(0.218)	(0.219)
	Real Average Wage (in 10,000s)	0.003**	0.003**
		(0.000)	(0.001)

Table 6: **DiD Regression Results**

NAICS	Variables	Canada	Mexico
2111	Post and Treatment	-.012**	-.015**
N_C = 46,662		(0.002)	(0.002)
N_M = 121,400	Post: 2004-2005	-.006**	-.004
		(0.002)	(0.002)
	Treatment	0.010**	0.010**
		(0.002)	(0.002)
	Unemployment	0.128	0.147*
		(0.064)	(0.065)

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Table 6 – continued from previous page

NAICS	Variables	Canada	Mexico
	Real Average Wage (in 10,000s)	0.003**	0.003**
		(0.000)	(0.000)
3221	Post and Treatment	0.009	
N_C = 46,662		(0.007)	
	Post: 2004-2005	-.014*	
		(0.005)	
	Treatment	-.006	
		(0.006)	
	Unemployment	0.242	
		(0.180)	
	Real Average Wage (in 10,000s)	0.005*	
		(0.002)	
3251	Post and Treatment	-.012*	-.012*
N_C = 46,662		(0.004)	(0.004)
N_M = 34,117	Post: 2004-2005	-.002	-.002
		(0.004)	(0.003)
	Treatment	0.004	0.002
		(0.003)	(0.004)
	Unemployment	0.340**	0.370**
		(0.112)	(0.114)
	Real Average Wage (in 10,000s)	0.005**	0.005**
		(0.001)	(0.001)
3252	Post and Treatment	-.018**	
N_C = 46,662		(0.006)	
	Post: 2004-2005	-.019**	
		(0.005)	
	Treatment	0.014*	
		(0.005)	
	Unemployment	-.567**	

Continued on next page

Table 6 – continued from previous page

NAICS	Variables	Canada	Mexico
		(0.165)	
	Real Average Wage (in 10,000s)	0.008**	
		(0.001)	
3261	Post and Treatment	-.005*	
N_C = 46,662		(0.002)	
	Post: 2004-2005	-.034**	
		(0.002)	
	Treatment	0.002	
		(0.002)	
	Unemployment	-.019	
		(0.052)	
	Real Average Wage (in 10,000s)	-.004**	
		(0.001)	
3331	Post and Treatment	0.003	
N_C = 46,662		(0.004)	
	Post: 2004-2005	-.035	
		(0.003)	
	Treatment	-.009**	
		(0.003)	
	Unemployment	0.195	
		(0.103)	
	Real Average Wage (in 10,000s)	-.019**	
		(0.002)	
3339	Post and Treatment	0.003	
N_C = 97,838		(0.003)	
	Post: 2004-2005	-.028**	
		(0.002)	
	Treatment	-.006**	
		(0.002)	
	Unemployment	0.240**	
		(0.066)	

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Table 6 – continued from previous page

NAICS	Variables	Canada	Mexico
	Real Average Wage (in 10,000s)	0.000	
		(0.000)	
3341	Post and Treatment		-.008
N_M = 24,299			(0.006)
	Post: 2004-2005		-.046**
			(0.005)
	Treatment		0.003
			(0.005)
	Unemployment		-.271
			(0.158)
	Real Average Wage (in 10,000s)		0.000
			(0.000)
3342	Post and Treatment		-.015**
N_M = 31,733			(0.005)
	Post: 2004-2005		-.033**
			(0.004)
	Treatment		0.012**
			(0.004)
	Unemployment		-.003
			(0.001)
	Real Average Wage (in 10,000s)		0.003**
			(0.001)
3343	Post and Treatment		0.001
N_M = 8,541			(0.009)
	Post: 2004-2005		-.039**
			(0.008)
	Treatment		-.008
			(0.008)
	Unemployment		0.081
			(0.243)
	Real Average Wage (in 10,000s)		0.005

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Table 6 – continued from previous page

NAICS	Variables	Canada	Mexico
			(0.003)
3344	Post and Treatment		-.006
N_M = 83,576			(0.003)
	Post: 2004-2005		-.041**
			(0.003)
	Treatment		0.000
			(0.003)
	Unemployment		-.048
			(0.079)
	Real Average Wage (in 10,000s)		0.002**
			(0.000)
3345	Post and Treatment		0.000
N_M = 93,256			(0.003)
	Post: 2004-2005		-.030**
			(0.002)
	Treatment		-.002
			(0.002)
	Unemployment		-.003
			(0.070)
	Real Average Wage (in 10,000s)		0.005**
			(0.001)
3353	Post and Treatment		-.003
N_M = 39,964			(0.004)
	Post: 2004-2005		-.021**
			(0.003)
	Treatment		0.000
			(0.003)
	Unemployment		0.276*
			(0.106)
	Real Average Wage (in 10,000s)		0.001

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Table 6 – continued from previous page

NAICS	Variables	Canada	Mexico
			(0.001)
3359	Post and Treatment		-.007
N_M = 30,975			(0.005)
	Post: 2004-2005		-.031**
			(0.004)
	Treatment		0.004
			(0.004)
	Unemployment		-.051
			(0.126)
	Real Average Wage (in 10,000s)		-.004**
			(0.001)
3361	Post and Treatment	-.049**	-.052**
N_C = 4,980		(0.015)	(0.014)
N_M = 5,590	Post: 2004-2005	-.003	-.003
		(0.012)	(0.011)
	Treatment	0.032*	0.036*
		(0.013)	(0.013)
	Unemployment	0.324	0.296
		(0.376)	(0.377)
	Real Average Wage (in 10,000s)	0.003	0.003
		(0.001)	(0.001)
3363	Post and Treatment	0.001	
N_C = 72,308		(0.003)	
	Post: 2004-2005	-.025	
		(0.002)	
	Treatment	-.005	
		(0.002)	
	Unemployment	0.151	
		(0.069)	
	Real Average Wage (in 10,000s)	0.000	

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Table 6 – continued from previous page

NAICS	Variables	Canada	Mexico
		(0.000)	
3364	Post and Treatment	-.011*	
N_C = 36,899		(0.004)	
	Post: 2004-2005	-.032**	
		(0.003)	
	Treatment	-.005	
		(0.003)	
	Unemployment	-.001	
		(0.001)	
	Real Average Wage (in 10,000s)	0.001	
		(0.000)	

Appendix A: *Description of 4-digit NAICS Codes used in the preliminary analyses*

2111	Oil and Gas Extraction
3221	Pulp, Paper, and Paperboard Mills
3251	Basic Chemical Manufacturing
3252	Resin, Synthetic Rubber, and Artificial Synthetic Fibers and Filaments Manufacturing
3261	Plastics Product Manufacturing
3331	Agriculture, Construction, and Mining Machinery Manufacturing
3339	Other General Purpose Machinery Manufacturing
3341	Computer and Peripheral Equipment Manufacturing
3342	Communications Equipment Manufacturing
3343	Audio and Video Equipment Manufacturing
3344	Semiconductor and Other Electronic Component Manufacturing
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing
3353	Electrical Equipment Manufacturing
3359	Other Electrical Equipment and Component Manufacturing
3361	Motor Vehicle Manufacturing
3363	Motor Vehicle Parts Manufacturing
3364	Aerospace Product and Parts Manufacturing height